

THESIS

ACCOMMODATION OF HAPTIC LEARNING STYLE IN
TRADITIONAL LEARNING ENVIRONMENTS

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ABSTRACT

ACCOMMODATION OF HAPTIC LEARNING STYLE IN TRADITIONAL LEARNING ENVIRONMENTS

This case study intended to help teachers reach their audiences more inclusively. It determined if and how haptic learners, who preferred learning through touch, feeling, doing, and/or sensing; were being accommodated in college classrooms. Three professors were observed for in-class accommodations of haptic learners. Observations accounted teaching methods that were used to accommodate haptic learners. Data included determining learning styles of the students and professors via the Learning and Interpreting Modality Instrument (LIMI) to ascertain haptic volume. Also each professor's teaching preferences and philosophy was determined by the Principles of Adult Learning Scale (PALS) and the Philosophy of Adult Education Inventory (PAEI). The results of the instruments were analyzed to see if their preferences and philosophies affected their choice to accommodate haptic learners in their classrooms. Student Course Surveys were analyzed to see if students felt positive or negative towards their professor. The results lead to the discovery of if and how haptic learners were accommodated in these case studies. At minimum, 42% of each class's students were dominantly haptic learners. All professors effectively accommodated haptic learners as was determined by in-class observations and their Student Course Surveys. The professors used group work,

repetition and active review, holding classes in non-traditional classroom settings, and collected student feedback as methods to accommodate the haptic learners. Each professor resided in the PALS learner-centered paradigm. Each showed strength in the secondary PALS categories of climate building and flexibility for personal development. The professors scored two dominant philosophies in their PAEI, and all registering Progressive Adult Education as a dominant teaching philosophy. Two of the three professors were dominantly haptic according to the LIML, with the third professor as a dominantly visual learner; however he scored as a strong haptic learner. In all cases, the students were pleased with the professors and their courses, which insinuated they felt accommodated within the courses. Practitioner recommendations were made such as using the professor's examples to set a tone for those who wish to accommodate all learning styles by accommodating haptic learners, which in turn accommodate all learning styles inclusively.

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CHAPTER 1: INTRODUCTION

As a learner of life I have talked to thousands of individuals in my everyday living, at school, on an airplane, at the bank, in line in the grocery store, and just about anywhere we interact with one another in our day-to-day life. For the past 13 years, since I began my undergraduate studies of Parks and Recreation Management in 1997 at Northern Arizona University (NAU), I have unintentionally conducted an amateur social study with the general public. Without fail they always asked, “what do you do?” implying what do I do with my life. I always answered, “I want to teach.” From there a conversation ensued, every time, about learning styles, of course prompted by me. I expressed how I believe in hands-on, active learning because I knew I learned best this way and found information more accessible and interesting to gather when I got to do what I was learning. Overwhelmingly have I received agreement from people in that they felt they learned best through active learning as well. Often would I hear from them, “I really learn best doing too,” or “gosh I wished I had a teacher who would have taught me like that.” Mostly the person would say, “I know I’m an active learner too” or “I agree with you. I had a hard time in school too because I don’t learn so well through lectures and presentations. I get bored.” The response over the years had become overpowering. I started to see a pattern, it seemed everyone I randomly talked with felt they were an active learner, and most of them wished someone would have catered to their needs while in school. I knew just how they felt.

In my undergraduate work, I was fortunate enough to have many classes that entailed primarily active learning segments. For the first time in my life I was learning with ease and not working unbelievably hard to understand information. I knew early on in my life I was the type of learner who was tremendously hungry for active learning over trying to learn visually or auditorily. School had always been a monstrous challenge as a result of my learning style and still is today. In fact, it wasn't until college that I got a taste of learning that was not extremely arduous for me. I discovered through my experience I learned best actively. I had no idea that some learning could be easy, natural. Maybe there was hope for me as a student after all. I would not have imagined that I would be here today doing graduate work on if or why my type of learning style ought to be accommodated. I hope the discovery of the accommodation of active, tactile, feeling learners in traditional learning environments will help teachers in the future reach their audiences at a more complete and functional level.

A learning style indicates the sensory preference in which the learner dominantly processes the transfer of knowledge delivered from the teacher. There are three learning styles relevant to this study. The three learning styles are auditory, visual, and haptic; each preferring a different method of the presentation or delivery and/or transfer of knowledge from teacher to learner. The Auditory learner prefers sound and audio experiences as a way to devise information. The Visual learner prefers images, pictures, and visual cues, and uses sight as the chosen mode for learning. The Haptic learner prefers learning through touch, feeling, or sensing information in an active format as the chosen mode for learning.

Optimizing educational conditions for learners in traditional classroom settings relies heavily on teachers who desire to accommodate learners' individual learning styles. Weiss (2001) found in brain based research that we are all haptic learners who had both tactile and active learning inclinations and preferences. Further, Weiss (2001) stated when learning styles are accommodated, academic achievement and learner attitude increased. Therefore, by accommodating haptic learners, all learners would be accommodated.

For example, by accommodating haptic learners, one would use verbal and/or auditory methods to tell information as well as visual methods to instruct haptic learners, which would then ask them to do what they had just heard and seen. Therefore, auditory, visual, and haptic learners' needs can be met and accommodated through telling for auditory learners; showing for visual learners; and doing for haptic learners. When a learning segment evolves to the doing process, haptic learners' needs are met, while both auditory and visual learners reinforce the learning segment with what has been already been presented in their particular learning style preference. Learning Style affects academic accomplishment and academic fruition (Ross, Drysdale, & Schultz 2001). With academic achievement and positive learner attitudes, an optimal traditional learning environment can be exhibited.

Ultimately learners rely on teachers to convey information in a manner that is relatable and absorbable for the learner, known as the transfer of knowledge or course content. The learner is the major stakeholder, with tremendous reliance on the teacher's ability to recognize and accommodate individual learning styles. Without the recognition and accommodation of individual learning styles, optimal and effectual learning is not

occurring. As a result, learners struggle to absorb and synthesize information being taught; thus, learning is neither optimal nor effectual (Hlawaty, 2001; Ross et al., 2001). Therefore, it is suggested that the predominant learning style, the haptic learner, be accommodated within traditional classrooms across America.

A secondary stakeholder is the teacher. Teachers desire optimal transfer of knowledge and assurance that their instructional methods of teaching are effective and penetrating to the learner. Given that the teaching and facilitating stakeholder group has the complete and unlimited exposure to and interaction with the predominant stakeholders (the learners), they are considered the experts in regard to the accommodation of haptic learners in a traditional classroom setting.

To investigate if haptic learners are being accommodated in traditional classrooms, archival data approved by Colorado State University's (CSU) Internal Review Board (IRB) has been selected as the main body of information to be explored for this study. The archival data was collected in the spring semester of 2008 at CSU. The convenience sample consisted of five Natural Resources classes of nearly 200 students and three professors, and ranged from freshmen level courses to a senior honors course. The archival data included the administration of the Learning and Interpreting Modality Instrument (LIMI) crafted by Dave Lemire (1996, 1998) which determines dominant learning style preferences; the Principles of Adult Learning Scale (PALS) developed by Gary Conti (1983), which reveals teaching preferences; the Philosophy of Adult Education Inventory, known as PAEI, fashioned by Lorraine Zinn (1983) that deciphers teaching philosophies; in-class observations, intended to determine if haptic learners are being accommodated within traditional classrooms; and the Student Course Survey which

was completed by the students of each of the five Natural Resources classes at the beginning of their course. These surveys reveal the student's reactions, impressions, and thoughts regarding the overall course.

Problem Statement

The problem, as evidenced by Weiss (2001), supported that the majority of learners are predominantly haptic learners, yet are most often taught in traditional classrooms via auditory and visual learning style methods. Consequently, a shift in how teachers and facilitators approach the transfer of knowledge in a traditional classroom should regard the individual learning styles of their learners, and therefore heed and accommodate haptic learning methods within a traditional classroom so that optimal learning conditions can occur.

Purpose Statement

The purpose of this study is threefold: first, to determine if haptic teaching methods are being employed within traditional classrooms to accommodate haptic learners; second, to determine individual learning styles of the students to establish the need to accommodate haptic learners by volume and use this information as a motivating factor in the accommodation of haptic learners within traditional learning environments; and finally, to discover if a teacher's preferences in their personal learning style, philosophy of education, and teaching style affects their choice to use haptic teaching methods to accommodate haptic learning within their classroom.

Research Questions

A mixed quantitative and qualitative case study method addressed the central question: “Are haptic learners being accommodated in Natural Resources classes at Colorado State University?” and these sub-questions:

1. What methods for accommodating haptic learners are teachers and facilitators using in each of the five Natural Resources classes at Colorado State University?
2. What is the relationship between the accommodation of haptic learners and the percent of haptic learners in these classes?
3. What is the relationship between the teacher’s personal learning style, teaching preferences, teaching philosophies, and his accommodation of haptic learners for each class?
4. What is the relationship between the Student Course Surveys and the accommodation of haptic learners?

Researcher’s Perspective

Courses within the Human Dimensions of Natural Resources department at CSU were chosen as a convenience sample. I have a bachelor’s degree in recreation from Northern Arizona University (NAU), which is comparable to a bachelor’s in Natural Resources at CSU. I believe that due to prior experience as a recreation student in a bachelor’s program and as a haptic learner, the student body in Natural Resources will likely have a high volume of haptic learners, potentially with teachers who lean toward haptic learning style as well. Therefore this study group has been chosen due to my presumption that a high volume of haptic learners will be present within this domain. It is critical to mention that I am dominantly a haptic learner, which may or may not provide

bias in the analysis of the observation process. I became interested in this topic, as I have struggled to learn comfortably through out my educational career as elaborated in the introduction. I learned through a majority of haptic learning segments in my undergraduate program and finally felt my learning style was being accommodated for the first time in my learning life. The bias I have is that all learners deserve the opportunity to be taught toward their own learning style however I feel that the haptic learners are nearly always left out of this belief. Rather, courses are taught in auditory and visual methods via lecture and visual presentation such as PowerPoint and overhead presentations.

Significance of the Study

Thus far no previous study has been found that analyzes both learner and teacher learning style preference while examining teaching style preferences coupled with teaching philosophies and strengthened via in-classroom observation and Student Course Surveys. This study is significant due to its unique approach in determining if haptic learners are in fact being accommodated within traditional classrooms.

CHAPTER 2: REVIEW OF THE LITERATURE

Little research exists on the accommodation of haptic learners within the traditional classroom, particularly in higher education. Within the literature review chapter, the terms “haptic”, “kinesthetic”, and “tactile” will be used interchangeably as well as “conventional” and “traditional”; “learner” and “student”; and “teacher”, “educator”, “professor”, and “facilitator” for discussion. The literature review will explore the following topics in order: the definition of learning style; the determination of learning style; exploration on haptic learners; a discovery of methods which accommodate haptic learners; a look at teaching preferences and teaching philosophies; what it means to accommodate learners; and finally, an investigation into Student Course Surveys.

Definition of Learning Style

Learning style has had broad and multiple definitions (Lemire, 2001). Rita Dunn (1983) has been considered one of the most affluent modern learning style researchers. Her definition of learning style has been accepted as:

the way individuals concentrate on, absorb, and retain new or difficult information or skills. It is not the materials, methods, or strategies that people use to learn; those are the resources that complement each person’s styles. Style comprises a combination of environmental, emotional, sociological, physical, and psychological elements that permit individuals to receive, store, and use knowledge or abilities (p. 500).

However, other researchers defined learning style as “cognitive, affective, and psychological behaviors that indicate how learners perceive, interact, and respond to their learning environment” (NASSP, 1979, p. 31). Additionally learning style has been viewed as a learner’s tendency to adopt a certain approach to learning. Occasionally the learner has been seen as having a preferred learning style that was malleable to correlating tasks (Poon Teng Fatt, 2000). According to Madonik (1990), visual, auditory, and kinesthetic learning style has also been described as a mode of thinking which illustrated a learner’s approach to the assimilation of knowledge transfer from facilitator to learner.

Lemire (2001) has studied learning styles for more than 20 years and instituted three categories of learners as visual, auditory, or haptic. According to Lemire, a learner can have a dominant learning style or any combination of the three categories. A visual learner prefers seeing presented materials, an auditory learner is more inclined to absorb presented materials through listening and hearing, and a haptic learner will be more inclined to feeling, doing, touching, experiencing, and sensing presented materials.

Determination of Learning Styles

An exploration of learning style determination case studies and tools revealed that not all learning style tests are viable (Bacon, 2004). According to Lemire (2002), the researcher’s analysis typically clarified commonly accepted problems with current learning style tools. This perceived gap affirms the notion that more work should be done to sanction concrete, dependable, and consistent learning style measurement methods.

Bacon (2004) compared two types of learning style inventories accessible online: Felder’s Index of Learning Styles and Jester’s Learning Styles Survey. He

concluded that neither inventory was viable or reliable and reiterated that very few studies have been done pertaining to the effectiveness and viability of learning style inventories. Consequently, three common and accepted problems were identified by Lemire (2002), which directly related to the spectrum of learning style inventories. First, there was noted “confusion in definitions” (p. 177) pertaining to labeling of learning styles. Second, an apparent deficiency had emerged pertaining to the “reliability and validity” (p. 177) of learning style determination measurement tools. Lastly, the identification and distinction of the learner’s learning style characteristics in instructive settings, or “aptitude-treatment interactions” (p. 178). Lemire continued to elaborate the third problem noting that learning styles appeared “to be stable enough to warrant limited use and more research” (p.178).

Lemire (2002) reviewed the most commonly used learning style determination instruments, methods, tools, and kits. Each method endeavored to conclusively and accurately determine learning styles: Group Embedded Figures List (Witkin, Oltman, Raskin, & Karp, 1971); Barbe-Swassing Modality Kit (Barbe & Swassing, 1988); Sternberg Model (Steinberg, 1998); Lemire Model (Lemire, 1998); Myers-Briggs Type Indicator (MBTI) (Hammer, 1996); Kolb Model (Kolb & Boyatzis, 1993); Greyorc-Butler Model (Butler, 1984, 1987, 1988); Gardner Multiple Intelligence Model (Gardner, 1985); Intelligence Quotient (IQ) Test (Checkley, 1997); and the Learning Style Inventory (LSI) (Dunn, Dunn, & Price, 1983).

Harr, Hall, Schoepp, and Smith (2002) offered that learning styles could be accommodated in the classroom. According to Harr et al., Lemire (2002), Pengiran-Jadid (2003), and Mitchell, Dunn, Klavas, Lynch, Montgomery, and Dunmore (2002), the

world educational market preferred the LSI to determine learning styles. However, more research on fluid and accepted methods of deciphering learning styles would be beneficial in creating continuity among teaching preferences and philosophies that ultimately lent greater consideration toward accommodating haptic learners in traditional classrooms.

In response to his criticism and perceived shortcomings of learning style determination instrumentation, Lemire (1998) developed the Learning and Interpreting Modality Instrument (LIMI), which categorizes learners as visual, auditory, haptic, or a combination of the three. The LIMI has been used in multiple previous studies of Lemire's (1998).

Haptic Learners

Cajete (1999) conducted a study of who the Native American learner was and how to effectively teach this particular learner, which he considered dominantly haptic. He discovered that Native American learners were resoundingly kinesthetic in their learning styles and required specific in-classroom accommodations to ascertain academic achievement. Successful accommodations for this specific learner group included the combination of "lectures and demonstrations, modified case studies, storytelling, and experiential activities" (p. 141). In light of experiential activities, Cajete highlighted that "personalized encouragement coupled with guidance and demonstration...narration, humor, drama, and affective modeling in the presentation of content" (p. 143) not only improved relationships between teacher and learner but also engaged the learner in the traditional classroom. Cajete astutely noted that learners brought their learning style from

outside the classroom to the classroom and that the learner was “significantly diminished through [the] homogenization of the education process” (p. 145).

Lemire (2001) preformed a study of learning styles and their modalities and discovered that most adult learners are visual learners in close suit with haptic learners, while auditory learners trail rather far behind. From a sample of community college adult learners, Lemire applied the LIML. The results identified 62% visual learners, 36% haptic learners, and 5% auditory learners. Lemire’s results provided evidence that there is a feasible audience to warrant accommodating the haptic learning style in traditional classrooms.

Pengiran-Jadid (2003) conducted a study in the county of Borneo, located in Malaysia. She gave the LSI to a group of primary and secondary students in order to determine the best way to teach to them and obtain a positive learner outcome. The students varied in their results between visual, auditory, and kinesthetic learning styles. The comparison of the two age groups revealed that students tend to become more kinesthetic as they grow older.

The literature demonstrated that haptic learners learn through touch, feeling, are tactile and active; and require a range of activity for conducive learning to occur (Cajete, 1999; Lemire, 2001; Madonik, 1990; Poon Teng Fatt, 2000). For the adult learner it was paramount to recognize this learning style, evidence suggested there were more haptic learners with older populations (Cajete, 1999; Poon Teng Fatt, 2000). This study was geared toward learners within the adult scope. Haptic learners need activity, are likely to be a significant part of the classroom population, and should increase in frequency as adult populations’ age in traditional classrooms (Harr et al., 2002; Pengiran-Jadid, 2003).

Most importantly, haptic learners need active, hands-on experiences if their style of learning is to be recognized, taught to, and accommodated by teachers and facilitators (Cajete, 1999; Lemire, 2001; Pengiran-Jadid, 2003).

The haptic learner is the fusion between kinesthetic (or active) learner with the tactile (or touch and feel) learner. A complete picture of a haptic learner is one who is active, does, feels, experiences, touches, and is in motion for part or all of their learning process.

Methods of Accommodating Haptic Learners

Teaching Preferences

A teaching preference refers to the method that a teacher personally chooses to convey knowledge to their learners. In the case of this study a teaching preference is the methods a teacher chooses that specifically accommodate haptic learners. Fittingly, Cajete (1999) elaborated on methods of teacher implementation within their classrooms: “Teaching is essentially processing and communicating of the information to students in a form they can readily understand, combined with facilitating their learning and relative cognitive development. Ideally, the teaching methods and information presented to students will be in a form that is relevant and meaningful to the student” (p. 148) but used with positive discretion as a result of one’s teaching preferences.

One teaching method is to determine the majority of a class’s dominant learning style and teach to that style, which is referred to as a group style (Cajete, 1999; Poon Teng Fatt, 2000). McAllister and Plourde (2008) suggested “inquiry-based, discovery learning approaches that emphasize open-ended problem-solving with multiple solutions

or multiple paths to solutions” (p. 40) for accommodating the active or haptic learner within traditional classroom arrangements.

Hlawaty (2001) shared an example of what happened when teaching preferences were not accommodated to the kinesthetic learner in the classroom; fundamentally the effects were damaging with regard to the promotion and preservation of the learning process. A ninth-grade student with a learning disability and kinesthetic learning style participated in an inclusive learning environment with the assistance of a special education teacher. She attended a science class that began with a lecture and was followed by an independent work session. The student struggled and was unable to complete the assignment in the given amount of time. At the time, she knew she would be able to finalize the assignment at home with the use of task cards, a common kinesthetic approach. The teacher preference was to call on the student during a post-activity discussion for an answer the student was unable to provide due to her circumstance. The teacher then casually ridiculed the student; she awkwardly smiled as the teacher interpreted the smile as acknowledgement of a lighthearted tease. Regrettably the student lost respect for her teacher and her interest in the class rapidly diminished. At this point Hlawaty commented that the teacher continued the lesson as normal.

Weiss (2001) recommended providing an opportunity for the mind and body to work together through movement, breathing, and laughter. Her brain-based research discovered that physical movement influenced learning on multiple levels, including visual, auditory, and kinesthetic. Further, Weiss conceived “mental gymnastics” (p. 63) as mental kinesthetic activity. Exercises to help with mental kinesthetic agility included problem solving, crossword puzzles, chess, and backgammon.

The overall theme of these teaching preferences is that haptic learners do require activity and methods of information delivery that go beyond show and tell by the teacher. Teaching preferences to accommodate haptic learners involve delivering information to learners with variety. Sometimes this includes lecture, audio/visual methods, group work, task cards, games, and frequent changes in information delivery in order to provide multiple teaching and learning preferences. Varying the combination of many teaching preferences for haptic learners will likely be the most accommodating approach for professionals within traditional classroom confines. Creativity of course designs and teaching approaches should enhance the accommodation of specific learning styles.

Teaching Philosophies

Teaching philosophy, or one's fundamental view in teaching, varies across individuals. Therefore, each teacher potentially will have distinctive and diverse philosophies in teaching.

Harr et al. (2002) sampled eight teachers who were continuously rated excellent by peers, superiors, learners, and parents alike. The eight teachers strongly corroborated that there was a need to teach learners to their different learning styles. Three major themes emerged as a result of observing their teaching and their willingness to be adaptable toward learners with varying learning styles in traditional classrooms. Initially, teachers revealed how they talked about different learning styles in students, which acknowledged their awareness that each learner's uniqueness provided a spectrum of learning styles. Teacher response to different learning styles was accepting. Harr et al. presented how and why these eight excellent teachers responded to different learning

styles in the classroom. The exemplification of *how* revealed by the data showed that most of the eight teachers' philosophies were flexible enough to adjust their teaching preferences in an aim to meet the learners' learning style until the teachers verified the learners were actually learning through sound assessment methods. *Why* the eight teachers responded to different learning styles stemmed from passionate care of learners and the teachers' desire for the learners to synthesize and attain academic achievement. The mixture of fundamental flexibility, willingness to adjust teaching preferences, and passion for helping others learn surfaced as excellent pathways to accommodating the haptic learner within more conventional learning environments.

Additional literature conveys similar solutions via embracing methods. Cody (2000) proposed

Instructional methods from both traditional/explicit grammar and learner-centered/constructivist camps which also incorporates metaphors of many types (abstract, visual, kinesthetic) in order to lead learners from declarative to proceduralized to automatized knowledge. This integrative, synthetic approach would arguably result in several different or multiple ways of "knowing" aspect, providing learners with a more complete organization of that which is encompassed in native-like use of aspect. (¶ 2)

The implication of accommodating learning style via teaching to all learning style was thematic in the likes of Cajete (1999), Cody (2000), McAllister and Plourde (2008), and Poon Teng Fatt (2000). Each author inferred in their cited works that telling the information for auditory learners, then showing the information for visual learners, and doing the information to accommodate haptic learners not only accommodated each

learning style but also reinforced the information for all learners. A common theme found among these authors was a multiple approach teaching philosophy. The importance of the delivery of knowledge was given to the learners in several different modes. In this respect, knowledge can be organized, interpreted, and absorbed by the learner through many potential vehicles. This provides opportunity for information reinforcement and many occasions for various learners to successfully acquire the material being delivered.

In addition to multiple approaches of the transfer of knowledge Lemire (2002) encouraged (specifically to college students) that one should take initiative and discover more about their individual learning styles. In doing so the learner will have greater understanding for how they learn. Another proactive step a learner can take is not only to embrace their learning style but also to stretch their own learning styles (Ross et al., 2001) in an attempt to bend in concert with the teacher and peers to create a more effectual learning environment.

Mixon (2004) further concluded that teaching to all three learning styles is the most complete and effective approach to assure learner success and accommodate learning style, particularly kinesthetic, within conventional classroom environments. With further consideration and review, recognizing learning styles is a common theme to several of the above philosophical teaching approaches. The choice to recognize independent learning styles reduces homogeneity within the transfer of learning and envelopes the potential for a more accommodating learning environment for kinesthetic learners. The edification of students to bend and stretch their individual learning styles suggests individual maturity and denotes both learner and teacher evolution through the learning and teaching cycle. Therefore, in an attempt to carry a teaching philosophy that

is accommodating to haptic learners, the philosophy will also include accommodating other learning styles. As a result, both students and teachers are likely to become better suited to and more adept in their prospective roles in respect to the educational process.

Accommodation of Learners

In an attempt to commit to the accommodation of learner success with regard to learner style, both learner and teacher must exercise effort. The learner must be willing to identify, acknowledge, and stretch their learning style in order to compliment the efforts of the teacher. Various strategies for the teacher prove to offer a more active and tactile environment in both teaching and assessment, which decisively and effectively accommodates the haptic learner if both parties are invested and cooperative.

Teaching preferences and philosophies were found to play a large role in the success of the learner. Pengiran-Jadid (2003) reported that traditional teaching methods were used at first for a progressive group of kinesthetic learners. Flexibility in both teaching preference and philosophy, in order to meet the needs of the learners' modulating learning styles, indicated in the study, to be a prominent metamorphosis toward accommodating the kinesthetic learning style. Verification from the Borneo study showed a successful effort made to accommodate the kinesthetic learner in the classroom.

Ross et al. (2001) encouraged teachers to become increasingly aware of strategies that improved learner success in relation to learning style. They suggested providing a method to ascertain individual learning styles. Specifically for the kinesthetic learner, it was recommended to provide occasions for learners to work with peers' in-group settings. Ross et al. also recommended encouragement to all learners to broaden their learning styles and learning preferences. They further advised educators to strive for

teaching style flexibility, including varied sizes of group discussion, case studies, and providing a range of audio-visual equipment, lecture, and problem solving opportunities. A greater assurance of accommodating kinesthetic learners could be found through diverse assessment methods like essays, projects, multiple -choice tests, and performance assessment and were of great benefit to academic success, according to Ross et al.

McDaniel and Lansink (2001) conducted a study for the purpose of improving the conveyance of learner information to their staff via workshops and seminars. Their study implied that traditional teaching methods are not effective for adult kinesthetic learners. They suggested that kinesthetic learners preferred teaching methodologies such as web-based activity, audio conferencing, and virtual face-to-face meetings. Supporting evidence from the McDaniel and Lansink study iterated 65% of the adult learning population preferred kinesthetic methods over other methods that catered to visual and auditory learning styles. Resolutely, the study showed preference of adult learners leaned greatly toward kinesthetic methods and supported a professional inclination to cater to kinesthetic needs when in teaching environs.

Ross et al. (2001) discerned that learners obtained a dominant learning style that directly affected the learner's achievability quotient in learner outcomes. Their study was comprised of 974 college computer students whose learning styles were collected and evaluated in comparison to their course grades, which was a direct indication of success in learner outcomes, as concluded by Ross et al. Results indicated that kinesthetic learners would have reached greater academic success had their curriculum been tailored toward their learning styles.

Thus far, the “multiple ways of knowing” approach seems to be a dominant theme among the authors in this literature review. The combination of approaching many or all learning styles from multi-faceted approaches appears to be the strongest proponent to truly accommodating learners and, moreover, haptic learners. LDA Learning Center recommended visual approaches such as “paper, white board, note cards, overhead”; auditory tactics like “instructors voice, learners own voice, choral reading, audio tapes”; and certainly haptic methods involving “writing in a sand tray, tracing letters or words, [or] standing up and giving a speech or explanation about the materials.” Finally the author said that the haptic methods can also be exercised as the active “input of the new information” and/or as “a demonstration, or test, of the learnings” (ABE NetNews, 2001, p. 1). This means that both the transfer of knowledge and assessment approaches is achievable in active, hands-on, haptic environments.

ABE NetNews (2001) additionally suggested that in order to prepare to teach lessons in a multi-sensory fashion, the educator should ask three serious questions with the intention to be answered thoroughly. The source provided a small list of suggested answers to motivate and inspire the educator’s creativity. This exercise was listed as follows:

1. How many different ways can I present the materials visually? Read on paper or from book, teach from flash cards, read on white board, read from overhead, read on computer monitor, look at picture that represents concept.
2. How many different ways can I have the students hear the information?
Instructor says it, learner repeats it (student listens to him or herself), group

discussion of concept, listen to audio tape, learners records and listens to his or her own voice, watch a video tape (combines visual and auditory).

3. What activities or physical actions can I use to demonstrate and reinforce the learning? Use sand trays, carpet strips and other manipulatives, learner teaches the skill to someone else, learner explains it to the instructor, role play, get up and write it on the board, make up a game (Jeopardy). (ABE NetNews, 2001, p. 10)

In support of the previous literature on accommodating learners, ABE NetNews closed the exercise by encouraging educators to use each learning style aspect for every lesson taught, with the intention to teach to and accommodate all learning styles in traditional classrooms and beyond: “Retention of new information will go up. Learners will experience success” (pp. 10-11).

To ensure that the needs of haptic learners are met in academic settings, both the learner and teacher must be practical and willing to bend, which leads to creating synergetic learning conditions. Through embracing learning styles both in the role of learner and teacher, foreseeable success is imminent. The implication is to accommodate the learning styles of students; therefore, presenting information in a relatable format will lend meaning and relevance to the learner. This approach recognizes individual learner differences in learning style and forces the teacher to modify teaching philosophies and preferences to encompass every learner in the conventional class.

Student Course Surveys

Student Course Surveys are viewed as instruments administered in a university setting at the completion of a course. For this document the term “Student Course Survey” will be used since it has been noted that Colorado State University (CSU) refers

to their instrument as “Student Course Survey”. Further, the mention of “survey” relates directly to the instrumentation in use at the conclusion of course work. The instrument’s intention is to measure teacher effectiveness within the course itself. Often times these instruments consist of Likert scales that range from “extremely bad or strongly disagree [to] extremely good or strongly agree” (Darby, 2007, p. 7).

Academics note that a link between final grades granted and the outcome of Student Course Surveys as a reflection of the teacher does exist (Avery, Bryant, Mathios, Kang, & Bell, 2006; Boysen, 2008; Darby, 2007). Marlin (1987) commented that “because the primary purpose of the college or university is education, few administrators would deny that some measurement of teaching effectiveness is necessary if faculty are to be honestly evaluated” (p. 705) in regards to Student Course Surveys. Grussing (1994) said the following about rating effective teaching: “Rating scales should avoid student rating of instructor ‘personality,’ ‘charisma’ or similar attributes. Only those instructor traits which have been shown to be related to effective teaching should be emphasized, e.g., ‘student-teacher interaction’ or ‘concern for students’ learning’” (p.316). Boysen (2008) shares from his research that there seem to be three direct correlations between final grades and positive evaluation outcomes; first, “superior teachers,” second, granting a “reward in exchange for a [positive] grade,” and third, a “preexisting student interest in course topics” (p. 218).

Overall (1980), supported through a study that claimed results of surveys at the end of a chosen year were amazingly similar many years later for the same teacher teaching the same course. He stated that evaluations “can be effective” (p. 321) and are reliable, valid, and “conducive to instructional improvement” (p. 321). Grussing (1994)

mentioned that “well-established instruments” (p. 316) would have “high reliability and validity” (p. 316). CSU has such an instrument that is provided at the conclusion of every course. Further, Boysen (2008) mentioned three concerns relating to validity in End of Course Survey instrumentation. First, he conveyed a concern that if grades are higher, the evaluations will be higher, and if grades are lower, evaluations will correlate. Second, high evaluations could indicate the teacher is an easy grader, and low evaluations could indicate punishment from the students to the teacher for being a hard grader. Third, if a teacher is considered popular with the students, then their evaluation is likely to be higher. This information does not correlate between grades given and evaluations made by the students.

Avery et. al (2006) mentioned “end-of-course student ratings of instruction have been employed by institutions of higher education for most of this century” (p. 21). They noted the evolution from a pen-and-paper method toward an online method of the instruments throughout academia. According to their study (pp. 23-24), online evaluations were not consistently completed by the student, versus paper-and-pen administrations, which tended to be higher in favor of the teachers’ student evaluations. Many students in Marlin’s (1987) study felt that the evaluation process at the end of the course was “effective for rating instructors” (p. 707). Grussing (1994) mentioned that “standardized instructions to student raters can minimize ... common rating error effects” (p. 318). He went on to highlight that the appropriate way to administer such instruments to students requires a neutral officiator other than the teacher under evaluation. Further, the teacher under evaluation should not be present while the instrument is being used to

avoid possible skewed data. It is important to mention that CSU follows these basic recommendations with all of their classes' Student Course Surveys.

Nair, Adams, Ferraiuolo, & Curtis (2008) listed five ways students' needs are met through the Student Course Surveys:

“Diagnostic feedback to faculties about their teaching that will aid in the development and improvement of teaching; useful research data to underpin further design and improvements to units, courses, curriculum and teaching; a measure of teaching effectiveness that may be used in administrative decision making, e.g., performance management and development appraisal; useful information to current and potential students in the selection of units and courses; and, a useful measure for judging quality of units and courses increasingly becoming tied into funding” (p. 225).

He continued to emphasize how the data acquired from the evaluations gives administration a tool in which to make informed decisions about their facility, staff, and programs. Marlin (1987) concurred with Nair et. al (2008) by concluding from his own investigations that current evaluative processes for the teacher by the student are useful and reliable.

Lastly, a few studies on the effectiveness of Student Course Surveys have been conducted. Buchert, Laws, Apperson, & Bregman (2008) purported “that first impression[s] of an instructor formed in the first two weeks of classes are not significantly different from end-of-semester student evaluations of instruction” (p. 406). A second study conducted in Australia's higher education system revealed that students can acquire survey fatigue and that, to date, no publications were found identifying

improving teaching through student evaluations (Tucker, Jones, & Straker, 2008).

However Tucker et. al (2008) shared that some instruments help glean constructive information for the teachers from the students' reaction to their individual teaching styles and unit content. Also, their study recommended the conglomerate use of best practices by embedding them into future versions of academic programs (Tucker et. al, 2008).

Finally, a study conducted by Spooner, Jordan, Algozzine, & Spooner (1999) looked at a comparison of on-campus classes' versus distance learning students' ratings of instruction. The study concluded that the results were virtually the same through out the span of the ratings and that no differences were found when the courses were taught either off or on campus.

Conclusion

Substantial evidence supports that there is a need to accommodate haptic learners. There is a movement to fill the gap of inconsistent deciphering of learning styles by suggesting the development of a more reliable and viable measurement tool (Bacon, 2004; Harr et al., 2002; Lemire, 2001; Lemire, 2002). In response, Lemire (1998) developed the LIMI as a reliable and valid instrument. Professional inclinations and preference lean toward accommodating haptic learners through a varied and assorted framework approach to avoid the consequence that learners will become aloof or detached from learning when haptic learning style needs are not met. Evidence shows that through the accommodation of haptic learners, academic success is attainable. Collaborative efforts by both the learner and teacher are recommended to achieve the goal of accommodation of the haptic learner, with directive and multiple initiatives

facilitated by the teacher. Conclusively, more research must be done on the subject of accommodating the haptic learner in conventional learning environments.

Research has shown that the accommodation of haptic learners in the classroom is beneficial and enhances and increases the likelihood that learners will reach desired and designed learning outcomes (Bacon, 2004; Harr et al., 2002; Hlawaty, 2001; Mitchell et al., 2002; Pengiran-Jadid, 2003; Ross et al., 2001). Veritably, Weiss (2001) asserted that we are all kinesthetic learners and concluded this from results of brain-based research. Furthermore, Lemire (2001) revealed, “learning styles are understudied” (p. 86). This review has defined learning style; revealed the determination of learning styles in the field of education; indicated who and what composes a haptic learner; and divulged methodologies via teaching preferences, teaching philosophies, and the direct applied accommodation of the haptic learner in traditional learning environments.

CHAPTER 3: METHOD

Although evidence from the literature suggested the accommodation of haptic learners was beneficial and effectual, a remarkably small amount of resources and research exists on this topic. Therefore a need for further research on the accommodation of haptic learning in traditional learning environments is strongly advocated. A comprehensive analysis of peer-reviewed journal articles has directed this study toward further professional research. An extensive majority of sources found on learning styles were outdated beyond 15 years; therefore, a study concerning the accommodation of haptic learners within traditional classrooms will be beneficial to the current knowledge base.

Research Design and Rationale

A case study approach was used in this study. Creswell (2005) defined a case study as “an in-depth exploration of a bounded system (e.g. an activity, event, process, or individuals) based on extensive data collections” (p. 439). He went on to explain that a bounded system meant that the case was “separated out for research in terms of time, place, or some physical boundary” (p. 439). In this instance, activities, events, processes, and individuals were observed and analyzed during the spring of 2008 in five Natural Resources classes at Colorado State University (CSU). These occurrences were isolated and examined to discover if haptic learners were accommodated by three specific professors, in five particular classes, in one academic program at CSU.

Three professors were observed through part of a semester for their in-class accommodation of haptic learners within their traditional classroom settings. The results reported based on observation and use of instrumentation lead to a discussion of the discovery of if haptic learners were accommodated in each of these case studies. Dr. McQuien was observed in three classes, never-the-less, his case study comprised of all three classes. The other two professors, Dr. Gooding and Dr. Turner were observed in one class each which also comprised of their individual case study.

A gap was discovered during the discovery phase of the initial literature review for this study. What was discovered was there was a gap within the study of learning style in relationship to teacher perceptions and philosophies; specifically how haptic learners are being accommodated by teachers with varying perceptions and teaching philosophies. Hence the reliability and validity of the Learning and Interpreting Modality Instrument (LIMI), Principles of Adult Learning Scale (PALS), and Philosophy of Adult Education Inventory (PAEI) were reasonably strong, and therefore these instruments were chosen to use in this study.

Archival data approved by CSU's Institutional Review Board (IRB) in the spring semester of 2008 was used. The archival data was originally a study put into archive, was a mixed study in nature, and was a convenience sample. The archival data was originally an independent study that consisted of three inventories, in-class observations, and end of the course evaluations. First, the administration of the LIMI to the students and teachers indicates each participant's preferred learning style. The remaining two inventories have been administered strictly to the teachers, since the function of the PALS assists in determining teaching style preferences and the PAEI is designed to "assist the adult

educator to identify his/her personal philosophy of education and to compare it with prevailing philosophies in the field of adult education” (Zinn, 1983, p. 59).

Observations in-class was conducted to document the transfer of knowledge to the learners, specifically the accommodation of haptic learners within a traditional class. While observing I questioned what specific approaches, teaching preferences, teaching methods, and/or teaching philosophies were used to accommodate haptic learners. Lastly, analyses of the Student Course Surveys, which were filled out by the learners and are accessible in the public domain, were scrutinized to glean overall student satisfaction. No data was analyzed until this thesis.

Participants and Site

The participants were nearly 200 students enrolled in five Natural Resources courses held at CSU in the spring of 2008. Three professors from the department of Human Dimensions of Natural Resources conducted the five courses and were also active participants in the data collection. All participants were a convenience sample. All data collected was archival data, placed in the archives at CSU in the spring of 2008. All archival data was data collected, and observations recorded in a note fashion, and have not been analyzed until this thesis. Pseudonyms were used for the professors.

Data Collection

The majority of data has been collected and is archival data from the spring semester of 2008 at CSU. This archival data consisted of the administration of the LIMI twice for reliability and validity means to all students and professors. Additionally, the administrations of the PALS and PAEI to the professors and in-class observations have also been collected.

The Student Course Survey data are end of the course evaluations provided by the students at the commencement of their courses. This data is accessible and considered public information by CSU.

Measures

A discovery of this trend was best suited for the administration of the Learning and Interpreting Modality Instrument (LIMI) crafted by Dave Lemire (1996, 1998). This instrument was chosen for the original archival study in the spring of 2008 at CSU due to its proactive nature in specific response to perceived shortcomings in previous learning style instrumentation. Further, the LIMI classifies subjects into three categories (auditory, visual, and haptic). The organization and ease of administration made sense to me coupled with reasonable reliability and validity reports; the LIMI was chosen to determine both learner and teacher learning styles for this study. Knowing the learning styles of both learner and teacher will reveal the volume of haptic learners needing accommodation and aid in determining if the teacher's learning style has an effect on how they teach their classes and/or if they accommodate haptic learners within their traditional classrooms.

