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The Effect of Differentiated Instruction Training on the Instructional Strategies of Education Trainees at Hawk Mountain Sanctuary

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THE EFFECT OF DIFFERENTIATED INSTRUCTION TRAINING ON THE INSTRUCTIONAL STRATEGIES OF EDUCATION TRAINEES AT HAWK MOUNTAIN SANCTUARY

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ABSTRACT

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This research examined the effects of differentiated instruction and self-reflection training within a post graduate education trainee program. The purpose of the study was to investigate the effects of the inclusion of multiple teaching and learning strategies and reflective practice instruction on how education trainees chose, adjusted, and assessed instructional methods in their programs. Differentiated instruction theory, learning style theory, and reflective theory constituted the framework for this study.

The method of analysis was a case study of individual education trainees utilizing multiple data collection methods. Qualitative data was gathered through structured interviews, dialogic seminars, and reflective journals. Constant comparative analysis of the data sets using emergent thematic coding resulted in four themes.

Instruction in multiple learning styles theory resulted in trainees researching audience demographics prior to programs, suggesting the information was perceived as essential for effective teaching. Instruction in a variety of teaching strategies resulted in the development of a growth mindset focused on taking new knowledge and applying it in their own practice. The inclusion of reflective practices resulted in trainees focusing on the reactions of learners to the learning experience. Self-reflection was seen by trainees as a platform for the development of differentiated instruction techniques.

Keywords: differentiated instruction, learning styles, reflective journals

DEDICATION

This work is dedicated to my dearest trainees- the trainee program was my passion project and they are the results of it. I am so thankful that they have remained in my life even after they “fledged” …

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"It always seems impossible until it's done." ~Nelson Mandela

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To my beautiful daughters who are my reasons for advocating for meaningful learning experiences for every student… every day… everywhere.

And lastly to our cohort, the most amazing and dynamic group of teachers I have ever had the privilege and pleasure of working with, and whose friendships have supported me through this experience and will continue to inspire me.

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CHAPTER ONE: INTRODUCTION

1.1 Problem of Practice

At the time of this study, I worked at Hawk Mountain Sanctuary, a non-profit raptor conservation organization, as the Director of Education and supervisor of the education trainee and education intern (referred to collectively as trainees from here forward) programs. The Sanctuary offers pre-kindergarten through senior programs to all types of schools, groups, and organizations both on and off-site. In addition, trainees travel to other types of education facilities to experience programming offered at the state, county, and local levels. This wide scope of non-formal programming introduces trainees to a diverse audience in regards to age, gender, class, race, culture, and cognitive, intellectual, behavioral, and physical abilities.

An example of this program diversity would be a typical program day when I took trainees with me to teach three off-site programs. The first was for pre-service elementary teachers at a local urban college. My task was to model what a program for elementary students would look like and at times step out of my program role to discuss why I was using certain teaching strategies geared for younger students. Afterwards, the trainees inquired about the many different strategies and were interested in learning more about them. The second program was at a high school in the same city. Here I worked with a teacher to present a program for ELL students also labeled as “at-risk” due to behavior problems, resulting in placement in this school. The trainees presented parts of the program as well. After the program, they questioned me on how I managed to keep the students engaged. The final program was at a nursing and rehabilitation center, also in the same city. Most residents were wheelchair users and many had additional obvious

physical and mental disabilities. The trainees whispered to me, “You can do this program on your own” and went to sit in a far corner of the room. On the ride home, they asked me why I had chosen to engage in a discussion type program with question and answer elements and not a lecture type program…in other words how could I be sure any of the participants would even understand and answer me. My feelings about this day have morphed from surprise and frustration with the trainees to disappointment in the program and myself for not preparing them sufficiently for the diverse learners we encountered. This led me to my research interest.

1.2 Statement of the Problem

All teachers should recognize that different audiences require different teaching methods in order to prevent discrimination against students and ultimately to close the achievement gap. This necessity for multiple teaching strategies in order to reach diverse learners in a personal and meaningful way is *not* recognized by our novice trainees. The problem to be addressed was to reframe education trainees’ perspectives from a “one size fits all” view of teaching to a “differentiated instruction” mindset of teaching in order to connect with the diverse learners of a variety of learning profiles that they would encounter over the course of the traineeship.

1.3 Purpose Statement

In response to this problem, the study incorporated the teaching and modeling of critical thinking skills and diverse teaching strategies that relate to how individuals understand and process information differently. In addition, reflective journaling was incorporated into the trainee program throughout the semester in the form of responses to

programs, weekly seminar curricula, and personal interviews about trainee facilitated programs.

The purpose of this research project was:

1) To investigate the effects of the inclusion of multiple learning strategies in the education trainee program on how trainees choose instructional methods for future programs.
2) To investigate how the inclusion of reflective practice in the education trainee program affects the ability of trainees to assess and adjust future instruction.

1.4 Significance of the Study

Human potential can be tied to one's preferences for learning (Gardner, 2006); thus, it is important for teachers, both formal and non-formal, to recognize the differences among learners in order to maximize their potential. It is a disservice to the learner by not recognizing differences and individualizing instruction because their trajectory and future accomplishments are being affected (Gardner, 2006). Learners' multiple learning preferences can be addressed when instruction includes a range of meaningful and appropriate methods, activities, and assessments. Engaging learners in instruction through different approaches to learning, by appealing to a range of interests and calling upon a range of instructional strategies results in powerful curricula and engaging, responsive instruction (Tomlinson, 2014).