Two additional instruments were selected to administer to the teachers. Both instruments report strong reliability and validity and have been used in several previous studies. These merits assisted in the choice of a teaching styles inventory known as "Principles of Adult Learning Scale" (PALS), developed by Conti (1983), which classified teaching preferences into the following categories: learner-centered activities, personalizing instruction, relating to experience, assessing student needs, climate building, participation in the learning process, and flexibility for personal development.

The second instrument selected for the teachers was the Philosophy of Adult Education Inventory known as PAEI, fashioned by Zinn (1983). Zinn categorized five teaching philosophies of adult education, which are listed as: Liberal (Arts), education for intellectual development; Behavioral, education for competence, compliance; Progressive, education for practical problem-solving; Humanistic, education for self-actualization; and Radical, education for major social change. The intent is to delve deeper into who the teacher is as a whole by discovering their teaching preference, their teaching philosophy, and their learning styles.

With the combination of LIMI results from both learner and teacher, clear indications of teaching style preferences and philosophies, mixed with direct class observation, I intend to reveal if haptic learners were in fact being accommodated in the classrooms. Moreover, I intend to see if the teacher's dominant learning style, dominant teaching style preference, and/or dominant philosophical preference has any impact on how or if haptic learners are being accommodated within their classroom.

Student Course Surveys have been examined with the expectancy that learners will express their fulfillment that the course was successful or not. The evaluations have been leveraged against numeric data describing trends in the study group via the LIMI and for the teachers the LIMI, PALS, and PAEI. Likely, if learners feel accommodated, then learning will occur (Ross et al., 2001; Hlawaty, 2001) and Student Course Surveys will reflect these potential satisfactions.

Learning and Interpreting Modality Instrument (LIMI)

The Learning and Interpreting Modality Instrument (LIMI) by Lemire (1996, 1998) was chosen for this study. To establish validity, Lemire administered to 77 adult

learners and compares the outcome of the LIMBI to three other learning style instruments, all of which were designed to measure identical learning style preferences. Seventy-five percent of outcomes were congruent among the four instruments. These same students were also asked about their self-perception of their learning style. Nearly 60% of a learner's self-perception matched the results of the four inventories given. The 77 learners' validity results were 65% visual, 6% auditory, and 18% haptic.

Lemire (1998) also reports reliability in both a test-retest and split-half.

Group 1:	Visual = .76	Group 2:	Visual = .78
	Auditory = .71		Auditory = .68
	Haptic = .77		Haptic = .76

The corrected Spearman-Brown reliabilities for the three subscales are reported below:

Group 1:	Visual = .46	Group 2:	Visual = .39
	Auditory = .15		Auditory = .39
	Haptic = .31		Haptic = .44

The Standard Error of Measurement for Group 1 was $V = 2.38$, $A = 1.74$, and $H = 2.22$.

The Standard Error of Difference at .05 was $V = 3.98$, $A = 4.21$, and $H = 3.90$.

Principles of Adult Learning Scale (PALS)

Conti developed the Principles of Adult Learning Scale (PALS) instrument to measure one's teaching style. Many formal studies have been conducted using PALS to measure the effects of a teacher's style on the performance of the students. According to Conti, "PALS is a highly reliable and valid rating scale (Conti, 1983; Parisot, 1997; Premont, 1989) that consists of 44 items and uses a modified six-point Likert scale to assess the degree to which a respondent accepts and employs principles associated with

the collaborative, learner-centered mode for teaching adults” (Conti, 1990, ¶ 12).

Seventy-four recent studies using PALS are listed in a review of dissertation abstracts international. Furthermore a Cronbach’s alpha for internal reliability with a coefficient of .89 was reported by McCollin (2000). Conti (1982) reported:

Validity was established by two separate juries of adult educators. Content validity was established by field tests with adult basic education practitioners, conducted in two phases. Criterion-related validity was confirmed by comparing scores on PALS to the Flanders Interaction Analysis Categories (FIAC), which also measures the constructs of initiating responsive behaviors in the classroom. The reliability of PALS was established by the test-retest method with a group of 23 basic education practitioners after a seven day interval. A reliability coefficient of .92 was obtained. Analysis of 778 cases indicated that the descriptive statistics for PALS are stable (p. 140).

The PALS results range from 0 to 220 with a mean of 146 and a standard deviation of 20. “Scores above 146 indicate a tendency toward a learner-centered approach to teaching-learning transaction, and lower scores imply preference for the teacher-centered approach in which authority resides with the teacher. High scores in each factor represent support of the learner-centered concept implied in the factor name, and scores indicate support of the opposite concept” (Conti, 1990, ¶ 12).

Philosophy of Adult Education Inventory (PAEI)

Zinn (1990), the creator of the Philosophy of Adult Education Inventory (PAEI) in 1983, said that her instrument was indented to support educators in discovering their

personal philosophy in education and to “compare it with prevailing philosophies in the field of adult education” (p. 59). Zinn (1983) reports after creating the PAEI:

After revision, the instrument was tested for content and construct validity, internal consistency, and stability. Content validity was established by a jury of six nationally recognized adult education leaders; construct validity was determined through factor analysis. Data for factor analysis and reliability testing were obtained from 86 individuals.

The Inventory (PAEI) was judged to have a fairly high degree of validity, based on jury mean scores of $>.50$ (on a 7-point scale) for 93% of the response options, and communality coefficients of $>.50$ for 87% options. Reliability coefficients of $>.40$ for 87% of the response options, and alpha coefficients ranging from $.75$ to $.86$ for the five scales were considered measures of moderate to high reliability (pp. 81 – 82).

Zinn (1983) concluded the PAEI as a reliable and valid instrument, reporting Cronbach's alpha levels of $.75$ and $.86$.

It is prudent to mention one previous study, which combined the use of the PALS and PAEI to 111 adult education graduate students. Correlations and ANOVA were used to determine trends within the target population. Overall the sample was considered within the means of the PALS and determined as progressive via the PAEI (DeCoux, Rachal, Leonard, & Pierce, 1992). What the study was showing was that the combination of the PALS and PAEI worked well together in assessing teacher philosophies and preferences.

Student Course Survey

The name “Student Course Survey” refers specifically to the End of the Course Evaluations required and provided to each enrolled student at the end of the semester, after the course has been completed. There is no reliability or validity established on this instrument. However much reliability and validity has generally been established on Likert scaled Student Course Surveys, which was discussed in the review of literature in Chapter 2.

Data Analysis

The archival data consisted of a convenience sample from an independent study in the spring of 2008 at CSU. The archival data was made up of LIMI results from both students and teachers, results of the PALS and PAEI from the teachers, results of the Student Course Surveys from the particular classes in the original archival study, and lastly, note like format of in-class observations documenting how and if haptic learners were accommodated in their classes.

Specifically in this thesis, the general format for data analysis consisted first, of a course description and highlight of each course and its syllabus to give the reader a foundation of what the courses’ objectives and outcomes were. Second, day-by-day in-class observations were richly noted and described. Third, student LIMI results for each course were examined with the assistance of a class frequency bar graph and the hapticness per individual frequency histogram. Fourth, a look at the Student Course Survey results for each class through a close analysis of each question on the survey. Lastly, the teacher’s instrumentation results were described in this order: the teacher’s

personal LIMI result, followed by their PALS result, and closed with their PAEI result, both the PALS and PAEI results were shared through tables.

The reporting of Dr. McQuien's results was slightly different as three of his courses were involved in this study. First all of the course information was divulged per class by course description and syllabus, followed by that course's particular in-class observations, and then that particular course's student LIMI results. After all of his three courses were reported then Dr. McQuien's personal instrumentation results were reported.

Frequency of Accommodating Methods

A scrutinizing look at in-class observations for the accommodation of haptic learners will address research question one: What frequency of accommodating methods for haptic learners are teachers and facilitators using in each of the five Natural Resources classes at Colorado State University? I have determined a frequency of accommodating methods illustrated by the teachers through observations, syllabi, and by using the lens of current academic literature, which is provided in this thesis through rich qualitative case study narratives.

Percentage of Haptic Learners

Research question two was answered via the following methods. What is the relationship between the Accommodation of Haptic Learners and the percent of haptic learners in these classes? The LIMI classifies subjects into three categories: (auditory, visual, and haptic). Additionally the LIMI was administered to each participant so that future reliability for the instrument could be established. The results are disclosed in the analysis in Chapters 4, 5, and 6, all of which include descriptive statistics and frequency

reports of volume of dominant learning styles coupled with rich qualitative case study narratives.

Accommodation of Haptic Learners

Research question three was addressed from the following constructs. What is the relationship between the teacher/facilitator's personal learning style, teaching preferences, teaching philosophies, and their accommodation of haptic learners for each class? Comparisons of each dependent variable (teacher's personal learning style, teaching preferences, teaching philosophies) to the independent variable of the frequency of accommodating occurrences within their prospective classrooms does divulge if a teacher's preferences, philosophies, and dominant learning style indicate a tendency to recognize and accommodate haptic learners within their classrooms. Results have simply been reported in table format and have been analyzed and synthesized in the discussion in chapter 7.

Student Course Surveys

Research question four states: what is the relationship between the Student Course Surveys and the accommodation of haptic learners? Course evaluations aid in the measurement of whether the learners felt satisfied or, in other words, accommodated within their classes. This data is exposed through descriptive statistics as well as through rich qualitative case-study narratives. Trends in the data have surfaced and are discussed with respect to whether haptic learners have been accommodated within the five Natural Resources courses in the spring semester of 2008 at CSU.

In summary, descriptive statistics, frequencies, comparisons, and discussion will attempt to scientifically address and answer all three research questions within the scope

of this study. Further, the results will add to the existing knowledge base by filling a necessary gap in learning style awareness and accommodation in traditional educational environments.

CHAPTER 4: ROBERT GOODING RESULTS

Chapter 4 focuses on the results of Dr. Robert Gooding and his Fundamentals of Protected Areas Management course. First, a description of the course and syllabus is offered for understanding of the study arena. Second, observations were disclosed of if haptic learners were accommodated in Dr. Gooding's class. Third, the student Learning and Interpreting Modality Instrument (LIMI) results are reported. Fourth, the results of the Student Course Survey are displayed. Finally, Dr. Gooding's personal instrumentation of his LIMI, Principles of Adult Learning Scale (PALS), and Philosophy of Adult Education Inventory (PAEI) are revealed.

Fundamentals of Protected Areas Management

Course Description and Syllabus

The course was titled "Fundamentals of Protected Areas Management" and was comprised of a series of in-class lectures and on-site work sessions at Colorado State University's (CSU) Environmental Learning Center (ELC). I was invited to observe one in-class lecture day and six workdays at the ELC. The objectives for the course according to Dr. Gooding were to "provide a broad but comprehensive understanding of the challenges confronted by park professionals and the techniques and tools managers apply to them. Students will acquire skills and knowledge about a wide variety of topics necessary for the management of protected areas, including: Leadership/Personnel Management, Contemporary Protected Area Management Frameworks, Park Design Technique, Trail Design and Restoration, Interpretation, Applicable Recreation Law

Enforcement/Policy, Conflict Management, Current Park Issues.” Although I was unable to observe each objective being presented and met, many of these objectives were approached and fulfilled during my observations.

In-class Observations

Seven class meetings were attended and observed by me, the researcher. I was looking for any indication of active learning, which would be other than strictly verbal or visual teaching approaches. Only one observation period was physically in the classroom at CSU; the other six observations took place on-site at the ELC. Each class observation is described below.

Tuesday, April 8: Guest Speaker on the Muir Woods. Class was held from 2:15 pm to 4:00 pm in the Forestry Building at CSU. The organization of the classroom consisted of four large tables, each independent of the other, and multiple students sat at each table, see Figure 4.1.

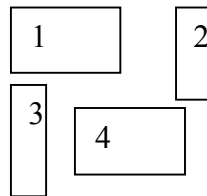


Figure 4.1. Diagram of in-class seating configuration.

The front of the class was a podium centered in front of tables 1 and 2 with a white board mounted on the wall and a retractable screen, which was pulled down in front of the white board. Tables 3 and 4 were at the back of the room, with the classroom door nearest to table 4. There was a total of 18 students in-class. Table 1 consisted of two male students and three female students; table 2 sat three male students and two female; at table 3 was one male student and two female students; and table 4 had three female

students and one male student. There were two chairs under the windows near table 1 where the Teacher's Assistant (TA) was sitting. Dr. Gooding never sat and moved around the classroom the entire session.

Upon the commencement of class, Dr. Gooding walked around to each table checking for material lists. At least one group of students was at each table. There were five work groups, which were providing material lists. The material lists were for needed items to complete projects pertinent to the "Fundamentals of Protected Areas Management." Dr. Gooding had obviously given each group previous class time to discuss and plan for their prospective projects to be executed at the ELC. The material lists of each group required items like large dirt loads, wood, signs, and weed barrier. Next, the professor did some housekeeping. He asked for volunteers for various projects, which were Natural Resources program related. Several students volunteered.

The main purpose of this class meeting was to host a guest speaker. The guest speaker was a former graduate of the program and at the time of the visit a graduate student in the same department. He gave a presentation on Managing Soundscapes in National Parks. The first thing the guest said was that he would like to have a conversation rather than give a lecture. Immediately, Dr. Gooding chimed in with how the guest speaker's topic was relatable to the class and encouraged them to engage in the conversation with the premise of how this topic related to the class. With the tone set for this class session the speaker began a PowerPoint (PPT) presentation on Visitor Experience in relation to quiet in the National Parks. The students were attentive, forward facing, and each student was clearly paying close attention to the speaker. The speaker became interactive with the students by asking questions. Initially there was a deadpan

silence, so Dr. Gooding began to prompt the students by helping them to recall their knowledge and personal experience on the topic, and the students perked up and began to respond to the speaker's questions. As the students began to verbally participate, the speaker pointed out that he saw people nodding in agreement and wanted them to speak up. At this point the students began to list multiple experiences and answers to the speaker's questions. The professor added to the speaker's content to engage himself and asked the students rhetorical questions to provoke thought and reflection among the students.

Then the tone changed from the recent burst of participative activity. The TA was doodling. One student was texting on their cell phone, another was playing with her hair, and yet another student was picking her nails. The speaker was still speaking and rolling through his PPT presentation. Despite the observations of distracted or possibly bored students, they as a class all responded to the speaker's questions when asked, even if they were not asked directly. Only fifteen minutes had lapsed.

At 2:30 pm a new male student came in to listen to the speaker. During this segment two students appeared to be taking notes; upon further observation, they were both doing homework for another class. Three students left independently for the restroom, and one student went to talk with the professor in the hall. Almost instantly, Dr. Gooding re-entered the room to close the door, which preserved sound levels in the classroom. Shortly, the various students and Dr. Gooding returned to the classroom and the door remained shut.

The guest speaker continued a common in-class PPT presentation, which traditionally consists of visual PPT slides accompanied by verbal/auditory methods of a

lecture style provided by the guest speaker. At that point Dr. Gooding pointed out that the students had actually done what the speaker was talking about. The speaker was talking about using high-tech microphones in the Muir Woods to measure sound. The students did this same activity at the ELC in this class previous to the guest speaker.

Once Dr. Gooding made his point he retired to the back of the classroom and very quietly talked with another student. He was standing by the student who was texting on her cell phone and she stopped her activity. One student was still reading. The other students who were doing homework for other classes were aware of the professor's presence and tried to look alert. They were at least making occasional eye contact with the guest speaker. The speaker was reading directly off of the PPT slides and then elaborated each slide. People started to fidget and get restless in their chairs. Conversely, the speaker had an enthusiastic approach and seemed to keep the listeners attention for the most part. At the time the speaker was discussing gaining stakeholders.

The professor then sat on the far side of the room. He had now moved all around the room. He added humor to the presentation by pointing out that the professor, TA, and guest speaker were dressed nonsensically in a photo on the slide. He pointed out acceptable versus unacceptable dress for working in the field. Then, Dr. Gooding grabbed the student's attention again; they were laughing, and engaging. He did this by appealing to their maturity level. He then asked for examples of how they should approach guests. Once the student's engaged and participated, the professor called on a specific student to elaborate from his perspective as a former Park Ranger with Park Ranger Training. After he shared his experience, a hand was raised and the first engaging question from a student was asked. The professor addressed the question and elaborated via the angle of the class.

The students who were reading, doing homework, and texting has stopped these activities and began actively participating in the discussion.

Another professor came into the room to talk with Dr. Gooding. It happened quickly and quietly. Immediately after the visiting professor left the room, Dr. Gooding instantly commented on the speaker's current thoughts. The visiting professor returned with a box and talked to the students very quickly, explaining that there are tee shirts for them to wear on their Earth Day project of this current class, which will take place at the ELC. The visiting professor was the Director of the ELC; therefore, the class's projects and the remainder of the course would take place strictly at the ELC. This was why he interrupts the class. This class session was the last class session in a traditional classroom on campus.

After the visiting professor left, Dr. Gooding brought up a scenario in relation to the guest speaker's content on how to engage with stakeholders/visitors. He asked the students if anyone knew what to say in this particular experience. He again got the students to engage and answer him. He encouraged them to keep talking. A lively discussion ensued. One student suggested offering stickers for flowers, meaning trading the visitor a sticker for any wildflowers they may have picked. This would allow the ranger to educate and reward the visitor for doing the right thing by making the choice to keep the wildflowers in the park. Many other students engaged in this discussion and began to share other ideas pertaining to the discussion. One student was close to falling asleep, a cell phone rings, and another is doodling. Dr. Gooding continued to ask engaging questions to the class. He received an answer from a student who had not talked today. The professor asked another question, and more students answer. The students

were responding well. At 3:05 pm one student left. Suddenly the speaker began to ask engaging questions. A student who had not participated in-class yet today engaged with the speaker's questions. All but one student was attentive and engaged; she was still doing homework for another class. At 3:10 pm, the guest speaker was finished with his presentation.

Dr. Gooding took over the class after the PPT presentation. He asked people to get into their ELC work groups. He delegated each group one representative to create a list of materials needed from Home Depot. The professor reminded the group that the next class session on April 17 would be a preparation day for the big public event, Earth Day, Saturday, April 19. On Earth Day the students and their perspective groups would host community volunteers all day long. The volunteers would assist with each group's project at the ELC. He reminded the students to wear their new tee shirts on Earth Day, to remember they are representing CSU, and to be on their best behavior.

There were five groups, each doing a separate project for the ELC. Each group would meet every Tuesday and Thursday until the end of the semester and work on their projects at the ELC, including the Earth Day event. Below is a description of each group and their projects.

The first group was focusing on interpretation signs through out the ELC and its various hiking trails. They planned on changing the names of all the trails in order to recognize the donors of the ELC. Also, they were going to add a bird watching information sign at a particular bird watching viewpoint. This group had found a sign maker to special order their signs so that they look like ones found in national or state parks.

The second group was doing vegetative restoration to an area known as Zach's Cliff. Recently there was a set of train tracks that ran through the area that destroyed the vegetation. They planed to do soil amendments and add various grass and shrubs to the area.

The third group planed to widen one of the trails and meet the ADA (American Disabilities Act) guidelines in order to accommodate wheelchair accessibility for a portion of the trail. They would widen a two-foot trail by four feet to make it six feet wide with a packed, flat dirt service. The portion of the trail they would be working on extends from the bridge to the bird-viewing vantage point and was 540 ft. in length.

The fourth group would be monitoring visitor use. They acquired a special infrared counter that shot a laser across the trail and counted movement each time the laser stream was broken. The professor provided the device and it was known as the Trail Master 3500. This group would also conduct verbal surveys to visiting guests.

The fifth group was building a turnpike at a particular portion of one of the trails that was experiencing higher erosion rates. The turnpike would be designed to slough off and aid in draining water from this portion of the trail. They planed to use French drainage systems to prevent floods on the trail. Also, they would refurbish another adjoining turnpike. This project's purpose, according the group, was trail beautification.

Each of these projects was important to the management of protected areas, the purpose of the course. Each group would experience the opportunity to manage a portion of a protected area at the ELC. The ELC is a designated wilderness area within the city limits of Fort Collins, Colorado, and is owned by CSU. Dr. Gooding intended for the class to learn through one another's project experiences as well as their own. He hoped

the students would see how much work went into managing protected lands via their own in-class projects.

After the groups had some time to plan, the professor facilitated the coordination of material lists and gathered one representative from each group that needed items from the store. This became a sub-group, which would be placing orders with Home Depot for delivery at the ELC or would bring smaller items to the ELC when class commenced the following week at the ELC. The ELC was paying for the materials. The speaker and TA teased Dr. Gooding and the entire class laughed. The class's energy was high and boisterous.

The professor cancelled class for the next session because his wife was having a baby. He asked if anyone needed to be in-class for that day, and no one replied. He opened the floor for questions. The students had a few questions pertaining to the preparation of Earth Day. He told the student who had been texting the entire class that if she had any questions she can text them to him. This was a partial joke, and both the student and audience knew it.

At this point class was almost over. He hands out the tee shirts for Earth Day and made a statement that no one was allowed to leave the class until they have turned in their group plans and Home Depot forms. Class ends at 3:30 pm.

Thursday, April 17: Preparation for Earth Day and Volunteers. In this class session the groups were preparing for the arrival of many volunteers on Saturday, Earth Day who were going assist each group in their projects. There was a large amount of rock material and dirt dumped on tarps near the trailheads. This dirt would be used at Zach's Cliff, the wheelchair accessible trail, and the turnpike projects. The group monitoring

visitor use and the sign groups were not at the ELC today. The visitor use group was meeting with a professor on campus who would review how to use the Trail Master 3500, which they intend to use on Saturday. The sign group was placing orders with the sign company to make their signs for the trails.

The Zach's Cliff group would be accompanied by random volunteers on Saturday. They requested the sign group get them a sign made to post at the site that read "Restoration In Progress" so that visitors would not impact the fragile area. The group had done research on what species of plant life would thrive in the area and also was indigenous to Fort Collins. The group gathered around to tell me about the plants and shrubs they had chosen for Zach's Cliff. Each student had different knowledge about which plants and shrubs would best suit the area. There was a lot of enthusiasm and excitement within the group to share their knowledge. They did say that the plants would be a gamble, because it will take three to five years for the plants to establish themselves at Zach's Cliff. Today they were discovering through trial and error which tools will aerate the soil the best. They first tried rakes, which do not work so well, leading the group to aerate the soil by turning the dirt with spaded shovels. They choose to keep the rocks they dug up to ultimately place on top of the soil when the project is finished in order to prevent erosion and give the area a stronger chance to refurbish. They planned to turn manure and compost into the aerated soil to enrich its mineral and nutrient content for the success of the plants' survival. Each group member was actively participating in the project today.

The turnpike group also will accept any volunteer who shows up to help on Saturday. When I arrived to observe them, they were in a discussion about how to

manage their volunteers on Saturday. The group decided on one individual to delegate tasks to the individuals as well as explain the process of building the turnpike, keep an eye on safety, help maintain the parts of the turnpike that have been completed throughout the day, and the old turnpike they are building upon. The group agreed on a process for Saturday. They made the choice for the volunteers to carry out the railroad ties needed to create perimeters of the turnpike. The group decided it was important to place some information in the kiosk at the trailhead highlighting trail erosion, including a descriptive graph. Today the group was gathering river rocks from the surrounding area to use as a foundation for their turnpike. They were taking wheelbarrows to various locations throughout the ELC and filling them with river rocks. They would then return to the turnpike site where a few group members were arranging the rocks into a foundational structure. The group was working together as a team. A wheelbarrow breaks and the entire group pitches in to help fix it successfully.

The handicap trail building group was working hard as a single unit. By the end of class they had completed a railroad tie boarder on both sides of the trail, all 540 feet. They had a group goal to complete the railroad ties for preparation for the Earth Day event. On Earth Day they then planned to place and compact the dirt for the flat surface of the trail, with the help of volunteers. For this group, the Rotary Club of Fort Collins will volunteer their time on Saturday.

Saturday, April 19: Earth Day with Volunteers. Earth Day was bustling with people and groups organizing, while both Dr. Gooding and the director of the ELC handed out snacks and water to everyone. There was a feeling of great zeal and excitement in the air. I talked with many volunteers, and the consensus was that they

were excited to be giving back to a place, the ELC, where they spend so much of their leisure time. Many of them felt that the act of helping to improve the ELC only made open spaces last longer for future visitors to enjoy. One volunteer had been coming to the ELC to help with Earth Day projects for five years. I made laps to visit each group several times throughout the day.

The first group I encountered was the sign group. They were carrying out the posts on which the prefabricated signs were to be mounted. The posts looked like a cross. The vertical axis was made out of a 4x4 railroad tie with a piece of rebar placed through a drilled hole on a very low horizontal axis to act as an anchor underground. The posts were bulky and awkward to carry. After several tries hand-carrying them, the group devised a way to transport the posts in wheelbarrows with a group member stabilizing the post at the broad end. Half of the group was removing the old signage, and the other half of the group was preparing the new signs to be set in the ground.

Next I encountered the wheelchair accessibility trail group. Their project was originally substantial and they still have a lot of work to do. The professor was in the area handing out water and snacks and chatting with the volunteers. He stopped by to tell me this group is not going to complete this project alone. He felt that the scope of the project will eventually become overwhelming for the group. He also intended to allow the group to learn by doing and having a self-guided experience, as they will learn more by making mistakes rather than through the professor trying to manage the completion of the project in a timely fashion.

Zach's Cliff was coming along well. Many volunteers were helping the group to mix manure, compost, and indigenous soil together. The group had accumulated a very

large pile of rocks, which they will place on the topsoil. They were also covering the railroad tracks and making nutrient rich soil to plant above the railroad-track portion of their refurbishment area. Soon the group planned to water down the soil and begin the planting process. They planned to have each plant in the ground by the end of the day.

The turnpike group had just finished gathering river rocks and setting them up as a foundation with the assistance of many volunteers. In the center of the trail where the turnpike would be built, there was a dome-like mound of river rocks spanning about 60 feet. This dome-like structure would be built upon to complete the turnpike and aid in maintaining the integrity of the structure. They began to lay down a protective weed barrier on top of the rocks and then cover and tamp with dirt wheel-barrowed in from the large dirt mound out in the parking lot. The dirt was placed in a similar dome-like fashion mimicking the shape of the foundation with hopes that this will encourage the water to slough off rather than cause trail erosion issues, including puddles.

The group monitoring the Trail Master 3500 had set the device at the entrance of a single suspension bridge that each visitor must cross in order to enter the trail system at the ELC. One of the group members was standing near the Trail Master 3500 manually keeping a count of bridge crossers to compare her manual tally to that of the computerized device and validate the machine. Meanwhile, the rest of the group was helping the director of the ELC by planting a native edible plant garden, scraping off chipped paint from a picnic table and painting a nature mural on it instead, with a commemoration for Earth Day 2008.

The wheelchair accessibility trail crew has changed their tactics. They intended to move most of the mounds of dirt out of the parking lot, down a trail about three- tenths of

a mile long, over the suspension bridge, and down the 540 feet of trail they are building. The wheelchair accessibility trail was an old hiking trail that was being widened so that the bird-viewing deck can be accessible to all visitors. The tactics changed to have people stationed at the dirt mound with shovels to fill the wheelbarrows; stationed at different points along the way to take the wheelbarrows over; people stationed on the trail to disperse the dirt where it was being dumped; and people to tamp down the dirt that had been dispersed to create a hard, even surface accessible for wheelchairs. Their previous tactic was to have just a few people fill, push, and bring the wheelbarrows to the site while many others stood idle needing a job. The group also brought in more wheelbarrows so a greater quantity of dirt could be moved at once.

Every group but the wheelchair accessibility trail group had finished their projects. The finished groups joined the wheelchair accessibility trail group to lend more hands to their process. Other students from the Natural Resources Department, who are not a part of this class, showed up to help. The projects they were doing at the ELC were trash clean up by the river and removing invasive plants from the area. More volunteers like families, friends, and students arrived to help with the trail building. There was a real sense of community, and everyone is moving, doing, and had a role to fulfill.

Some visitors came to the ELC and hiked around. They were in awe with all of the projects going on and were happy to see so many people wanting to help improve the area. The President's Class of CSU, a special group chosen by the university president, came to interview this class and their efforts. The President's Class will write a paper about this class and Dr. Gooding's students' projects at the ELC. One of the other students in the program who came to help was pregnant and she helped hand out tools

back at the ELC warehouse. Her water broke just before lunch and she was off to the hospital to have a baby. Her baby will be remembered by the class as being born on their big project day at the ELC on Earth Day 2008. At 12:30 pm all activity ceased and the professor fed the class and volunteers lunch. After lunch, many people stayed to continue working on the wheelchair accessibility trail while others left for the day.

Tuesday, April 22: ELC Work Day. The class was walking to the various project sites and doing an update on projects so that the entire class would be aware of the big picture for the course focus, protected areas management. Each group will update the class before they continue to work on their prospective projects. The visitor monitor/counting group was not present at the ELC today; they are with another Natural Resources professor on campus, crunching numbers for their data set from Earth Day. There were 10 volunteers who helped on Earth Day who have come today to continue helping with the projects. In-class at the ELC today, there are 16 students present.

The wheelchair accessibility trail group was working hard on their project. At this point they are only halfway done with the trail and realized they have a lot of remaining work to do. They were still doing the process formulated on Earth Day, as they found this method extremely efficient and effective in getting the job done. They continued shoveling dirt into wheelbarrows, transporting the dirt nearly a half a mile down the path and over the bridge, dumping the dirt where needed, and tamping the dirt down with hand tampers. The group got a count of people so they could delegate individual roles for help. The entire class and volunteers will work on this project today.

The Zach's Cliff group had newly planted sages, cacti, and various brushes. It was obvious that they were proud of their work and showed exuberance through out their

group. Each group member was participating in describing what had been done to the area. It was evident that the soil had been freshly turned and enriched when compared to the surrounding terra. The area was now blocked off with large logs since they were unable to obtain a sign.

The sign group was not present today but all six of the new signs were up in their new positions. The turnpike group also was not present today. However, their project felt solid when walking on it, the new turnpike was slightly narrower than the old one, the old turnpike looked refreshed, and their project was complete. After the tour, the class and volunteers got to work on the wheelchair accessibility trail by using the identical system they devised on Earth Day. The fact that they returned to the same system showed they are learning proficiency and have found a method that works when working with a large group of people on one particular project.

Thursday, April 24: ELC Work Day. The first administration of the LIMI was given to the class. There were 14 students and the professor present. The class took 15 minutes to complete the LIMI.

The visitor use group was still working on their data set, but they had a small informative presentation to update the class regarding their progress in data crunching. The group had now become proficient in data crunching without the help of a professor or graduate student. They produced a graph to share with the class displaying visitor usage for Earth Day. Also, this group completed the edible garden. They showed us wild rose, catnip, and a variety of wildflowers. Lastly, the picnic table mural was complete with the intended message of being happy in the outdoors.

Dr. Gooding gave a vision talk to the class about what the plan was for today. He expected everyone to pitch in and help work on the wheelchair accessibility trail. The professor rented a dirt tamper which was electric and used water to help tamp and solidify the terra. He hoped for the trail building to become much more efficient and the class to make greater progress in this session. Many new processes occurred today as a result of the electric tamper and the need to get the trail done before the last day of class, as they will have guests coming to view their work.

First, a water pump was set up at the river about 200 yards away, with a hose bringing water to the trail in progress. Second, a student was stationed at the trailhead to state to visitors that the trail was closed, since the portion of the trail the class was working on began just over the suspension bridge from the trailhead. The class worked extraordinarily well together, with each person playing a critical role in the group. The professor was running the tamping machine while the TA was leading the articulation on the water hose, which required constant movement to follow the work and took about four people to man the hose from the river to the trail. Meanwhile, other students were shoveling, moving, and dumping dirt on the trail; then students were hand-tamping the new dirt; and the professor followed in tandem, with the water people electronically tamping the trail. The system was efficient. The group was communicating up and down the work area by shouting and relaying messages back and forth. This method of communication worked well for the class as one large group. Their efficiency was improving as they communicated a change in the water hose position from the river to near the bridge so they would not have to articulate it so much. There was not much

talking and a lot of doing; everyone seemed to know their job and did it well. The pump and hose were set up quickly, and the class was back to work.

I overheard a student say, “I care about this class way more, because we did something real compared to the other one [Service Learning class].” The Service Learning class will be reviewed in chapter five. The students created a hypothetical project and planned it out, but they were not required to carry out their project. The student said that the Management of Protected Areas class meant more to him because he felt like he really did something, rather than hypothetically pretending to do an activity.

Furthermore, both Dr. Gooding and the TA were leading and teaching by example. Both of them were extraordinarily involved as active members of the class. Their examples and leadership seemed to be part of the motivation necessary to keep alive the group exuberance and passion for the big picture of the projects. It worked too, as the class was enthralled in the process. Each individual was extremely active and involved. The end was in sight and the group was working harder and faster; as more silliness pervaded in the spirit of the group. The professor was letting students use the electric tamper, which appeared to be an exciting task many wanted to try. Remarkably, the class completed the project at 3:55 pm just before class ended at 4:00 pm. The grand finale entailed the professor rallying the hand tampers, by gathering the rest of the class around them, and encouraging cheers as they complete the last of the hand tamping at the junction of the suspension bridge and their new trail. The student who ran the electric tamp asked the professor to help turn it off. Dr. Gooding played a little with uplifting the class spirit by pretending the machine got away from him, but in reality he received chuckles and cheers. The machine turned off and the class celebrated the completion of

all of their projects, especially their largest project, the wheelchair accessibility trail, all 540 feet.

One student left for the service learning poster session set at the Lory Student Center (LSC). At 3:59 pm an alumnus from the program showed up to see the students' projects; he was in this class a year before. Now he is a Seasonal Park Ranger at Yosemite National Park, and he says he loved his program at CSU dearly. The alum took a moment to share how meaningful this class had been in his career and tells them they can apply what they learn in this class to their real life experiences. The alum's visit was not planned; he just wanted to visit Dr. Gooding.

The professor outlined project tasks for the next week of class meetings. He reminded the class that on the final day they would have a guest visit by a City of Fort Collins Park Ranger. He encouraged them to invite other professionals out to see their work. He then called for a team "power clap" on three, all accept, and the class was officially a team and not only a class.

Tuesday, April 29: ELC Work Day. The second administration of the LIMI was given to the class. There were 17 class members present, all of whom took the LIMI. After the LIMI, Dr. Gooding announced that the visitor counter group did not need to be present but he invited them to stay anyway. The class was touring the projects and working on the turnpike project as a group. One student broke her leg last week and was in a full cast but ready to work and help out. Her peers wheeled her out to the turnpike in a wheelbarrow. Others haul loads of dirt to the turnpike, leaving these students there while the rest of the class took a tour of the other projects.

Before they left on the tour the visitor count group gave the class an update. They were having issues with the Trail Master 3500. Dr. Gooding gave them someone to call in the Natural Resources Department who can help them. The group wanted to reset the time on the counter to reflect actual time while the counter was being used at the ELC. This group departed the class to return to CSU campus and find the help they needed to solve their problem.

The wheelchair accessibility trail was the first stop. The professor pointed out that there might be a problem with loose gravel on the surface of the trail. He asked them a rhetorical question, “Did we choose the right material?” The students looked on in a questioning manner. He then asked if they felt like raking the loose gravel off of the surface would be a good idea. The students responded with a unified “Yes.” The professor suggested the group come back after the tour and rake the loose gravel off of the surface of the trail.

Zach’s Cliff was watered the past weekend by a student who came out on his own time out of concern for the re-vegetation of their project. The use of rocks to keep the seeds down and prevent erosion was working. Some students in this group stayed behind to water Zach’s Cliff. Everyone else was headed to the turnpike.

On the way, the class stopped and examined the new trail signs. Dr. Gooding noted that the group did not use concrete to stabilize the sign in the ground. The signs were a bit unsteady and wobbled. The professor pulled one sign out of the ground by hand and dug a deeper hole with a shovel. He showed the group how deep the holes should be and encouraged them to return to the other signs and replace them in deeper holes.

Dr. Gooding and the class carefully scrutinized the turnpike. The group wanted to round it off more so the water would run off and drain away from the trail. They noticed the old turnpike was concave which caused a potential for standing water. The standing water caused hikers to step around the pools, which negatively created braided trails off of the intended trail. Further, the group pointed out that the standing pools of water created an unwanted mosquito habitat. Surprisingly, the student with the broken leg worked here on the turnpike last Thursday, after she broke her leg.

The issue with the turnpike was the railroad ties used as edging were coming loose and were dangerous for hikers to step on. The professor made a joke of the loose ties and starts pulling at them with caveman grunts; the class laughed. Three students arrived with more dirt to fill in a soft spot. Before they filled the spot, the professor asked the group how to manage the soft spots. They planned to lay the dirt, wet it, and then tamp it solid. Dr. Gooding pointed out that “this is not the most efficient way to do this.” Some of the group complained that the dirt was mostly sand and therefore it was having an issue absorbing water and gelling together when tamped. The professor mentioned this was a good learning lesson and suggests that using less water may create a better mud for tamping.

The class brought water, dirt, a few people to shovel, and some tampers, but somehow the Dr. Gooding ended up doing the work while the class looked on. The professor asked who was in charge, in order to encourage the students take ownership of their project. The group began to work and took the professor’s suggestion of using less water, and had a successful tamping experience. Dr. Gooding then asked the group “what do you think of your project now?” The group answered, “As soon as the water reabsorbs

and we drive rebar into the railroad ties instead of stakes our project will be good,” and the professor agreed.

The group got the rebar and Dr. Gooding drove a piece into the ground with a river rock. Two other students followed, driving rebar into the railroad ties with river rocks. The professor encouraged, empowered, and cheered on the students, which in turn got the rest of the class cheering for their peers. The class agreed as a whole that the turnpike became stable and in good working condition from their work in this class session.

As class ended, they strolled by the wheelchair accessibility trail to check on other students progress of raking off the loose debris. The group had come a long way but still had work to do. The professor called the class together to end the session. He commented that the trail will take some time to perfect, and the class agreed. He reiterated they all did a great job on their projects and ended class for the day.

Thursday, May 1: ELC, Ft. Collins City Park Ranger Visit. A Park Ranger from the City of Fort Collins came and visited the class to review their projects. The weather was windy, rainy, and cold. Not everyone was dressed for a day outside, so the Dr. Gooding decided to take the class inside the ELC warehouse and have each group explain their projects to their visitor. The professor invited them to then take a walking tour of their projects with their guest after class. Either way, he intended to take the ranger on a tour at the end of the class session. Each project was complete at this point including the wheelchair accessibility trail project. I observe that everyone was listening, but they seemed to be distracted by the wind and cold. Furthermore, the class paid closer attention once inside, out of the elements.

The ranger was the project manager for Natural Areas for the City of Fort Collins. He once was a river ranger for many years for the National Park Service in Grand Canyon National Park. He gave a talk to the students on what it is like to be a ranger. He highlighted the need for policy enforcement both to protect the natural area and resources, and to look after the visitor. He also emphasized how critical it would be for the students to be aware that should they choose to become a ranger, they will be both the authority of the resource they are protecting and managing, and the major steward and stakeholder of the resource. He continued that it would be the students' responsibility to set examples of positive behavior and stewardship as the protected area ranger or management agency.

The visitor use group had hard copies of the daily counts and passed them around to the class. They explained how the Trail Master 3500 had to be calibrated many times so the infrared light was accurate in counting visitors. This process took eight hours with the assistance of other professors on campus. This group also interviewed people as they were exiting the ELC to determine the duration and frequency of their visits to the ELC. As it turns out, they threw out the data collected from the Trail Master 3500 on Earth Day because the count likely was not accurate, due to volunteers, group projects, and excessive coming and going across the bridge during the day's activities. They mentioned to the class that had they kept the Earth Day data, the numbers would have skewed the data by about 3000 additional visitors who in actuality were classmates and volunteers doing projects at the ELC. Lastly, they passed out graphs to the class for the students to review. The graphs depicted visitation by the day and by the hour. The graphs were going on display in the trailhead kiosk for the public to view.