Teachers are increasingly finding themselves in classrooms with students from culturally diverse backgrounds that are different from their own (Russell & Russell, 2014). Yet, "…the vast majority of public-school teachers are female, White, in their twenties, from middle class backgrounds, monolingual, and culturally encapsulated"

(U.S. Department of Education, 2009, as cited in Russell & Russell, 2014, p. 3). Most of the trainees in the education program are White, middle class, female, monolingual, college graduates. Therefore, the personal and cultural knowledge they have created is based on these demographics, their political and social views, and more (Sensoy & DiAngelo, 2011). Moll & Arnot-Hopffer (2005) argue that teacher education should be not only about technical competence and content matter, but also about sociocultural competence in working with diverse students that characterize classrooms across America. Their study of pre-service teachers found that most were resistant to examining their own privilege and that their reflective writing was superficial and did not address the experiences that had shaped their lives and identities. Technical proficiency is not enough for the teachers of the future. Demographics and moral principles must also guide the reflective teacher's actions (Colton & Sparks-Langer, 1993).

Reflection involves examining one's own thoughts, beliefs, values, attitudes, and assumptions, which form the foundation of one's understanding. "Reflection is what allows us to learn from our experiences. It is an assessment of where we have been and where we want to go next" (Wolf, 1996). Reflective practice is not undertaken to just visit the past, but to guide future actions; thus, the intent of reflective journaling is to switch the focus from the trainee and her skills as a teacher to that of her students' learning. Initially, the idea of reflection would need to be explained and aided partly due to the fact that many preservice teachers do not understand the concept of self-reflection or how to do it (Gay & Kirkland, 2003). Thus, it is a learned skill not yet acquired by novice teachers (Danielson, 2007). Teaching reflection will enable the trainees to evaluate at a forthcoming teaching situation, set goals for it, plan and monitor actions,

evaluate results, and reflect on their actions and thinking (Colton & Sparks-Langer, 1993).

The results of this research project have the potential to significantly contribute to the field of non-formal education. The non-formal learning sector can be described as "…a wide range of institutions usually funded privately…and dedicated to a wide range of activities and disciplines, where the curriculum might follow some structure, plan, or pattern, but usually will not lead to credentials" (Sefton-Green, 2013). Teaching and learning may be highly organized in a non-formal program, but the participation is voluntary and the expectations by the educator and the consequential power structure is different from the formal school classroom. Non-formal education tends to focus on an instructor who decides the content, the objectives, the instruction, and the outcomes of the program. Incorporating learning style theory and differentiated instruction theory resulted in flexible and responsive instruction centered on the learners instead of the instructor. It was also significant to Hawk Mountain Sanctuary, in that it addressed a problem of practice- encouraging trainees to consider the social and ethical implications of their teaching decisions and enabling empowerment by recognizing differences among learners. For the future learners of the education trainees, it will help to prevent stereotyping (Gardner, 2006) and ensure powerful curricula and engaging, responsive instruction (Tomlinson, 2014).

1.5 Research Questions

The researcher proposed to answer the following research questions employing a framework of learning style theory, differentiated instruction theory, and reflective theory.

1) How does the use of differentiated instruction training in an education trainee program influence how trainees design their own instruction?
2) How does the use of reflective practice support trainees in the development and implementation of differentiated instruction?

1.6 Theoretical Framework

Stewart and Felicetti (1992) define learning styles as those "educational conditions under which a particular student is most likely to learn" (p. 5). Learning styles are not really concerned with what learners learn, but rather how they prefer to learn. As classes continue to increase in size and diversity, learning style may become an increasingly pertinent pedagogic tool. This review will describe various learning style theories.

Bernice McCarthy developed the 4MAT System in 1972. "4MAT is an eight-step cycle of instruction that capitalizes on individual learning styles and brain dominance processing preferences" (McCarthy, 1990, p.31). This cycle is a four-quadrant model with each quadrant aligning with the four major learning styles- imaginative, analytical, common sense, and dynamic learners. In addition, each quadrant considers right-mode and left-mode hemisphere processing by the brain in an effort to engage the whole brain. Lastly, the model includes perception and processing differences among learners with quadrants falling into both categories. For example, Quadrant 1 is geared toward imaginative learners who tend to watch (reflective observation) with their left mode and sense/feel (concrete experience) with their right mode. In sum, if all four quadrants are taught to all students in the order of the cycle, all learning styles are considered and all learners will be comfortable at times but challenged at other times. McCarthy suggests that teachers can use this system to improve their instruction to include diverse teaching

strategies. It provides a framework for teachers to design their curriculum and instruction in a systematic way while giving thought to the diverse needs of students and their various learning styles.

David Kolb's Learning Styles and Experiential Learning Cycle theory (1985) works on two levels: a four-stage cycle of learning by doing and four separate learning styles. Kolb's theory states that a learner favors a certain learning style based on his or her inner cognitive make up, social experiences, and educational background. The four learning styles are Accommodating, Diverging, Converging, and Assimilating. Accommodating learners prefer a hands-on approach. Diverging learners tend to be imaginative and emotional. Converging learners have a think and do style and are technical minded. Assimilating learners think and watch and are interested in logical sounding theories and clear explanations (Kolb, 1985). Each learner prefers a specific learning style and teachers are recommended to develop appropriate teaching material and activities structured with appropriate teaching methods to engage all students. The experiential learning cycle consists of concrete experience, reflective observation, abstract conceptualism, active experimentation, followed by a new concrete experience. The cycle can be entered by the learner at any point, but the stages must be followed in sequence in order to learn by doing.