The Zach's Cliff group explained the donations of water and manpower from the public, along with tree donations from Bath Nursery in Fort Collins. Dr. Gooding asked the group to explain the story of Zach's Cliff. Initially, another class attempted to restore the area, and it did not work very well. The Ranger asked what the reasons were and the group answered that the soil was not enhanced and that the water striation was extremely erosive. Therefore, the group learned from the past group's mistakes and enhanced the soil to prevent massive erosion from water, and placed rocks on the seeds to prevent wind erosion. Thus far, their approach had been successful and proactive. The total cost of their project was \$136.

The history on the wheelchair accessibility trail was that a few years ago another group from the class built a bird-viewing platform. The current group wanted to expand visitation to the platform by making the trail 100% wheelchair accessible from the bridge to the platform so that anyone could enjoy the birds. The group researched what material the American Disabilities Act (ADA) regulated and the degree of the slope of the trail. They discovered that four feet of crushed concrete with railroad ties boarding the trail were required by ADA guidelines. The group made a choice to widen the trail to eight feet so that two wheelchairs could pass each other going opposite directions. The Fort Collins Rotary Club gifted the group \$1000, and the project had two major volunteer days, as the work was the most extensive of any of the projects the class undertook. On Earth Day, the group was only halfway finished with the project. They explained the process the group and class developed while putting in a few hundred man-hours to complete the project.

Dr. Gooding asked the group, “What was the biggest challenge or surprise for you?” They answered that getting the money coordinated and synchronizing many people to do one job was the most difficult. They also said that they realized the trail would take some more maintenance to keep it in good condition. The professor added that drainage issues will certainly surface later. He loved how the whole class helped to finish this project and told the whole class they did a nice job.

Next, the interpretation sign group shared that they replaced all interpretive signs on the trails to acknowledge the ELC donors and to make the signs more clear to read. They replaced six signs and missed one. The ranger noted that leaving one sign provided a good opportunity to compare and contrast while he takes his tour at the end of the class. The group had four volunteers during Earth Day and finished their project that day. The signs were designed to replicate interpretive signs in national or state parks, are brown, made of aluminum, and had the ELC logo of footprints on each sign. The posts of the signs were whether sealed and the rebar was dug deeper after the professor went on a tour with the class. The signs were in great repair at this point. They also placed a sign at the bird-watching platform explaining the basics of “how to get into bird watching.” The total cost of the project was \$240.

Originally, the turnpike group intended to join up with the wheelchair accessibility trail; however, they chose not to and felt their goals were too ambitious. They assessed the trail and measured its concave aspects. The location they choose to improve had a lot of standing water problems, which created a thriving mosquito habitat. They chose to improve and add to an existing turnpike by 64 feet. First, they cleaned out the drainage of the original turnpike and put more dirt on the top to reshape it so that the

slope would drain water more effectively. Then they explained the process of building a mound of river rocks from the area, covering the mound with weed barrier, and laying down dirt that came from the restoration group at Zach's Cliff to shape the mound. Also, they laid recycled fence posts as their border, which were railroad ties reinforced with rebar. They mentioned how Home Depot gave them a great discount for being part of a school project. The group felt that a future class could also add more rebar to the railroad ties to make them stronger. They also reflected that in the future they would choose to focus on quality of projects rather than quantity of projects to be completed. The turnpike project cost was \$60.

Dr. Gooding then invited anyone who wished to tour the projects with the ranger to stay after class. He mentioned that it was wonderful that the class stuck together and worked as a group on the bigger projects of the turnpike and especially the wheelchair accessibility trail. Class ended on an upbeat note with Dr. Gooding saying "nice job" to everyone and reminding them that their final papers were due in his office on Tuesday. Three students stayed behind for a walking tour with the ranger. The walking tour was quick, due to the rain. The tour was finished in about 15 minutes and class was over.

Student LIMI Results

The LIMI added up cumulatively to 100% across three categories and separated a participant's learning style into three percentage-based classifications (auditory, visual, and haptic learning styles). The LIMI was administered to the majority of the subjects, providing their attendance in-class. Figure 4.2 provides a view of the dominant learning styles found in Dr. Gooding's Fundamentals of Protected Areas Management class. Each category was denoted by the type of learning style. The administration was to 14

students. Further, it is pertinent to the study to ascertain the volume of haptic learners.

The figure seems to show haptic learning style as the predominate style at 86% followed only by visual 14% and no dominantly auditory learners in the class's populous.

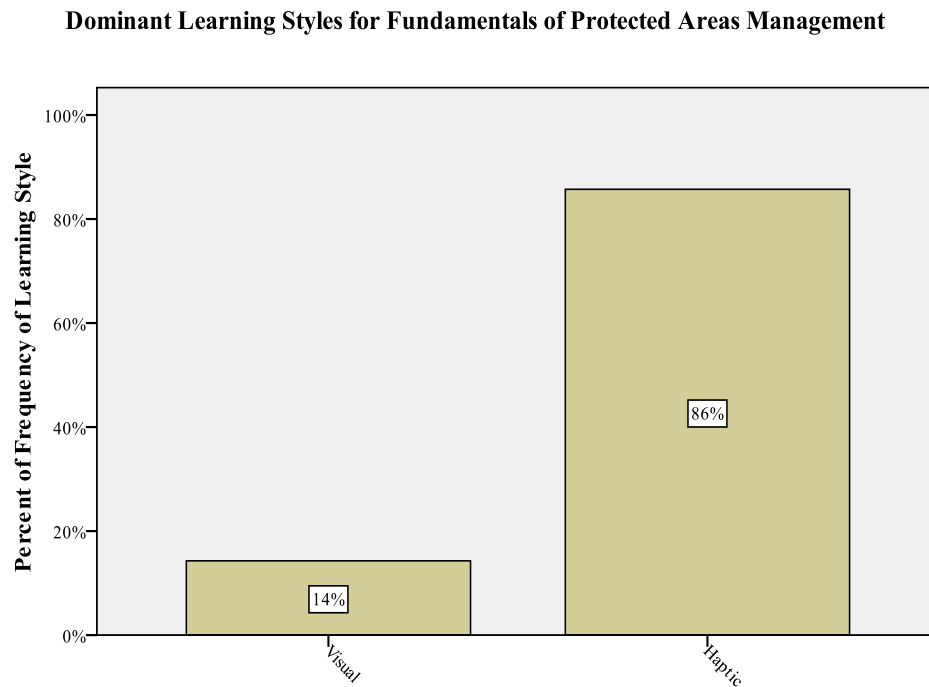


Figure 4.2. Dominant learning styles for Protected Areas Managment

Histograms offered a closer look at the haptic learners in the testing set of the LIMI. Figure 4.3 displays the percentage a learner tended to be haptic in Dr. Gooding's Fundamentals of Protected Areas Management class. The LIMI placed the learner into the three categories (visual, auditory, and haptic), based on a percentage, which always will add up to 100%. For example, a learner may be assessed by the LIMI as having 11% auditory, 22% visual, and 67% haptic, which sum to 100%. The histogram below examined the frequency of the percentages of haptic classifications of each learner and included a bell-curve shape implying a normal, functional data set. Figure 4.3 presented

11 of 14 students fall in the haptic range between 44% and 54% on the LIMI. This data appeared to show that most haptic learners are above 50% of dominance of the overall 100% scale devised within each personal LIMI test.

Histogram for Haptic Learners in Fundamentals of Protected Areas Management

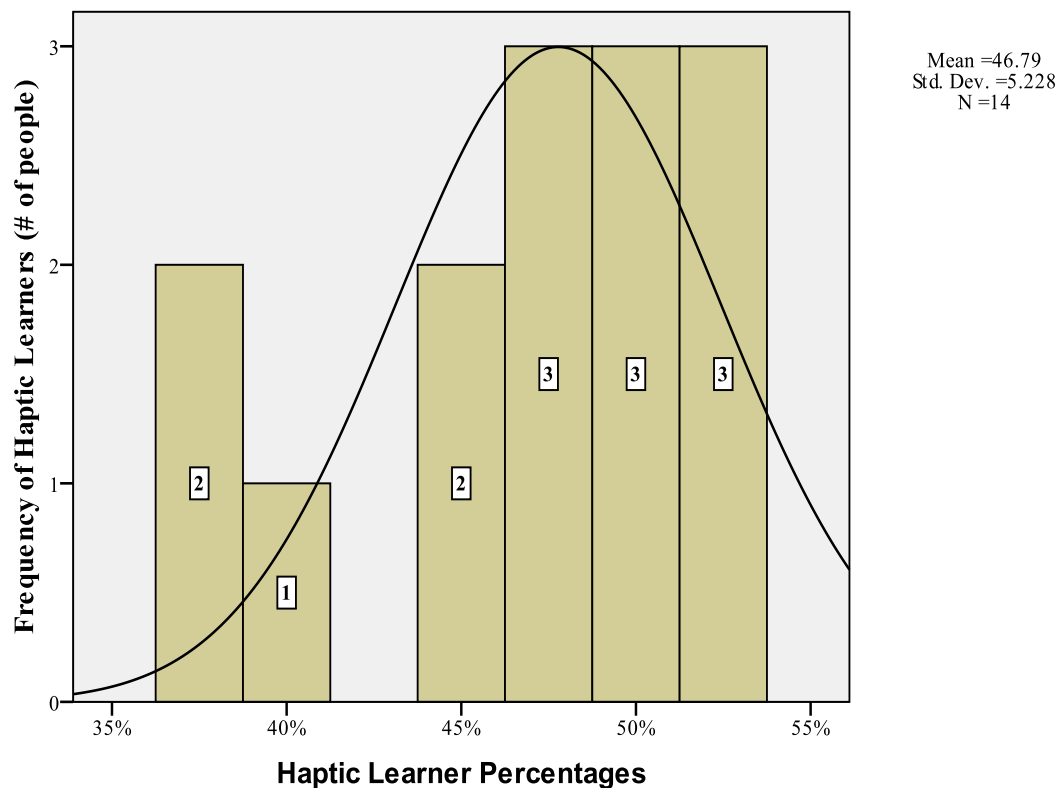


Figure 4.3. Frequency of hapticness in the learners of Protected Areas Management

Student Course Survey Results

Table 4.1 revealed the class's cumulative results from Student Course Survey for the Spring 2008. The student's opinions and views of how well the course was taught were divulged here. A few of the questions in the survey were important to pay special attention to in regard to this study, relating to if the accommodation of haptic learners

was achieved in the course. Questions 4-7, 10-13, and 15-17 collected information relating directly toward if in fact haptic learners felt accommodated in throughout the course. As a result, these 11 questions are of particular interest in regard to the accommodation of haptic learners. Dr. Gooding was reviewed by 16 students for his Protected Areas Management course. He received strong positive reviews on all 11 questions; all answers were in the “strongly agree” and “agree” categories consistently through the Student Course Survey report (see Table 4.1 for complete report). Since all responses from his students were in the “strongly agree” and “agree” categories it is believed that from the student’s view Dr. Gooding did accommodate his haptic learners in this class, which was an overwhelming 86% haptic dominance through out the class. There were three demographic questions from the Student Course Survey. The class was made up of 2 (12%) Sophomores, 6 (38%) Juniors, and 8 (50%) Seniors. All of the students were in the Natural Resources major. Out of the 16 students who filled out the survey 13 (81%) expected to receive an “A” grade and 3 (19%) expected to receive a “B” grade.

Table 4.1

Student Course Survey for Fundamentals of Protected Areas Management

QUESTION	SA	A	N	D	SD	NA
1. Course objectives were clearly stated	14	2	0	0	0	0
2. Grading system was clearly explained	11	4	1	0	0	0
3. Text/course materials were appropriate	13	3	0	0	0	0
4. Course was intellectually challenging	9	7	0	0	0	0
5. Assignments increased my understanding	11	5	0	0	0	0
6. Class sessions increased my understanding	15	1	0	0	0	0
7. Overall, I would rate this course as good	15	1	0	0	0	0

QUESTION	SA	A	N	D	SD	NA
8. Quality of the classroom/facilities was good	5	6	3	2	0	0
9. Quality of the technology used was good	6	8	0	1	0	1
10. Teacher was knowledgeable about the subject	16	0	0	0	0	0
11. Teacher was enthusiastic about the course	16	0	0	0	0	0
12. Teacher organized the course effectively	12	4	0	0	0	0
13. Teacher was prepared for class sessions	15	1	0	0	0	0
14. Teacher was fair/impartial assigning grades	15	1	0	0	0	0
15. Teacher created atmosphere of learning	15	1	0	0	0	0
16. Teacher created atmosphere of respect for students	15	1	0	0	0	0
17. Teacher was willing to help students	14	2	0	0	0	0
18. Overall, I would rate this teacher as good	16	0	0	0	0	0
19. I put considerable effort into this course	8	8	0	0	0	0

Note: The survey is portrayed via a Likert scale with the following key: SA, Strongly Agree; A, Agree; N, Neutral; D, Disagree; SD, Strongly Disagree; and NA, Not Applicable.

Robert Gooding-Personal Instrumentation Results

Learning and Interpreting Modality Instrument (LIMI) Results

Dr. Gooding was dominantly a haptic learner at 45% and he was equally a visual and auditory learner with both categories coming in at 27.5 %. His dominant learning style, haptic, means Dr. Gooding learns best by doing, touching, feeling, hands-on, tactile, and active approaches.

Principles of Adult Learning Scale (PALS) Results

Dr. Gooding was 1.5 points above the mean total score based on a normalized mean developed by Conti (1990), the instrument creator, Table 4.2. The highest possible total score was 220. He was in the 80 percentile, which indicated he leans reasonably strong toward learner-centered Activities. On the other hand only half the time or 50%

was he inclined to Personalize Instruction or otherwise teacher-centered in his learning/teaching paradigm.

Other strengths revealed by the PALS were considered secondary to denoting whether an individual was inclined to be more learner-centered or teacher-centered in their learning-teaching paradigm. The sub-categories depicted 100% proclivity in climate building, 75% inclination to assessing student needs, and 74% leaning in flexibility for personal development. Each of these categories supported, signified, and integrated the nature of nuance surrounding Dr. Gooding's preference to be a learner-centered teacher.

Table 4.2

Robert Gooding PALS Results

Factor	Gooding's Score	Mean	± from the Mean	Standard Deviation
Learner-centered Activities	48	38	+10	8.3
Personalizing Instruction	23	31	-8	6.8
Relating to Experience	18	21	-3	4.9
Assessing Student Needs	15	14	+1	3.6
Climate Building	20	16	+4	3.0
Participation in the Learning Process	5	13	-8	3.5
Flexibility for Personal Development	18.5	13	+5.5	3.9
<i>TOTAL SCORE 147.5</i>				

Philosophy of Adult Education Inventory (PAEI) Results.

Two predominant categories exhibited the unique culmination of Dr. Gooding's personal teaching philosophy. He favored a behavioral philosophy with the purpose to

“promote skill development and behavioral change” and also focused on the “compliance with standards and societal expectations” (Zinn, 1990, p. 73). In the behavioral philosophy the learner takes an active role in the learning process while they practice new learned behaviors and receive feedback from the teacher. In addition, the learner’s experience is under “strong environmental influence” (p. 73). Meanwhile, the teacher assumes a role, which functioned as a “controller”, and “manager” of the class while “predict[ing] and direct[ing] learning outcomes” (p. 73). According to the PAEI, the behaviorist view will practice the following methods “programmed instruction, contact learning, criterion referenced testing, computer-aided instruction, and skill training” (p. 73).

His second dominant category was progressive adult education, which supported the behaviorist philosophy for Dr. Gooding in revealing his unique concoction of the five major philosophies in the PAEI. The progressive philosophy was described by Zinn (1990) as “promoting societal well being, enhancing individual’s effectiveness in society, giving learners practical knowledge and problem solving skills” (p. 73). A perception of the learner by the teacher was, according to Zinn (1990), that “people have unlimited potential to be developed through education” (p. 73). Furthermore, the learner’s “needs, interests and experiences are fundamental elements in learning” (p. 73). The teacher’s role in the progressive view was the organizer, which “guides learning through experiences that are educative and stimulates, instigates, and evaluates the learning process” (p. 73).

Dr. Gooding’s third view of his personal philosophy of adult education was also an influential classification that lent overtones to the primarily dominant behaviorist view

and was entwined with the progressive view. His results showed two categories residing in a significantly lower group, which the instrument stated made him less likely to demonstrate these traits in his teaching via his teaching philosophy. Dr. Gooding scored high in two categories of the PAEI that are considered to be favored and strongly influential in his teaching philosophy. See Table 4.3 for complete results in Dr. Gooding's PAEI.

Table 4.3

Robert Gooding PAEI Results

Philosophy of Education	Numeric Score	Influence on Professor's Cumulative Philosophy
Behavioral Adult Education Education for Competence and Compliance	93	Highly Favored
Progressive Adult Education Education for Practical Problem-Solving	91	Highly Favored
Liberal (Arts) Adult Education Education for Intellectual Development	88	Some Influence
Radical Adult Education Education for Major Social Change	77	Moderate Influence
Humanistic Adult Education Education for Self-Actualization	71	Moderate Influence

Summary for Fundamentals of Protected Areas Management

First we looked at the course description of Fundamentals of Protected Areas Management and its syllabus. The course description and syllabus aimed to teach students about ways in which one would need to manage protected areas via in-class projects. Next, in-class observations made by me were disclosed. Much of the

observations included an in-class project at the ELC where the class was split into several small groups to complete many smaller projects that aided in the management of the ELC. Third, the student LIMI results were reported, where 85% of the class population was dominantly haptic learners. Further, a histogram was offered as support to show how haptic the learners were. The results reported 11 of 14 students fell in the haptic range between 44% and 54% of tendency to be a haptic learner. Next, the Student Course Survey revealed that Dr. Gooding and his course were well liked by his students. Finally, Dr. Gooding's personal instrumentation results were reported. His LIMI results indicated that he was dominantly a haptic learner at 45% out of 100% with both visual and auditory taking a less significant role. On the PALS he favored learner-centered Activities. Lastly, His PAEI revealed that he equally favored Behavioral Adult Education and Progressive Adult Education.

CHAPTER 5: CALVIN TURNER RESULTS

Chapter 5 highlighted Dr. Calvin Turner and his course “International Issues in Recreation and Tourism.” The course explored sustainable tourism development through a type of learning called service learning, which “is a teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities” (NSLC, 2005-2008, ¶1). Most of the students were junior or senior level Global Tourism majors or were taking the course as an elective for various programs at Colorado State University (CSU); a few students were freshmen or sophomores. First, a course description and important points from the syllabus will be divulged. Second, a detailed report of in-class observations made by me in the spring of 2008 will be described. Third, a look at the students’ Learning and Interpreting Modality Instrument (LIMI) results revealed the frequency of various learning styles among the class as a whole. Fourth, an examination of the Student Course Surveys provided a glimpse in the students’ perception of how well the class was taught and offered a learner’s impression of if the transfer of knowledge was sensed by the students or not. Finally, Dr. Turner’s personal instrumentation results were disclosed. His personal instrumentation was broken down into three categories: Dr. Turner’s personal LIMI results, Principles of Adult Learning Scale (PALS) results, and Philosophy of Adult Education Inventory (PAEI) results. A summary of data for the whole of his class’ results then follows.

International Issues in Recreation and Tourism

Course Description and Syllabus

The course was titled “International Issues in Recreation and Tourism” and focused on a concept that was a product of the Rio de Janeiro 1992 Earth Summit called sustainable tourism development. The students were organized into groups that developed service-learning projects that were applicable to particular Fort Collins community organizations and could be implemented if the groups chose to do so outside of the classroom. The course offered case studies on various service learning aspects, which related to sustainable tourism development. The course provided the students with the opportunity to explore the intervention of sustainable tourism strategies via small group service learning projects. Each project was required to be sustainable within the local community via local community companies or resources. Furthermore, the small group service learning projects were ultimately on display for public and academic interest in a public forum in a formal, interactive academic poster session displayed toward the end of the course in Lory Student Center at CSU. Community members, academics, and peers attended the poster session in April of 2008.

In-class Observations

Five class meetings were attended and observed. Each session attended was upon invitation of the professor. I was looking for any indication of active learning, which would be other than strictly verbal or visual teaching approaches. Four of the class meetings were in the classroom, and the fifth meeting was a poster session in a ballroom at the Lory Student Center on the CSU campus. Each class observation is described below.

Wednesday, April 9: Project Work Day. Today was the only day scheduled in the syllabus as an in-class workday for the service learning groups. The professor took roll and got some housekeeping done at the beginning of class. The class was organized in traditional rows of desks. There were 11 rows spanning the room. Students were scattered throughout the rows, with some sitting toward the rear of the room and others toward the front, with the majority of students gathered in the center of the classroom. There were 42 students enrolled in the class, and 38 were present today: 11 females and 27 males. Attendance was considered 100 points toward each student's total grade, with an allowance of three excused absences throughout the semester.

A service-learning group addressed the class about the cultural arts. They passed out a half-page questionnaire to their peers for feedback and collected those after a short amount of time. The first question asked the students, "Which of these icons would you be more likely to click on or visit just from first glance?" The group provided both icons via computer and projector on a big screen for the class to answer on their surveys. At this point, the professor joined the class and sat with them in their rows. He suggested that the group to put the survey on RamCT the web component of the class, so that students who were absent today could also take the survey. The group agreed with the professor to put the survey on RamCT.

At this point, Dr. Turner instructed the class to break into their service learning groups and scatter throughout the room. He encouraged them to use this time to plan their projects and stated that he and his TA would visit each group to help in any way they could with their planning. Once each group had come up with a sufficient game plan for

how to execute their project, then class was considered over for the day. The professor expected each group to use its time wisely today and solidify its project plans.

I took time with each group to understand its project and observe its work sessions. Overall, the work session was an animated exchange of ideas supported by Dr. Turner and his TA. Both the professor and the TA visited each group individually and participated in discussions at each group. Often they would guide the students by asking questions to check for their understanding of the service learning projects at hand.

Group 1 was the Composting group. They were focused on community composting in conjunction with the Whole Foods supermarket community compost. Their idea was to encourage more composting throughout the community by creating more awareness through their service-learning project.

Group 2 was the Reduce/Reuse/Resource group. They were working with the Fort Collins community ReSource store, which concentrates on acquiring used building materials for public resale and use. The group planned to market ReSource through their project and make their poster session physically interactive by using ReSource products as the poster itself. They were painting an old six-pane window so that they could use it as the backdrop for their poster.

Group 3 was the Straw Bale construction project. They were promoting a local company that specializes in Straw Bale homebuilding as a sustainable alternative to conventional homebuilding. Their aim was to make the public aware of Straw Bale homes, specifically to be built here in Fort Collins. Their tactic was to create a brochure about the company and their products to be available at the Colorado Visitor's Center on the edge of town. Dr. Turner was visiting with this group while I made observations. He

continuously asked the group thought-provoking questions with the intention of helping the group to re-think their ideas.

Group 4 was the Poudre River Awareness Event. The group planned to promote community awareness of the nationally designated Poudre River National Heritage Area, near the city of Fort Collins. The group was deliberating whether or not they could organize a river float for the public when the TA suggested that there might be less liability in offering a bike tour of the area, and immediately an idea sprang up from the group to organize a “Grand Opening” of the trail via a public bike ride.

Group 5 was the REI group. They chose to create a local adventure book to be offered at the Fort Collins REI based on REI required structure. The book was developed for locals by locals as an insider’s guidebook to hiking, biking, and climbing in the area. The top picks of places to be entered into the guidebook were based on a local public survey.

Group 6 was the Fort Collins Sustainable Eating group. They elected to draw attention to cultural aspects of local tourism by promoting local restaurants that use local resources, such as locally grown food products. The group chose to highlight CSU’s formal restaurant, the Aspen Grill, because the restaurant uses local resources. One of the group members was a Hotel and Restaurant Management student at CSU and the executive chef at the Aspen Grill. Their plan was to create a local dish and then take it on tour around town to create awareness in the public and other restaurants.

Group 7 named themselves the Go Green/Eat Green group. Though a brochure meant to be distributed to the student body on campus, awareness would be created for the public to eat locally. The brochure would focus on a variety of mom-and-pop

restaurants rather than chain restaurants, all which used local resources. The idea was to promote local restaurants that use local products, which in turn are sustainable and supported by the local community.

Group 8 elected Bike Tours/Sustainable Biking. Their aim was to develop a bike tour of Fort Collins to be offered out of a hotel, perhaps the Hilton. They were discussing if an event day would help promote their product along with a sustainable tour of town. Also, they were debating if they should have a self-guided tour or if their experience would provide a guide.

Group 9 chose Year-Round Community Farming. They were working with a local farm to create a green house that runs on geothermal energy. The group intended to sell the food produced to particular local restaurants and the Larimer County Food Bank. The other option they were debating was to distribute the food to CSU and some local restaurants.

Group 10 was working on a local website called Beet Street and was also the group that provided the survey at the beginning of the class session. The group was working with the website's designer to help improve the idea. Beet Street will connect 40+ local event calendars to one localized website.

At 1:50 pm, with ten minutes of class left, eight groups remained. Some of the groups were working on their posters while others were still discussing ideas and making group decisions. The TA shared with me that from student feedback from previous classes they had needed more work time with their groups in semesters past. Dr. Turner chose to build in work time in the syllabus as a response to his students' needs. In this

class session, the work session appeared to be productive and a place where ideas were shared and work completed.

Monday, April 21: Project Preparation. Today 39 students were present, 11 females and 28 males. This class session was geared toward practicing presenting their posters to their peers. The professor paired up the groups to take turns presenting to each other. The professor handed out judgment sheets that mimicked the judgment sheet the professor, former students, and select judges would use at the pubic form to grade each group. Meanwhile, the practice round was peer reviewed and would give each group feedback on their presentations. Each group was allotted ten minutes to present and ten minutes to have a question-and-answer session with their audience. In addition, both the TA and Dr. Turner were surfing around each group and listening to their presentations. It appeared that the professor and TA spent about five minutes with each group before moving on. The professor was taking notes.

The composting group invited their listeners to a sustainability fair to learn more about sustainability and composting. Immediately, the question and answer session began and the presentation turned into a discussion. The group brought flyers for their listeners to look at. Each member of the group spoke about their project and appeared enthusiastic. Equally, each member of the listening group had a question, which showed they were interested and listening to the presentation.

The Reduce/Reuse/Resource group planed to present at the poster session, as well as executing an awareness campaign on Earth Day. Their window from the ReSource center had been prepared as a poster and would be on display at the ReSource center on Earth Day, as well as at the poster session for the class.

The Straw Bale construction group was talking rather quietly. Only one person was speaking and many listeners were leaning forward appearing to struggle to hear what was being said. However, all the listeners were making eye contact with the speaker and many heads were nodding as a sign of agreement or understanding of their speaker. Likely, many listeners could hear the speaker but had to concentrate to hear his complete thoughts. The quietness of the presentation was a bit distracting.

The Poudre River Awareness Event had Dr. Turner in their audience when I arrived to observe their presentation. The group began to explain their project, and Dr. Turner interjected to provide some guidance. The group showed extreme passion about their project, which was revealed in excited vocal tones and body language, such as head nodding and hands-on their faces as to say “hmm” or “I hear what you’re saying.” Many listeners were leaning in toward the speaker and creating a discussion environment. Dr. Turner presented the idea of prolonging this project and helping it to grow for future classes, and he asked the students if they felt their project was sustainable. They answered “somewhat” and discovered that helping future classes build up their project was sustainable.

The REI group was finished presenting by the time I made my rounds, but the group and its listeners were talking among themselves about their service learning projects, their enthusiasm was lingering.

The Fort Collins Sustainable Eating group was extremely engaged in their presentation. The listeners were nodding their heads in agreement and asking many questions to ascertain a solid understanding of their project. The group had thorough answers for their listeners, which showed they were prepared and able to support their

service-learning project in public at the forum. The group's body language was congruent, showing agreement and support when one of their members was providing an answer. All of their heads were turned toward the speaker and made eye contact with them while nodding their heads in agreement.

The Go Green/Eat Green group was talking before class began. One student said, "I just remembered we have to present today. That's okay I have a map of our project, we can make it." This comment allowed me to know they were not fully prepared to present but were able to improvise the presentation to their peers. During the group presentation in class, each group member had valid information to share with their peers, which showed they were more prepared than originally thought before class. Each listener was making eye contact and listening intently. This group hoped to place their brochure in the Lory Student Center at CSU. Thus far, this was the second service-learning project from this class intending to take their project beyond the classroom and to the community, which directly made their learning experience haptic in nature.

The Bike Tours/Sustainable Biking group received many questions from their listeners. The entire group of presenters and listeners was engaged and both sides were providing poignant questions coupled with strong and succinct answers. It was clear this group had thought out their service-learning project in many respects. For example, the speakers brought up possible pitfalls such as legal and liability concerns, as well as bike breakdowns and flat tires. Every listener had their eyes on the speaker at all times, which indicated they were actively listening and engaged in the presentation.

The Year-Round Community Farming group had designed a greenhouse for a community farm in conjunction with a community member who does community

farming for a living. All eyes were on the speaker, and the group was paying close attention. There was passion in the speaker's voice, and a second group member added comments to the main speaker with equal passion and excitement. This group too would implement their project in the real world after the class had ended.

The Beet Street group had only one speaker. She began to explain their logo choice as a result of the class survey. Their work was described by the group member as seamless and a convergence of multiple calendars. Their group's work would also come to fruition in the real world after the course has ended.

At this point in the class the professor called for a two-minute wrap-up, and the volume in the room increased dramatically as groups attempted to finish their question and answer sessions with their peer listeners. It took the professor three times beyond the two-minute warning to regain the class' attention. Once he had their attention he asked "Was this experience worth while?" and the students answered enthusiastically, "Yes!" and, "Super!" He then asked them why this experience was worth while and the class answered in discussion format that having peers ask questions helped the groups be prepared to provide information to their onlookers that each group did not think of while making their posters. Another classmate pointed out that this experience gave them the chance to practice and articulate their thoughts before they faced the public.

Finally, Dr. Turner wrapped up class by asking who needed an electrical outlet for their poster session on Thursday. Then he asked if there were any questions. There were no questions. Lastly, he encouraged the listener groups to give their peer evaluations to the presenting groups as a source of feedback to help them to prepare for the poster session on Thursday.

Thursday, April 24: Service Learning Project Poster Session. The tone of the ballroom at the Lory Student Center was brimming with excitement. Each student was dressed professionally, and some other classes had joined in the poster session. The entire ballroom was filled with people perusing the students' posters. I had a moment with Dr. Turner as the session got underway. He shared that the poster session was an extremely active portion of the class because each service learning group:

must explain and support their projects to peers and the public at large. Also, having to do this type of activity gives the students a chance to learn from the other groups in the class as well as the other CSU courses involved in today's event. Today will give the students a glimpse of poster sessions that occur at the graduate level, as well as throughout academia, and sometimes in the work world. So this opportunity gives the students some solid active experience (C. Turner, personal communication, April 4, 2008).

Dr. Turner encouraged me to enjoy the poster session and ask questions as well. All 42 students were present.

The Composting group's station was very crowded. They stated that they loved the interaction with others and were receiving many new ideas from their visitors. They felt better organized and were ready to take their project to the Sustainability Fair to promote composting at the community level. Lastly, they shared that they were having a positive experience learning about the other groups in their class.

The Reduce/Reuse/Resource display was completely made out of materials from the ReSource center. They had had a booth at the Earth Day fair and had a strong communal response to their advertisement. What they have gained the most out of this

experience was that they had ideas and recommendations to improve that activity for next year's class.

The Straw Bale Construction group had a computer video, which showed the benefits of that type of construction coupled with a poster display. The group had enjoyed communicating with different business owners rather than just being in a classroom lecture. They all felt there was benefit to learning so much from the businesses and were better equipped to answer questions in the public forum.

The Poudre River Awareness Event had a video from last year's group in this course. Beyond the video, the group also had acquired sponsors who were equally passionate about the event from around the community. They reflected that it was amazing to see other ideas from community members and share those ideas here at the public forum. The group had the chance to experience the National Heritage Area and now felt they can talk about the Poudre River from an educational standpoint. The group conveyed "it is great when you can touch what you are learning rather than talk and have lots of chatter." Another group member added, "It means more to practice what is preached to you." The group felt they had learned a lot from other projects here at the poster session. Some ideas they got from other groups were to create brochures and surveys to connect with the public.

The REI group felt their project would make a difference in the community since their adventure book would be available at the Fort Collins REI. Their presentation included many hands-on artifacts, which suggested the various activities one can find in their adventure book, such as snowshoes, hiking boots, hiking poles, climbing harnesses, climbing shoes, a biking helmet, maps, and various guide books. The group was partial to

the public-speaking element and sharing their knowledge with others, rather than keeping their new knowledge to themselves.

The Fort Collins Sustainable Eating group cooked their display food twice to create a valid cost analysis. One group member was a chef and a Restaurant Management student at CSU. He was taking the course as an elective and had never heard of sustainable tourism before. To his surprise he discovered how sustainable tourism gels with his profession, as their project displays. Eighty percent of their food travelled within Colorado, most of that within Larimer and Weld counties, making the endeavor predominantly local. Many people had gathered at their booth. A discussion for the need of balance between accommodation of sustainability and tourism was occurring among several group members and the public. The air was passionate as I departed the booth.

The Go Green/Eat Green group had done service learning projects before and was excited to share their past experience with the class as they embarked on a service learning project. They had enjoyed the experience of learning from others during the session and found there was a lot to learn and many different organizations they would like to engage in beyond class.

Bike Tours/Sustainable Biking felt it was good to hear other classmates give strong presentations on their projects. From their experience they had gained new ideas for next year's group such as maps and slide shows of their biking routes. Their group was different because it catered to tourists out of the Hilton hotel. They learned if their project were to become a reality they would have two other competitors within one mile of their operation. As a result, they chose to enhance their project to contend with their

competitors by highlighting food, cultural events, art, parks, and Fort Collins' famous breweries, pubs, and restaurants.

Year-Round Community Farming provided a diorama of their greenhouse and photos of the farm. They also had a sponsor from the community farm they are working with join them to help support their knowledge base at the public forum, which made their presentation unique. The group was extremely proud of their work and research. Much passion and dedication was conveyed by the group, fueled by their desire to make their geothermal powered greenhouse come to fruition with the support of an existing community farmer.

Beet Street was ecstatic to share with both the class and the public that their project was already a reality, an up-and-running website. One group member said, "It is cool to say you took part in this experience here in-class which became a real thing. It feels good. I like the process of actually making things happen." The group also expressed enjoyment in finally seeing their peers' projects. They were so wrapped up in their own they had very little knowledge of what others were doing. A second group member expressed, "I get it now that I can see what people have been talking about and touch it in real life, instead of visualizing just an idea."

Monday, April 28: Service Learning Reflection Discussion. Today was the first administration of the LIML. Thirty-seven students were present, 11 females and 26 males. All students and the professor took fifteen minutes to complete the instrument. Today was the first class after the poster session, and Dr. Turner had planned to have a reflective discussion on the event.

He opened the discussion by asking, “What did you think? Does the poster session reflect what you do in-class?” One student responded, “I’d rather do it rather than boring stuff like papers and tests.” An overwhelming majority of the class shakes their head or says “I agree” or “Yep”.

Next Dr. Turner asked a series of questions on how his students learn best. He requested that they raise their hands in response to his inquiry. “How many of you learn best by reading?” No hands were raised. “How about hearing?” Two hands went up. “Does anyone learn best by hearing and reading?” Four hands were raised. “What about learning best by reading and doing?” About 90% of the class’s hands rose, indicating through the professor’s inquiry that an overwhelming majority learn best by reading and doing.

He accentuated that sustainability stresses the importance of keeping things local, and that applied here in Fort Collins or across the world in Berlin, “hence International Issues in Recreation and Tourism is the name of my course.” From this comment participation began to engage throughout the class. Almost every student shared their views and what they had learned this semester very openly. Dr. Turner was writing their comments on the board and many students were waiting their turn to share. I saw the majority of students with smiles on their faces and many of them resting their chins on their hands in a reflective state.

Dr. Turner then asked, “How would you change the service learning project?” One student responded that to “actually carry out last semester’s project plan, for example my group would have taken us all on a tour of the community farm.” A second student suggested, “Lengthening out the time frame on the project itself.” Finally, a third

student requested “more space between case studies and the service learning segments on the syllabus, so we can be more elaborate with our projects.” Dr. Turner said, “The fact that the presentation occurred doesn’t mean that the project is over. We still have two weeks left in the semester.” Another student said, “Let us use the past project from other semesters as the case studies we look at in-class to help propel forward the service learning concept.” Dr. Turner replied, “That’s an interesting idea.” Two students spoke in tandem and declared, “We think the case studies are important,” “But a more current book or current case studies.”

Finally, Dr. Turner asked, “What is the value of this dialogue?” The answers he received were “to get the students’ opinions,” “helping future students,” “giving the best opportunity to future students,” “we [current students] will promote the class to future students by word of mouth,” “our suggestions help you make improvements in the class,” “this dialogue helps us to process the class and the experience we’ve had this semester,” and finally, “it is important we talk now because our thoughts are fresh.” Many students said nearly at the same time “the class went well.”

Then Dr. Turner offered the results of the poster session as determined by former students, select judges, and Dr. Turner. First, he asked the students’ guess of how the results played out. They answered that first place went to REI due to appeal and the fun factor; second place to Fort Collins Sustainable Eating because they stayed local and had a different approach; third place to Straw Bale Construction because the project was different, they were knowledgeable, and they stayed local; and fourth place to Bike Tours/Sustainable Biking because it was sustainable and promoted local tourism.

Dr. Turner then shares the results as follows: Popular Results: first place – Year-Round Community Farming; second place – REI; and third place – Poudre River Awareness Event. The Judge’s Results: first place – Beet Street; second place – REI; and third place – Year Round Community Gardening. Finally, from Dr. Turner’s perspective he saw: first place – REI; second place – Beet Street; third place – Straw Bale Construction, and a close-behind third place for fourth place – Reduce/Reuse/Resource. Dr. Turner explained that he made his choices based on how much guidance they offer the community at large. He closed class with, “Nice job, everyone,” and let the class go early.

Monday, May 5: Second LIMI administration. Today was the second LIMI administration. There were 38 students present, 11 females, 27 males, and Dr. Turner. The LIMI took about 15 minutes; I was excused from class because the service learning segments I was invited to had ended.

Student LIMI Results

The LIMI classified a participant’s learning style into three percentage-based classifications (auditory, visual, and haptic learning styles), and added up cumulatively to 100 % across three categories. Providing their attendance in-class, the LIMI was administered to the majority of the subjects in Dr. Turner’s International Issues in Recreation and Tourism class. Figure 5.1 provided a view of the dominant learning styles found in Dr. Turner’s class. Each category was denoted by the type of learning style. The administration was to 37 students. Further, it was pertinent to the study to ascertain the volume of haptic learners. The figure seems to show the haptic learning style as the leading learning style at 49% followed closely by visual at 41%, with both auditory and

visual/haptic each obtaining 5% of the class's population. It was important to mention that combination dominant learning styles meant that the person taking the LIMI scored equally high in both categories, therefore creating a split of two learning styles for their overall dominant learning style. In this case, 5% of the population scored equally dominant in both visual and haptic learning styles.