Robert Sternberg's Triarchic Theory of Intelligence (1985) categorizes learners into three categories: analytical, creative, and practical and is represented as a triangle. Students with an analytical intelligence (componential) tend to think abstractly and process information effectively. Those who are creative thinkers (experiential) are able to create new ideas from seemingly unrelated information. And students who are practical

(contextual) have the ability to adapt to and change their environment in order to maximize their strengths and to compensate for their weaknesses. In sum, Sternberg's theory states that there are three components that contribute to people's intelligence and depending upon where they tended to linger and feel comfortable accounts for learning differences among individuals. He suggests that teachers vary their teaching strategies to include all three types of intelligences in order to reach all students.

According to Gardner's Multiple Intelligences Theory (2006), intelligence is best described in terms of an individual's "abilities, talents, or mental skills" (p. 6). Multiple intelligences theory claims that all learners have multiple intelligences in varying amounts. There are eight intelligences thus far: verbal-linguistic, mathematical-logical, musical, visual-spatial, bodily-kinesthetic, interpersonal, intrapersonal, and naturalist (Gardner, 2006). Each learner has a unique composition of these intelligences. Teachers are urged to address all of the intelligences in order to strengthen or reinforce the intelligence in each student. At times the student will feel comfortable and at other times will feel stretched or challenged in his or her learning.

A commonality to all four learning style theories is the belief that all learners have combinations of all of the learning styles or intelligences. The theories of McCarthy (1990) and Kolb (1985) are quite similar with cyclical models and elements of perception and processing. Both focus on the ways that learners approach tasks within learning. McCarthy's 4MAT System's "theoretical foundation is based on Kolb's work" (McCarthy, 1990, p. 31). The theories of Sternberg (1985) and Gardner (1983) both focus on intellectual abilities as intelligences. Sternberg's work analyzed how individuals overcame challenges in order to succeed. Gardner's work with both normal and gifted

children and also adults with brain damage led him to analyze how individuals think and therefore learn. All four theories include hands-on, logical, and creative components. Finally, all four theories suggest that teachers recognize their students' diverse learning styles and adjust their instructional strategies to reach all students.

The learning style theory that best fit this research project was that of Gardner's (2006) multiple intelligences. Exposure to and experience with Gardner's multiple intelligences theory allows educators to provide educational experiences that are relevant to a wider array of diverse learners than the other theories. Multiple intelligence-based science instruction can become an inclusive model that helps trainees integrate different learning styles into programs. Abdi, Laei, and Ahmadyan (2013) state "…multiple intelligence-based science instruction challenges students to develop meaningful understandings of the world around them…" (p. 282), complementing the experiential outdoor learning offered at the Sanctuary. The theory of multiple intelligences is intriguing because it expands our horizon of available teaching and learning tools beyond the conventional linguistic and logical methods used in most classrooms (Armstrong, 2018). Gardner's theory offers more intelligences and therefore the possibility for trainees to regard intelligence and learning more broadly, which translates into a broader variety of instructional strategies to meet those needs. It can be said then, that learning style theories inform instruction.

Every student differs in his or her approach towards the thought process, the perception towards the content being delivered, the type of content being delivered, or the sequence of instruction (Rasheed & Wahid, 2018). Differentiated instruction (DI) is a philosophy for effective teaching that involves providing different students with different

avenues to learning in terms of content, process, and learning environment so that all students can learn effectively, regardless of differences in ability. According to leading DI expert Carol Ann Tomlinson (2016), the hallmark of differentiated instruction theory is "…to engage students in instruction through different approaches to learning…" (p. 3). Instead of falling back on the familiar patterns of teaching such as lecture and "covering" the information, teachers call upon a range of instructional strategies in order to provide an engaging learning experience. A working knowledge of various instructional strategies will move trainees from a scripted program to an interactive and engaging program focusing on the learners' needs and not the trainee's comfort level. In order to teach culturally and academically diverse learners effectively, teachers have to move from standardized to personalized instruction. Teacher responsiveness to race, gender, culture, learning preferences, and more results in increased student motivation, engagement, and achievement (Tomlinson & Strickland, 2005). Tomlinson's approach to DI includes methods and techniques for differentiating content, process, and learning environment. These are the three areas which had the potential to be differentiated by trainees, making Tomlinson's expertise and approach to DI best suited for this research project.

Cruickshank and Applegate (1981) define reflection as a process that helps teachers think about what happened, why it happened, and what else could have been done to reach their goals. Done properly, reflection allows teachers to not only revisit their past performance, but also to guide future teaching. It is in this way that reflection is an important tool that teachers can use to address differences among learners and how those differences might be addressed in order to promote an inclusive learning environment. Critical self-reflection both before and after a program can ensure that trainees

differentiate content and instruction, while creating scenarios that are positive, safe, and supportive thus fostering engagement and learning for all students.

Donald Schön (1987) states that there is a "dilemma of rigor or relevance" (p. xi) due to schools' standardized curriculum and assessments and the separation of reflection from practice. He advocates for an epistemology of practice based on "reflection-in-action" (p. xii) and a rethinking in general for reflective practice in education. Schön distinguishes two forms of the reflective process. He defines reflection-in-action as "…the thinking *what* they are doing *while* they are doing it." (p. xi). Reflection-on-action tends to be afterwards or during teaching where the teacher may stop and think about what is going on, but there is no direct impact on or connection with the present action. Whereas reflection-in-action is reflection in the midst of the action without interrupting it. The teacher's thinking serves to reshape what is happening *while* it is happening and makes a difference to the situation at hand. This type of reflection tends to be a type of "professional artistry" (p. 22) seen in competent and experienced teachers. Schön suggests that coaching of this "professional artistry" be included in pre-service and new teacher practicums. Under this model, teachers would examine their practice both reflectively (reflection-on-action) and reflexively (reflection-in-action).