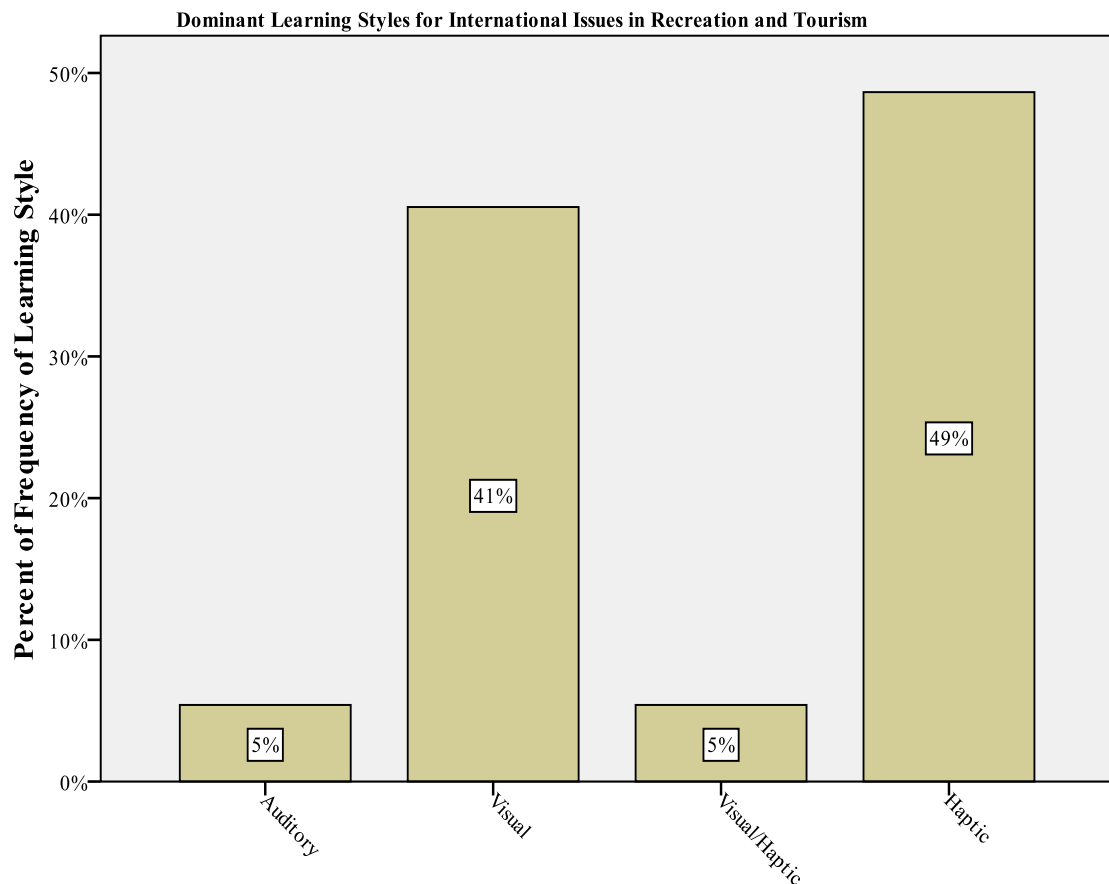


Figure 5.1. Dominant learning styles for International Issues in Recreation Tourism

Histograms presented a more detailed look at the haptic learners within the testing set of the LIMI. Figure 5.2 displays the percentage a learner tends to be Haptic. The LIMI placed the learner into the three categories (visual, auditory, and haptic), based on a percentage, which always added up to 100% as the design of the LIMI. For example, a

learner may have been assessed by the LIM I as having 9% auditory, 22% visual, and 69% haptic, which sum to 100%. The histogram below will look at the frequency of percentages of haptic classifications of each learner and did include a bell-curve shape implying a normal, functional data set. Figure 5.2 indicated that 28 of 37 students fall in the haptic range between 30% and 50% on the LIM I. This data appeared to show that 12 haptic learners were above 50% of dominance of the overall 100% scale devised within each personal LIM I test.

Histogram for Haptic Learners in International Issues in Recreation and Tourism

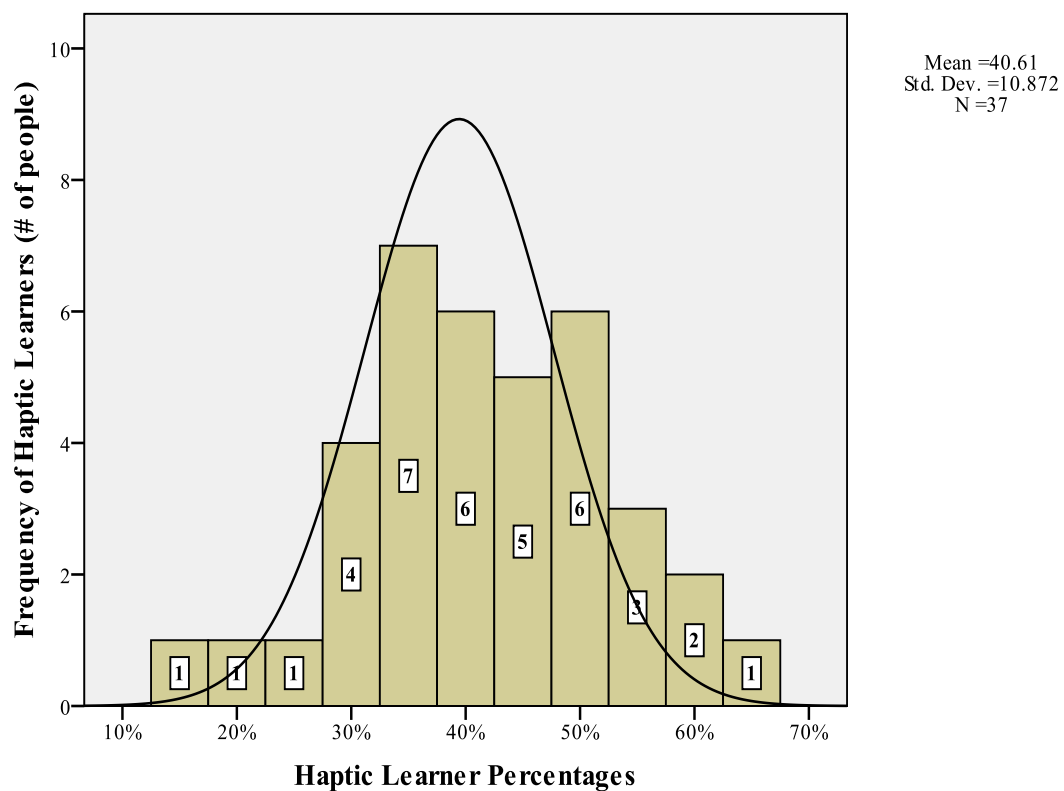


Figure 5.2. Frequency of hapticness in the learners of International Issues in Recreation Tourism

Student Course Survey Results

The Student Course Survey disclosed the student's opinions and views about how well the course was taught. A few of the questions in the survey were important to pay special attention to in regard to this study, relating to whether or not the accommodation of haptic learners was achieved in the course. Questions 4-7, 10-13, and 15-17 garner information relating directly to whether haptic learners felt accommodated in throughout the course. These 11 questions were of particular interest in regard to the accommodation of haptic learners and were focused on as indicators if learners felt accommodated by their professor. Dr. Turner was reviewed by 47 students for his International Issues in Recreation and Tourism course. Not all 47 students answered all of the questions, however at least 42 students answered every question on the Student Course Survey. He received solid positive reviews on all 11 questions; with the vast majority of the answers in the "strongly agree" and "agree" categories in the Course Student Survey report (see Table 5.1 for complete report). Forty-nine percent of Dr. Turner's students were dominantly haptic according to their LIMI results. Since almost half of his class was dominantly haptic and the vast majority of responses from his students were "strongly agree" and "agree;" it is believed that from the student's view, Dr. Turner did accommodate his haptic learners in this class. Below in Table 5.1, the complete Student Course Survey results are revealed, including the 11 questions of particular interest from Dr. Turner's Student Course Surveys for his International Issues in Recreation and Tourism course in the spring of 2008 at CSU. There were three demographic questions from the Student Course Survey; again not all 47 students answered every question. The class was made up of 1 (2%) Freshman, 5 (12%)

Sophomores, 29 (67%) Juniors, and 8 (19%) Seniors. The majority of students were in Natural Resources major or 30 (70%), 13 (30%) students were non-majors. Out of the 47 students who filled out the survey, 42 answered what grade they expected, 17 (40%) expected to receive an “A” grade and 25 (60%) expected to receive a “B” grade.

Table 5.1

Student Course Survey for International Issues in Recreation and Tourism

QUESTION	SA	A	N	D	SD	NA
1. Course objectives were clearly stated	14	24	3	2	0	0
2. Grading system was clearly explained	11	25	4	3	0	0
3. Text/course materials were appropriate	12	18	8	5	0	0
4. Course was intellectually challenging	15	23	4	3	0	0
5. Assignments increased my understanding	20	16	5	2	0	0
6. Class sessions increased my understanding	17	17	4	5	0	0
7. Overall, I would rate this course as good	18	16	4	3	1	0
8. Quality of the classroom/facilities was good	12	25	5	0	1	0
9. Quality of the technology used was good	11	28	2	1	1	0
10. Teacher was knowledgeable about the subject	27	11	3	1	1	0
11. Teacher was enthusiastic about the course	27	14	1	1	0	0
12. Teacher organized the course effectively	14	18	7	3	1	0
13. Teacher was prepared for class sessions	23	18	1	0	0	0
14. Teacher was fair/impartial assigning grades	16	17	6	3	1	0
15. Teacher created atmosphere of learning	22	17	2	1	1	0
16. Teacher created atmosphere of respect for students	23	17	1	1	1	1
17. Teacher was willing to help students	17	16	6	1	1	2
18. Overall, I would rate this teacher as good	25	11	4	2	0	0
19. I put considerable effort into this course	16	24	3	0	0	0

Note: The survey is portrayed via a Likert scale with the following key: SA, Strongly Agree; A, Agree; N, Neutral; D, Disagree; SD, Strongly Disagree; and NA, Not Applicable.

Calvin Turner-Personal Instrumentation Results

Learning and Interpreting Modality Instrument (LIMI) Results

Dr. Turner was dominantly a visual learner at 42.5%, followed closely by a haptic learning style at 37.5% and much less an auditory learner registering at 20%. His dominant learning style preferences seeing, looking, reading, and watching; he also learns well by doing, touching, feeling, hands-on, tactile, and active experiences.

Principles of Adult Learning Scale (PALS) Results

Dr. Turner was nine points below the mean total score based on a normalized mean developed by Conti (1990), the instrument creator. The highest possible total score was 220. He was in the 87th percentile for the learner-centered Activities category, which indicated that he leaned especially strong toward learner-centered Activities. On the other hand, nearly half the time or 49% was he inclined to Personalize Instruction or otherwise teacher-centered in his learning/teaching paradigm.

Other strengths revealed by the PALS were considered secondary to denoting whether an individual was inclined to be more learner-centered or teacher-centered in their learning-teaching paradigm. The sub-categories depicted a strong 70% preference to Climate Build; closely behind he had a 67% inclination toward Relating to Experience; and showed a 60% partiality in Flexibility for Personal Development. Each of these categories supported, signified, and integrated in the nature of nuance surrounding Dr. Turner's preference to be a learner-centered teacher. See Table 5.2, which shows Calvin Turner's complete PALS results.

Table 5.2

Calvin Turner PALS Results

Factor	Turner's Score	Mean	± from the Mean	Standard Deviation
Learner-centered Activities	52	38	+14	8.3
Personalizing Instruction	22	31	-9	6.8
Relating to Experience	20	21	-1	4.9
Assessing Student Needs	5	14	-9	3.6
Climate Building	14	16	-2	3.0
Participation in the Learning Process	9	13	-4	3.5
Flexibility for Personal Development	15	13	+2	3.9
<i>TOTAL SCORE 137</i>				

Philosophy of Adult Education Inventory (PAEI) Results.

Dr. Turner's personal teaching philosophy was balanced with two categories sharing first place and two alternate categories sharing second place, followed by third place for the remaining category. He favored both the categories of progressive adult education and of radical adult education. Zinn (1990) described the progressive philosophy as "promoting societal well being, enhancing individual's effectiveness in society, giving learner's practical knowledge and problem-solving skills" (p. 73). Where teachers tended to perceive their learners as "people have unlimited potential to be developed through education" (p. 73) and see their "needs, interests and experiences are fundamental elements in learning" (p. 73). In the progressive view the teacher would organize their class by "guides[ing] learning through experiences that are educative and stimulates[d], instigates[d], and evaluates[d] the learning process" (p. 73). Furthermore, and equally Dr. Turner's tendency to prefer a radical view of adult education would

“bring about through education fundamental social, political, and economic changes in society” (p. 73). According to Zinn (1990, p. 73), the teacher tended to assume the role of the coordinator who suggested which route learning could go but did not dictate the direction of learning for the students. Furthermore, the radical teacher saw their student as an equal in the learning process where both stakeholders were invested in the endeavor to learn with the purpose of learning, obtaining “personal autonomy; people create and change history and culture by combining reflection with action” (p. 73). In summation, Dr. Turner predominantly adopted a balance of both the progressive and radical philosophies for adult education.

Secondary influences were revealed also as a balanced embodiment of two teaching philosophies, the behavioral and humanistic perspectives. First, the behavioral perspective promoted “skill development and behavioral change” along with “compliance with standards and societal expectations” (Zinn, 1990, p. 73). The learner assumed an active roll in the learning process by practicing new learned behaviors and receiving feedback from the teacher. Moreover, the learner’s experience was under “strong environmental influence” (p. 73). The teacher’s assumed function was “a controller” and “manager” of the class by “predict[ing] and direct[ing] learning outcomes” typically through teaching methods such as “programmed instruction, contact learning, criterion referenced testing, computer-aided instruction, and skill training” (p. 73). Additionally, the humanistic view bared the same weight in Dr. Turner’s secondary teaching philosophy outlook. The humanistic view “enhance[d] personal growth and development” while facilitating “self-actualization” (p. 73). The teacher was the facilitator who encouraged “experiential learning; group tasks; group discussion; team

teaching; self-directed learning; individualized learning; [and the] discovery method” (p. 73). The learner was “highly motivated and self-directed [and] assumes responsibility for [their] learning” (p. 73). Like his dominant category of the PAEI, Dr. Turner equally shared two philosophical perceptions in his secondary category, the behavioral and humanistic philosophies in adult education. See Table 5.3 for complete PAEI results for Calvin Turner.

Table 5.3

Calvin Turner PAEI Results

Philosophy of Education	Numeric Score	Influence on Professor's Cumulative Philosophy
Progressive Adult Education Education for Practical Problem-Solving	88	Highly Favored
Radical Adult Education Education for Major Social Change	88	Highly Favored
Behavioral Adult Education Education for Competence and Compliance	83	Some Influence
Humanistic Adult Education Education for Self-Actualization	83	Some Influence
Liberal (Arts) Adult Education Education for Intellectual Development	75	Moderate Influence

Summary for International Issues in Recreation and Tourism

Chapter 5 disclosed the results for Dr. Turner's course in International Issues in Recreation and Tourism. The results began by examining at his course description and syllabus. The course focused on service learning and a class service-learning project followed up by an academic poster session. The next section of the results revealed in-class observations made by me upon invitation of the instructor. The majority of the observations were made in a traditional classroom, with the exception of the poster

session, which took place at the Lory Student Center on the CSU campus. The student LIMI results were then reported with 49% of the class registering as dominantly haptic and 41% as dominantly visual, a close second place. Following the students' LIMI results was the Student Course Survey, which revealed the students' opinions of Dr. Turner and his course. The results showed the students favored Dr. Turner and his course, International Issues in Recreation and Tourism. Finally, the last segment of results reported were Dr. Turner's personal instrumentation of the LIMI, PALS, and PAEI. His LIMI revealed he was dominantly a visual learner followed by a secondary dominance in haptic learning style within five percentile. His PALS results showed a strong preference for learner-centered Activities. Lastly, the PAEI instrument divulged that he highly favored both the philosophy of Progressive Adult Education and of Radical Adult Education.

CHAPTER 6: ROSS MCQUIEN RESULTS

Chapter 6 showcases Dr. Ross McQuien and three of his courses. First, each separate course will consecutively have a course description following by their corresponding in-class observations, student Learning and Interpreting Modality Instrument (LIMI) results, and Student Course Survey results. Once each course has been reported, Dr. McQuien's personal instrumentation results will ensue. The courses will be examined in the following order: "Environmental Communication;" "Recreation Measurements;" and "Natural Resources History and Policy."

Environmental Communication Results

Course Description and Syllabus

The Environmental Communication course of the Spring 2008 consisted of 110 students who met in a large lecture hall on the Colorado State University (CSU) campus. The class met three times a week for 50 minutes each session from 9:00 am to 9:50 am. The course focused on both theoretical and applicable lessons in interpretation, environmental communication, and education. Students were provided a variety of experiences to apply positive communication skills toward tasks that required specific communication outcomes. Lastly, the students were required to attend a self-guided field trip throughout Fort Collins to evaluate environmentally interpretive media. I was unable to observe each objective being presented in this class; many of these objectives were approached and fulfilled during my observations.

In-class Observations

Four class meetings were attended and observed. Each session attended was upon invitation of the professor. I was looking for any indication of active learning, which would be other than strictly verbal or visual teaching approaches. All of the class meetings were held in a large lecture hall. Each class observation is described below.

Friday, April 4: Environmental Behavior Change Theory. There were 65 of 110 students in-class today; 28 females and 37 males. Dr. McQuien opened the class with 11 review questions posted on the overhead machine. The students wrote down the questions. He reminded them that the review questions were intended for the final exam and that the final exam was not cumulative. This process took about eight minutes.

Next, Dr. McQuien distributed handouts to the students for in-class group work. They were working on outdoor scenarios in groups. While distributing handouts, he asked the class a question regarding course content and received blank stares in return. He responded to their stares by telling the students to “look the answer up in your notes.”

At 9:15 am, chatter began due to group work assignments. Dr. McQuien bounced from group to group and talked to the students about the application of what they were learning regarding the handout correlating with course content. Some students were checking their notes while others were brainstorming as a group. Meanwhile Dr. McQuien put the review questions back on the overhead for students to complete copying them. He then continued to roam the room from group to group.

One student exclaimed, “I just hope we get the five extra points.” The student was referring to five extra points, which Dr. McQuien called “Freedom Points” in his syllabus, which were to be added to the student’s point total at the end of the semester if

the student had completed all assigned work. Two students chose to work on their own without a group. The majority of the class seemed happy with the group work project as observed by an increasing volume in the lecture hall.

At 9:25 am the first student left the class. Dr. McQuien was having engaging conversations with many of the groups. At 9:30 am two more students leave. Lots of smiles were seen on the rest of the students and everyone was working together. Dr. McQuien came to help the group where one of the members recently stated, "I just hope we get the five extra points." He engaged with the group through guided discovery by providing many examples or possibilities as potential answers to their worksheet. The students engaged and volleyed back to make their ideas into answers that worked for their assignment. At 9:35 am, over half of the class had gone. Many students had last-minute questions for the professor, which he addressed. At 9:40 am Dr. McQuien began to clean up the lecture hall.

The TA never engaged with the class during this session. He sat up front and wrote madly in a notebook. At 9:40 am, three groups were still working hard and conversing. All of the students were enthusiastic, as they were completely participating in their group work. At this point, one group approached the TA for help. He was able to help, again through guided discovery. One student said, "My project is only two pages and it's supposed to be four," and the TA responded, "Create a table." At this point class was over.

Wednesday, April 23: Communicating Risk and Scientific Uncertainty.

Sixty-six students were in-class, 22 females and 44 males. Dr. McQuien handed their papers back. He then discovered that he had technical difficulties with his computer and

projector. He resolved the issue by putting up the same information on an overhead projector.

The overhead was about ten risks, which he asked the students to rank from one to ten. He related the activity to the students by telling a story about his aunt falling in a hole and joked that one had a better chance of being hit by an asteroid or being in a terrorist attack. The class laughed, was sitting forward in their chairs, seemly engaged, and loud. Dr. McQuien used the ranking activity as an engaging icebreaker for his current topic for the course.

He then pulled up a PowerPoint presentation, which concentrated on communication and risk. Many students were smiling and looking around at each other; there was a lot of group chatter. He introduced a perceived risk as the three-ounce bottles required for liquids in carry-on luggage found at airport security. He pointed out that there was a difference between perceived risk and actual risk. To display this fact, he shared an actual risk of losing a child in a store and said that the risk-management tool to prevent the actual risk was a device called a child locator. Furthermore, he added that parents also used child leashes and nanny cameras to prevent actual risk. The class was laughing and loving the jokes Dr. McQuien was making. His jokes maintained student interest in his lecture. He mentioned that bulletproof backpacks were introduced to the market two days after the Columbine shooting and that thousands of kids die every year, which validated the actual risk he was presenting. The students snorted and sighed as an acoustical signal of agreement to Dr. McQuien's point about actual verses perceived risk.

Now Dr. McQuien related his topic to their major, Natural Resources, by listing actual versus perceived risks, such as: wildfire, West Nile virus, wildlife, travel safety,

and kids being outside. He asked students open-ended questions that were rhetorical in nature. The students answered the questions never-the-less, which showed the maintenance of their in-class engagement. Dr. McQuien brought the conversation back around to perceived risk and introduced the concept of balance between risk management between both perceived and actual risks. Many students were nodding as a sign of understanding, ten people were taking notes, and five people were reading the newspaper in the back row of the class. The tone was very serious in the class; this was denoted by how quiet the class was, coupled with the fact that all but the newspaper readers were learning forward. Dr. McQuien gave a formula for calculating risk; 100% of the class wrote the formula down. Furthermore, he shared a PowerPoint slide that was bulleted and highlighted perceived risk. Again, 100% of the class wrote this information down. Interestingly, the newspaper people were paying at least peripheral attention, which was shown by the fact that they take some notes at pertinent times although their attention is not fully directed to the class and Dr. McQuien's lecture.

The time was 9:48 am, with three minutes left in-class. Students were starting to become antsy and fidget; even so, they continued to take notes. The overall experience in-class this day was in lecture format. The majority of the students were taking notes, facing forward, and actively showing they were engaged and paying attention to Dr. McQuien's lecture.

Monday, April 28: Discussion of Evaluation Projects and Evaluation Projects

Due. The administration of the first LIM1 occurred at the beginning of class and took about 10 minutes. There were 80 students in-class today; 34 females and 46 males.

The students had a class assignment called the “self-guided evaluation report” where they had to take a self-guided field trip to various locations around Fort Collins and report on the different types of environmental communication they encountered. This class was a planned discussion of their complete self-guided field trip experience.

Dr. McQuien opened the class with a PowerPoint picture of the ELC, which was one of their destinations. He asked an open-ended question, and one student raised her hand and answered. Shortly, other students provided additional information to add to the original answer. Dr. McQuien led the discussion in order to provide course relevance. He did this by asking the class to name two advantages of the self-guided trail at the ELC. No one answered. He reminded them that they might see this information on the final exam. Suddenly, every student sat up in their desk and began to take notes. Dr. McQuien highlighted that the self-guided trail catered to visual learners. He also mentioned that it gave total control to the visitor of where to go and what to choose to read, which in turn, took the intimidation factor away that could exist when dealing with a guide, and further a self-guided trail was less expensive than other alternatives.

He then asked, “What are the disadvantages of a self-guided trail?” At this point the class was beginning to engage in the discussion. One student answered, “With the self-guided trail you can’t get more information or ask questions.” Another replies, “A guided hike works better for an auditory learner because they can listen to someone share information.” The discussion showed evidence that the students were learning because there was no redundancy in their answers.

Next Dr. McQuien asked the students to apply their experience to their readings in-class. He asked them if the readings had a message as a prompt. One student knew the

answer, “to help get kids back into nature.” Dr. McQuien added that role modeling of the adults was important for kids to get back into nature. At this point, much of the class felt inspired to add comments relating to the topic. Each comment was different from the others mentioned. Most of the comments were about using the trail appropriately, rather than going off the trail and creating unwanted braided trails. It was important to note that the trail sign the class was discussing does ask hikers to follow “Leave No Trace” principles, including exercising minimum impact skills, by staying on designated trails. The discussion evolved to conjoin the importance of staying on the trail and coupled with the importance of positive role modeling from adults who assist in helping children, so that the children would learn these principals and skills.

Dr. McQuien dimmed the lights and I heard yawns throughout the class. He had the self-guided fieldtrip questionnaire up on the PowerPoint screen. He pointed to a specific question and asked the students, “Did you answer this question?” The class gave blank stares, and Dr. McQuien was struggling to get them to respond. Finally, out of the silence one student spoke. He was happy she answered the question.

Next he put up a photo of the “garbage garage” which was found at the Fort Collins dump and asked, “Who loved the garbage garage?” This time the students sat up in their seats, and many raised their hands and had smiles on their faces. Dr. McQuien highlighted “Bloom’s Taxonomy” on the big screen and it was apparent that the class was familiar with this information. He asked how the garbage garage catered to different cognitive abilities. Suddenly, there was more enthusiasm in the room displayed in the tones of the students’ voices. Two students were answering at the same time. The time was 9:40 am, with ten minutes left in-class. Out of 80 students, all but four seemed to be

engaged and alert to the ensuing conversation. One student was sleeping in the back row, while three others were reading the newspaper, also in the back row.

One student in particular was volleying most of the conversation back to Dr. McQuien. The majority of the class was following the conversation like a tennis match, with their heads following from one speaker to the other. Finally, a student in the back row spoke up. This was the first time he had spoken since I began making observations in this class. Meanwhile, the volley near the front of the class continued. Dr. McQuien interrupted the volley and addressed the student in the back of the class. The student in the back row repeated himself and his comment had now entered the discussion. Suddenly, the back of the room lit up with comments, and various others from around the lecture hall began to add to the dialogue as well.

At this point, Dr. McQuien began to relate to the students by bringing up one of their favorite hangouts, the New Belgium Brewing Company. He brought the brewery up to highlight that they have had much power in the community, both as a positive influence by a direct result of their reputation and as an innovative green approach to running a successful business. He added that the brewery was visited by droves of tourists, locals, and students consistently every year. The tone in response to the professor was identifying, agreeing, reassuring, and relatable. This was displayed by the entire class, all 80 students faced forward, were learning into the conversation, some were nodding their heads, others commented in agreement, and every student exhibited this behavior. Then Dr. McQuien wrapped up the class by asking, “Who has the ability to effect 23,000 students on CSU’s campus? The answer is Natural Resources students. For example, how many times have you heard other people on campus say, ‘Why are the

Natural Resources students always so thirsty?” The entire class burst out into laughter with comments like, “That’s true,” “That’s good,” or, “I agree.” Dr. McQuien continued through the identifying laughter and said, “It’s because we are sustainable and eco-friendly and carry our own water bottles. Well, others have noticed. The more they ask about it, the more they will learn how important it is to have your own water bottle, rather than create extra waste on cups or disposable bottles, right?” The class responded with a unanimous, “Right!” as they pack up and left the room, still chuckling to themselves.

Monday, May 5: Review. There were 82 students in the class, 42 males and 40 females. Dr. McQuien was passing back their papers and explained to the students how to find out their running grade for the course so far, so they can figure out how well they needed to do on the final in order to get the grade they desired. The TA began to give a tutorial on the big screen via computer to show the students how to navigate in RamCT to find their current standing grade. The tone was serious, and everyone was paying attention. Many were taking notes. The second LIMi administration then took place and took about 10 minutes. During the LIMi administration, Dr. McQuien did classroom housekeeping. He handed back their self-guided field trip papers. He also handed back other papers students had not picked up throughout the semester.

Once the housekeeping was finished, he turned the class’s attention to review for the semester. He began on the self-guided fieldtrip. Today they were talking about Coyote Ridge Natural Area, one of their stops on the self-guided fieldtrip. He reviewed the questions directly on the assignment and had the students verbally respond. He did this by prompting them to answer the questions with the same word that they had on their assignments. He began the conversation by asking them, “Do you care who takes your

tax dollars to preserve natural areas?” The question immediately engaged the class, and many students began to comment around the room. The discussion evolved into how their tax dollars go to many things, like buying new police cars. Dr. McQuien had a PowerPoint presentation, which displayed the answer to his question, evidence of various ways their tax dollars are being spent at Coyote Ridge Natural Area. A few examples were the kiosk signs, parking lot, and trail maintenance. Meanwhile, four students were doing crosswords in the newspaper; all were sitting in the back row.

He showed the students some photos of various kiosk signs. One he pointed out was very positive in its verbiage and a second was riddled with the word “No” all over the sign. He explained that the softer approach was the positive approach rather than the negative approach, which was filled with the word “No.” Dr. McQuien then asked the students, “Which take do you think is more effective?” Unanimously the class exclaimed, “No.” Dr. McQuien told them they were correct and that it took an average of 31 seconds to absorb information from a kiosk written in a negative fashion, and much longer to ascertain a positively slanted sign; therefore, the negative sign was more effective on the public at large.

Most of the students were facing forward and watching the professor as he moved across the front of the classroom; some were even leaning forward, which was a display of body language that signifies attention and interest. Some students raised their hands, while others were articulating comments right away. One of the students pointed out that the signs needed to be written for a certain age range and possibly for children to be able to read, or they should have a section, which speaks just to children. One example Dr. McQuien pulled up was a sign made for children at an adult kiosk that showed a nature

scene with questions beside the photo for the children to interact with and answer. For example, one said, “Can you find the deer?” and another said, “Touch the snake head.” Dr. McQuien commented that, “Signs in general should be written at the 6th grade level.”

Next, he moved on to a conversation about their visitation to the New Belgium Brewing Company and the Avery House. Some students were starting to doodle, while throughout the classroom people were shifting in their seats and getting restless. Even episodes of small side conversations were occurring throughout the classroom. Dr. McQuien asked the class to “settle down.” He moved on to inquire about environmental literature that the students found at the New Belgium Brewing Company and their tour at the Avery House. The Avery House was an old historic homestead established by one of the founding fathers of Fort Collins, Colorado. He tried to maintain their attention by directing them and saying, “If you are not sure of the answers to my questions, look at your assignment.” One student answered that her tour guide was 95 years old and shared many stories of when she was a little girl in Fort Collins.

Next, Dr. McQuien asked the class about any adult learning that was evident in their self-guided fieldtrip. Their answers were listed on the board at the front of the class as follows: 1. voluntary; 2. self-guided; 3. by asking what you wanted to see by the guide; 4. Relevance; and 5. history/location/Avery house. As the list was being made, students were raising their hands to provide answers. Dr. McQuien seemed to know everyone’s name. Meanwhile, most of the class was beginning to get restless again. Dr. McQuien responded by asking the class for a second time to “please be quite”. The time was 9:45 am. He chose to end class a few minutes early and wrapped up the conversation.

Student LIMI Results

The LIMI separated a participant's learning style into three percentage-based classifications (auditory, visual, and haptic learning styles), and added up cumulatively to 100% across three categories. The LIMI was administered to the majority of the subjects in this study, with the consideration of their attendance in-class. Figure 1 provided a view of the dominant learning styles found in Dr. McQuien's Environmental Communication class. Each category was denoted by the type of learning style. The administration was to 77 students. Further, it was pertinent to the study to ascertain the volume of haptic learners. The figure seemed to show haptic learning style as the predominate style at 45% followed closely by visual at 43%, with auditory at 6%, visual/haptic was 4%, and auditory/haptic at 1% of the class' population. It was important to mention that combination dominant learning styles meant that the person taking the LIMI scored equally high in both categories, therefore it created a split of two learning styles for their overall dominant learning style. In this case 4% of the population scored equally dominant in both visual and haptic learning styles and 1% of the population scored equally dominant between auditory and haptic learning styles. Lastly, if you collaborate all learning styles that exhibit haptic dominance (which include haptic, visual/haptic, and auditory/haptic), the total percent of the populace with haptic dominance was 50% of the class. Below figure 6.1 shows the percentage of frequency of their learning styles in Environmental Communication.

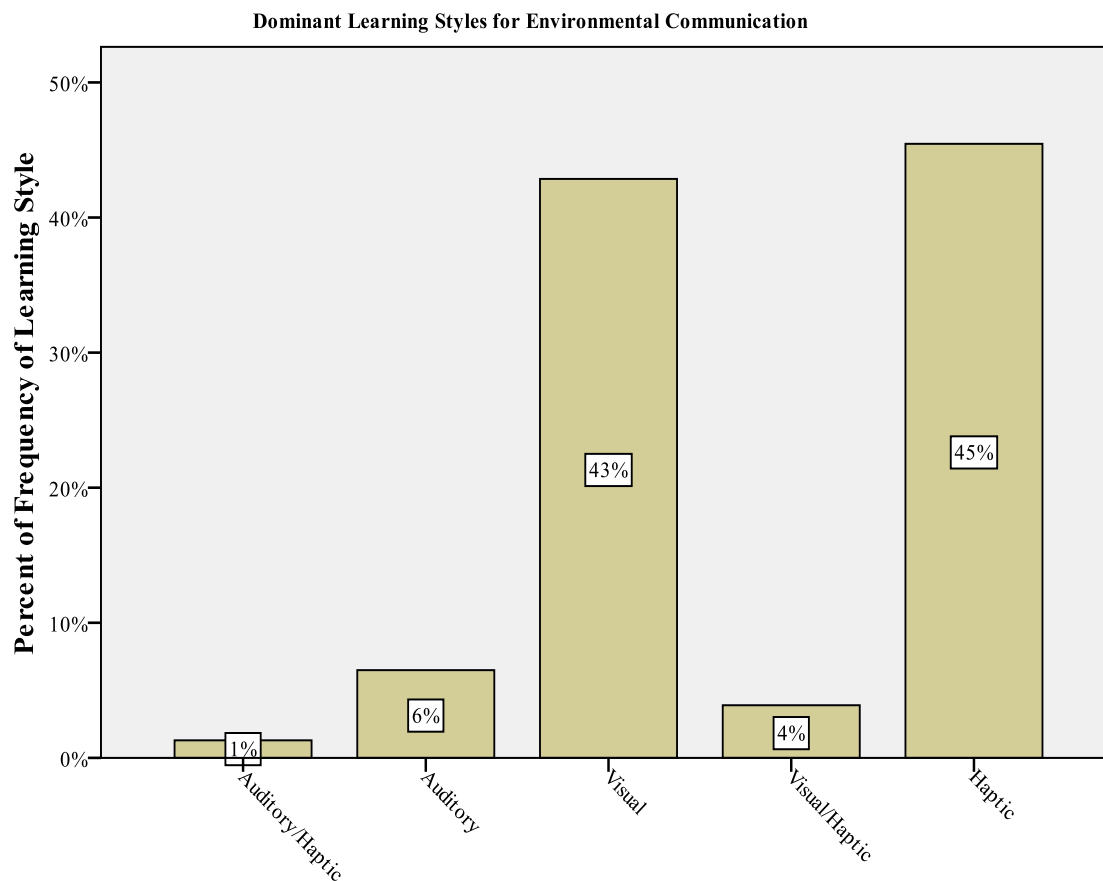


Figure 6.1. Dominant learning styles for Environmental Communication

Histograms provided a closer look at the haptic learners in the testing set of the LIMi. Figure 6.2 displayed the percentage a learner tended to be Haptic in Dr. McQuien's Environmental Communication class. The LIMi placed the learner into the three categories (visual, auditory, and haptic), based on a percentage that always added up to 100%. For example, a learner may be assessed by the LIMi as having 30% Auditory, 18% Visual, and 52% Haptic, which sum to 100%. The histogram below examined the frequency of the percentages of the haptic classifications of each learner in Environmental Communication and included a bell-curve shape implying a normal, functional data set. Figure 6.2 indicated that 45 of 77 students in Dr. McQuien's

Environmental Communication class fell in the haptic range between 30% and 50% on the LIMI, with a notable spike of 17 students registering at 37.5% on the LIMI collective scale. This data appeared to show 18 haptic learners are above 50% of dominance of the overall 100% scale devised within each personal LIMI test.

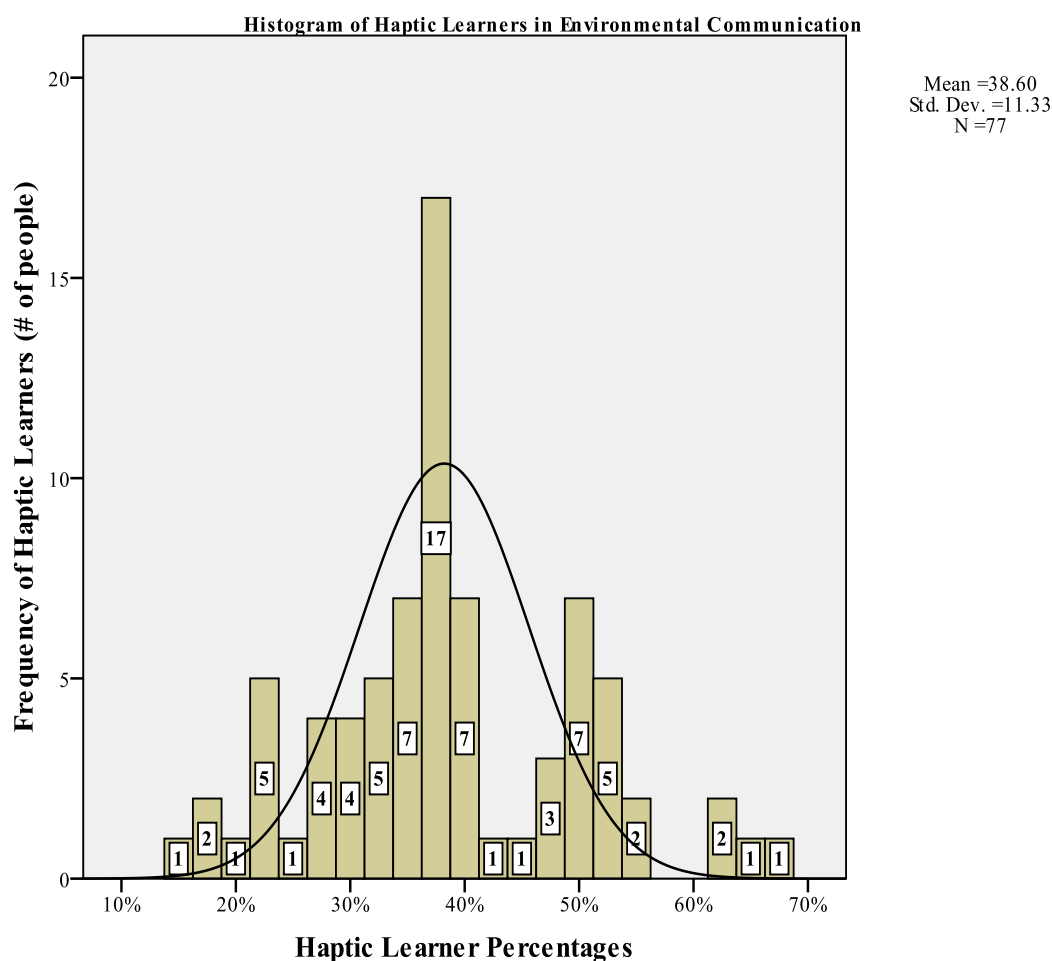


Figure 6.2. Frequency of hapticness in the learners of Environmental Communication

Student Course Survey Results

The Student Course Survey shared the students' opinions and views of how well the course was taught. A few of the questions in the survey were significant and required particular attention in regard to whether or not the accommodation of haptic learners was

achieved in the course. Questions 4-7, 10-13, and 15-17 revealed information relating directly toward whether haptic learners felt accommodated throughout the course. These 11 questions were of particular interest in regard to the accommodation of haptic learners and were focused on as indicators if learners felt accommodated by their professor. Dr. McQuien's Environmental Communication was surveyed by 77 students. All 77 students answered all of the questions except four questions where one student did not answer the particular question on the Student Course Survey. Dr. McQuien overwhelmingly received positive reviews from his students on all 11 questions; with the greater part of the answers in the "strongly agree" and "agree" categories in the Course Student Survey report (see Table 6.1 for complete report). Nearly half of his Environmental Communication class or 45% of students were dominantly haptic according to their LIMI results. It was determined that Dr. McQuien did accommodate haptic learners in this class and the student's responses on their Student Course Survey implied the same conclusion from the students, as the bulk of responses from his students were "strongly agree" and "agree." It is believed that from the student's view Dr. McQuien did accommodate haptic learners in this class. Below in Table 6.1, the complete Student Course Survey results are revealed, including the 11 questions of particular interest from Dr. McQuien's Student Course Surveys for his Environmental Communication course in the spring of 2008 at CSU. There were three demographic questions from the Student Course Survey; again not all 77 students answered every question. The class was made up of 4 (5%) Freshman, 30 (40%) Sophomores, 24 (32%) Juniors, 17 (22%) Seniors, and 1 (1%) Graduate student. The majority of students were in Natural Resources major or 74 (97%), 2 (3%) students were non-majors. Out of the 77 students who filled out the survey, 76 answered

what grade they expected, 28 (37%) expected to receive an “A” grade, 41 (54%) expected to receive a “B” grade, and 7 (9%) expected to receive a “C” grade.

Table 6.1

Student Course Survey for Environmental Communication

QUESTION	SA	A	N	D	SD	NA
1. Course objectives were clearly stated	38	36	2	0	1	0
2. Grading system was clearly explained	38	35	2	0	2	0
3. Text/course materials were appropriate	33	29	10	5	0	0
4. Course was intellectually challenging	30	34	11	1	1	0
5. Assignments increased my understanding	39	31	5	2	0	0
6. Class sessions increased my understanding	40	32	3	2	0	0
7. Overall, I would rate this course as good	41	29	5	1	1	0
8. Quality of the classroom/facilities was good	22	38	11	5	1	0
9. Quality of the technology used was good	28	42	6	0	1	0
10. Teacher was knowledgeable about the subject	59	17	0	0	1	0
11. Teacher was enthusiastic about the course	57	18	1	1	0	0
12. Teacher organized the course effectively	45	27	4	0	1	0
13. Teacher was prepared for class sessions	45	31	0	0	1	0
14. Teacher was fair/impartial assigning grades	45	27	1	2	2	0
15. Teacher created atmosphere of learning	50	23	3	1	0	0
16. Teacher created atmosphere of respect for students	53	20	2	2	0	0
17. Teacher was willing to help students	40	31	4	1	0	1
18. Overall, I would rate this teacher as good	52	21	4	0	0	0
19. I put considerable effort into this course	20	47	6	2	1	0

Note: The survey is portrayed via a Likert scale with the following key: SA, Strongly Agree; A, Agree; N, Neutral; D, Disagree; SD, Strongly Disagree; and NA, Not Applicable.

Recreation Measurements Results

Course Description and Syllabus

The Recreation Measurements course offered in the Spring 2008 consisted of 23 students who met in a computer lab on CSU campus. The class met two times a week for one hour and 50 minutes, and each session was from 12:00 pm to 1:50pm. The course focused on research paradigms, “protocol for presenting results, and techniques for successful survey design.” Much of the course occurred in a computer lab, where the students had hands-on learning segments that pertained to preparing group research projects requiring particular statistical data analysis and reports from SPSS, a statistical analysis and reporting program.

In-class Observations

Five class meetings were attended and observed upon invitation of the professor. I was looking for any indication of active learning segments and the accommodation of haptic learners within the classroom. Four of the class observations took place in a computer lab in the Natural Resources building, and the final class observation took place in a small and traditional classroom setting. Each class I observed in the computer lab, I sat in the back of the room where I could see every computer screen the students were using.

Monday, March 24: Data Manipulation/Recoding Variables. All 23 students were in-class; there were 14 males and 9 females. Each of them was at their own computer terminal, and most of them were logged in to RamCT, CSU’s virtual classroom network. Dr. McQuien was handing back qualitative assignments to the groups. He also had RamCT on the big screen for all to see. While handing back completed assignments,

he recapped the class session prior, reminded them of upcoming assignments due, and explained how they will be working in pairs for the in-class SPSS assignment.

Dr. McQuien began with a lecture, and he seemed at ease with the information he was presenting to the class. He described statistics versus real life to the students. He handed out a demonstration survey concerning research variables. He verbally guided the students on their computers while they were using the SPSS program. One student was not in RamCT to start and had difficulty navigating to where the class was, so other students around him helped him catch up to the class. Dr. McQuien reminded the students to double-check their work and encouraged them to think logically.

At 12:25 pm only one student was actively taking notes. Two other students seemed to be playing around with SPSS and navigating to places on their own rather than following along with the class. All but two students were paying very close attention to Dr. McQuien and his instructions.

Dr. McQuien asked the class for logical breaks in their data sets. It appeared this was an exercise, and every group had the same data set. Many students from around the room offered suggestions and answers to his question as he wrote them on the board at the front of class. From the students' suggestions, Dr. McQuien guided them to the correct answer within their data sets. He also encouraged them to use common sense as they learned to decipher their data sets. He did the steps he was describing on his big-screen computer in front of the class; meanwhile, each student emulated his example on their individual computers. At this point only, one student was taking notes. Some students in the back of the room were talking to each other to find out how to recode variables. They successfully helped each other. At the front of the class on the big-screen,

Dr. McQuien instructed and showed them how to recode the variables into new group codes: $0 - 1 = 1$; $2 - 5 = 2$; $6 - 15 = 3$; and $16 - 175 = 4$.

Dr. McQuien knew everyone's name in the class as he floated around the room to help students with their work. He was able to fix students' problems and answered their questions. The TA also floated around the room offering individual assistance. Students across the room were helping each other. It appeared natural that they were forming pods of groups and were helping each other learn. Dr. McQuien allowed for their success in the transfer of knowledge, and encouraged their peer interactions. Meanwhile, he used jargon similar to the students', apparently to relate to them while exchanging information. His pattern was to explain verbally, show visually, and then have the students do what was explained and shown to them. Before Dr. McQuien departs from a group, he always checked for understanding from the students.

Next, he passed out a recoding dataset worksheet for the students to complete in-class as pairs. The worksheet was designed to help the students figure out tasks through the SPSS computer program specific to recoding data. Dr. McQuien told the class that he wanted to see if they can do what he just taught them, but on their own in a group setting. The students paired up into groups of twos and threes. There were eleven groups. Dr. McQuien continued to float around the room. As questions arose from the students, he addressed them to the entire class. He constantly walked around the lab, verbally checking for understanding in each group. Clearly he was making himself available for the students. The TA followed Dr. McQuien's lead and also checked on the students around the lab. There was a lot of discussion between partners. One student said to his

group with confidence, excitement, and a big smile on his face, “Yea, I think we’re rockin’ it!”

At 1:00 pm, the first student left the class. Dr. McQuien was very attentive to the students and their questions. The groups began to work together with other groups. At 1:03 pm everyone seemed to be engaged in their activity and working well together. One student was working alone because the student who left at 1:00 pm was her partner. Dr. McQuien noticed this and sat with her to help her work for a while.

The class was beginning to grow loud with chatter while Dr. McQuien led them through a review of the worksheet. All of the students were engaged and were active participants in the review. This was their second computer lab, session and the students seemed enthusiastic about their activity. Meanwhile, Dr. McQuien continued to give individual attention to the lone group member. She appeared to be engaged and accommodated. He was revisiting the lesson for the day with her and she finally felt like she got it. The TA was guiding some groups. He was asking them questions to see if they understood the concept. However, he was not giving them answers; instead he was allowing them to come up with the correct answers as a group.

One group asked Dr. McQuien for clarification on what exactly was being asked on some of the worksheet’s questions. He responded by revealing the same question in a different fashion, worded differently. Also, he was seeking for the students’ understanding and receives positive affirmation.

At 1:10 pm, the girl who was working alone and then with Dr. McQuien was finished and left class. Two groups in the back of the computer lab finish and leave as well. The group the TA was helping for such a long time has finished. One of them

leaves, and the other group member stayed to help a neighboring group. While she was helping the neighboring group, she told them she wanted to get her group project done as soon as possible. Dr. McQuien over heard this and passed by them. He did not say anything but was observing to be certain that they were on the right track.

There was a second student from a group in the back of the class who had moved to the front to help a group with their work. There was a conversation among these students on how to do their literature review to broaden their scope for their projects. This interaction was among students only. At 1:20 pm this group left, followed by three other groups who were working at the front of the computer lab. There were two groups working together helping each other to finish the worksheet. There was one group of two people working independently of each other. One of the group members seemed to know what they were doing, while the second member seemed to be struggling by the confused look on his face. The TA checked on the two groups who were still working. The cohesive group helped the group who was working independently from one another.

The time was 1:25 pm, and the class was finished. There was no students left working. Dr. McQuien and his TA had a conversation about what they discovered in-class, and what needed to be reviewed for the students. They agreed that standard deviation needed to be reviewed. Also, Dr. McQuien's TA was a Ph.D. candidate and expressed a need to teach more, and would like to have the experience teaching under Dr. McQuien's watch. The conversation ended and the class was officially over.

Wednesday, March 26: Cross Tabs. As a result from Monday's conversation between Dr. McQuien and his TA, his TA was teaching the class today. There were 21 students in-class, 10 females and 11 males. The TA began by talking about the final

project, which constituted making a poster. Dr. McQuien brought an example of an academic poster. The TA directed the students to a computer lab on campus that will print out their information in poster size.

The TA started by presenting a hypothetical research question to the class as an example for today's learning segment. He was giving a PowerPoint presentation to the class. He read directly from PowerPoint slides but provided his own examples. Further, he recapped information from previous classes to help the students assimilate the information into a final project. He asked the audience questions to check for understanding, and the students immediately responded as a class, but in a soft and quiet manner. The TA used relatable examples for Natural Resources students such as skiers versus snowboarders. A student asked a question which the TA addressed immediately by acknowledging the question and promised to come back to it later. In his example, he told the students that the answers all lie in the cross tabs, which was what they would be working on in-class today on their computers in the SPSS program.

The TA asked the class for the first step. Some students were lost and were looking to their neighbors for help. He then checked for understanding by asking the students who just received help from their neighbors for the correct answer. At first, they wavered, so the TA guided the students by showing them the path toward the answer on the big-screen computer in front of the class. They produced the correct answer. All of the students were sitting very still; they were active on their computer terminals, and clearly paying attention. The TA once again checked for understanding. This time he received a larger response than before. Still, a student was talking with his neighbors, trying to hash out a scenario in order to check for his own understanding. Both the TA

and Dr. McQuien confirmed he had arrived at the correct answer. The TA then took the time to explain the confusion by showing the class what he was talking about in SPSS on the big-screen computer for all the students to see.

A new question was asked that allowed the TA to segway “into my next topic.” He asked a question to the class to see if they understood. One student had the correct answer. The TA asked that student to explain to the class why this was the correct answer. Yet there was still a lot of confusion throughout the class. The TA promised there would be lots of practice so they will come to understand what he was talking about. He joked with the class and told them they “ruined my [his] show” and the tension broke with the class bursting into laughter.

The TA was guiding the class again by taking them all back to something they knew. The students responded positively by actively typing on their computers, navigating to the place he was talking about in SPSS. The class was engaged on their computers and student questions began to arise. Dr. McQuien, for the first time this class session, strolls up to the students and helps a few of them. Dr. McQuien reiterated the concept for review and showed the students how the concept applied to their class needs. The pace appeared to be good as the whole class responded through activity on their computers in reaction to Dr. McQuien’s review. One student flagged over Dr. McQuien for individual help, and the TA again checked for understanding of the entire class by asking a question. The students were getting up from their computers to help other classmates. Dr. McQuien was also roaming the class to help.

It appeared the students were back on track again. Dr. McQuien brought them back to the hypothetical research question the TA offered at the beginning of the class,

and focused on how what they were currently learning applied to the final project. He asked for verbal indications of understanding. At first he receives a few “huhs,” and then the students began to ask questions, which lead them toward their own understanding. Dr. McQuien’s route was working, and the students finally understood the concept. Eventually Dr. McQuien answered the hypothetical research question but did not check for understanding. However the students showed their understanding by playing devil’s advocate in a discussion form.

The TA took this opportunity to shift gears and move the discussion to his next topic by saying, “You all actually are moving into my next subject, reliability analysis, otherwise known as Cronbach’s alpha.” Dr. McQuien jumped in to speak about common sense and mentioned this hypothetical example may not be the best example. Most of the students were listening, a few were fidgeting, and one just turned off and was surfing the Internet. Then suddenly the students were all listening. Some questions arose, which caused side comments. The TA reiterated the idea of common sense and reminded them to keep their research filter on. A new student showed up for class at 1:00 pm. Dr. McQuien personalized some examples to specific students. The TA and Dr. McQuien created a quick reference guide to assist the students while they worked on their end-of-class projects. Many students lent positive feedback and approved of the quick guide as a helpful tool.

Next the students were to work in groups and solve some problems on a worksheet. Dr. McQuien immediately went to visit an ESL (English as a Second Language) student to check for understanding and made sure the pace of the class was

good. There were 11 work groups. The TA and Dr. McQuien were talking with each other, and the groups of students were helping from group to group.

A hand rose up, and the TA immediately went to help them. In turn he helped two groups at the same time. Shortly after, a few more hands went up, but the TA did not notice. Dr. McQuien went directly to help the groups in need when he realized that the TA forgot to share some important information about Chi-Square, and he then shared the necessary information with the class. The TA said in retort, "I got too excited about everything else." Dr. McQuien commented, "If you are not sure about what we just addressed raise your hand and we will come around and help you." Two hands rose and the TA and Dr. McQuien addressed their questions.

The groups continued to listen in on Dr. McQuien and the TA while still helping each other in neighboring groups. Dr. McQuien and the TA bounced around the room helping groups. This portion of the class session was much more talkative and engaged than earlier in the lecture portion. One student was teaching to the latecomer what they learned in-class. In one instance, Dr. McQuien asked to look over the group's shoulder as they attempted to solve a problem on the worksheet in SPSS. The students were getting the answers right, and understanding was occurring.

The class began to wind down as the first group left at 1:36 pm. One student who was finished with her work and chose to stay behind to help others. At one point, Dr. McQuien got on a computer right next to a group to show them the correct path to their answer. The group emulated his actions. At 1:48 pm, three groups were still working. At 1:50 pm, when class ended, one group was still working. The TA offered to help the latecomer in office hours while Dr. McQuien offered extra help to another student for

their final project. Dr. McQuien described the process of the literature review to the student he was assisting, and the student was happy. At 1:52 pm, there was one last student working, and Dr. McQuien stayed with them until she was finished with the worksheet.

Monday, April 28: Lab: work on projects. Today was the first administration of the LIM1, and it took ten minutes for the students to complete. There were 21 students in-class, six females and 15 males. After the LIM1, the students began to work on their end of class projects. Some students in the groups lead their peers by doing the work on the computer, while other students sat quietly and watched. Only three of 12 work groups seemed to be sharing the work load responsibility, while in each of the remaining nine groups one person was doing all of the work while the other group members looked on. The TA was helping a student who was working solo. For 10 minutes Dr. McQuien helped a particular group to manipulate their data set so that it would work for the project. There were 18 computers in use. Some groups were using more than one computer at a time. Two computers were working on actual posters and their graphics, six computers were working on text, and nine computers were working on data manipulation in SPSS.

Dr. McQuien was in the back of the class helping a group with their t-tests. He checked all of their t-tests for them while showing them on their computer how to double-check these answers. The TA was still helping the girl who was working solo. She was asking questions and he guided her on her computer. I overhear her say, "Thanks this is helping me a lot." At 12:42 pm, there were 11 groups working. There were two

students checking their emails and two students talking about non-related class items.

The TA and Dr. McQuien both went back to their own computers while the class worked.

At 12:50 pm, a student in the back row raised his hand. No one noticed. A few minutes later he raised his hand again and was still not noticed by the TA or Dr. McQuien. One group just created their research question for their project and they were very excited. Dr. McQuien was up front helping a group, while the TA was helping a group in the middle of the computer lab. Still, the student in the back had not been helped and he had not raised his hand recently. Finally, Dr. McQuien saw the student's hand in the back of the classroom, and he answered his question easily. A female student who left class early returned to tell Dr. McQuien that she and her partner were working on their project in the downstairs computer lab. He said that was okay. The girl working solo had many questions of Dr. McQuien, all which he answered quickly and easily. By 1:10 pm, all of the groups had left the lab and class was over.

Monday, May 5: Lab: work on projects. The second administration of the LIM1 took place today. There were 23 students in-class, 16 males and 7 females. The LIM1 took ten minutes for the students to complete. Once class resumed, their work was identical from last week's work session, they continued working in groups on their end of class project. The TA and Dr. McQuien were roaming the class answering questions, except the students were much louder this week. Dr. McQuien provided a template of the final project to help the students with their work. Some students had questions, which were answered by Dr. McQuien and the TA; most of the students went directly to work. The class was preparing for their poster session at the end of the course.

There was a certain set of students in the class who never seemed to have questions, or at least they did not ask questions. Every student was focused on working, and the class volume lowered quite a bit. They all seemed to be extremely focused, and are not helping neighboring groups like they had in many past class sessions. One group had three students working independently of each other on the same project. It seemed like most of the groups were done with their rough drafts and were now working to perfect their projects. The majority of students were working independently, with the exception of one group that had four people working together on one computer. Many of the students appeared to be working from Dr. McQuien's handouts. Not all of the handouts were the same, and they appeared to be from throughout the semester. However each of the handouts looked like a questionnaire.

One group in particular had spent the entire class with the TA or Dr. McQuien asking questions. The students seemed to clearly understand their task at hand and answered many of their own questions. It appeared they wanted the direction and clarity of their thoughts validated by the TA or Dr. McQuien. Possibly, the group had a fear of failure and was making certain their chosen path to success was the correct path for the final project.

One student was listening to an iPod. The class was getting louder. The time was 12:35 pm. Dr. McQuien talked socially with many of the students. Occasionally he answered a class related question. The TA was guiding a student through a certain process on the computer. Many students had made comments today expressing that this experience was their first time doing research work like this; one student, for example, asked, "How do I incorporate this information into writing my methods for research?"

The TA swiftly probed the student to tell him the process of the research project the student had chosen. Once the student explained his project, he saw immediately that he just verbally explained the methods. The TA encouraged him to write up those thoughts as his methods.

A student worked directly with Dr. McQuien for his final class project; however, the project was not hypothetical like his classmates. Instead, his project was real and was supported by Dr. McQuien. Both the TA and Dr. McQuien had been spending extra time throughout the work sessions helping this student with his accuracy in his final course project.

At 12:45 pm all of the groups were working hard. One group was cutting and pasting from one document to another as they created their poster on the computer. Three groups were talking to each other and figuring out which steps they needed to do next. Another group was asking their neighboring group for assistance. Dr. McQuien and the TA were each helping additional groups. As in past work sessions, the class came together and helped each other to find answers and to succeed in their course work.

Student LIMI Results

A participant's learning style was broken down into three percentages by the LIMI. The three percentage categories (auditory, visual, and haptic learning styles) added up cumulatively to 100% across three categories. The LIMI was administered to the majority of the subjects, with consideration to in-class attendance. Figure 6.3 provided a view of the dominant learning styles found in Dr. McQuien's Recreation Measurements class. Each category was denoted by the type of learning style. The administration was to 19 students. Further, it was pertinent to the study to ascertain the volume of haptic

learners. The figure seems to show haptic learning style and visual learning style both as the predominant learning styles in the Recreation Measurements class, each at 42%, followed by auditory at 11% and auditory/visual at 5% of the class's population. Dual combination dominant learning styles showed that the person taking the LIMI scored equally high in both categories which therefore created a split of two learning styles as their overall dominant learning style; in this case 5% of the population scored equally dominant in both Auditory and Visual learning styles. Lastly, haptic learners dominated 42% of the class.

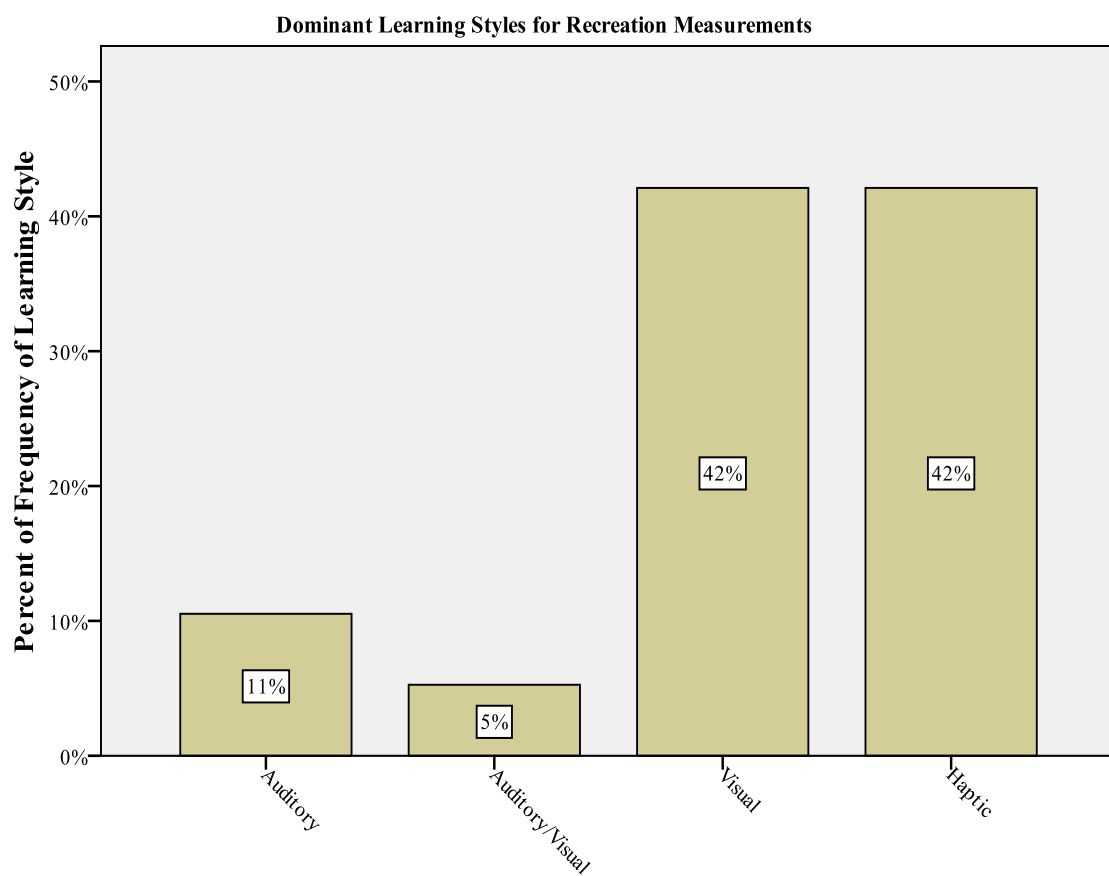


Figure 6.3. Dominant learning styles for Recreation Measurements

Histograms presented a more precise look at the haptic learners in the testing set of the LIMI. Figure 6.4 displayed the percentage a learner tended to be Haptic out of 100%. The LIMI was designed to add up to 100% and placed the learner into the three categories (visual, auditory, and haptic), based on a percentage. For example, a learner may have been assessed by the LIMI as having 38% auditory, 19% visual, and 43% haptic, which added up to 100%. The histogram below examined the frequency of the percentages of the haptic classifications of each learner and included a bell-curve shape implying a normal, functional data set. Figure 6.4 indicated that 12 of 19 students fell in the haptic range between 30% and 50% on the LIMI. A notable spike of four students registered at 35% on the LIMI collective scale. This data appeared to show six haptic learners were above 50% of dominance of the overall 100% scale devised within each personal LIMI test.

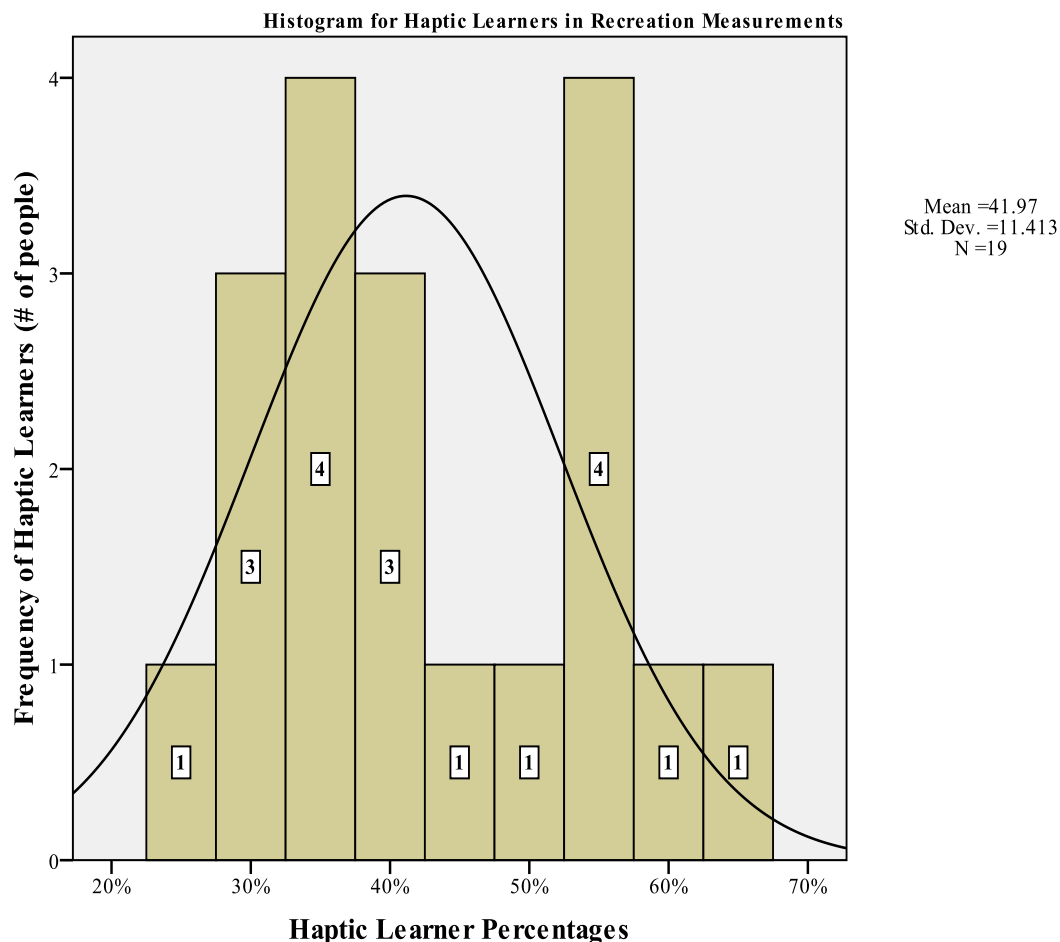


Figure 6.4. Frequency of hapticness in the learners of Recreation Measurements

Student Course Survey Results

The Student Course Survey portrayed the students' opinions and views of how well the course was taught. A few of the questions in the survey were related to whether the accommodation of haptic learners was achieved in the course. Questions 4-7, 10-13, and 15-17 garner information relating directly to whether haptic learners felt accommodated throughout the course. These 11 questions were of particular interest in regard to the accommodation of haptic learners and were focused on as indicators if learners felt accommodated by their professor. Dr. McQuien's Recreation Measurements course was assessed by 23 students. Nearly every question was answered by all 23

students with the exception of two questions, which were answered, by 22 students. He received overwhelmingly positive remarks from all of his students. All of the students answered, “strongly agree” and “agree” with the exception of three students; two who remained neutral on one question and one student who “disagree[d]” with one question (see table 6.2 for complete report). This response confirmed that Dr. McQuien’s students in Recreation Measurements felt accommodated by Dr. McQuien within his class. Forty-two percent of Recreation Measurements was dominantly haptic according to their LIMI results. This was the lowest amount of haptic learners in any class in this study, and yet nearly half of the class was dominantly haptic. Again, it was determined that Dr. McQuien did accommodate haptic learners in this class and the student’s responses on their Student Course Survey implied the same conclusion, as the bulk of responses from his students were “strongly agree” and “agree.” I believe that from the student’s view Dr. McQuien did accommodate his haptic learners in this class. Below in Table 6.2, the complete Student Course Survey results are revealed, including the 11 questions of particular interest from Dr. McQuien’s Student Course Surveys for his Recreation Measurements course in the spring of 2008 at CSU. There were three demographic questions from the Student Course Survey; again not all 23 students answered every question. The class was made up of 1 (4%) Sophomore, 4 (17%) Juniors, 17 (74%) Seniors, and 1 (4%) Graduate student. The majority of students were in the Natural Resources major or 21 (95%), and 1 (5%) student was a non-major, 22 students answered this question. Out of the 23 students who filled out the survey, 22 answered what grade they expected, 14 (64%) expected to receive an “A” grade, 7 (32%) expected to receive a “B” grade, and 1 (4%) expected to receive a “C” grade.

Table 6.2

Student Course Survey for Recreation Measurements

QUESTION	SA	A	N	D	SD	NA
1. Course objectives were clearly stated	16	7	0	0	0	0
2. Grading system was clearly explained	16	7	0	0	0	0
3. Text/course materials were appropriate	15	7	1	0	0	0
4. Course was intellectually challenging	15	7	1	0	0	0
5. Assignments increased my understanding	15	8	0	0	0	0
6. Class sessions increased my understanding	17	6	0	0	0	0
7. Overall, I would rate this course as good	14	9	0	0	0	0
8. Quality of the classroom/facilities was good	13	7	1	2	0	0
9. Quality of the technology used was good	17	6	0	0	0	0
10. Teacher was knowledgeable about the subject	19	4	0	0	0	0
11. Teacher was enthusiastic about the course	20	2	1	0	0	0
12. Teacher organized the course effectively	18	5	0	0	0	0
13. Teacher was prepared for class sessions	17	5	0	1	0	0
14. Teacher was fair/impartial assigning grades	17	6	0	0	0	0
15. Teacher created atmosphere of learning	17	6	0	0	0	0
16. Teacher created atmosphere of respect for students	20	3	0	0	0	0
17. Teacher was willing to help students	17	6	0	0	0	0
18. Overall, I would rate this teacher as good	19	4	0	0	0	0
19. I put considerable effort into this course	10	12	1	0	0	0

Note: The survey is portrayed via a Likert scale with the following key: SA, Strongly Agree; A, Agree; N, Neutral; D, Disagree; SD, Strongly Disagree; and NA, Not Applicable.

Natural Resources History and Policy Results

Course Description and Syllabus

The Natural Resources History and Policy course offered in the Spring 2008 consisted of 19 students, which met in a small traditional classroom twice a week for one hour and 15 minutes, and each session was from 3:00 pm to 4:15 pm. The course was offered to upper classmen as a student-led discussion experience focusing on issues in Natural Resources history and policies. Class size was intentionally small to promote more of a Socratic approach in the class format, and all readings were required to be completed prior to each class session to promote an active discussion environment. Participation in discussion was expected and required. Furthermore, according to Dr. McQuien, the class was “intended to test higher-level cognitive abilities. As an upper-division course, students are [were] expected to think, question, problem-solve and debate information presented in-class.”

In-class Observations

Two class meetings were attended and observed upon invitation of Dr. McQuien. A critical eye was on the lookout for any indication of active learning segments and the accommodation of haptic learners within the classroom. The class observations took place in a small traditional classroom in the Natural Resources building.

Wednesday, April 9: The Legislative Process in Natural Resources. There were 19 students in-class today, 6 males and 13 females. The room was set up in a “u” shape, with a row of tables flanking the back of the classroom. Students were scattered among the tables as shown below in Figure 6.5. Dr. McQuien commented to me that the setup was to encourage discussion. The first administration of the LIMI occurred today. It

took the class ten minutes to complete.

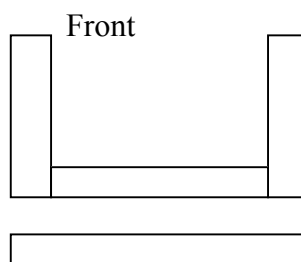


Figure 6.5. Diagram of in-class seating configuration.

Dr. McQuien addressed the class and reminded them that they were going to discuss the legislative process in Natural Resources. The TA and Dr. McQuien began to set up a video for the class to watch. In the meantime, Dr. McQuien began to talk about the “institution and how it started.” The TA then talked about current events while waiting for the technology to gear up. She passed around the room some national parks articles, and many students commented and engaged. Dr. McQuien related a personal story to the class concerning national parks. At the beginning of class, the students were watching “School House Rock” an episode called “America Rock, I’m just a Bill.” It was a cartoon about what happened to a bill as it went through the legislative process to become a law. The students were all engaged and laughing. One student was doing homework for another class during the movie; the rest of the students were paying attention. Once the movie was over, the class thanked the TA for another great movie in class.

Dr. McQuien explained to the class that they were going to role play attempting to pass a bill through the legislature. Each student would have an identity, which Dr.

McQuien had dispersed to the students via index cards. On the back of each index card there was information telling students who they were. The bill they were trying to pass was directly related to an in-class question from last week. The question was, “Why don’t national parks get to keep their money from the gate instead of having to send it to Washington D.C.?” Dr. McQuien explained that the bill they were going to try to pass was, “All National Park units will keep 50% of their gate revenue and add up to \$10 to their entrance fees.” Dr. McQuien also stated that he chose this bill topic solely based on the previous class so that the discussion was fresh and exciting for the students. Furthermore, he announced, “From this point forward, I am the facilitator of what happens to our bill. As I call on you, please come to the front of the class with your index card, and we’ll see what happens from there.”

First Dr. McQuien found who the house representative was and informed her that it was her bill the class was trying to pass. Additionally, he asked her to share what was on the back of her index card, and explained that the back of their cards would tell them their philosophies for the role play. The house representative’s shared her philosophy for a budget, which consisted of three elements: first, a decentralized government; second, a balanced budget (acting as a devil’s advocate for the benefit of operating in debt); and third, he believed in the national park service’s history from a political standpoint. Once the student shared these factors with the class, Dr. McQuien encouraged all of the students to take a moment to think through these three factors and get out their notes from the previous class. In the meantime, Dr. McQuien jests who in the class could sing the bill song from the cartoon, and surprisingly, three students could and sang the song.

Dr. McQuien brought the house representative to the front of the room and announced her name was “Representative Tree Huggin, and she is from Alaska.” She told the class what bill she was sponsoring, addressed her three budget philosophies, and asked the class for their support in her bill. Dr. McQuien then asked for a co-sponsor of the bill, and a student raised their hand. He then asked what the Speaker of the House decided to do and if they will send the bill to the Natural Resources Committee. The Speaker of the House looked at his index card for guidance and chose to pass the bill to a House Subcommittee of the National Forest Service, Parks, and Lands. The Speaker of the House liked the bill. A student asked, “Would people opposing the bill want to be there as the bill gets passed to the committee?” Dr. McQuien answered, “Opposition would already be on the committee.”

At this point, while in character, the Speaker appointed members of the subcommittee. He addressed who decided for the committee and the committee subdivided into a subcommittee. Dr. McQuien interjected that the Speaker cared who was chair of the committees, so that the bills he liked would stand a greater chance of passing. Furthermore, the chair of the committee likely was the one who cared the most about where the national parks money was going. A committee was formed at the front of the class, which was then split into a subcommittee for the National Forest Service, Parks, and Lands. The committee passed the bill into the subcommittee.

Dr. McQuien explained that when a bill was passed to the subcommittee they could amend the bill. One subcommittee member was also on the Ways and Means Committee, was a senior committee member, and would like to amend the bill so only 25% of the money goes to the parks and the rest stays in Washington D.C. A second

subcommittee member only cared about a balanced budget. This member talked about how 25% more money staying in Washington D.C. would help to balance the budget. Meanwhile the chair of the subcommittee wanted to keep the bill as was, with a \$10 increase in national park entrance fees. Dr. McQuien orchestrated a subcommittee vote. Two out of three committee members passed the bill in their subcommittee.

Now that the bill was out of the subcommittee, it arrived back at the committee chair and the entire committee was gathered. Dr. McQuien asked for the amended version of the bill from the subcommittee senior member. The bill was amended to allow the national parks to retain 25% of their gate fee money with a \$10 increase in the fees; however, the committee, not the sub committee, proposed to amend the fee increase to \$7.50. The committee chair and the senior subcommittee member argued over this point. We discovered that the committee chair was once the superintendent of the national parks. Dr. McQuien highlighted his personal investment in national lands had led him to the position of committee chair. A student on the committee stated, "Can I propose to amend?" Dr. McQuien said yes. The student proposed to amend the bill to reduce the amount the parks keep to 10% of fees. Other committee members argued and agreed to compromise at 15%, when yet another debate ensued and the committee rested at 10%. Dr. McQuien facilitated and encouraged the committee to vote on the amended version of the fee retention of 10% versus 15%. The 10% retention of fees failed. Now the committee chair could not amend the bill, and the amendment of a \$7.50 increase died. Finally, Dr. McQuien shared with the class that the passed version of the bill from the committee was at its original state of 25% park fee retention with a \$10 park entrance fee

increase. Someone in the class got excited and we hear a “Yes!” exclaimed, and the class giggled.

Dr. McQuien then asked, “Where does the bill go now?” He answered his question, “To the Ways and Means Committee.” He called for all the Ways and Means Committee members to the front of the room and their debate began. The first committee member asked, “How much will this bill cost the government?” and continued to mention he sees the government would be losing 25% of the revenues they made from last year due to national parks fee retention rates with this bill. A committee member supported the parks and argued to keep the money disbursement as passed from the National Forest Service, Parks, and Lands Committee. The senior member who was on the National Forest Service, Parks, and Lands and on the Ways and Means Committee commented that he at least got the bill to change from a 50% park fee retention rate down to a 25% park fee retention rate. The Ways and Means Committee agreed that was a good move. The committee further amended to take all of the extra revenue generated from a \$10 fee increase and streamline it directly back to Washington D.C. while still giving the national parks 25% of their original fee retention prior to the \$10 fee increase. Dr. McQuien interrupted to break the numbers down visually on the white board for the class. Students were engaged, learning forward, listening, watching, and nodding their heads. The committee voted and the bill passed through the ways and means committee.

Next, the bill went back to the Speaker of the House of Representatives, who, as Dr. McQuien pointed out, had the option to send the bill back to the National Forest Service, Parks, and Lands Committee, to the floor of the House, or not put the bill on the agenda so that the bill dies. The Speaker chose to send the bill to the House floor. A

student asked, “What if a representative misses the house floor vote?” Another student said, “You can do that?” Dr. McQuien answered, “Yea, it happens all of the time that house members miss votes.” Yet a third student asked, “Is there still a chance to amend the bill at this point on the house floor?” and Dr. McQuien responded, “yes.”

Now the bill has left the House and was being sponsored at the Senate by Senator Bird-Callin’ of Maine. The students had an epiphany and see that if the bill died in the House then it was dead and maybe a Senate version could pass in the senate. Senator Bird-Callin’ chose to go with the original version of the House bill. In the Senate, they choose to amend it so that 80% of all the revenue would stay in the park and all of the visitor center money from each park would go to Washington D.C. The question Dr. McQuien asked the class was, “Where would you want the visitor center money to go in Washington D.C.?” The students answered that they would like the money to stay in the parks.