Bain, Ballantyne, Mills, and Lester (2002) are concerned mainly with reflection-on-action, reflection that occurs before and after teaching. Bain et al.'s work with pre-service teachers and thus their focus is on the problems and dilemmas encountered by those new to teaching with little skill for reflective practice. In an effort to assist pre-service teachers with developing reflective skills and dispositions, Bain et al. created the 5Rs framework. This framework is concerned with ways to enhance reflective writing and

thinking. The major components of the framework are: reporting, responding, relating, reasoning, and reconstructing. Reporting is a descriptive account of the situation, responding is the emotional response to it, relating is based on knowledge, theory, or literature, reasoning is explaining the situation, and reconstructing is developing a future action plan. Each component has a scale with levels 1, 2, and 3. These levels assist pre-service teachers in their progression to more advanced reflection. In sum, this framework is used as a self-assessment instrument within which feedback between the mentor and the student can be offered and interpreted (Bain et al., 2002).

Max van Manen (1977) proposes three different levels of reflectivity which increase in difficulty and experience. Technical reflection is the first level and focuses on the concerns and techniques of teaching. This is the 'how to' teach level. Practical reflection is the second level and is concerned with actions and consequences for learners in teaching. It is at this level that teachers consider their own values, experiences, perceptions, and assumptions for the purpose of reorienting their actions in the classroom. Critical reflection is the third level and considers the ethical and moral dilemmas of 'what could or should be' in education. It is also where the teacher addresses "…the question of the worth of knowledge and to the nature of the social conditions necessary for raising the question of worthwhileness in the first place." (van Manen, 1977, p. 227). van Manen asserts that all teachers should eventually be operating at this level.

Rolfe, Freshwater, & Jasper (2001) created a model to write reflectively based upon three simple questions: What? So what? and Now what? The 'What?' element is simply describing the situation. The 'So what?' element is where what happened is analyzed and explained using knowledge, theory, or literature. The 'Now what?' element is where the

greatest contribution to practice can occur because what has been learned and how can it be applied in the future is considered. This simple reflective framework delves into description, theory and knowledge building, and action-oriented reflection.

Schön's (1987) cyclical model of practice and reflection focuses on two forms of reflective practice. The reflection-in-action process, which requires the ability to be able to change direction in the midst of teaching, is characteristic of experienced teachers. A problem with this model is that there is little time for deliberative reflection in the midst of the surprises of teaching. Experienced teachers know what to look for and are proactive in their acting accordingly. This could be mistaken for reflection-in-action. van Manen (1977) proposes three levels of reflection. He recommends that all teachers reflect at the third level of critical analysis of the moral and ethical deliberations of everyday teaching. Again, this level is attained by experienced teachers. A problem with this hierarchy of reflection is that every day dilemmas in the classroom may fall on any of the three levels and dictates the reflection of the teacher at any given time. Bain et al.'s (2002) 5Rs framework considers five components of reflective writing and thinking with a scale or levels within each component. This is an aided journal reflection framework which requires students to draw upon research and theory literature. Their research shows this framework to be difficult for students, but highly effective in improving reflective writing. The only drawback would be that it is a time-consuming model. Rolfe et al.'s (2001) reflective model is also geared for reflective writing and thinking. It consists of three questions, which are similar to three components found in the 5Rs framework. 'What?' corresponds to 'reporting', 'So what?' to relating, and 'Now what?' to reconstructing. Also, both Rolfe et al. (2001) and Bain et al.'s (2002) frameworks require

drawing upon literature in order to develop a better understanding of the situation or dilemma and a future solution or action plan.

The reflective model that best matched the intents of reflection in this research project was Rolfe et al.'s (2001) simple three question model which was created to guide the reflective writing process. The 'What?' allows trainees to describe the situation or problem and what feelings it evoked. The 'So what?' prompts for analysis of the situation or problem based on knowledge, research, and theory gained from seminars and curricula. And the 'Now what?' is an explanation of what was learned and how it can be applied in the future. The insights the trainees gained about themselves and their teaching practices using this model of reflective journaling and dialogic reflection could facilitate their growth as educators and lifelong learners.

1.7 Definitions of Key Terms

Academic knowledge- consists of the concepts, paradigms, theories, and explanations that constitute traditional and established knowledge in the behavioral and social sciences. An important tenet within the mainstream academic paradigm is that there is a set of objective truths that can be verified through rigorous and objective research procedures that are uninfluenced by human interests, values, and perspectives.

Case study- a research strategy and an empirical inquiry that investigates a phenomenon within its real-life context. Case studies are based on an in-depth investigation of a single individual, group, organization, or event to explore the causes of underlying principles.

Differentiated instruction- a framework or philosophy for effective teaching that involves providing different students with different avenues to learning in terms of:

acquiring content; processing, constructing, or making sense of ideas; and developing teaching materials and assessment measures so that all students within a classroom can learn effectively, regardless of differences in ability.

Diverse learners- includes students from racially, ethnically, culturally, and linguistically diverse families and communities of lower socioeconomic status.

Instructional strategies- specific strategies to support high-impact learning.

Learning styles- the ways in which learners gather, sort through, interpret, organize, and come to conclusions about new information.