The Senate Majority Leader sent the bill to the National Reserve and Energy Committee, which sent the bill to a subcommittee. Dr. McQuien was saving some time by telling the class what was happening in the role play so that the bill can either pass or fail before the class session ended. He also talked about back room deals, where dirty politics happened, which were usually found in the subcommittee phases more likely in the Senate.

The bill arrived at a Senate subcommittee on national parks. The bill arrived with the amendment that 80% of the revenue stayed in the national parks. One committee member supported national parks and was 100% supportive of the bill in its current state. A second member was against the bill but was willing to amend it to 25% fee retentions

for national parks. A third member who was also the chair of the Appropriations Committee cared about money and the national parks but suggested the fee retention go down to 20% for the parks. Finally, the fourth member cared about a balanced budget and agreed with the third member to keep the fee retention rate at 20% for the national parks. A sponsor of the subcommittee offered to take the bureaucratic nature out of the bill and keep it in its original state of 80% retention for the national parks. Another committee member suggested that the money retained by Washington D.C. should be used any way they feel like. The sponsor argued he wanted to diminish red tape in the government. Dr. McQuien interjected and explained that what was occurring in the role play was akin to how the Senate finds money for things like war. The debate on what to do with national parks money was an example, and many times it ends up not helping the parks but assisting in other endeavors, such as funding a war. The subcommittee voted to amend the bill to a 20% parks fee retention rate.

A student asked, "Can the Senate call a House member to testify for the original bill?" The answer was "yes" from Dr. McQuien. Another student passionately exclaimed, "Let's get people's input!" One student commented, "What if the congressional session has ended then what happens to the bill?" Dr. McQuien responded, "Then the bill dies and must be redone at another congressional session."

Dr. McQuien took the class back to the subcommittee on national parks in the Senate where they passed the amendments to a 20% fee retention rate. One senator said she did not care about the national park system, and another senator commented that he believed in a central government with a strong base. These roles were just sharing all of their information off of their index cards with the class. Never-the-less, the bill passed in

the subcommittee of the national parks in the Senate. One senator asked Dr. McQuien, “Can I filibuster?” The answer was, “No that can come in the next phase of the bill.”

Next the bill arrived in the Appropriations Committee. Dr. McQuien mentioned that the chair of this committee was very powerful. He also said that once, he saw the Senate in session in Washington D.C. and witnessed senators falling asleep during a filibuster. He told the class that the version of the bill with the 20% park fee retention rate passed in the Appropriations Committee despite a filibuster. A student asked, “Why is everyone so depressing?” Another student retorted with laughter, “Because that’s our roles (laughter).”

The Majority Leader took the bill to the Senate floor, where they could single handedly pass the bill or chose for it not to be a priority. Immediately the students became talkative and restless. They were making comments like, “I see bad loopholes,” “Seems like this isn’t a good system,” and, “We need to make a better system.” Dr. McQuien smiled and said, “Okay, the Senate floor is open for debate.” On the white board were the different scenarios for the amended bill. The debate in question was whether the bill should stay at a 20% fee retention rate or change so that the parks can retain up to 80% of their generated fees. Dr. McQuien explained that 50% of the House of Representatives plus one vote was considered a majority for a passing vote; and 50% of the Senate plus one vote was considered a majority for a passing vote. However, the Senate could filibuster to halt the vote in hope the congressional session will end before a vote could be cast. He continued to add that 60 votes in the Senate were needed to beat a filibuster and that the filibuster usually continued until 60 in the Senate have been reached either for or against a bill.

A student asked, “Can I testify for this Bill?” Dr. McQuien said yes but brings the role play to a halt due to time left in the class session. He thanked the class for their passion in this activity. The appointed House speaker and Senate majority leader find middle ground through a conference committee of the two branches of congress. A student asked, “So the speaker and majority leader are very powerful positions and depending on their preferences a bill could or could not survive right?” He was answered by other students in the class with an overwhelming yes. Many questions were asked in the role playing scenario, and all but one student asked questions or made comments throughout the role play. The class was deeply engaged and active throughout the learning segment.

The time was 4:13 pm and Dr. McQuien wrapped up the role play and class for the day by making some final comments. He shared with the class that the bill would at this point go to the President of the United States, and he chose to sign the original house bill with the 25% fee retention rate. A student asked, “Could the bill pass by the President not signing the bill?” Dr. McQuien answered, “No, the bill either gets signed by the president or fails by his veto power.” At this point class was over.

Monday, April 28: Policy Analysis Presentations (in pairs). There were 19 students in-class, six males and 13 females. Dr. McQuien was not in class, but his TA was teaching. The TA was setting up a computer to project on the big screen and was having technical difficulties. Class began at 3:00 pm and took 25 minutes to get the computer to work. The class worked together with the TA to assist with the technical difficulties. As a team they solved the problem. Also, during the wait time, the second administration of the LIMI was given. It took the students 10 minutes to complete the

LIMI.

The computer was now working, and the students were giving presentations in pairs. The TA advised the class to take notes on each other's presentations and ask questions. She assured the class she would also be taking notes and asking questions. The first presentation was given mostly by one student on a PowerPoint slide show. The second student ran the slide show on the computer as the first explained the slides to the class. Occasionally the student running the computer would contribute additional comments to the presenter's original thoughts to provide a more complete picture of the presentation. Then the team traded places, and the student who was on the computer was presenting. It was unclear if this was their plan or if the student on the computer just took the presentation over. This student showed the class alternatives to the policy they analyzed specifically to make the class "think," she said. The presenters chose to show the history of the bill they analyzed. The bill had been passed out of the House of Representatives with amendments. The presenters said they thought this was a good thing to add in, since the class had had a good experience role playing how a bill was passed.

Many students in the class seemed to be elsewhere in their minds. One student was sleeping. The student sleeping also verbally claimed, "I love active learning," while she was taking the LIMi earlier in the class. Two other students were texting on their cell phones. Three students were taking notes from the presentation. The TA was taking notes with her feet propped up on a chair. One student was asking many questions of the presenters. One student was folding origami flowers. However, six other students periodically ask questions that were well thought out. The TA appears laissez faire with her feet up on the chair, which appears to set a strange tone for the class.

In response to the presenting group, one student honed in on their alternatives to the policy analysis. She asked many questions and engaged in a discussion with the presenters. She suggested a particular idea for an alternative, to which the presenters responded. They explained how her idea does not work because Congress debated that alternative while passing the bill and that alternative was concluded to not work for this particular instance. The TA asked only one question at the end of the presentation.

A second group began a PowerPoint presentation on climate change and the polar bear habitat in Alaska. They read directly from their slides to the class. They pointed out that if the bill passed, then polar bears would become extinct. They recommended that an advocate of the polar bears from the House of Representatives must be found in order to fight the bill. One advocate they found was the Alaskan Conservation Solutions. They recommended the advocate lobby a House representative to fight the bill in Washington D.C. A second presenter intervened and elaborated more on the topic from her knowledge base, rather than from reading off of the slide.

No students were sleeping, texting, or doing origami any more. Everyone was paying attention to this presentation. The presentation showed both the pros and cons if the bill passed; furthermore, they showed a proposal of alternatives. The TA had taken her feet down from the chair and was taking many notes while listening attentively. The speaker of the presentation was well versed, had a strong vocabulary, and was an excellent and passionate public speaker. The presentation ended with a seven-minute question-and-answer session. The TA asked zero questions. One student was asleep again, right next to the TA, who did not notice.

Meanwhile, the rest of the class was engaged in a strong question-and-answer period. It was evident that the class was hungry for the information. They were self-driving, as the TA had not asked any questions, nor had she noticed the sleeping student sitting right next to her. The time was 4:10 pm and the class ended five minutes early.

Student LIMI Results

The LIMI had three learning style categories: auditory, visual, and haptic. The instrument divided a participant's learning style into three percentages assigned to each category, which added up cumulatively to 100% across three categories. The majority of subjects were administered the LIMI considering their in-class attendance. Figure 6.6 provided a view of the dominant learning styles found in Dr. McQuien's Natural Resources History and Policy. Each category was denoted by the type of learning style. The administration was to 17 students. Furthermore, it was pertinent to the study to ascertain the volume of haptic learners. Figure 6.6 seemed to show haptic learning style and visual learning style both as the predominate learning styles in the Natural Resource History and Policy class, each at 47%, followed by Auditory at 6% of the class's population. Lastly, haptic and visual learners dominated the class equally with a collective total of 94% of the class' population, which was dispersed equally by 47% per each learning style, both visual and haptic.

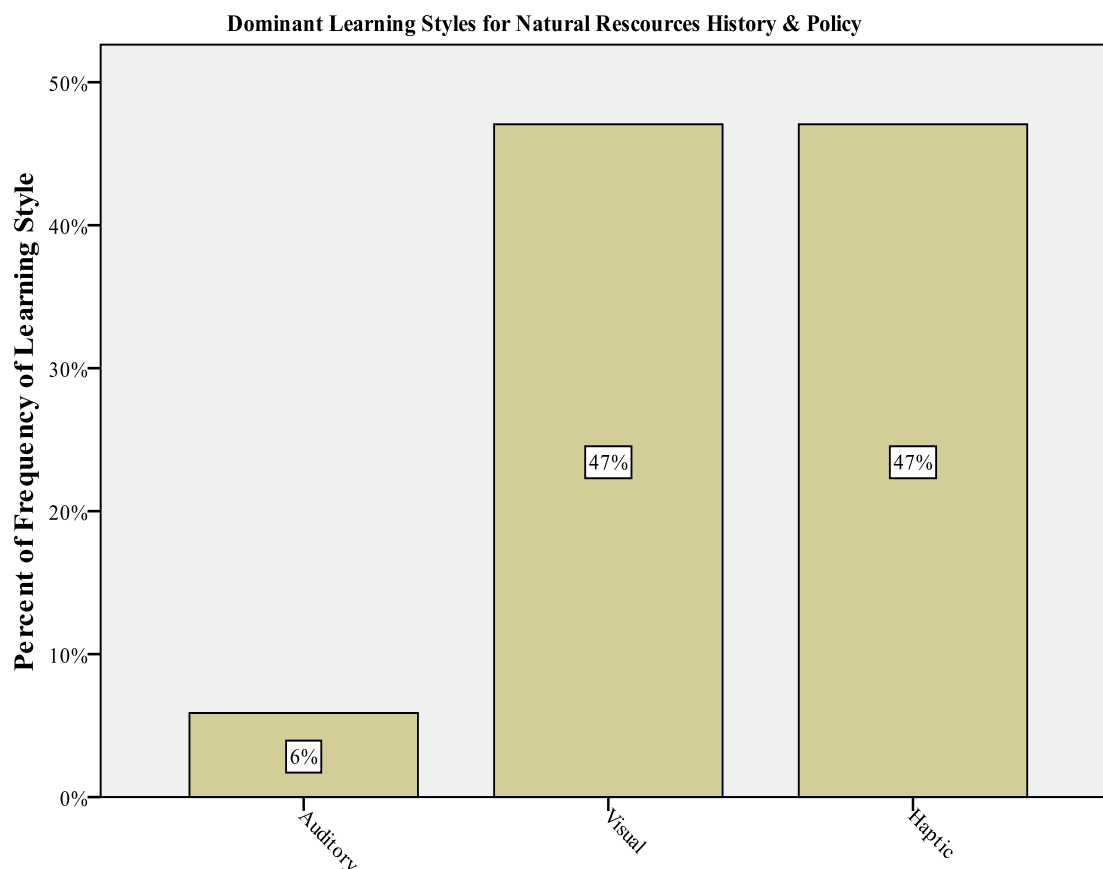


Figure 6.6. Dominant learning styles for Natural Resources History and Policy

Histograms communicated a more accurate look at specifically haptic learners in the testing set of the LIMI. Figure 6.7 displayed the percentage a learner tended to be haptic. The LIMI was designed to create a cumulative score of 100% for the participant, and disbursed their learning style into the three categories: visual, auditory, and haptic. For example, a learner could be assessed by the LIMI as having 19% Auditory, 22% Visual, and 59% Haptic, which add up to 100%. The histogram below looked at the frequency of the percentages of the haptic classifications for each learner and included a bell-curve shape implying a normal, functional data set. Figure 6.7 indicated that eight of 17 students fell in the haptic range between 30% and 50% on the LIMI with a notable

spike of three students registered at 55% on the LIMI collective scale. This data appeared to show that five haptic learners were above 50% of dominance of the overall 100% scale devised within each personal LIMI test.

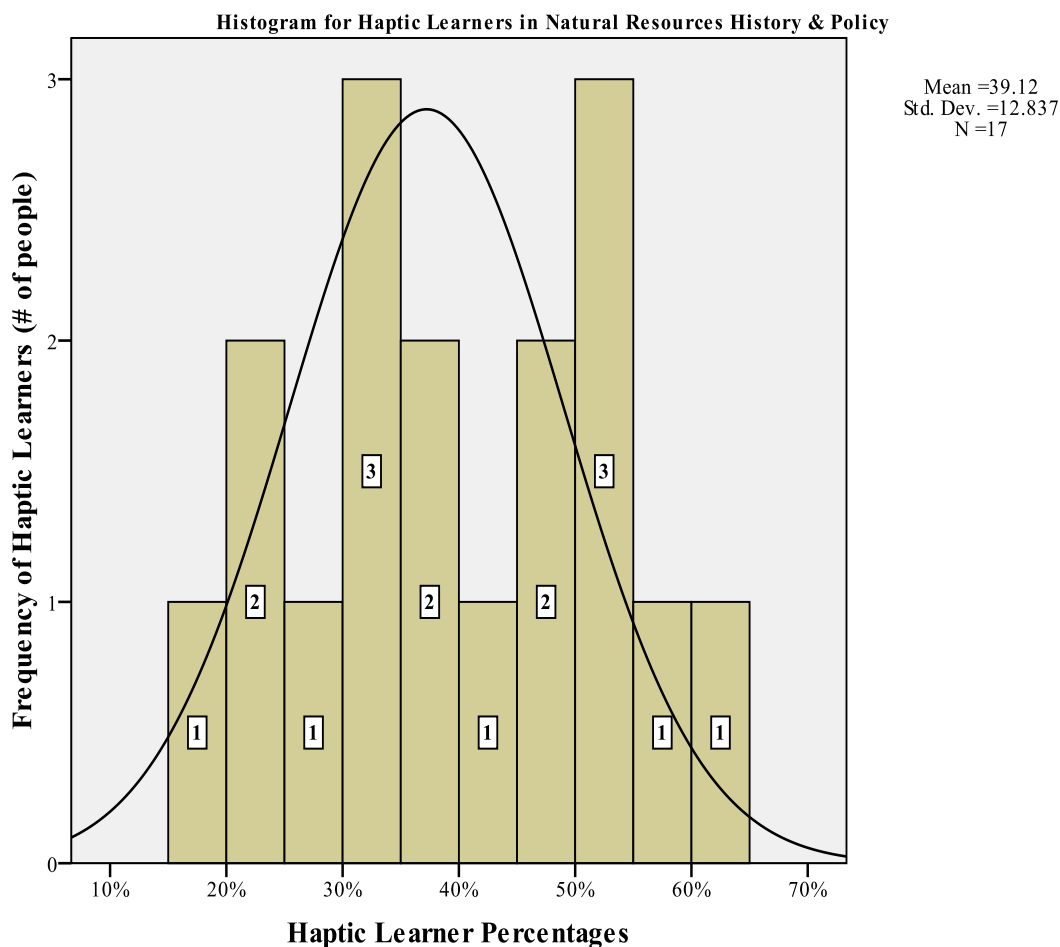


Figure 6.7. Frequency of hapticness in the learners of Natural Resources History and Policy

Student Course Survey Results

The Student Course Survey displayed the views of the student in light of how well each individual felt the course was taught. A few of the questions in the survey were important to pay particular attention to regarding to whether or not the accommodation of haptic learners was achieved thorough out the course. Questions 4-7, 10-13, and 15-17

garner information relating directly to whether haptic learners felt accommodated throughout the course. These 11 questions were of particular interest in regard to the accommodation of haptic learners and were focused on as indicators if learners felt accommodated by their professor. Dr. McQuien's Natural Resource History and Policy was evaluated by 16 students. A few questions were not answered by all 16 students; one question was not answered by two students, and a second question was not answered by one student on the Student Course Survey. Dr. McQuien overwhelmingly received positive reviews from his students on all 11 questions; with the greater part of the answers in the "strongly agree" and "agree" categories in the Course Student Survey report (see Table 6.3 for complete report). Two students remained neutral and one student disagreed; with each occurrence happening once. Almost half of Dr. McQuien's Natural Resource History and Policy or 47% of students were dominantly haptic according to their LIMBI results. It was determined that Dr. McQuien did accommodate haptic learners in this class and the student's responses on their Student Course Survey implied the same conclusion from the students as the majority of responses from his students were "strongly agree" and "agree." I believe that from the student's view Dr. McQuien did accommodate his haptic learners in this class. Below in Table 6.3, the complete Student Course Survey results are revealed, including the 11 questions of particular interest from Dr. McQuien's Student Course Surveys for his Natural Resource History and Policy course in the spring of 2008 at CSU. There were three demographic questions from the Student Course Survey; again not all 16 students answered every question. The class was made up of 6 (38%) Sophomores, 8 (50%) Juniors, and 2 (12%) Seniors. The majority of students were in Natural Resources major or 13 (81%), 3 (19%) students were non-

majors. Out of the 16 students who filled out the survey, 16 answered what grade they expected, 15 (94%) expected to receive an “A” grade, and 1 (6%) expected to receive a “B” grade.

Table 6.3

Student Course Survey for Natural Resources History and Policy

QUESTION	SA	A	N	D	SD	NA
1. Course objectives were clearly stated	8	8	0	0	0	0
2. Grading system was clearly explained	7	8	1	0	0	0
3. Text/course materials were appropriate	8	5	3	0	0	0
4. Course was intellectually challenging	4	10	0	0	0	0
5. Assignments increased my understanding	7	8	1	0	0	0
6. Class sessions increased my understanding	11	4	1	0	0	0
7. Overall, I would rate this course as good	9	7	0	0	0	0
8. Quality of the classroom/facilities was good	4	12	0	0	0	0
9. Quality of the technology used was good	4	6	4	1	0	0
10. Teacher was knowledgeable about the subject	11	5	0	0	0	0
11. Teacher was enthusiastic about the course	12	3	0	0	0	0
12. Teacher organized the course effectively	12	4	0	0	0	0
13. Teacher was prepared for class sessions	12	4	0	0	0	0
14. Teacher was fair/impartial assigning grades	10	5	0	0	0	0
15. Teacher created atmosphere of learning	11	5	0	0	0	0
16. Teacher created atmosphere of respect for students	12	4	0	0	0	0
17. Teacher was willing to help students	10	5	0	0	0	1
18. Overall, I would rate this teacher as good	12	4	0	0	0	0
19. I put considerable effort into this course	4	11	1	0	0	0

Note: The survey is portrayed via a Likert scale with the following key: SA, Strongly Agree; A, Agree; N, Neutral; D, Disagree; SD, Strongly Disagree; and NA, Not Applicable.

Ross McQuien-Personal Instrumentation Results

Learning and Interpreting Modality Instrument (LIMI) Results

Dr. McQuien was dominantly a haptic learner at 45%, followed by a visual learning style at 35% and much less an auditory learner registering at 20%. He learns best by doing, touching, feeling, hands-on, tactile, and active approaches.

Principles of Adult Learning Scale (PALS) Results

Dr. McQuien was 34 points below the mean total score based on a normalized mean developed by Conti (1990), the instrument creator. The highest possible total score was 220. He was in the 64th percentile for the learner-centered Activities, which surfaced as his strongest category in the Principles of Adult Learning Scale (PALS). His PALS also indicated that he had a strong inclination of 53% toward Relating to Experience and a 52% inclination for Flexibility for Personal Development within his classroom. Dr. McQuien was considered to be a learner-centered teacher within his teaching paradigm.

Other strengths revealed by the PALS were considered secondary to denoting whether an individual was inclined to be more learner-centered or teacher-centered in their learning-teaching paradigm. The sub-categories depicted a 45% preference to Climate Build and equally to Assessing Student Needs. Each of these categories supported, signified, and integrated in the nature of nuance surrounding Dr. McQuien's preference to be a learner-centered teacher. See Table 6.4 for complete PALS results on Ross McQuien.

Table 6.4

Ross McQuien PALS Results

Factor	McQuien's Score	Mean	± from the Mean	Standard Deviation
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Learner-centered Activities	38.5	38	+.5	8.3
Personalizing Instruction	19	31	-12	6.8
Relating to Experience	16	21	-5	4.9
Assessing Student Needs	9	14	-5	3.6
Climate Building	9	16	-7	3.0
Participation in the Learning Process	7.5	13	-5.5	3.5
Flexibility for Personal Development	13	13	0	3.9
<i>TOTAL SCORE 112</i>				

Philosophy of Adult Education Inventory (PAEI) Results

Three predominant categories exhibited the unique culmination of Dr. McQuien's personal teaching philosophy. He favored a progressive philosophy, which carried the purpose to "promote societal wellbeing; [and] enhance effectiveness in society" and also focused on the "give[ing] learner's practical knowledge and problem solving skills" (Zinn, 1990, p. 73). The learner was perceived by the teacher to have unlimited potential that could have been developed through education, and their experiences and interests were "key elements in learning" (p. 73). Meanwhile, the teacher assumed a roll as "organizer" of the class while "guides[ing] learning through experiences that are educative" (p. 73). According to the Philosophy of Adult Education Inventory (PAEI), the progressive view would practice the following methods: "problem solving; scientific method; activity curriculum; integrated curriculum; experimental method; project method; [and] cooperative learning" (p. 73).

The second dominant category of humanistic adult education supported the progressive philosophy for Dr. McQuien, by revealing his unique concoction of the five major philosophies in the PAEI. The humanistic philosophy was described by Zinn

(1990, p. 73) as “enhance[ing] personal growth and development; [and] to facilitate self-actualization.” A perception of the learner by the teacher was that the learner was “highly motivated and self-directed; [and] assumes responsibility for learning” (p. 73). The teacher in the humanistic view would be the facilitator or helper who “promotes but does not direct” (p. 73).

Dr. McQuien’s third view of his personal philosophy was behavioral adult education; and this classification that had overtones of the primarily dominated progressive view and was also entwined with the humanistic view. These three views of progressive, humanistic, and behavioral were close in their scoring, and according to Zinn(1990) they influenced each other. Also, his results showed two categories residing in lower groupings; the instrument stated he was less likely to demonstrate in his teaching via his teaching philosophy. Logically, the groups with the highest scores influenced his teaching philosophy the most, and the lower scores have less influence on his teaching philosophies. Dr. McQuien scored high in three categories of the PAEI, which are considered to be favored and strongly influential in his teaching philosophy. See Table 6.5 for the complete PAEI results of Ross McQuien.

Table 6.5

Ross McQuien PAEI Results

Philosophy of Education	Numeric Score	Influence on Professor’s Cumulative Philosophy
Progressive Adult Education Education for Practical Problem-Solving	76	Highly Favored
Humanistic Adult Education for Self-Actualization	75	Highly Favored
Behavioral Adult Education Education for Competence and Compliance	74	Highly Influential

Liberal Arts Adult Education Education for Intellectual Development	70	Moderate Influence
Radical Adult Education Education for Major Social Change	61	Low Influence

Summary for Ross McQuien and his three classes which were observed

Dr. Ross McQuien was observed teaching three classes. Chapter six revealed the results of each class's observations made by me, the researcher. Each class included a course description, followed by in-class observations, student LIMI results, and Student Course Survey results. All classes attended and observed were upon invitation of Dr. McQuien. After the three classes' results were disclosed, Dr. McQuien's personal instrumentation results were revealed, and they included his LIMI, PALS, and PAEI reported results.

The first class observed was a large lecture hall based course of 110 students called Environmental Communication. Four class meetings were attended and observed. The student LIMI results revealed that 45% of the students were dominantly haptic learners. For the class as a whole, 18 haptic learners were above 50% of dominance of the overall 100% scale devised within each personal LIMI test. The Student Course Survey revealed Dr. McQuien was reasonably well liked by his students in Environmental Communication.

The second class of Dr. McQuien's that was observed was Recreation Measurements. Five class meetings were attended and observed. The student LIMI results revealed that equally 42% of learners showed haptic dominance and an additional 42% showed visual dominance, with a cumulative total of 84% of the class. For the class as an entire unit, six of 19 students showed a haptic dominance of over 50% in the overall

100% the LIMI culminates per student administration. The Student Course Survey revealed that his students favored Dr. McQuien.

The final class of Dr. McQuien's that was observed was Natural Resources History and Policy. Two classes were attended and observed. The student LIMI results revealed that equally 47% of learners' showed haptic dominance and additional 47% showed visual dominance, with a cumulative total of 94% of the class. For the class as an entire unit, five of 17 students showed a haptic dominance of over 50% in the overall 100% the LIMI devised per student administration. The Student Course Survey revealed that Dr. McQuien was highly preferred by his students.

The last section of Chapter six revealed Dr. McQuien's personal instrumentation. His LIMI results showed he was dominantly a haptic learner at 45%. His PALS showed that his teaching paradigm was learner-centered, rooted strongly in learner-centered Activities. Lastly, his PAEI results told us that Dr. McQuien preferred a progressive view in adult education, entwined with humanistic tendencies.

CHAPTER 7: ANALYSIS, INTERPRETATION, AND SYNTHESIS

A closer look at the results described in Chapters 4, 5, and 6 and how they associate with the four research questions and supporting literature will take place in this chapter. Each section synthesized correlating evidence including in-class observations, literature support, and instrumentation results as designed to address the study research question being discussed. The major problem the research questions addressed in this study was if haptic learners were being accommodated within traditional classrooms among five Natural Resource courses offered at Colorado State University (CSU) in the spring semester of 2008.

Research Questions

Accommodating Methods Used

What methods for accommodating haptic learners are teachers and facilitators using in each of the five Natural Resource classes at Colorado State University? This question has been addressed through common categories or trends, which surfaced among the five classes being observed in the Natural Resources department at CSU. The methods were revealed through a critical look at the observations made. Supporting evidence of founded literature is shared and correlated for each method along with specific instances referring directly to the observations made in Chapters 4, 5, and 6. Not every class had an example, which related to each accommodating haptic method. However, each class where a particular method of accommodation was observed has been discussed and examined under that correlating method. Synthesis has been shown as

one professor's tactic of an accommodating method was similar to that of one of their peer professors, which seems to be an uncommon occurrence in this study. I presume it was because of individual approaches to accommodating to various learners under dramatically different classroom circumstances.

Group Work. Group work was the most predominantly used method, surfacing in all five of the classes observed. Ross et al. (2001) specifically recommended for the haptic learner to be provided occasions for these learners to work with peers in group settings. Group work ranged from small in-class tasked assignments like worksheets to large semester long projects with results occurring outside of the classroom such as a new trail at the ELC or a service learning project posting their project as an interactive website in Fort Collins. Specific examples per class were analyzed below.

Professor Turner exhibited awareness of the need to accommodate active learners in his classroom by planning time in the syllabus for group work and interaction in the classroom rather than merely on the student's own time. First, in providing a work day for the service learning groups the professor was accommodating active learners by engaging them in the planning process of their projects. Dr. Turner provided time specifically for his students to take ownership of their learning process by allocating time for the groups to be active in their projects within his class rather than requiring all work to be done outside of the classroom on the students' own time. Cajete (1999) said, "Ideally the teaching methods and information presented will be in a form that is relevant and meaningful to the student" (p. 148). Dr. Turner and his TA were involved with the in-class work session by actively engaging with each group. The work session by its nature supported the haptic learner purely through engagement and was accommodated

by the professor simply through his active participation in each group's planning. Further, Dr. Turner's literal activity in the work session was also haptic or active in its character.

Second, the active learning segment of developing a service-learning project brought up several dimensions of awareness within the groups. For example, the Bike Tours/Sustainable Biking group did not intend to implement their project in the community, but have actively gained experience in developing problem solving tactics for very real problems, such as legal and liability concerns for that type of project. For their particular project to remain hypothetical, it is extremely thorough and well thought out by taking into consideration legal and liability issues. Furthermore, a haptic example from the work of the group Reduce/Reuse/Resource was observed. They actively applied their concept to the poster being made during the workday session by using ReSource windows as their backdrop to the poster. This intellectual activity showed another positive aspect of allowing students to discover, learn, and grow within haptic learning constructs. Hence, accommodating active learners, like Dr. Turner did, pushed the learner beyond simple project guidelines into a realm of discovery and exploration of the project.

The nature of the group work in Dr. Gooding's class was supported both by Cajete (1999) and Poon Teng Fatt (2000), which was to teach to the dominant learning style. In this instance it happened to be the haptic learner (see Figure 4.1 for disclosure of student Learning and Interpreting Modality Instrument (LIMI) results in Dr. Gooding's class). Group experiences were haptic, especially when each member had a position or responsibility to address for the group in order to complete their task. This was evident as the groups prepared for the Earth Day event and saw their projects come to fruition as a result of active learning segments. Dr. Gooding allowed his students to discover that they

had taken on too large of a project to be completed on Earth Day, the wheelchair accessibility trail. However, he guided the class by using group work to complete the wheelchair accessibility project and as teachable moment of what the realities of managing a protected area could be like.

Dr. McQuien conducted an active learning segment in his Recreation Measurements class. First he told the students what to do with SPSS, and then he showed them on the overhead computer screen; which allowed them to follow along by doing what he was doing on his computer at their individual computer terminals. The haptic magic occurred when he passed out their worksheets as an active in-class learning segment, where the students needed to do what they had just been taught. Further, Dr. McQuien and his TA made themselves available and roamed the room checking for understanding of each group. Any time there was a question Dr. McQuien made the knowledge transparent by sharing each question and its subsequent answer with the class. Evidence that the learning segment was working occurred when the student exclaimed, “Yea, I think we’re rockin’ it!” with a big smile on his face. This showed confidence in the learning segment and excitement in processing and acquiring the transfer of knowledge passed from Dr. McQuien to his students. This was a perfect example of accommodating haptic learners in traditional classrooms. As much of the literature said, (ABE NetNews, 2001; Cajete, 1999; Cody, 2000; Lemire, 2002; McAllister and Plourde, 2008; Mixon, 2004; Poon Teng Fatt, 2000; Ross et al., 2001) if you could accommodate the haptic learners, then the visual and auditory learners would also be accommodated; merely by default of necessity of presentation. In other words the practitioner should follow this formula: first, tell the information for the auditory learners; second, show the

information for visual learners; and finally, have the students do the information to assure accommodation for the haptic learners. The doing only reinforces the showing and telling segments of the knowledge being presented for all students. Dr. McQuien did what the literature said, by first showing and telling the information and then by offering a haptic occurrence as the worksheet, for the students to complete.

McAllister and Plourde (2008) encouraged students to work together as a group while seeking “inquiry-based, discovery learning approaches that emphasize open-ended problem-solving with multiple solutions or multiple paths to solutions” (p. 40). It was haptic in nature to allow the students to learn in a free environment where they were able to control what they need to learn best. This was displayed in Dr. McQuien’s Recreation Measurements class when groups were naturally helping other groups work on the recoding datasets worksheet. Every group eventually successfully finished the worksheet. In the class there were at least four incidences where groups were helping neighboring groups to understand and complete their work. Furthermore, the one female student who was working alone received individual attention and guidance from Dr. McQuien on how to recode datasets correctly. Once she was done with her worksheet she immediately moved to a struggling group and began to help them successfully understand and complete the worksheet. This active engagement reinforced what the female student just learned by actively teaching the knowledge to others; hence, this action was haptic in nature. Also, in Dr. McQuien’s Environmental Communication class he had his students solve a problem worksheet concerning outdoor scenarios. Dr. McQuien roamed the room and gave the students the freedom to solve problems with variance as McAllister and Plourde (2008) mentioned. This approach was also seen in his Natural Resource History

and Policy class when the students provided group presentations on policy analysis presentations, which sparked in-class questions and discussions. The nature of allowing the students to discover solutions to problems presented in class accommodated haptic learners by encouraging them to engage and work as a team to solve the presented problems.

Group work surfaced in every class observed. Each of the three professors in this study displayed that group work was a productive and accommodating method for haptic learners within the traditional classroom.

Repetition and Active Review. Repetition and active review surfaced hand in hand in this study. All active review segments were repetitive in nature as the professors used this method to prepare students for tests, papers, and final assessment types of assignments. This method was found through observation in three of the five classes. Each professor displayed this method slightly different from the other. Hence, we will look at each professor's choice separately, although it is important to note that this method was congruent in use among the three professors.

Dr. Turner provided his groups a chance to practice in front of their peers before they were graded by him in a public form. This activity would be considered both a form of repetition and actively reviewing what the students had learned in-class. He accommodated haptic learners by allowing them to practice and work in a group setting, as Ross et al. (2001) recommended as a positive accommodation toward haptic learners. The experience provided an opportunity for haptic learners to execute their experience once, prior to being graded. For a closer examination, the REI group and their listener's enthusiasm both lingered after they practiced presenting. This indicated a positive and

exuberant learning environment as a result from an activity that was repetitious as active review. Additionally, the Fort Collins Sustainable Eating group showed extreme vitality and concurrence as a group, via their supportive inner-group body language exhibited during their practice presentation among their classmates. Hence, the choice to accommodate the haptic learners through repetition and active review reinforced the learning process for all learners, as much of the literature suggests. I suspected their attitudes were shaped by Dr. Turner's support of their learning styles. He accommodated haptic learners, which according to the literature, (ABE NetNews, 2001; Cajete, 1999; Cody, 2000; Lemire, 2002; McAllister and Plourde, 2008; Mixon, 2004; Poon Teng Fatt, 2000; Ross et al., 2001) taught to all learning styles alike. In teaching to the haptic learners, the visual learners were shown, the auditory learners were told, and the haptic learners could learn by doing. In the nature of doing, the other non-haptic learners were being reinforced the information they have just been delivered while the haptic learners were being accommodated.

Dr. Gooding brought his class around to review their progress in their projects at the ELC several times throughout their process. As a result the students became more involved with the ideal of protected areas management as a concept. Toward the end of the course, the class began to work on projects as a unit, specifically at the wheelchair accessibility trail. The processes necessary to manage a protected area became more apparent as the students had an active opportunity to invest in the management of the ELC. They realized that their individual projects summated the whole of the management of the ELC. Cajete (1999) strongly supported the use of experiential activities as a means to accommodate haptic learners, with the use of "personalized encouragement coupled

with guidance and demonstration...narration, humor, drama, and affective modeling in the presentation of content” (p. 143). The entire project based learning segment, which consumed much of Dr. Gooding’s class, improved relationships between teacher and learner, and engaged the learner in the traditional classroom, specifically the haptic learner.

Weiss (2001) recommended providing an opportunity for the mind and body to work together through movement as a method of accommodation for the haptic learner. Dr. McQuien creatively accommodated these learners in his large Environmental Communication class through three separate instances.

First, in Environmental Communication, the use of an overhead projector was considered a visual tool by nature. Dr. McQuien took a visual activity and translated it into a haptic experience by having his students write down the questions, which was an action or movement, rather than passing out a handout. This simple movement was active enough to assist haptic learners in gathering the information in their minds by having them actively write down the information. The act of writing rather than reading information assimilates in a haptic mind much more fluidly. Second, Dr. McQuien suggested to his students to look an answer up in their notes when he asked an open ended question and received only blank stares in return. He was encouraging the students to actively seek the answer out in providing them a location in which to find the answer, again encouraging movement. Third, Dr. McQuien reviewed the self-guided fieldtrip on the review day May 5th. He directly read from the assignment and was actively seeking for the students to provide the answers. As a result, he did this to help students who got the answer incorrect so that they could fill in the correct answer and study for the final

exam. After all, the review day was geared toward correct answers for the final exam. It was indirectly or unconsciously a haptic learning segment to assist the students in gathering the correct answers, if the student took the time to listen to the review and write down the correct answer, which was the movement element Weiss (2001) was referring to. What was haptic about this exercise was the students took ownership in gathering the correct answer geared toward their final exam.

Class setting not in a traditional classroom. Although each of the courses in this study was offered on campus at CSU, many of them had class sessions in places other than their assigned classroom. Four of the five classes studied had such occurrences. Fittingly, Cajete (1999) expounded on haptic methods. “Teaching is essentially processing and communicating of the information to students in a form they can readily understand, combined with facilitating their learning and relative cognitive development. Ideally the teaching methods and information presented will be in a form that is relevant and meaningful to the student” (p. 148). His astute methodological observation pertained to all three professors in this study. Equally, Ross et al. (2001) supported the need for a teacher to be flexible within class settings. Below are examples of how the three professors were flexible and presented information in a “relevant and meaningful” (p. 148) way to the students.

Dr. Gooding took his class to the ELC to complete projects pertinent to their discovery of Protected Areas Management. The class spent the majority of their sessions at the ELC rather than in the assigned classroom on campus. Dr. Turner held class in a traditional classroom for every session except the poster session which was what his class was surmounting to, the poster session experience. He provided his students with the

opportunity to be in a forum to share their knowledge with others. Providing this opportunity supported the constructs of haptic learning segments as Ross et al. (2001) iterated the need to be flexible in-class settings in order to accommodate the haptic learner. Finally, Dr. McQuien had two separate occurrences of holding class not in the traditional classroom. First, in Environmental Communication he cancelled in-class sessions for one week for the dedication of the students to work on their self-guided fieldtrip assignments during that time. The assignment required the students to visit various locations within the community, away from the CSU campus. The second occurrence was found in Recreation Measurements. The class began in a traditional assigned classroom on CSU campus. About half way through the course the class sessions began meeting in a computer lab, for a hands-on experience as they learned the SPSS computer program. The following segments cited these four occurrences from each of the three professors observed in this study.

Dr. Gooding's class had about half of the class sessions held in a non-traditional class setting, the ELC. From that point forward the class became 100% hands-on, active and precisely pertinent to the course content and designed outcomes. As a result of working together outside of the classroom, the students gained a sense of pride and accomplishment. The individual groups sensed this as well as they began working harder and maintaining interest, involvement, and passion with the volunteers on Earth Day. Furthermore, the students displayed dignity and a desire to see the projects come to fruition as a class. This attitude indicated the students saw the big picture of what they were there to learn, how to effectively manage protected areas. They learned this through gaining value and worth in their individual projects and taking a step back to look at the

improvements of the ELC as whole. The active learning that took place did foster value and meaning for the students. Much of this was achieved when Dr. Gooding accommodated his students learning styles, displayed by how he incorporated an extremely haptic approach to learning the management of protected areas, and by providing the opportunity for the students to manage elements of a protected area. As evidence of the accommodation of haptic learners, the students took ownership in the process. It is important to note that 86% of his class registered as dominantly haptic on their LIMI scores.

Dr. Tuner directly acknowledged to me that the poster session was an active activity, which certainly accommodated haptic learners. He felt the experience gave every student a practical and hands-on experience to a scenario, which occurred commonly in professional life, both deeper in academia and in the workforce. It became clear from observing and talking to the students at the poster session that many of them learned a lot from the poster session and the experience grew into a haptic learning segment for the majority of the students involved. This evidence was shown through the following group's reactions at the poster session: REI, Fort Collins Sustainable Eating, Go Green/Eat Green, Bike Tours/Sustainable Biking, Year-Round Community Farming, and Beet Street.

The REI group preferred public speaking and sharing of newly acquired knowledge with others as positive elements in their course experience. These activities were haptic in nature and the group conveyed a preference for haptic participation in the course.

The students at the Fort Collins Sustainable Eating display engaged in a passionate discussion with their visitors on the course content of why sustainable tourism was important. The group was eager to share their new knowledge, like the REI group. Both instances were evidence that the learners had gained positive knowledge from the course and were passionate to share their knowledge with others.