Multiple Intelligences Theory- Howard Gardner outlined this theory in 1983 and suggests that all people have different kinds of intelligences. Gardner has identified 8, possible 9 intelligences.

Personal and cultural knowledge- consists of the concepts, explanations, and interpretations that students derive from personal experiences in their homes, families, and community cultures constitute personal and cultural knowledge.

Place-based education- Pedagogy of place, PDE immerses students in local heritage, cultures, landscapes, opportunities and experiences, using these as a foundation for the study of language arts, mathematics, social studies, science and other subjects across the curriculum.

Reflective practice- the ability to reflect on one's actions so as to engage in a process of continuous learning and improvement on practice. To examine one’s practice both reflectively (reflection-on-action) and reflexively (reflection-in-action).

Self-reflection- the suspension of making conclusions about a dilemma in order to gather information, study the problem, gain new knowledge, and come to a sound

decision. This deliberate contemplation brings about new learning. The processes that a learner undergoes to look back on her past learning experiences and what she did to enable learning to occur, and the exploration of connections between the knowledge that was taught and the learner's own ideas about them.

CHAPTER TWO: LITERATURE REVIEW

2.1 Sociocultural Knowledge

Education trainees come to teaching with knowledge gained through personal experiences. According to Brown (2016), this background knowledge is based on all of the experiences that the preservice teacher (trainee) had before beginning their student teaching (traineeship). Teacher educators, similar to trainee supervisors, find it difficult to alter this type of deeply held personal knowledge. It is imperative that teachers work effectively with all types of students, so it is important to include multiple learning styles, differentiated instruction, and self-reflection in trainee education. Immersion in both learning and teaching style theories and development of these skills through practice would enable trainees to align the two for more effective student outcomes (Spoon & Schell, 1998). Through personal and collaborative reflection on practice, trainees can examine their personal experiences and background knowledge for limitations and biases that they stand to bring to their teaching, which will ultimately impact how they see themselves as teacher, their students, and teaching in general. Preservice teachers tend to come to teaching with traditional beliefs that "teaching is an objectifiable craft" rather than a "technical craft" (Gay & Kirkland, 2003, p. 182). In other words, the preservice teacher believes that as long she can master all of the technical parts of teaching, she can then apply those learned parts to all students in all settings and be an effective teacher. This is a "one size fits all" mindset of teaching (Gay & Kirkland, 2003, p.182). Gay and Kirkland suggest that in order to counter this and to ensure improved opportunities and outcomes for students, especially students of color, cultural critical thinking and self-reflection are needed in preservice programs. Milner (2007) states that "It is critical for

teacher educators to examine their own practice because what they do, say, and model in the classroom has the potential to influence teachers and students in P through 12 classrooms" (p. 584). This examination of practice includes examining and monitoring personal beliefs, background knowledge, and instructional behaviors through self-reflection. It also means instruction in cultural critical thinking and knowledge construction in order to learn the values of all cultures and the best ways to instruct them. For this to happen, preservice teachers must be told from the beginning to think deeply and analytically and to carefully examine their teaching experiences in order to take the new knowledge that they are learning and translate it into effective instructional techniques for the diverse students they will teach. As this is a learned skill, preservice teachers should first be assisted through the self-reflection process. Eventually, the preservice teachers move toward self-directed reflective analyses of their development and facilitation of instruction.

Sensoy and DiAngelo (2011) define critical thinking as "…constantly seeking out new knowledge, but also understanding the historical and cultural context in which knowledge is produced, validated, and circulated" (p. 24). Preservice teachers most likely have received knowledge without these additional constructs and their personal and cultural background knowledge will include discriminatory beliefs, even if not recognized by them. This can be inferred based on James Banks' (1993) knowledge typology which explains personal and cultural background knowledge as being steeped in family and community culture and directly taught by family members without question or challenge by the learner. Discrimination in the classroom and elsewhere is mostly unconscious and takes place whether the preservice teacher intends to discriminate or not and in fact she

may think that all students are being treated fairly and equally. The problem in not addressing this issue in teacher training is that the discrimination will continue under the guise of willful ignorance. The bottom line is that preservice teachers needs to learn how to think critically so that they can recognize and analyze how knowledge, including their own personal knowledge, is socially constructed by family, friends, popular culture, and the institutions they attended. The goal is to help preservice teachers to understand that their knowledge has been created based on their own social perspective and subjectivity and to guide them in developing the skills needed to analyze their own positionality and to challenge the knowledge they accept and reproduce in order to work toward equality and betterment for students. This would lead to a more positive attitude toward all students and higher expectations for school performance.

Deficit thinking about students by teachers limits student academic success and is therefore a social justice issue. Mirci, P., Loomis, C., and Hensley, P. (2011) state that "…what we do or do not do, what we say or do not say, and our judgements of individuals based on racism, sexism, heterosexism, classism, ableism, ageism, expectations, and religious beliefs have a *profound* positive or negative impact on students…" (p. 70). Students tend to internalize the expectations of teachers regarding their ability and this impacts school performance. Rosenthal and Jacobsen's (1992), experiment at The Oak School provided proof of this when random students were chosen and labeled as high achieving actually outperformed all other students because the teachers expected them to be high achievers (as cited in Mirci, et al., 2011). This describes the Pygmalion effect, when a student fulfills the academic expectations of a teacher- whether positive or negative. A study of this effect, involving 121 teachers from

underperforming schools, found that teachers who blamed students for poor performance did not use multiple teaching strategies with these same students (Thompson, Warren, & Carter, 2004). Diverse learners require diverse teaching methods. The students who performed poorly were the traditionally underserved groups of African Americans, Mexican-American, Native Americans, and Latinos. The achievement gap between these groups and Whites must be closed. This requires critical thinking skills (Appendix Q) and multiple teaching strategies (Appendix R) on the part of the teacher, skills that should be taught to preservice teachers.