The Bike Tours/Sustainable Biking group chose to tweak their project in response to real life competitors. This was interesting to see since the group never intended to have their project come into fruition. This action showed that the students were impassioned by the service learning project that was established by Dr. Turner as a haptic learning segment. Therefore, students who engaged their learning in haptic segments were likely to intensify their ownership for the learning segment as we have seen with the Bike Tours/Sustainable Biking group.

The Year-Round Community Farming group, due to the haptic exercise of a service-learning project, expressed a strong amount of passion and dedication. They were actively working in the community on their project, which was cultivated by great drive to apply their newly gained knowledge from Dr. Turner's course immediately.

Lastly, Beet Street group members imparted some substantial evidence, which supported haptic learning segments. Two group members were quoted at the poster session. The first said, "It is cool to say you took part in this experience here in-class, which became a real thing, it feels good. I like the process of actually making things happen." A second group member expressed, "I get it now that I can see what people have been talking about and touch it in real life instead of visualizing just an idea."

Dr. McQuien had two occurrences, which were held outside of the traditional classroom setting. First, the self-guided fieldtrip from the Environmental Communication class was haptic in nature because the students were required to go out and do, see, experience, touch, feel, be active, and answer a worksheet to complete the project. Additionally, the students were expected to write a reflective paper that addressed the answers to the questions on the worksheet which was due in-class, in order to complete the assignment. Overall, the students responded well to the assignment and showed interest as reflected in their in-class discussion on April 28, 2008. Second, the Recreation Measurements class kept the majority of its learning segments in a hands-on, haptic environment by providing computers for each student, with the professor at the front of the class on an overhead projected computer that was used as a show and tell tool. This way the students could mimic his actions on their own computer and “do” the work.

Flexibility and Adaptability. Pengiran-Jadid (2003) reported traditional teaching methods (implied auditory and visual methods) were used initially for a progressive group of haptic learners. Pengiran-Jadid (2003) discovered that flexibility in both teaching preference and philosophy through advising educators to strive for teaching style flexibility, including “varied sizes of group discussion, case studies, providing a range of audio-visual equipment, lecture, and problem solving opportunities,” was effective and did accommodate the haptic learners in their study. Dr. McQuien was noted as being both flexible and adaptive. This was evident when two students in his Environmental Communication class chose to work on their own without a group and displayed signs of non-haptic behavior. Their approach to learning was not active, tactile, or sensory involved. This was an important detail to note, and likely they were not

dominantly haptic as the literature described, haptic learners will engage in-group work (Cajete (1999); Pengiran-Jadid (2003)) and desire interactive activities. It was interesting to notice how these likely non-haptic learners accommodated their learning style needs as well. Furthermore, Harr et al. (2002) reviewed eight teachers who continuously were rated excellent from peers, superiors, learners, and parents alike. The eight teachers strongly agreed that there was a need to teach learners to their different learning styles. One of the major themes that emerged as a result to observing them in their teaching was their willingness to be adaptable toward learners with varying learning styles in traditional classrooms. Furthermore, Dr. McQuien did not take concern toward the fact that the two students were working independently rather than with a group as instructed. Dr. McQuien's action shows an inclination toward accommodating varying learning styles within his traditional classroom setting. Further, the rest of the class seemed happy with the group project, which was observed by an increasing volume, smiles, and everyone working together in the lecture hall. This positive observation indicated the class was content with a haptic activity rather than traditional lecture, based in a traditional college classroom.

Moreover, in Recreation Measurements Dr. McQuien accommodated haptic learners by choosing to be flexible and adaptive by verbally rewording questions from his worksheet when students expressed confusion on what was being asked. The desired outcome or answer was the same from the students, but the approach to lead or guide the students to the correct outcome was changed, which accommodated their direct request to clarify and relieve confusion.

Dr. McQuien accommodated the haptic nature of both his undergraduate students in Recreation Measurements along with his graduate student who was also his TA in the class. It was important to recognize that both the undergraduates and the TA were technically Dr. McQuien's students. He achieved needed haptic accommodation to both stakeholders. Dr. McQuien allowed for a dual accommodation of student needs by giving the TA the room to struggle with his teaching so that he had the opportunity to gain more experience, as he requested. He also accommodated the undergraduates' needs by offering help when the students ultimately became confused with worksheets or during computer work sessions. Both actions accommodated haptic needs. First, in providing a requested teaching experience to the TA, Dr. McQuien adapted to his haptic need to do which allowed his TA to gain teaching experience. Second, for his undergraduate students in Recreation Measurements, Dr. McQuien kept his class on track, understanding new concepts on SPSS. He did this by assisting navigation on their computers to specific locations within SPSS. Further, he asked them for verbal indications of understanding and received positive feedback from the students throughout the class. This experience showed what McAllister and Plourde (2008) discussed and profess to educators as "inquiry-based, discovery learning approaches that emphasize open-ended problem-solving with multiple solutions or multiple paths to solutions" (p. 40) for accommodating the active or haptic learner within traditional classroom arrangements. Dr. McQuien did this by accommodating his TA and undergraduate students, also by reassuring his students were learning the necessary information as his TA gained needed teaching experience.

Lastly, Dr. Gooding had the most frequent haptic experiences in his class when compared to the other professors in this study. It was observant of Dr. Gooding to note and accommodate the weather for the welfare and safety of his class on the last day of observation. The class did not endure the bad weather by choice of Dr. Gooding and yet the class was able to complete the haptic learning segment planned for the day, presenting their projects with the Park Ranger. In giving the groups an opportunity to then brave the elements after their projects have been described and shared, the professor provided more opportunity for haptic occurrences and interaction with their guest. Again the professor had achieved teaching to all three learning styles, which according to the literature does accommodate the haptic learner (ABE NetNews, 2001; Cajete, 1999; Cody, 2000; Lemire, 2002; McAllister and Plourde, 2008; Mixon, 2004; Poon Teng Fatt, 2000; Ross et al., 2001). In this instance flexibility and adaptability on the professor's behalf has been the key elements in accommodating haptic learners.

Guided Discovery. Cajete (1999) mentioned that “personalized encouragement coupled with guidance and demonstration” (p. 143) proved guided discovery as an accommodating method for haptic learners. Guided discovery could either be lead by the professor or relinquished to the student. Once the method was relinquished to the student the method was then referred to as self-guided discovery. In many cases the student would gravitate toward other students and naturally work together which lead to the enhancement of discovery. One example of guided discovery occurred in Dr. Gooding's class as he iterated to me while observing that the wheelchair accessibility group “bit off almost more than they can chew” with the size of their project. Dr. Gooding ended up guiding the entire class to the success of project completion by having the entire class

pitch in to discover how much work their large project took. His guided discovery also promoted success of the project for the class as a whole when they reached the completion of the wheelchair accessible trail.

McAllister and Plourde (2008) advocated “inquiry-based, discovery learning approaches that emphasize open-ended problem-solving with multiple solutions or multiple paths to solutions” (p. 40) for accommodating the active or haptic learner within traditional classroom arrangements. They also support the discovery element, which exists in guided discovery. Ross et al. (2001) promoted for teachers to become increasingly aware of strategies, which improved learner success in relation to learning style. In particular for the haptic learner it was recommended to provide occasions for learners to work with peers in-group settings. They further advised educators to strive for teaching style flexibility, including problem-solving opportunities. Both sources support the idea of guided discovery and self-guided discovery as accommodating methods. Dr. McQuien was observed providing this method many times; once in his Environmental Communication class, and many occasions in his Recreation Measurements class to provide such accommodations. The one example, which occurred in the Environmental Communication class, occurred in helping a group find possibilities and examples of answers to their worksheet, Dr. McQuien provided a guided discovery of the transfer of knowledge.

The following five instances stood out while observing Dr. McQuien’s Recreation Measurements class concerning guided discovery/self-guided discovery. Dr. McQuien stayed with a student after class until they completed a worksheet from the session that was taught by the TA. Although the student did not ask for assistance, a positive sign of

accommodation was that Dr. McQuien chose to stay after class until he was certain that all of his students understood the information needed to be successful at that given point in his course. This support was literally active and accommodating to any type of learner especially a haptic learner. It was accommodating to a haptic learner because he allowed the student to actively do their work and discover their answers via the act of doing work. Meanwhile, he continued to be available for guided discovery, rather than just providing the answers to the student.

A second example of guided discovery was shown in the active segment of the class the TA taught. When the students began to work on worksheet problems, which applied directly to his lecture, there was confusion and many questions. The students responded by helping one another as self-guided discovery. Meanwhile, Dr. McQuien and his TA roamed the room helping the groups as much as possible through providing guided discovery. Furthermore, self-guided discovery was displayed as a student was helping a latecomer by teaching him the information they learned in-class earlier that day. The haptic connotation was that the class helped each other out when in doubt of new knowledge. Having the freedom within their classroom to talk, discuss, and assist one another through their learning segments provided an accommodation of haptic learning segments where the students helped each other acquire and assimilate their information need, which achieved their goal of successfully completing their worksheet.

Another example of guided discovery was displayed through Dr. McQuien noticing one student was working alone after her partner left. It was accommodating specifically to her learning, in that he helped her work so she did not have to work alone. It was important that Dr. McQuien was revisiting the information from the day with the

lone student and gave her individual attention. It was his awareness that she needed to be successful in learning the information. His choice to give her individual attention, which was the accommodating act regardless of her individual learning style, was the basis for providing guided discovery, which accommodated toward the learner. Further it is impossible to tell what her LIMI score was since the Institutional Review Board (IRB) maintained anonymity to protect the individuals' identity. However, the act of guided discovery is an accommodating method for haptic learners as we have discussed.

A fourth example of guided discovery and self-guided discovery occurred after Dr. McQuien's TA in Recreation Measurements spent most of the class helping a specific group on the recoding the dataset worksheet. One group member left class while the other group member stayed behind to help out a neighboring group. This was a haptic choice on the student's behalf. In choosing to help another group learn she was gaining solidification in her own knowledge of newly learned information. Dr. McQuien floated by the group while she was helping them. It was clear that he was just checking that they were on the right track. Nevertheless he gave them their autonomy, which supported their active learning segment by not interfering with positive learning and active sharing of knowledge when the correct information was being provided. Dr. McQuien's silence was in a sense reinforcement of the correct answer and support for self-guided discovery in his classroom.

Example five was supported by Ross et al. (2001) and specifically recommended to provide occasions for haptic learners to work with peers in group settings while in the discovery phase of learning. Dr McQuien took this method recommendation a step further by allowing for self-guided discovery, guided discovery, and group work to occur

simultaneously. Groups were working together in self-guided discovery as they were also actively pursuing the assimilation of their new knowledge together as a class. The fact that Dr. McQuien allowed and promoted this type of behavior in his classroom fostered positive encouragement of learning for his students, specifically; he was accommodating the haptic learner by encouraging self guided discovery so that understanding the information and knowledge would transferred.

Guided discovery and its subset self-guided discovery occurred in both Dr. Gooding and Dr. McQuien's classes. Dr. Gooding allowed the class to learn from their group decisions. In his instance he promoted success by involving the entire class in a guided discovery experience. On the other hand, Dr. McQuien and his TA spent much time guiding students through processes in SPSS on their own computer. This practice and guidance accommodated haptic learners by encouraging them and allowing them to do the work, which solidified learning for the student and was obliged by a superior to avoid mistakes. In the end the outcome was positive and accurate for the student, which fostered and supported the transfer of knowledge and accommodated the haptic learner.

Role Play. ABE NetNews (2001) offered three questions they recommend to be asked by the educator as a guide to prepare lessons in a multi-sensory approach. The complete exercise may be found in Chapter 2 of this thesis on pages 20 and 21. Question three was designed to assure the haptic learner was being accommodated and asked, "What activities or physical actions can I use to demonstrate and reinforce the learning? Use sand trays, carpet strips and other manipulatives, learner teaches the skill to someone else, learner explains it to the instructor, role play, get up and write it on the board, make

up a game (Jeopardy)” (pp. 10 – 11). This question purposely recommended role play as a means to accommodate the haptic learner.

Dr. McQuien was the only professor to use this method of accommodation and it was observed in his Natural Resources History and Policy class. He chose to role play the class in passing a bill through the legislative process. The role play activity was haptic as each student was able to experience what it could be like to be a legislator and see some of the conditions and circumstances, which might affect a bill passing in the legislature. Also, Dr. McQuien made the choice to take the topic of the bill from a question, which occurred the previous class session. He unquestionably accommodated haptic learners in this instance from two differentiating dimensions: first, as a haptic learning segment used to reinforce to the students how a bill was passed through the legislature, and second, to personally address the students’ curiosities and questions which arose in his class the session prior to the role playing activity. Dr. McQuien facilitated this haptic learning segment, the role play, while all along maintaining an interesting and connected persona with his students. As evidence, there was laughter and silliness throughout the experience from singing songs from the cartoon watched in class to naming the sponsor House Representative “Representative Tree Huggin from Alaska.” This tone set an accommodating feel for his students as Dr. McQuien embraced identities, which his natural resource students identified with relating to their major. Further, Dr. McQuien’s role play in government was a haptic learning segment and successful for the majority of his students. The class was engaged, which was displayed by every student but one. Every student but one was asking questions or making comments throughout the role play experience.

In a separate haptic learning segment, on different day in Dr. McQuien's Natural Resource History and Policy class, the students were required to present a policy analysis. One group made the choice to show the history of a specific bill and where it came from within congress. The student presenters commented they made this choice because the class had such a good experience in role playing how a bill passed. This information inferred that the class had a positive learning episode with the haptic activity of role playing how a bill was passed in congress. Again another signal that Dr. McQuien accommodated his haptic learners in his traditional classrooms and a positive indication that role play was an effective method of the transfer of knowledge for haptic learners. Further as ABE NetNews (2001) recommends, role play was an effective method in specifically accommodating the haptic learner.

Collecting Student Feedback. Cajete (1999) discussed the importance of “teaching methods and information presented . . . in a form that is relevant and meaningful to the student” (p. 148). One way to assure information was relevant or meaningful for the learner was to obtain student reactions. Students' reactions to the material were observed in several of the classes as a method of accommodation to the haptic learner. Some of the reactions were acquired formally from the professor and other reactions originated in the observation process in this study.

The cliché “actions speak louder than words” could be an antidote in deriving meaning from one's intentions or reactions. Class attendance indicated student interest in the course and was an accommodating method of haptic learners in traditional classroom environments. The nature of the haptic learner, according to Lemire (2001), was to do, touch, and feel, which required one's presence in order to be effectively engaged in

haptic learning segments. Dr. Turner required positive attendance as part of his grading guidelines and; therefore, created an accommodating environment for the haptic learner to be successful in class by requiring their presence.

Another form of student reaction was found in Dr. Turner's class International Issues in Recreation and Tourism, and was displayed by the Reduce/Reuse/Resource group. They chose to not only participate in the poster session as required by the course syllabus but to also promote their project on Earth Day to the community at large. The effect of the project allowed the students to haptically apply their knowledge and share with the community in a practical sense, beyond the classroom. This action showed the students were learning and taking their knowledge a step further, the students applied their knowledge and shared the concept of sustainability with their community, as their service learning project was community focused. It was probable that Dr. Turner choosing to accommodate the haptic learner had inspired the learners to continue their quest for knowledge and express a desire to share their knowledge with others.

Dr. Turner also formally requested the student's reactions through two approaches. The first was during the Service Learning Reflective Discussion in his class session on April 28, 2008. Dr. Turner asked the class what they thought of the service learning poster session and if they felt it reflected what the students had learned in the course. One student responded and claimed that actual doing was a more interesting activity than traditional objective assessments such as "papers and tests." The student was ascribing to haptic learning sessions as a more preferable assessment method. Interestingly, an overwhelming majority of the class verbally or physically agreed with the commenting student by nodding their heads or verbally responding.

The second incident from Dr. Turner revealed some of the most indicative data in this study. He was directly questioned his class after the above discussed comment was made by the student reflecting on the class's poster session. The student's comment was "I'd rather do it rather than boring stuff like papers and tests." From this interaction Dr. Turner was compelled to ask a series of questions on how his students learn best. He requested they raise their hands in response to his inquiry. "How many of you learn best by reading?" No hands are raised. "How about hearing?" Two hands went up. "Does anyone learn best by hearing and reading?" Four hands were raised. "What about learning best by reading and doing?" About 90% of the class' hands rose, indicating through the professor's inquiry that a significant majority learns best by reading and doing. Clearly a strong observational piece of data, which supported the problem statement of this study:

The problem, as evidenced by Weiss (2001), supported that the majority of learners were predominantly haptic learners and most often taught in traditional classrooms via auditory and visual learning style methods. Consequently, a shift in how teachers and facilitators approach the transfer of knowledge in a traditional classroom should regard the individual learning styles of their learners, and therefore heed and accommodate haptic learning methods within a traditional classroom so that optimal learning conditions can occur.

In discovering though undeniable evidence that nearly every one of Dr. Turner's student's indicated they preferred "doing" over "not doing" as a learning activity supported that haptic learning segments are well received for a variety of learning styles. The student LIM1 for his class revealed that there was 49% of students who were dominantly haptic and 5% of students who were dominantly visual/haptic; therefore, over

one-half of his International Issues in Recreation and Tourism class registered as dominantly haptic.

Dr. Turner also provided the Service Learning groups with an in-class peer feedback and practice session, prior to the actual poster session with the public and academics. This choice assisted him in setting his students up for success. Each group presented their material once to peers, who offered peer feedback to each presenting group, which allowed the formal poster session presentations and question answering to go more smoothly during the real time event. He allowed his students to actively practice to get their first time jitters out of the way, in front of their peers, while receiving their feedback and reactions from one another. This was a positive sign of the accommodation of haptic learners as each group took turns presenting and offering feedback and reactions to each other. These reactions and feedback reinforced the transfer of knowledge to the student. The students were now required to help their peers succeed in the haptic learning segment, the poster session, by offering constructive feedback as a means to support each group's future success.

A handful of comments from the students during the observation process were collected and were directly relevant to student feedback and the accommodation of haptic learners in traditional classroom settings. Dr. Gooding, Dr. Turner, and Dr. McQuien all had comments surface through out the observation process.

On page 56 of this thesis an account of a student commenting in Dr. Gooding's class while working on the class project at the ELC was overheard. The student said; "I care about this class way more because we did something real compared to the other one [service learning class]." In the service learning class students created a hypothetical

project and planned it out, however they were not required to carry out their project. In this class, the Fundamentals of Protected Areas Management, the student was expressing that the class meant more to him because he felt like he accomplished a genuine pursuit in the real world, rather than acting out a hypothetical idea that would only be accomplished in academia. This comment alone was valid and solid proof that active learning segments were impactful, meaningful, and a strong positive choice when attempting to transfer knowledge, experience, or meaning. The student gained great value out of doing actual project in Protected Areas Management rather than creating hypothetical experiences.

The Zach's Cliff group from Dr. Gooding's class exercised a trial and error session in order to discover which tools best aerated the soil, so their plant restoration project would thrive. This was a haptic activity; they directly tested different garden tools to discover, by means of group consensus, the best way to aerate their soil. The students were extremely enthusiastic to create good soil for their restoration project; which was due to their investment in the project where they did the research on which plants and shrubs would work best. They took ownership for their learning and were eager to share their newfound knowledge with their peers. By offering the students the opportunity to have haptic segments in Dr. Gooding's class, the students' behavior showed that haptic settings were exciting, challenging, and positively productive.

During the poster session of Dr. Turner's class, many comments were said by the service-learning groups, which supported the haptic learning segment of the poster session. The Straw Bale Construction group gained valuable information by meeting with various businesses around the community; as a result the group felt prepared to field

questions from the public in the poster session. Furthermore, they mentioned they would rather learn in this format versus a lecture series in a traditional classroom because they felt they got more practical, hands-on experience.

The Poudre River Awareness Event stated at the poster session, “It is great when you can touch what you are learning rather than talk and have lots of chatter.” Another group member added, “It means more to practice what is preached to you.” This was direct testimony that learners did appreciate haptic learning segments and welcomed them with eager minds and enthusiastic attitudes. Again, the only way this discovery could have been made was through the haptic method of collecting student feedback.

Beet Street group members imparted some substantial evidence, which supported haptic learning segments. Two group members were quoted at the poster session. The first said, “It is cool to say you took part in this experience here in-class which became a real thing, it feels good. I like the process of actually making things happen;” and a second group member expressed, “I get it now that I can see what people have been talking about and touch it in real life instead of visualizing just an idea.”

Dr. Turner’s class gave student feedback to me the researcher as I perused their poster session. None of the feedback was prompted. I visited each group’s table and observed their presentations. The above examples give insight to practitioners that these learners appreciated active, hands-on learning segments. Dr. Turner’s class registered at 49% of students as dominantly haptic learners.

Finally in Dr. McQuien’s Natural Resource History and Policy class, a student was sleeping during the policy analysis presentations that earlier in that class session commented while taking the LIM1, “I love active learning”. The same student was

completely involved and engrossed in the active learning segment of the congressional role play on how to pass a bill the class session prior. During a student lead presentation where she was listening to a lecture, she elected to fall asleep and disengage with the current class session. This was a sign that she would have been more engaged had the presentation been a haptic learning segment, which it was not. The presentation was rather a visual and auditory learning segment via lecture and PowerPoint presentation.

As Cajete (1999) reminded us, it was important to present methods, which were “relevant and meaningful to the student” (p. 148). Dr. Turner elected to accommodate his learners by both formative evaluation and class discussion. By acquiring the necessary feedback from his students, his intention was to discover if his delivery of information was accommodating and acceptable to the class (see Figures 5.1 and 5.2 for full disclosure of Dr. Turner’s class’ LIMI results). Furthermore, student reactions were observed that indicated casual feedback for this study, which was interpreted as student reactions to their particular learning segments, a critical form of data for the summation of this study. Through their comments, I discovered that students did like haptic learning segments and appreciated their real life applications.

Methods Conclusion. Research question one asked, “What accommodating methods for haptic learners are teachers and facilitators using in each of the five Natural Resource classes at Colorado State University?” Seven methods of instruction which accommodated haptic learners were discovered and observed in this study and they were: group work; repetition and active review; class setting not in a traditional classroom; flexibility and adaptability; guided discovery; role play; and collecting student feedback. All three professors used group work, repetition and active review of course material,

holding classes in nontraditional classroom settings, and collected student feedback as methods to accommodate the haptic learner in their classes. Both Dr. Gooding and Dr. McQuien exercised the methods of flexibility and adaptability; and guided discovery as a means to accommodate their haptic learners. Finally only Dr. McQuien used the method of role play to accommodate haptic learners in his Natural Resources History and Policy class. All of these methods are recommended to future practitioners as tools to use, which have been revealed in this study, to effectively accommodate haptic learners within traditional classroom environments.

It was observed that although these methods are supported by the literature to accommodate haptic learners, the majority of students were engaged in the learning process for the greater part of all observed learning segments at any given point in the study. Therefore, I conclude that the haptic accommodating methods can also entice a variety of learners. This conclusion was supported by the philosophies of Mixon (2004) and ABE NetNews (2001), which were generated from the LDA Learning Center. Furthermore, due to the positive interactions, enthusiasm, and the engaged spirit of the students, the methods to accommodate haptic learners observed in this study are productive, useful, and set a positive example for future practitioners who strive to accommodate all learning styles. Ultimately, it was beneficial to teach toward the haptic learner, and other learning styles will equally benefit from this approach. With these methods of accommodation, all learners will be taught to and have equal opportunities to absorb knowledge, rather than more traditional approaches which teach to only the visual or auditory learners through lecture and PowerPoint presentations. If you accommodate

the haptic learner then the greatest good for all learners is achieved and haptic learners are finally accommodated as this study recommends.

Accommodation and Volume of Haptic Learners

What is the relationship between the Accommodation of Haptic Learners and the percent of haptic learners in these classes? This question was addressed by looking at the first research question to determine if haptic accommodating methods were used in the classes by the professors during the observation period and by analyzing the LIMI results for each of the students in the study. In all, 164 participated in the initial administration of the LIMI. A look at the student's LIMI results determined if a substantial volume of haptic learners existed to justify the need to accommodate haptic learners within traditional classroom settings. Ideally a high occurrence of haptic accommodating methods would coincide with a higher frequency of haptic learners with in a specific class.

As examined in the discussion of the first research question, all three professors executed multiple and frequent accommodating methods for haptic learners in their classrooms. This was observed in all five Natural Resource classes at CSU. Therefore, it was discovered that accommodating methods were being were used in each class observed in this study. Now we will look at the percentage of haptic learners in each of these classes and discuss how that percentage warranted the accommodation of haptic learners within each specific class in this study.

Table 7.1 analyzed the number of haptic learners found in each of the Natural Resources classes. The table established if a warranted volume of haptic learners existed in this study to fulfill the need to accommodate them within traditional classroom

environments. Below Table 7.1 verified the percent of haptic learners in each of the five Natural Resources classes, followed by an analysis and synthesis of the relationship between the accommodation of haptic learners and the percent of haptic learners in these classes.

Table 7.1

Volume of Haptic Learners in each Natural Resource Class

Course Name	N	Haptic		50% and Over, Haptic	
		Number	%	Number	%
Protected Areas Management	14	12	86%	6	43%
International Issues in Recreation and Tourism	37	18	49%	12	32%
Environmental Communication	77	35	45%	18	23%
Recreation Measurements	19	8	42%	8	42%
Natural Resources History & Policy	17	8	47%	5	29%

The lowest percent of haptic learners in any class in this study was 42%, found in Dr. McQuien's Recreation Measurements class. However, this figure was nearly half of that class's population, which were dominantly haptic learners. In fact, all of the classes in the study with one exception were close to half full of dominantly haptic learners. The one exception was Dr. Gooding's class Protected Areas Management, which had 86% of his learners who were dominantly haptic. In summation, all five

classes had at least nearly half of the learners registering as dominantly haptic. Therefore the relationship between the accommodation of haptic learners and the percent of haptic learners in these classes was encouraging and constructive. As it turned out, each of the classes had at least 42% dominantly haptic learners, which established a strong enough volume of haptic learners in each class to warrant accommodating these learners. All three professors chose to use accommodating methods for haptic learners in their classes.

As discovered, at least 42% of the classes studied were dominantly haptic; as determined by Lemire's LIMI (1998), with the highest occurrence in the Protected Areas Management course at 86%. Equally, it was observed that Protected Areas Management was the most haptically accommodated course of the five courses observed. All of the classes accommodated haptic learners through out the semester, and also correlated with the prevalence of haptic learners in traditional classrooms within this study. Furthermore, each professor was found to use haptically accommodating methods for their students. By including active learning segments through out their course work that catered to all learners and accommodated the haptic learners in their class. It was warranted to use haptically accommodating methods due to the volume of haptic learners within each of the classes observed. On average, 53% of learners were dominantly haptic among the five Natural Resource courses.

Accommodation and Teacher Attributes

What is the relationship between the teacher's personal learning style, teaching preferences, teaching philosophies, and their Accommodation of Haptic Learners for each class? A conglomerate view of each professor's instrumentation has been analyzed and examined regarding their personal learning style as determined by the LIMI; teaching

preference that was discovered by the Principles of Adult Learning Scale (PALS); teaching philosophy that was ascertained by the Philosophy of Adult Education Inventory (PAEI); and a determination of if or how they accommodated haptic learners for each class. This question considered the relationship between all three instruments administered to the professors, coupled with my observations of their classroom dynamic that determined if accommodating methods was used for haptic learners.

As mentioned above, Lemire (1998) designed the LIMI and determined the instrument reliable and valid (see measures, Ch. 3). In this instance, the professor's dominant learning style, as determined by the LIMI, was examined to see if it had any influence on their teaching inclinations, including their teaching preferences, teaching philosophies, and accommodating methods for haptic learners. Conti (1983) developed the PALS to categorize teaching preferences and styles. His instrument was also considered strong, reliable, and valid. Zinn (1983) developed the PAEI to determine a teacher's teaching philosophy and was reported as strong, reliable, and valid. This research question looked for relationships between the professors' teaching preferences as indicated in the PALS results, the professors' teaching philosophy results as determined in the PAEI, their LIMI dominant learning style results, and the accommodating methods for haptic learners that were used in their classes, as observed and discussed in the first research question.

Robert Gooding. Dr. Gooding's dominant learning style was haptic, scoring a 45% on the LIMI in the haptic category. Further his class Protected Area's Management was 86% haptic learners. There was reason to believe that his dominant learning style, haptic; attracted students with the same learning style as well. It was believed Dr.

Gooding would be most comfortable teaching in his dominant learning style, haptic as most activities in his class showed to be of a haptic nature. It was notable that a high frequency of occurrences where haptic learners were being accommodated in Dr. Gooding's class was evident in the observation segment of this thesis.

Dr. Gooding's PALS results reported his teaching style as learner-centered. This meant he focused on his students and their needs primarily, and was more learner-centered in his teaching philosophy, rather than leaning toward being more teacher-centered in his philosophy. Complimenting his learner-centered preference in his teaching style, was an extremely strong inclination to climate build in his classroom for his student's sake. Other strengths that were revealed were an inclination to assessing student needs, and a preference for flexibility for personal development. The implication was he was able to discover student's needs and be flexible in order to accommodate their needs, via a learner-centered approach and preference according to the PALS (Conti, 1978). It was a feasible bridge that Dr. Gooding, a haptic learner and a teacher, had the idiosyncrasy to naturally haptically teach toward the haptic learners within a learner-centered paradigm. One example that stood out was allowing his students, through trial and error, to discover how to best achieve end results for their individual projects at the ELC. Specifically, Dr. Gooding assessed the needs of his students by providing them the learning freedom, through self-guided discovery, to improve upon their projects. He reinforced their discoveries by taking the class on tours of their projects through out the process and providing his direction coupled with their peer's observations to improve and complete the projects. By allowing his students to learn through self-

guided discovery with his supervision, he assessed their needs and provided flexibility for each student's personal development in the management of a protected area.

Dr. Gooding's personal teaching philosophy, as revealed by the PAEI, was a blend of two philosophies in which he strongly favored both; they were Behavioral Adult Education and Progressive Adult Education. The Behavioral philosophy gave the learner an opportunity to take an active role in their learning by "promote[ing] skill development and behavioral change" for the learner while "compliance with standards and societal expectations" (Zinn, 1990, p. 73) was also promoted. The second component allowed the teacher to give feedback with the ability to "predict and direct learning outcomes" (p. 73). Other important aspects of the behaviorist view, according to the PAEI, was that the teacher assumed the roll of "a controller" and "manager" of the class. Furthermore, the behaviorist view was known to practice the following methods "programmed instruction, contact learning, criterion referenced testing, computer-aided instruction, and skill training" (p. 73) according to the PAEI. Dr. Gooding exhibited his philosophy when he required his class to assume projects of a protected area's manager. Together the students behaved as a management team of the ELC for the interim of his class. Dr. Gooding continually gave them feedback to help improve upon their sense of management and showed them how their decisions affected the projects at hand. Essentially, as Zinn (1990) noted in the PAEI, Dr. Gooding was the class "manager" for the students by providing necessary feedback for the betterment of their learning processes. Lastly, as Zinn (1990) remarked, Dr. Gooding haptically provided "skill training" for his students by providing the haptic hands-on experience of managing a protected area as the course work.

Dr. Gooding's second dominate philosophy, Progressive Adult Education "promoting [ed] societal well being, enhancing[ed] individual's effectiveness in society, [and] giving [gave] learner's practical knowledge and problem solving skills" (Zinn, 1990, p. 73). Again, this was displayed by providing his students with a haptic experience of managing a protected area at the ELC under the guidance and supervision of Dr. Gooding. Zinn (1990) also noted that the teacher perception of the learner was that "people have [had] unlimited potential to be developed through education" (p. 73) and that the learner's "needs, interests and experiences are [were] fundamental elements in learning" (p. 73). Also the teacher would become the organizer, "guides learning through experiences that are educative and stimulates, instigates, and evaluates the learning process" (p. 73). Dr. Gooding allowed his students to take on ambitious projects, which he commented to me in the observation process, as much more work and time than the students anticipated. He did not allow his students' to fail; rather he assisted them in understanding how large their project was, specifically the Wheelchair Accessibility Path, and pulled together the entire class to complete the project. Dr. Gooding commented to me at one point that he felt the experience would be good for his students as a "teachable moment" where they could learn the intricacies of managing large projects in protected areas.

In all, Dr. Gooding was a haptic learner as deemed by the LIM1; focused on learner-centered activities reinforced by preferring to assess student needs and maintaining flexibility for personal development for his students according to the PALS; and also held both a Behavioral Adult Education and Progressive Adult Education philosophy, which resided over his teaching. In observation, he provided intense and

solid haptic learning experiences and segments for his entire class at an exceptional rate. Indeed, it appeared that Dr. Gooding's learning style, teaching preferences, and teaching philosophy accommodated haptic learners in his class through various haptic methods, which were observed. The accommodating methods Dr. Gooding's teaching preferences and philosophy supported and employed were: group work, repetition and active review, class setting mostly not in a traditional classroom, flexibility and adaptability, and guided discovery. As a matter of fact, his students were haptically accommodated often and consistently.

Calvin Turner. Dr. Turner was dominantly a visual learner at 42.5%. It is important to note that his haptic category registered close behind his visual dominance at 37.5% on the LIML. Never-the-less, Dr. Turner was dominantly a visual learner. Since I examined the relationship of his learning style to his teaching preferences and philosophies coupled with in-class observations, it seemed pertinent to mention although he was dominantly a visual learner and that his haptic category followed closely, within five percentage points. In other words he was dominantly a visual learner and closely a haptic learner as well. Perhaps his closeness will reveal how his learning style, teaching preferences and philosophies affected how he taught. During the work sessions in his class, he spent much time observing and watching his students in their group work.

Dr. Turner's PALS results reveled he resided within the learner-centered paradigm of teaching preferences. Further, he also was supported according to the PALS, based in a learner-centered approach, the factors of climate building with in his classroom; relating to experience, specifically his student's experiences; and supported flexibility for personal development for his students. While he observed his students in

their group work, Dr. Turner was approachable for discussion, eager to help and direct, and allowed his students freedom to learn haptically by group work and by encouraging them to carry out the plans the students made for the in-class projects. Conti (1978) denoted that a learner-centered teaching preference would support ideas of climate building, relating to one's experiences, and maintaining flexibility for personal development in meaningful regard toward the learner. Dr. Turner achieved this through providing and supporting group work experiences.

Dr. Turner's teaching philosophy was split evenly between two categories: Progressive Adult Education and Radical Adult Education. According to Zinn (1990), the progressive philosophy "promoting[ed] societal well being, enhancing[ed] individual's effectiveness in society, [and] giving [gave] learner's practical knowledge and problem solving skills" (p. 73). Teachers were inclined to perceive their learners as "people [who] have unlimited potential to be developed through education" (p. 73) and viewed their "needs, interests and experiences are fundamental elements in learning" (p. 73). This was observed by providing the opportunity for his students to develop projects of interest for his class and ultimately, giving them the opportunity to present their projects to their peers at the poster session. Also supporting this view the teacher "guides [ed] learning through experiences that are [were] educative and stimulates, instigates, and evaluates the learning process" (p. 73). Dr. Turner informally evaluated the student's learning process in the class meeting following the poster session. He held a reflective discussion with his students about what they gained in the learning process through the poster session experience. Many students enjoyed the experience so much that they planed to see their projects come into fruition above and beyond course requirements. This showed

eagerness and commitment from the students, directly as a result of the learning segments Dr. Turner provided.

Equally, Dr. Turner's teaching preference of a radical view of adult education endeavored "to bring about through education fundamental social, political, and economic changes in society" (p. 73). This aspect was evident, according to Dr. Turner, he required his learners to "to apply intervention strategies for sustainable tourism product development for Fort Collins as a means to apply and demonstrate content learned during the course." Zinn (1990) stated that the teacher assumed the role of the coordinator in the radical philosophy. Their role usually suggested which route learning could go, rather than dictate the direction of learning for the students. The radical teacher saw their student as an equal in the leaning process and perceived the learner and themselves as invested in the endeavor in order to learn, with the purpose of learning to obtain "personal autonomy; people create and change history and culture by combining reflection with action" (p. 73). Dr. Turner supported this philosophy by again giving his students the freedom to choose which project they would endeavor, with the premise it would be a beneficial, positive, sustainable, touristic plan, apropos to progressive culture, and with the intention of changing status quo locally in Fort Collins. Moreover, many of the student groups did carry out their projects into fruition with exuberance; evidence they were learning and feeling accommodated by Dr. Turner's learning philosophies. Dr. Turner promoted a balance of both the progressive and radical philosophies for adult education, which was obvious by the response and experiences his students showed throughout the observation process.

In summation, Dr. Turner was predominantly a visual learner according to the LIMI (with a nearly equal amount of haptic dominance); his PALS revealed he resided within the learner-centered paradigm, with the supporting preferences of climate building, relating to experience, and flexibility for personal development; and lastly his PAEI showed he ascribed equally to two teaching philosophies: the Progressive Adult Education and Radical Adult Education notions. Although he was dominantly a visual learner, he was able to accommodate to the 49% of dominantly haptic learners within his class. This was evidenced by their response to taking a class project farther than required and saw many of these projects into fruition. Dr. Turner supported the accommodation of the haptic learner based in his learner-centered approach to his students and by allowing them the learning freedom that both the progressive and radical teaching philosophies exude. Dr. Turner's teaching preferences and philosophies supported the accommodation of the haptic learner, coupled with the provision of haptic learning segments such as group work, repetition and active review, having some of the class setting not in a traditional setting, and collecting student feedback. Regardless of the difference in his dominant learning style as a visual learner, Dr. Turner did seek to accommodate the haptic learners in his course.

Ross McQuien. Dr. McQuien was dominantly a haptic learner with his LIMI results registering him as 45% haptic. Three of his classes were observed, each with a different percentage of haptic learners. First, his Environmental Communication course had 45% dominant haptic learners; second his Recreation Measurements class had 42% dominant haptic learners; and finally his Natural Resource History and Policy class had 47% dominant haptic learners. All three of his classes had nearly half of their populations

as dominant haptic learners, coupled with their professor who registered as a dominantly haptic learner on his LIM1.

According to his PALS results, Dr. McQuien had the preference to be a learner-centered teacher at 64% within the teaching paradigm. Sub-categories in his PALS indicated he has a strong inclination to relating to experience at 53%, a desire for flexibility for personal development within his classroom at 52%, and 45% preference to climate build, all within the learner-centered paradigm. Several instances were observed which support his PALS results. For example, he would stay late in all of his classes to help students with their work. As he stayed late, he would promote a positive climate for his students to assimilate their information, maintain an approachable atmosphere for his student's personal development, and keep the tone light, as he would continuously find ways to relate to his student's experiences and perceptions. A second illustration was a continual observation that Dr. McQuien would always find a way to joke and relate to his students on their level about their experiences, which fostered a tone of reassurance in the teacher-student relationship for both parties involved.