2.2 Reflective Practice

The development of reflection as a critically important learning objective has been used across many disciplines including preservice teacher training. Carrington and Selva (2010) argue that "Reflective practice can and should be taught- explicitly, directly, thoughtfully, and patiently…" (as cited in Russell, 2005, p. 203-4) in pre-service teacher education. Self-reflection is one such skill that teaches preservice teachers to read themselves and their past experiences and perspectives. Reflection on teaching by pre-service teachers involves "…emotions, values, and beliefs of the teacher, even though the teacher may not go so far as to challenge his/her deeply held views…during the reflective process" (Zeichner, 1983, as cited in Bain, Ballantyne, Mills, & Lester, 2002, p. 2). The goal is to ultimately move the preservice teachers to challenge their prior beliefs.

According to Russell and Munby (1992), a common method used to prepare teachers to teach thoughtfully and to consider the consequences of their work carefully is the reflective journal, a personal written account based upon professional practice. However, as found by Bain et al. (2002), "…research has shown that a typical, unaided journal

entry is likely to be a descriptive account…rather than a careful analysis of the issues involved and the consequent reformulation of practice" (p. 10). Reflection must be taught. It requires practice and development, but it can be learned using models of reflective writing. There are various models of how to think and write reflectively.

Bain et al. (2002) are concerned mainly with reflection-on-action, reflection that occurs before and after teaching. Bain et al. work with pre-service teachers and thus their focus is on the problems and dilemmas encountered by those new to teaching with little skill for reflective practice. In an effort to assist pre-service teachers with developing reflective skills and dispositions, Bain et al. created the 5Rs framework. This framework is concerned with ways to enhance reflective writing and thinking. The major components of the framework are: reporting, responding, relating, reasoning, and reconstructing. Reporting is a descriptive account of the situation, responding is the emotional response to it, relating is based on knowledge, theory, or literature, reasoning is explaining the situation, and reconstructing is developing a future action plan. Each component has a scale with levels 1, 2, and 3. These levels assist pre-service teachers in their progression to more advanced reflection. In sum, this framework is used as a self-assessment instrument within which feedback between the mentor and the student can be offered and interpreted.

Graham Gibbs' (1988) reflective cycle has successive phases for reflection. He states that students must move through all six steps. These steps include description, feelings, evaluation, analysis, conclusion, action plan, then a return to description for each learning event. This model includes links between preparing for action, the action itself (the experience), and reflecting upon the action and its results. Links between the doing and

the thinking and the reflection allow students to learn from past experiences. Gibbs' reflective cycle is useful for helping those who are learning from situations that they experience regularly. Thus, learners are involved in an active exploration of experience in a safe, supportive, carefully created learning environment. Learners then reflect in a critical way before experiencing the learning event again. The Gibbs model is unique in that it advocates for reflection by both teachers and students.

Donald Schön (1991) argues that professional education should be centered on enhancing the practitioner's ability for reflection-in-action, not solely reflection afterwards. Reflection-in-action is learning by doing, followed by developing the ability to problem solve in action. Reflecting while teaching and making decisions in the moment is the mark of an experienced and cognizant teacher. Teachers may often have a knowing-in-action, but not act upon it in the moment. Schön states that this is because of a teacher's dilemma for "rigor or relevance" (p. xi), a result of the pressure to cover content in order to meet educational standards as mandated by the school. Teachers may also not act upon a knowing-in-action because they lack the skills to do so. Schön advocates for a return to the tradition of education for practice in the forms of coaching by a master teacher in practicums. Less scholarship and knowledge acquisition and more emphasis on learning by doing in a low risk, supportive environment with a coach who is able to reflect-in-action is the model advocated by Schön.

Rolfe, Freshwater, and Jasper's (2001) model for reflective writing practice is based upon three simple questions: What? So what? Now what? The 'what' is simply describing the teaching situation. The 'so what' is an analysis of the situation based on theory and knowledge and may include reference to and citation of related literature. The

'now what' is an explanation of what was learned and how it can be applied in the future as action. Reflective writing includes an introduction to the problem, observations about the issue, and a conclusion of what would be changed next time. This simple reflective framework delves into description, theory and knowledge building, and action-oriented, (reflexive) reflection. This aligns with Wolf's (1996) often quoted statement "Reflection is what allows us to learn from our experiences. It is an assessment of where we have been and where we want to go next." Moving preservice teachers from 'what' to 'now what' requires change and advancement in their critical and reflective thinking.

Max van Manen (1977) proposes three levels of reflectivity that indicate process of thought. The first level is concerned with the means rather than the ends. The teacher is focused on the application of basic educational knowledge and principles. At the second level, the teacher is seeking to understand the nature and the quality of the educational experience and wants to make choices based on a framework for teaching. At the third level, the teacher is reflecting on social justice issues that affect education and the worth of education. Several researchers have adapted this framework for their own research with preservice teachers. Collier (1999) incorporated van Manen's levels into her study of pre-service teachers in order to categorize characteristics of student teacher oral and written reflections, including reflective journals. Pultorak (1993) adapted van Manen's levels in his work with novice teachers. He developed a taxonomy of questions to lead novice teachers to reflective thought. These ten questions can be utilized in reflective journals. This use of questions as prompts is an effective method that can be used to assist student teachers in developing reflective skills and dispositions using reflective journals.

The purpose of Orange's (2016) study was to "…understand how the introduction of structured guidelines and prompts might change [improve]… students' research journals" (p. 2178). Orange found that when using unstructured journals few students produced journals that demonstrated evidence of reflection or engagement, rather their entries seemed to be afterthoughts. Students in the study were given prompts to focus their journal writings. Orange selected topics that were 1) important for students to engage with to gain better understanding of their research and 2) based on literature (Orange, 2016). Orange's results found that "…students who adhered to the guidelines and prompts produced journals with a greater number of reflective entries…which contained more detail then their [previous] peers who did not receive prompts and guidelines" (p. 2181). These results suggest that structured guidelines and prompts increase the level of student reflection and that they may be more engaged.

"Reflection can be the catalyst that enables students to synthesize new understandings from the collision of theory and real-life events in the classrooms" (Baker & Shahid, 2003, p. 2). This study placed student teachers in diverse learner classrooms and all their complexities. These experiences were then reflected upon using a reflective journal. Baker and Shahid required that students submit journal entries reflecting on important events that occurred during their teaching experiences. They found that "…some students' journals were insightful, other students wrote…superficial…accounts of classroom life, and others never delved below the surface" (Baker & Shahid, 2003, p. 5). Without prompts, the researchers discovered that students tended to focus on negative comments about teacher instruction and student misbehavior. A list of nine reflective prompts, developmentally arranged and focused on diverse learners, were introduced to

students in lieu of unstructured journal writing. Positive differences were discerned between the aided and unstructured journal entries. Students were more likely to 1) "…analyze classroom experiences within the framework of the reflective question [prompt] rather than from an idiosyncratic point of view", 2) "…refine their thinking about instructional issues for diverse learners", and 3) "…were learning not simply by doing, but through thinking about what they have done" (Baker & Shahid, 2003, p. 11). In sum, the prompts encouraged students to reflect on issues that they may not have reflected upon on their own. Requiring students to respond to prompts rather than submitting unstructured journal entries encourages reflection on practice; however, when paired with instruction of a variety of teaching methods, practice is also improved.

Baker and Shahid also modeled a number of interactive instructional methods, ranging from small group activities to KWL charts to simulations, for student teachers to use in their classrooms with their diverse learners. Choosing appropriate instructional methods and differentiating learning are key to facing the challenge of the diversity of learner abilities in the classroom. Baker & Shahid found that these methods encouraged student teachers to "…think carefully about the *effects* of their teaching on the learners and the fact that one instructional size does not fit all" (Baker & Shahid, 2003, p. 7). Students reported that having numerous strategies allowed them to accommodate differences in learning styles and to engage all learners. The use of structured reflective journaling and the modelling of a variety of interactive instructional methods to accommodate all types of learners are two ways to lead student teachers to focus on their learners' needs and to take responsibility for their academic and personal growth.

2.3 Multiple Learning Styles

There are a variety of learning styles and just as many learning frameworks. McCarthy's (1990) 4MAT model of learning, Kolb's (1984) reflective learning cycle, the triarchic theory of intelligence (Sternberg, 1985), and the theory of multiple intelligences (Gardner, 1983) are all prominent learning style theories. All of these theories provide information about how students learn and support differentiation of instruction.

Bernice McCarthy developed the 4MAT System in 1972. "4MAT is an eight-step cycle of instruction that capitalizes on individual learning styles and brain dominance processing preferences" (McCarthy, 1990, p.31). This cycle is a four-quadrant model with each quadrant aligning with the four major learning styles- imaginative, analytical, common sense, and dynamic learners. In addition, each quadrant considers right-mode and left-mode hemisphere processing by the brain in an effort to engage the whole brain. Lastly, the model includes perception and processing differences among learners with quadrants falling into both categories. For example, Quadrant 1 is geared toward imaginative learners who tend to watch (reflective observation) with their left mode and sense/feel (concrete experience) with their right mode. In sum, if all four quadrants are taught to all students in the order of the cycle, all learning styles are considered and all learners will be comfortable at times but challenged at other times. McCarthy suggests that teachers can use this system to improve their instruction to include diverse teaching strategies. It provides a framework for teachers to design their curriculum and instruction in a systematic way while giving thought to the diverse needs of students and their various learning styles.

David Kolb's Learning Styles and Experiential Learning Cycle theory (1985) works on two levels: a four-stage cycle of learning by doing and four separate learning styles. Kolb's theory states that a learner favors a certain learning style based on his or her inner cognitive make up, social experiences, and educational background. The four learning styles are Accommodating, Diverging, Converging, and Assimilating. Accommodating learners prefer a hands-on approach. Diverging learners tend to be imaginative and emotional. Converging learners have a think and do style and are technical minded. Assimilating learners think and watch and are interested in logical sounding theories and clear explanations. Each learner prefers a specific learning style and teachers are recommended to develop appropriate teaching material and activities structured with appropriate teaching methods to engage all students. The experiential learning cycle consists of concrete experience, reflective observation, abstract conceptualism, active experimentation, followed by a new concrete experience. The cycle can be entered by the learner at any point, but the stages must be followed in sequence in order to learn by doing.

Robert Sternberg's Triarchic Theory of Intelligence (1985) categorizes learners into three categories: analytical, creative, and practical and is represented as a triangle. Students with an analytical intelligence (componential) tend to think abstractly and process information effectively. Those who are creative thinkers (experiential) are able to create new ideas from seemingly unrelated information. And students who are practical (contextual) have the ability to adapt to and change their environment in order to maximize their strengths and to compensate for their weaknesses. In sum, Sternberg's theory states that there are three components that contribute to people's intelligence and

depending upon where they tend to linger and feel comfortable accounts for learning differences among individuals. He suggests that teachers vary their teaching strategies to include all three types of intelligences in order to reach all students.