His PAEI showed he was strong in two different teaching preferences: Progressive Adult Education and Humanistic Adult Education views. The Progressive Adult Education view "promote[ed] societal wellbeing; [and] enhance[d] effectiveness in society" while focusing on the "give[ing] learner's practical knowledge and problem solving skills" (Zinn, 1990, p. 73). Many problem-solving skills were approached with his Recreation Measurements class, which taught the class how to use statistical software to create reports intended to be presented via academic poster sessions. This course groomed students for higher degrees by giving them the platform of statistical analysis

and experience, and by executing the process in a haptic, hands-on format. The applications were practical and potentially useful to future graduate students who learned from Dr. McQuien's Recreation Measurements course. Zinn (1990) also noted the learner was perceived by the teacher to have unlimited potential which could be developed through education, and their experiences and interests were "key elements in learning" (p. 73). The teacher's roll became the "organizer" of the class while "guides[ing] learning through experiences that are educative" (p. 73). Dr. McQuien guided his students in his Natural Resource History and Policy course in the making of a bill through the legislative process. This exercise was specifically a haptically educative experience as the students initially role played the making of a bill and also continued to actively review information they learned in several subsequent class sessions. The students engaged behavior through out the role play was evidence the students understood the legislative process of the making of a bill. The PAEI stated the progressive view would perform the following methods "problem solving; scientific method; activity curriculum; integrated curriculum; experimental method; project method; [and] cooperative learning" (p. 73). The self-guided fieldtrip in Environmental Communication showed to be an active learning segment that included an activity curriculum tied with cooperative learning as the learners actively took the self-guided fieldtrip and revisited the experience in-class through discussion and cooperative learning as a large class or group. Through the haptic method of guided discovery, Dr. McQuien lead his class to connect the active experience of the self-guided field trip to the relevance of the content in his course, by highlighting the types of environmental communication which existed at each point through out the self-guided fieldtrip.

Dr. McQuien's second dominant category of humanistic adult education was described by Zinn (1990, p. 73) as "enhance[ing] personal growth and development; [and] to facilitate self-actualization." The teacher's perception of the learner was "highly motivated and self-directed; [and] assumes responsibility for learning" (p. 73). The teacher's role in the humanistic view was the facilitator or helper who "promotes[ed] but does [did] not direct" (p. 73). Two of Dr. McQuien's syllabi had an element called "freedom points" which allowed students who did all of their work to acquire an additional five points to their final grade. This expression supported high motivation, self-direction, and the learner to assume responsibility for learning with a reward from Dr. McQuien, which contributed to their final grade. The concept was haptic in nature because the learner was required to "do" and "perform" in order to gain the freedom points.

Overall, Dr. McQuien was dominantly a haptic learner. He preferred a learner-centered approach, according to his PALS, with supporting sub-preferences of relating to experience and flexibility for personal development on behalf of his learners. His PAEI revealed he maintained dual teaching philosophies in Progressive Adult Education and Humanistic Adult Education viewpoints. Dr. McQuien did indeed accommodate haptic learners in all three of his classes in various ways. In Environmental Communication he provided experiences such as active review and self-guided fieldtrips. His Recreation Measurements course was filled with haptic learning segments as his students actively learned how to use the computer program SPSS for future education needs and attended their own in-class poster session on behalf of the projects they created in class through work groups. Finally in Natural Resource History and Policy, the use of role play gave

his students a haptic experience along with the opportunity to present to the class.

Methods he used to achieve haptic accommodation with in his three classes were: group work, repetition and active review, class setting not in a traditional classroom setting, flexibility and adaptability, guided discovery, and role play. More than any other professor, Dr. McQuien used the most accommodating methods for haptic learners the most often. Dr. McQuien also accommodated haptic learners in his classes.

Conclusion of the relationship of professors' instrumentation with and their Accommodation of Haptic Learners for each class. All three professors were found accommodating haptic learners to varying degrees consistently in their courses. A few aspects of their instrumentation results along with their choice of accommodating methods were shared in common among all three professors and are collectively reviewed here. This was a feasible aspect to analyze as an association of if and how one accommodates haptic learners. First, common threads among the professors emerged as potential indicators of teachers who accommodate haptic learners. Secondly, each professor as an individual had a particular concoction of their instrumentation, which helped to delineate who they were as a professor and as a learner; and furthermore, how and why they choose to teach the way they did. Each individual had a particularly different relationship between their instrumentation results and their accommodating methods of haptic learners as we have discussed and analyzed in this section (see Tables 4.1, 5.1, 6.1, 6.2, and 6.3 for complete Student Course Surveys relating to this study).

By connecting the dots to find correlating factors amongst the individual professors, to show what they believed or did alike to support and accommodate haptic learners in their classrooms, was intended to glean insightful information for future

practitioners wishing to accommodate the haptic learner. Research questions one and two established that each professor did in fact accommodate haptic learners through varying accommodating methods and by establishing a need to accommodate a fair volume of dominantly haptic learners via the student's LIMI results. The third research question examined what ingredients each professor had via their personal instrumentation in the LIMI, PALS, and PAEI results. Now an examination of how all of the professors accommodated haptic learners, in common ways within their classrooms, which established trends within their teaching preferences and philosophies supported by their LIMI results.

All five classes had a large percentage of haptic learners, with the highest percentage in Dr. Gooding's Protected Areas Management course at 86% haptic learners and the lowest in Dr. McQuien's Recreation Measurement's class at 42% dominantly haptic learners. Therefore all five classes had nearly half of their populations who were dominantly haptic. A large population of haptic learners existed in this study, which has substantiated reason for this study. All three professors resided in the learner-centered paradigm of the PALS. Each of them to varying degrees showed strength in the secondary PALS categories of climate building and flexibility for personal development. Finally all three professors had shared splits in their PAEI results, each professor scoring two dominant philosophies of teaching, and every professor had the Progressive Adult Education view as one of their dominant teaching philosophies.

Two of the three professors were dominantly haptic according to the LIMI, with Dr. Turner as a dominantly visual learner. Dr. Turner's LIMI results however did show haptic strength, as he was 42.5% visual and five points behind in the haptic category

registering at 37.5%. Never-the-less all professors continuously accommodated haptic learners within their classrooms. Three particular haptic accommodating methods were used by all three professors and they were: group work, repetition and active review, and class setting not in a traditional classroom setting. According to the results, analysis, and synthesis thus far in this study, the professors had a strong haptic population to teach to; supported by particular teaching preferences and philosophies, which lead to the accommodation of haptic learners in all of their classes. Lastly, a look at the student's reaction to their in-class experience as the fourth and final research question addressed the Student Course Survey.

Student Course Surveys and the Accommodation of Haptic Learners

What is the relationship between the Student Course Surveys and the Accommodation of Haptic Learners? The first three research questions addressed and answered that in fact, all three professors did accommodate haptic learners within their classrooms. This was achieved by using a variety of accommodating haptic teaching methods, which were observed through out the Spring Semester of 2008, in the five Natural Resource classes at CSU and addressed by the first research question. The second research question revealed the student LIMI results per class. All of five of the classes had at least 42% or more dominant haptic learners. It was determined that a 53% average of the five classes was dominantly haptic, and therefore, justified a student need to be accommodated haptically within their traditional classroom environs. The third research question then explored the professors' dominant learning style along with their teaching preferences and teaching philosophies. All three professors were discovered to share some common themes in their teaching preferences and philosophies. Upon further

analysis, it was determined that all three professors did indeed accommodate their haptic learners.

An examination of if the students' view, revealed through their Student Course Survey, showed that they did indeed feel accommodated. This question was answered with an average 53% of all students studied were dominantly haptic learners. Furthermore, the Student Course Surveys were noted by Grussing (1994) that rating effective teaching: "should avoid student rating of instructor 'personality,' 'charisma' or similar attributes. Only those instructor traits which have been shown to be related to effective teaching should be emphasized, e.g., 'student-teacher interaction' or 'concern for students' learning'" (p. 316).

Overall (1980) stated that evaluations "can be effective" (p. 321) and were reliable, valid, and "conducive to instructional improvement" (p. 321). Marlin (1987) and Nair et al. (2008) agreed that student evaluations of the teacher at the end of a course were both useful and reliable. Also Grussing (1994) discussed that "well-established instruments" had "high reliability and validity." CSU currently and previously has used the Student Course Survey, which has been well established and has been provided at the conclusion of every course. According to a study from Grussing (1994), results from Student Course Surveys from the end of a chosen year were remarkably similar for the same teacher, teaching the same course, several years later. This evidence supported that results from CSU's Student Course Surveys lend credibility and support for future courses taught by these professors, specifically to the accommodating perceptions of haptic learners as this analysis has explored. Furthermore, Marlin (1987) conducted a

study where the students in his study felt the evaluation process at the end of the course was “effective for rating instructors” (p. 707).

Each class’ Student Course Survey has been analyzed. Although there were 22 questions on the survey, only questions 4-7, 10-13, and 15-17 results have been analyzed since they address parameters of if haptic learners felt they were accommodated within their classrooms. Each of the five classes were individually analyzed and then summarized on how each professor was viewed by his students in accommodating haptic learners. The survey was a Likert scale with the following key: SA, Strongly Agree; A, Agree; N, Neutral; D, Disagree; SD, Strongly Disagree; and NA, Not Applicable, which is common in Student Course Surveys (Darby, 2007). This was the student’s view of how they felt their professor accommodated them.

Each question under review has been commented on regarding how the question related to the accommodation of the haptic learner. Then, a review of each professor’s results per class was examined to see if the students viewed the professor as proficient in accommodating them in their classroom. It has been assumed that since there were a certain percentage of dominant haptic learners in each class, at least 42% per class, the results of the Student Course Survey will divulge if dominantly haptic students felt accommodated by their professor in their class.

Question 4 stated the “Course was intellectually challenging.” An agreeable answer by the student, if they felt a challenge brought to them by the professor through the transfer of knowledge, would indicate the student felt their intellect was challenged. There was an insinuation that if the course was intellectually challenging at the college level, then the student would have had a gratifying feeling for taking the course. Further,

the haptic learner would feel satisfied that they had the experience of challenging their intellect, which indicated the material was presented in an accessible or rather accommodating fashion for their learning style.

Question 5 stated that the “Assignments increased my understanding [of the subject matter].” If the students answered in an agreeable fashion, then they would show that the assignments given were helpful in understanding the course content. In regard to the haptic learner, if assignments increased their understanding of the course content, then the teacher was providing assignments which accommodated haptic learners’ needs by doing, touching, and feeling in their assignment load, within the class.

Question 6 stated, “Class sessions increased my understanding” which implied that class sessions had haptic learning segments that accommodate their learning needs. For this study, it indicated that the learning segments increased student understanding and accommodated the haptic learner.

Question 7 detailed, “Overall, I would rate this course as good.” In a general rating, a haptic learner would have enjoyed their class, felt they had learned, and received a positive learning experience where, they the learner, would feel accommodated and therefore, saw the class as good.

Question 10 asked the student if they felt the “Teacher was knowledgeable about the subject.” If material was delivered to the haptic learner in a method which was accommodating to them, they would have given a positive response to this question, indicating that they felt the teacher delivered the subject to them in a way where the student would perceive that the teacher was knowledgeable. Delivery of knowledge was the pinnacle of this study, and if delivered in a way where students could appreciate the

information delivered, then the transfer of knowledge could occur. If the student perceived the professor as knowledgeable, then there was a strong chance that the professor was expressing their knowledge in a way, which was accessible, and therefore accommodating to the haptic learner.

Question 11 asked if the “Teacher was enthusiastic about the course.” A haptic learner would view “enthusiastic” as active, in motion rather than talkative, or showing. What stimulates a haptic learner, as the literature has suggested is; activity, touch, feel, and doing (Cajete (1999); Lemire (2001); and Pengiran-Jadid (2003)). In order for a haptic learner to perceive one as enthusiastic, the person must be perceived as enticing and exiting to a haptic learner, in their haptic domain or rather as active, hands-on, touching, and doing. Therefore, should a positive response be revealed, the haptic learner would have felt accommodated by enthusiasm, which was perceived as having haptic tones.

Question 12 asked if the “Teacher organized the course effectively.” A haptic learner would give a positive response if they felt that enough haptic learning segments, haptic-based assignments, and haptic experiences in the class occurred. If the professor organized the course in a fashion, which gave the haptic learner the opportunity to feel the course was effective, then the response would be a positive one.

Question 13 asked if the “Teacher was prepared for class sessions.” If the professor was offering haptic learning segments then some preparation for the in-class activity would have been required. A positive response from a haptic learner would show that the haptic learner gained something out of the learning segment due to the fact that the professor was prepared to deliver, facilitate, and administer haptic learning segments.

Question 15 inquired if the “Teacher created atmosphere of learning,” specifically, if they created an atmosphere of haptic learning. A positive response from the students directly indicated if the students felt accommodated within their learning environment. Since at least 42% of the students in any given class studied were haptic, then a positive response to this question will show haptic learners felt they were learning in a haptic friendly environment.

Question 16 asked if the “Teacher created atmosphere of respect for students.” Haptic learners would have felt respected in the classroom if they had the opportunity to learn the material. Hence for haptic learners to learn the material, it would have been presented in an accommodating manner. Students would have felt respected in an atmosphere if they were able to learn. A positive response would indicate an atmosphere, which also respected the haptic learner.

Finally, question 17 asked if the “Teacher was willing to help students.” Any haptic learner would have given a positive response to this question if they had felt accommodated, by receiving help from their teacher, which would have insured that their learning needs were accommodated.

Surprisingly and ultimately, all of the students’ in all five Natural Resources classes gave relatively positive reviews to each of the professors. In all cases, all of the Student Course Surveys conveyed that the students were pleased with the professors and their courses. This insinuated, regarding haptic learners, that the too reflected via their Student Course Survey that they felt accommodated within the courses.

Four research questions were directly addressed in this section. First, the ways that individual professors met accommodating methods of haptic learners was analyzed

and revealed. The accommodating methods discovered as a result of this study were: group work, repetition and active review, class setting not in a traditional classroom, flexibility and adaptability, guided discovery, role play, and collecting student feedback. Second, all the professors were found to accommodate haptic learners in their classes and there was also a reasonably high percent of haptic learners in each class with 42% or nearly half of a class at least dominantly haptic according to the LIMI. Third, teacher attributes were discovered through the LIMI, PALS and PAEI. A unique combination of each instrument made up each individual professor's learning style, teaching preference, and teaching philosophy. Common attributes for the three professors included a high percentage of hapticness from the LIMI; the use of group work, repetition and active review, and class settings not in a traditional classroom; all teachers were learner-centered according to the PALS; all teachers held the Progressive Adult Education view as regarded by the PAEI; and finally each of their classes held a high percent of haptic learners as deemed by the student LIMI results which warranted learning style accommodation. Lastly, positive reviews were given to the each teacher from their students via the Student Course Surveys.

CHAPTER 8: DISCUSSION

This section will draw conclusions and offer recommendations as a result of insights gained from this study. The recommendations are meant for future practitioners who wish to accommodate the haptic learner as well as embrace all learning styles in their courses. Many of the recommendations were imbedded in the professor's behaviors and teaching choices. The practitioner should regard the examples highlighted below as resources for ways to successfully accommodate haptic learners in their future classrooms. Finally, a mention of suggested future studies, which emerged for me, from this study.

Recommendations for the Practitioner

Characteristics of a Haptically Accommodating Practitioner

In review, a large haptic student population existed through out the study and all of the professors accommodated haptic learners in their classes. According to the PALS each professor was learner-centered with an interest in climate building and flexibility for personal development. Also, they each had two dominant teaching philosophies according to the PAEI of which one was always the Progressive Adult Education view. Three particular haptic accommodating methods were used by all three professors: group work, repetition and active review, and class setting not in a traditional classroom setting.

This information implies that haptically accommodating practitioners will be learner-centered, have an interest in climate building within their classrooms, and flexibility for their students' personal development. A Progressive Adult Education view

according to Zinn (1990) will “give learners practical knowledge and problem solving skills” (p. 73) where the learner’s “interests and experiences are key elements in learning,” (p. 73) the teacher “guides learning through experiences that are educative; stimulates, instigates...” (p. 73) and the learning process is an “experience-based” (p. 73) event. Group work was suggested by Ross et al. (2001) as an active exchange to create a conducive learning experience for haptic learners. Furthermore, semester long projects or small group worksheet experiences proved to be favorable to the students through out this study.

Active review and repetition was used as a mode of practice for future presentations or to reiterate information in an active format such as role play or to clarify information towards future in-class student assessments. Cajete (1999) highly encouraged active review and repetition as a means for the teacher to “personalize encouragement coupled with guidance and demonstration...narration, humor, drama, and affective modeling in the presentation of content” (p. 143).

As Ross et al. (2001) declared it was important for a teacher to be flexible within class settings, which surfaced as many class occurrences in this study were not held in a traditional classroom and yet maintained information which was “relevant and meaningful” (p. 148) to the students attainment. All classes in this study were directly applicable to content being presented for each course. Therefore, practitioners should consider spicing up the local of information being presented as Cajete (1999) mentioned, “Teaching is essentially processing and communicating of the information to students in a form they can readily understand, combined with facilitating their learning and relative

cognitive development. Ideally the teaching methods and information presented will be in a form that is relevant and meaningful to the student” (p. 148).

It may be that teachers with a dominantly haptic learning style attract students who prefer a hands-on, active, haptic approach for the professor to conduct with in their classrooms. It is reasonable to assume that professors gain a reputation good or bad according to how they approach learning segments and “teach” information to their students. Perhaps an active teacher will be talked about among the students and will attract a particular type of student for the most part. In this study a large haptic population existed. Two of the three professors were dominantly haptic. Never-the-less, all three professors were found to adequately accommodate the haptic learner.

For the practitioner what has been discovered for their benefit is in order to effectively accommodate haptic learners the practitioner should consider being learner-centered and having an interest in climate building and flexibility for personal development. The Progressive Adult Education view supported the constructs of meeting a haptic learners needs within the classroom. Lastly, the haptically accommodating methods of group work, repetition and active review, and holding class not in a traditional classroom where applicable were all positive and accommodating methods for both the haptic learner and all learners alike.

Stretch Beyond Lecture and PowerPoint

On that note, a theme that has continued to surface through out this study has been the teaching approach of lecture coupled with PowerPoint presentations. This seemed to be a traditional teaching approach in college classrooms, and will always lend its constructs to the visual and auditory learners and not haptic learners. Lecture is a verbal

format that caters to auditory learners and PowerPoint presentations is a visual format that caters towards visual learners. It is not advised for practitioners to rely solely on this method of teaching should they intend to accommodate haptic learners in their courses. The work of this study can be the basis for a guidebook on ways and means to accommodate haptic learners within traditional learning environments. Practitioners should go beyond relying on lecture and PowerPoint presentations and evolve their classroom manner with the integration of activity for the learners to engage in their learning. It is acceptable to play with new knowledge and make the information literally accessible and doable for the learner. At the point when a professor lectures and/or relies on PowerPoint, ask yourself “What else could I do to get the students interacting with each other, with the material, and with new concepts? How can I make the students feel like they have touched the information and discover how to own the information for themselves?” These questions will provide a launching place to foster the haptic learner. Furthermore, as the literature has iterated, when haptic learners are accommodated so will visual and auditory learners be accommodated under the same constructs (ABE NetNews (2001); Mixon (2004)).

A variety of learning segments occurred through out the study, which stretched beyond lecture and PowerPoint presentations. Student presentations were required at the conclusion of all large-scale group projects. This feature was universal through out the study. In fact, all the professors supported group work over lecture and PowerPoint. Also, role play and learner-centered activities was used repeatedly as a haptic tact for the learners to discover new information and transfer the new information into knowledge.

One way to promote active learning segments over relying solely on lecture and/or PowerPoint presentations would be to requiring the class to complete active learning segments which fill the majority of the classroom time. Upon the observation of this approach I learned it is invaluable, effective, and accommodating to the learner to determine your students learning style and to have frequent active learning segments so that all learning styles have the opportunity to have a positive transfer of knowledge. If at all possible, provide your students with the experience of emulating the work they will do in “real life” in the classroom, especially at the college level.

For example, if a class was designed to teach how to market leave no trace (LNT) usage of protected areas, provide simulated marketing experiences and exercises for the students that would be hands-on and haptic for the student to try out in a controlled and safe environment. Perhaps create a class protected area they must market, or have the students work in groups to create marketing schemes for current protected areas and then have them present to at least their peers and perhaps the simulated agency. The hands-on experience provided to the students will likely be in their memories as they set out to fulfill their professional careers. Keep this premise in mind as you teach to your students, they are future professionals who need practical experience to support their future success. The experience transferred into knowledge for the student and would then go into that student’s bag of professional tricks, which they will draw upon in professional, real world settings.

Another way to avoid the doldrums of pure lecture and PowerPoint presentations would be to create learning segments of value. This can be achieved through projects and their processes. First, give the students an opportunity to choose a project within your

course parameters; second, allow in-class group work time; third, provide the opportunity for the learners to practice their presentations to their peers and receive peer feedback to assist improving their project presentation prior to delivering them to the academic public; and lastly, in granting them the opportunity to deliver their schemes and ideas in project format. As a side note, many projects observed in this study went beyond the class parameters and came into fruition executed by the students and their drive was inspired by their professor and the design of his course. This brought about many dimensions of active learning from the classroom to symposium and into the community in real life.

Stretching beyond lecture and PowerPoint presentations is imperative in accommodating the haptic learner within a traditional classroom setting. Another way to promote active learning segments over relying solely on lecture and/or PowerPoint presentations would be to requiring the class to complete active learning segments which fill the majority of the classroom time. By offering students the opportunity to complete active learning segments which fill the majority of classroom time and then requiring the student to present their findings or project at the conclusion of the class was one way to create a haptically conducive environment and avoid the common lecture and PowerPoint experience. By creating learning segments of value such as role play and learner-centered activities, haptic learners have a more accommodating way to discover information and transfer it into knowledge.

Student Dynamic Awareness and Practitioner Response

Practitioners must be aware of their students' dynamics in the classroom and be able to respond accordingly to their learning needs. Various elements of student/teacher

dynamics can give the practitioner positive momentum in accommodating haptic learners as well as all learners in their classrooms. Being able to relate to students, fostering their autonomy, learning to read the audience and try new methods to accommodate learners truly can give practitioners a positive advantage in the accommodation of their learners. Furthermore, it is critical practitioners choose to share their accommodating experiences with their peers so that they too may learn how to accommodate haptic learners in their classrooms. Examples of poor classroom teacher/student dynamic and of a healthy accommodating classroom scenario are included in the discussion.

Relate to Students Early on for Success. An incident occurred during observation where a professor led a PowerPoint discussion. The discussion with the class was about a haptic learning segment the student's had just completed. For three-fourths of the class session the students struggled to stay alert or engaged. It was clear that students had done the assignment, however it was unclear why they were struggling to participate in the PowerPoint discussion. Then towards the end of the discussion the professor began to relate to the students through what their interests and pointed out the common threads the assignment shared with their interests in that particular major. Suddenly the students perked up as the professor changed the subject. The greater part of the class, even the consistently quiet students who sat in the back reading newspapers and napping began to participate in the discussion. This was a wonderful turning point for the discussion, although it happened at the end of the class session. Perhaps if the professor had related to the students on their terms earlier in the class session he may have had greater participation in his PowerPoint discussion. It was clear that relating to the students was

the dynamic, which changed their participation levels to interactive during the PowerPoint presentation.

Foster Student Autonomy while Overseeing. Fostering autonomy while overseeing that students were learning the intended information offered is recommended to offer learners a sense of empowerment and ownership in their own learning. During a group work segment a group finished their work and clearly understood the assignment. The group split up after they were finished working. One of the group members chose to stay behind and assist a neighboring group. This was a haptic choice on the student's behalf. In choosing to help another group learn the student was gaining solidification in her own knowledge of newly learned information. The practitioner chose to listen in on the group while she was helping them. It was clear that he was checking that they were on the right track. Nevertheless he gave them their autonomy, which supported their active learning segment by not interfering with positive learning and the active sharing of knowledge when the correct information was being provided. The practitioner was allowing for self-guided discovery, guided discovery, and group work to occur simultaneously as a haptic accommodation for the students.

Cajete (1999) recommended “personalized encouragement coupled with guidance and demonstration...narration, humor, drama, and affective modeling in the presentation of content” (p. 143) both improved relationships between teacher and learner and engaged the learner in the traditional classroom. Cajete astutely noted that the haptic learner's learning style was “significantly diminished through [the] homogenization of the education process” (p. 145). A simple process is suggested as a format for any practitioner to follow to assure the haptic learner is accommodated and student autonomy

is granted with the intention to empower students to own their knowledge thorough the learning process. First, tell the students the information; second, show the students how to assimilate the information; and third, empower the students to do, act, feel, create, touch, or re-create the information just presented.

An example of this process would be tell the students what to do with a specific computer program; next, show them on an overhead computer screen how to carry out the task or process; and then, allow the students to follow along by copying what is being done on the overhead on their own computers. The truly haptic magic will occur. As proof, when Dr. McQuien carried out this exact process with his students, he then passed out worksheets to create an active in-class learning segment where the students were expected to do what they had just been taught. Furthermore, Dr. McQuien and his TA made themselves available and roamed the room, checking for understanding within each group. Any time there was a question Dr. McQuien made the knowledge transparent by sharing each question and its subsequent answer with the class. Evidence that the learning segment was working occurred when the student exclaimed, “yea, I think we’re rockin’ it!” with a big smile on his face. This showed confidence in the learning segment and excitement in processing and acquiring the transfer of knowledge passed from Dr. McQuien to his students. This was a perfect example of accommodating haptic learners in traditional classrooms. As a result, the students were lead through a process, which ended in two haptic occurrences, the first was to use the computer and the second was to carry out the task of the worksheet. Nevertheless, all of his students had an autonomous experience, which empowered their learning confidence as they navigated the worksheet.

Another scenario occurred several times through out the observation process, which accommodated the haptic learner but also fostered their autonomy for the learner. In every occurrence the professor noticed when one student was working alone during group work. This condition would occur for several reasons, an absent group member, a group member needed to leave class early, or the student elected to work alone. The professor always approached the lone student to check for understanding of the in-class group work task. Sometimes the professor would discover the student did not need help, which allowed the student to work autonomously and accommodated their learning needs. Other times the student was struggling and needed some guidance, which first addressed the student's learning needs and second supported their autonomous decision to work alone. This support was literally active and accommodating to any type of learner, especially a haptic learner. It was accommodating to a haptic learner because he allowed the student to actively do their work and discover their answers via the act of doing work.

In fostering autonomy in students, the practitioner empowers the learner to actively own their new information. A process is recommended for the practitioner to present the information first by telling, second by showing, and third by providing an opportunity for the students to actively apply the information. Lastly, autonomy can exist at both the group level and at a personal level for students. Either way it is important as a practitioner to oversee the active learning segments so the learners will stay on the correct track towards the knowledge intended to be imparted on them.

Read Your Audience and Try Something Different. Simply try something different and change teaching tact if students are not engaged or acting like they have

interest in the class session. Rewording questions on a worksheet when students express confusion and sharing the new tact with the class can be a successful approach in accommodating haptic learners. The desired outcome or answer would be the same and the approach to lead or guide the students to the correct outcome would change to accommodate student's request to clarify and relieve confusion.

Pass On Your Accommodating Experience. As a practitioner it is strongly recommended that once the achievement of successfully accommodating the active learner in the classroom, you pass the knowledge on to your peers. One professor took the accommodation of his learners' one step further by accommodating his TA's learning needs as well. It was a powerful choice. The TA was learning through doing, by teaching the class. The TA was learning to teach under the wing of a professor who already was successfully accommodating haptic learners in his classes, mostly through the three step process of tell, show, and do. It was valuable to note that the professor was aware that even his graduate students who were helping to teach his undergraduate courses had learning needs and he was willing and able to accommodate their needs as well. Further the TA was a Ph.D. candidate who expressed a desire to teach more under the professor's supervision. This provided a learning experience in a safe environment while being overseen by the professional. Furthermore, it was clear that many of the teaching skills the TA has acquired could possibly have been inherited from watching the professor teach.

For example, when the TA noticed students struggling during a PowerPoint presentation and began to ask their neighbors for help, the TA checked for their understanding based on the answers they received from their neighbors. In the end, all of

the students had the correct answer. The TA was being flexible and allowing students to gather information where they felt that they might find it, from each other. The professor allowed this same dynamic during other in-class experiences. Therefore, not only did the professor accommodate haptic learning within his traditional classroom, he also sets an excellent and productive example for his graduate students, as a role model who was capable and achieves the accommodation of various learning styles within his teaching scope. In this instance the knowledge of how to effectively accommodate haptic learners was passed on to the TA from a proficient practitioner.

A Word of Caution. One example stood out of what not to do as a practitioner, however it was notable that the students were seasoned and gained the information they needed never-the-less. Dr. McQuien's TA in Natural Resources History and Policy was the only authority figure in the class, had her feet up on a chair, and set a laze faire tone for the policy analysis presentations. It was curious if her role modeling and body language gave the other students in the class nonverbal permission to not take the class as seriously. For example, out of 19 students' in-class that day, 17 were in the audience. Out of the audience, one student slept, two were texting on cell phones, and one was making origami flowers. Seven students were actively taking notes or asking questions. It was apparent that the TA had little investment in the class. She had a student sleeping in the seat right next to her and never noticed. She also promised to ask questions and only asked one question of one of the two groups who presented in class that day. However, the class itself took charge of their learning and engaged with the content despite the lack of leadership provided from the TA. The professor was absent from the class that day. The professor's historical involvement in any of his classes indicated that he would have

likely prompted the students to ask questions and become more engaged. It was probable that the students have learned the necessity of engaging in their own learning, perhaps even from the professor's positive role modeling. This was deduced to the students' behavior when class was not going so well and the professor was not present, the students still took learning into their own hands and self drive for their quest in the knowledge. Perhaps the accommodation of haptic learners may also foster in the ownership of the students when they have been given the opportunity to self drive their own learning direction, as they did the day of the policy analysis presentations with the TA at the helm of the class in the professor's absence. This was an encouraging find.

Healthy Classroom Scenario. Much of the literature has stated and inferred (Pengiran-Jadid (2003); Ross et al. (2001); McDaniel and Lansink (2001); ABE NetNews (2001) if you can accommodate the haptic learners then the visual and auditory learners will also be accommodated merely by default of necessity of presentation. In other words, tell the information for auditory learners; show the information for visual learners; and have the students do the information for haptic learners. The doing only reinforces the showing and telling segments of the knowledge being presented.

A healthy classroom scenario was observed and was placed in this section to provide a positive reflection of the accommodation of haptic learners for future practitioners' to use as a resource.

The professor knew all of his student's names as he moved around the room to help students with their work. He helped to fix problems and answer questions. Students were assisting each other. They were naturally forming small groups to help each other learn. It is paramount to note that the professor allowed the dynamic of his students

helping each other to learn. He supported their achievement in the transfer of knowledge, and encouraged their peer interactions. Furthermore, the professor used jargon similar to the students' in order to relate to them while exchanging information. His pattern was first to explain verbally, second to show visually, and third to require the students to do what was explained and shown to them. Lastly, the professor always checked for understanding from the students before he moved on to another group.

In this example it was essential that the students were allowed to first do hands-on, haptic learning via their own computers as he demonstrated on the big screen computer at the front of the classroom. Furthermore, he encouraged and supported the student's choices to help each other out while doing in-class group work. Through their interactions with the haptic learning segment, naturally forming groups to help each other, the professor's habit of checking for understanding from his students, his choice in verbal jargon which related to his students, and allowing flexibility in the learning environment; his students were learning and being accommodated in a haptic fashion. This was evident as they navigated through their in-class tasks and as a result were obtaining the correct information and producing the right answers. A positive accommodating pattern developed which was to explain information verbally, then show the information visually, and finally have the students do what was explained and shown to them, which resulted in an accommodating haptic method.

Conclusion of Practitioner Recommendations

As a result of this study, the characteristics of a haptically accommodating practitioner consist of a learner-centered approach; they will have an interest in classroom climate building and a flexibility for student's personal development. The practitioner

will agree with the Progressive Adult Education view according to Zinn (1990) that would “give learners practical knowledge and problem solving skills,” (p. 73) the learner’s “interests and experiences are key elements in learning,” (p. 73) the teacher “guides learning through experiences that are educative; stimulates, instigates...” (p. 73) and the learning process would be “experience-based” (p. 73). The practitioner would interchangeably use accommodating methods such as group work, repetition and active review, and hold classes through out the course in non-traditional classroom settings. There could be potential that an effective haptically accommodating practitioner would have a dominant haptic learning style, although some evidence of this study could support having haptic as one of the practitioners stronger learning style components according to Lemire’s (1998) Learning and Interpreting Modality Instrument (LIMI) rather than just be the dominant trait. Nevertheless, a strong haptic inclination for the practitioner would make accommodating the haptic learner a straightforward transition.

Recommendations for the practitioner suggested the practitioner stretch beyond the constructs of lecture and PowerPoint towards many active learning segments and by emulating work in real life reflected in the class setting. The practitioner is encouraged to create learning segments of value where active learning could be applied to meaningful situations such as real life projects or presentations. Student dynamic awareness with the ability for the practitioner to respond to the student dynamic is purported. Relating to students early on in a course provides a meaningful and successful relationship between the practitioner and their students. Furthermore, fostering student’s autonomy in learning while overseeing and assuring students gain the intended information empowers the student to own their new knowledge imparted from the practitioner. Another

recommendation is for the practitioner to choose to read their audience for signs of understanding and attentiveness, acknowledge when information is not being transferred to accommodate the haptic learners, and as a result, make a conscious choice to try new a teaching tact on the spot. Making the choice to tell about information, then show the information, and lastly have the students actively engage in the information is strongly advocated. Lastly, the practitioner is urged to pass on their haptically accommodating experiences to graduate students and peers alike.

Suggested Future Studies

Several potential future studies surfaced in my mind as a result of the process of discovering if haptic learners were being accommodated within traditional classrooms. Some questions which continued to resurface for me will be addressed below as potential future studies and they were: what was the frequency of haptic learning segments used throughout a particular haptically accommodating course; could student comments be attained from the Student Course Surveys to glean further into their perceptions of their professors; could the identical study be conducted on any professor with a similar outcome or not; does class size affect the attention span of the students and does class size affects the ability to incorporate more haptic approaches in their learning segments in a large class/lecture hall size class; finally, do the affects of Dr. Turner's course improvement implementations, based on his student's suggestions, truly improve the course for all learners. Each future study concept is described below.

The Amount of Haptic Techniques Used

One study of interest which flowed directly from this present study is to attempt to answer the question: "Out of professors who accommodate haptic learners from the

‘Accommodation of Haptic Learning Style in Traditional Learning Environments’, what is the frequency of haptic learning segments thorough out each course?” A case study model might work for this idea where professors who accommodate haptic learners in their classrooms are observed to count how often haptic learning segments occur versus non-haptic learning segments. Furthermore, a more extensive and through record of haptic learning segments could be created as a resource for future practitioners.

Analyze Student Comments

Another study might be analyzing written student comments from their Student Course Surveys. Unfortunately we do not have direct student comment or thoughts other than a Likert scale Student Course Survey offered by CSU at the commencement of each of their courses. Information provided by the surveys omits their option to add additional written comments that could prove as invaluable information that could allow us to learn how accommodated a learner may or may not feel. This study would require additional research and IRB approval to gain access to the student written comments relevant to the Student Course Surveys in the accommodation of haptic learners segment. Otherwise, a new study could be conducted where the researcher gains IRB approval to administer the LIMI to students in Dr. Gooding’s, Dr. Turner’s, and Dr. McQuien’s classes in the future since we know they accommodate haptic learners. Then the researcher would also need to gain IRB approval to have access to the physical Student Course Surveys in order to see student written comments and individual professor permission. Since the comments are given directly to the professors, then it would up to individual professors to elect to share their comments as a participant in this suggested study. Then this suggested study would glean more clearly what the students though. Also, an in class questionnaire could be

conducted simply stating, “If you are a haptic learner, did you feel your learning needs were met in this class?”

Are Haptic Learners Being Universally Accommodated

This future study would act as a check and balance to the results of the “Accommodation of Haptic Learning Style in Traditional Learning Environments” study. A large haptic student population existed through out the study; all of the professors were learner-centered with an interest in climate building and flexibility for personal development; and lastly they each have two dominant teaching philosophies of which one is always the Progressive Adult Education view. Three particular haptic accommodating methods were used by all three professors and they were group work, repetition and active review, and class setting not in a traditional classroom setting. Does this suggest that an accommodating professor will have these attributes or should strive for them? A case study would accommodate this idea. New professors would be picked, possibly more than three to create a larger sample size. Each professor would be observed in-class for accommodating haptic methods, and administered the LIMI, PALS, and PAEI to determine if accommodating professors would have these particular attributes. Then common threads between the two studies could be analyzed to see if aspiring practitioners should strive for these certain attributes.

The Affects of Class Size

It is evident after much observation in the large lecture hall class that the students get bored from PowerPoint discussions. They were shifting, talking, and were asked to settle down several times. Each class session consistently had students reading the paper doing crosswords, sleeping, texting, or doodling at the back of the class. More studies are

necessary to discover if class size affects the attention span of the students, or if class size affects the ability to incorporate more haptic approaches in their learning segments in a large class/lecture hall size class. Furthermore, it is evident however that the students are not positively responsive or interested in the manner in which the material has been presented. This is demonstrated by the student's diverting their attention to other activities such as the newspaper, each other, or sleep.

A case study could be conducted where any professor from the accommodation of haptic learners in traditional learning environments study could participate since it is known they accommodate haptic learners in their classes. Then classes of varying sizes taught by the same professor would be under observation to note the difference in classroom behavior by the students. Also in class surveys could be conducted inquiring about the student's behavior.

Evaluation Methods and Implementation

It would be interesting to see the affects of Dr. Turner's informal evaluations coupled with his Student Course Survey to see how he implements change in his course. We knew from an incident with the TA that Dr. Turner had elected to provide an in class work session for the service learning projects as a result of student feedback. Interviews with Dr. Turner would satisfy the information needed to see the changes he has made over the years for his International Issues in Recreation and Tourism. Through these interviews we could track the progressive changes his course has implemented. Student Course Surveys could also be analyzed as an indicator of successful or unsuccessful course changes.

Conclusion

Overall, haptic learners did feel accommodated by the three professors in this study. There was a large haptic population throughout the study, which warranted the need for their in-class accommodations. All three professors have effectively accommodated haptic learners as determined by this study. Through accommodating methods and residing within certain teaching philosophies and teaching preferences the learners felt accommodated, as revealed in their Student Course Surveys and further supported by in-class observations. Themes which emerged throughout the study were characteristics of a haptically accommodating professor, which entailed being learner centered, having an interest in climate building in the classroom and a desire for flexibility for student's personal development. Also each professor held the Progressive Adult Education view as a dominant teaching philosophy where active learning is a prevailing principle. Many haptically accommodating methods emerged, however three accommodating methods sustained through out all three professor's courses and they were: group work, repetition and active review, and holding class at times in a non-traditional classroom setting. There was potential that a dominant haptic teacher would be more incline to accommodate haptic learners, however not necessarily. It could be that professors at least with a heavy haptic inclination according to their LIMI scores would also accommodate haptic learners in their courses.

Several recommendations to the practitioner also emerged as a result of this study. The practitioner was urged to stretch beyond lecture and PowerPoint presentation; have a high volume of active learning segments in their course work; be certain to emulate real life scenarios in their course work; create learning segments of value where learning can

be applied in meaningful manners for the student; become aware of student dynamic and be able to respond to their needs; relate to students early in courses for success; foster student autonomy while overseeing their learning; choose to read your audience and responsibly try a new teaching tact if necessary, and finally, pass on your haptically accommodating experiences to your peers. Allow their examples to assist setting a tone for future practitioner who wish to accommodate all learning styles within their classrooms.

Lastly, several potential future studies emerged as a result of “Accommodation of Haptic Learning Style in Traditional Learning Environments,” they are: the amount of haptic techniques used in classes already studied, the analysis of student comments from Student Course Surveys pertaining to the courses studied, if haptic learners are universally accommodated by other practitioners, what are the affects of class size, and if teacher evaluation methods are successfully implemented for the benefit of haptic learners.

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