The theory of multiple intelligences (MI) was developed by Howard Gardner. Gardner's early work in psychology and later in human cognition led to the development of this theory of seven intelligences (Gardner, 1983). Today there are eight intelligences and the possibility of another (Gardner, 2006). Gardner maintains that although the uniform school sounds fair, it is actually unfair. His reasoning is that "The uniform school picks out and is addressed to a certain kind of mind…the IQ or SAT mind" (Gardner, 2006, p. 5). But if your mind works differently, then "…school is certainly not fair to you" (Gardner 2006, p. 5). Armstrong (2018) also asserts that the theory of multiple intelligences is fair because it moves teaching beyond the traditional linguistic and logical methods of teaching and addresses more than the visual and auditory learners. Gardner believes that human intelligence is better described in terms of abilities, talents, or skills, then as a number. It is a more "humane and veridical" (Gardner, 2006, p. 6) view of intelligence than alternative views.

The MI theory provides evidence that individuals learn in different ways. This implies the need for individualized instruction in order to accommodate different learning styles. While the task to individualize instruction for every student in the classroom is a daunting task at best, "…individual differences do exist, and since a person's own particular intellectual configuration will color his or her trajectory and accomplishments throughout life, it is a disservice to ignore these conditions" (Gardner, 2006, p. 139). Fortunately, MI based-instruction is holistic and inclusive and lends itself to cross-curricular links and

helps teachers to integrate different learning styles and abilities (Abdi, Laei, & Ahmadyan, 2013). Gardner's MI theory, along with the previously mentioned learning theories directly inform differentiated instruction (Fountain, 2014).

2.4 Differentiated Instruction

A large body of research addresses "…how congruence of teaching and learning styles affects student outcomes and satisfaction with different aspects of the educational process" (Spoon & Schell, 1998, p. 42). Learning styles are the ways in which learners collect and organize data into meaningful and useful information. Teaching styles are teaching behaviors, or methods of instruction, which might change or remain the same when the content changes (Spoon & Schell, 1998). "There is a relationship between the method of instruction and the attainment of objectives" (Baez, 1971, as cited in Abdi et al., 2013, p. 281). Differentiated instruction (DI) supports this relationship by "…offering instruction through different approaches to learning, by appealing to a range of interests, and varied rates of instruction along with varied degrees of complexity and differing support systems" (Tomlinson, 2014, p. 4). Teachers who differentiate their instruction approach learning with a variety of instructional strategies, modify their curriculum or content, provide clear learning goals, offer a supportive and respectful environment, and are flexible in order to ensure that all students reach their goals and are successful. "Serving all students well should include examining students' preferences for different teaching styles…learning styles and classroom environment…and how this contributes to students' academic achievement and satisfaction." (Migletti & Strange, 1998, p. 1-2).

Given the increasingly diverse student populations in school classrooms, DI for students with developmental disabilities needs to be included in preservice teacher

training (Gartin, Murdick, Imbeau, & Perner, 2002). This means making purposeful modifications to support students who have difficulty with skills and understandings that are needed to be effective learners. MI theory suggests that there are multiple "entry points" (Gardner, 2006, p. 139) to curricular material for teachers to offer to students, allowing all students some measure of success while exposing them to multiple perspectives, thus reducing biases and stereotypes in the classroom.

Differentiated instruction, informed by multiple intelligences theory, works because students are offered a variety of learning experiences and are therefore interested and engaged in the learning process. As a result, students retain more knowledge because they fully understand the material in multiple ways. "Teachers should be educated in ways to infuse their curriculum with a multiple intelligences framework to create more authentic and engaging learning experiences for learners." (Abdi et al., 2013, p. 283).

It was this framework, one of using aided self-reflection journaling logs, instruction in multiple learning styles, and the modelling of a variety of effective instructional methods, that was found to be most effective with trainees when moving from personal and cultural knowledge to transformative knowledge, as supported by the literature. The traineeship provided the opportunity for growth of the education trainees through self-evaluation, multiple teaching experiences with diverse audiences, and reflection on practice.

CHAPTER THREE: METHODS

3.1 Setting

The study took place primarily at Hawk Mountain Sanctuary, 1700 Hawk Mountain Road, Kempton, PA 19529. The trainees utilized the visitor center's Wings of Wonder Gallery, the Irma Broun Kahn Education Building, the visitor center seminar room, the trainee/intern office, the amphitheater, the Laurelwood Niche outdoor classroom, the accessible Silhouette Trail, trails and lookouts, and off-site school program classrooms and auditoriums.

The decision to conduct the study at the Sanctuary came from the action research position that one should study a behavior or problem in the natural setting where it occurs, thus allowing data to be collected and knowledge generated from problem-solving in real life situations.

3.2 Participants

The participants in the study were education trainees enrolled in the Education Traineeship program at Hawk Mountain Sanctuary. The first group of trainees were college graduates, between the ages of 22 and 25, enrolled in a four-month program. The trainees in this group numbered four. Their backgrounds were education and natural sciences. The second group of trainees were college seniors, between the ages of 21 and 23, enrolled in a three-month program with similar backgrounds as the other trainees. There were two trainees in this group. The only requirement for participation in the study was to be enrolled in the Hawk Mountain Sanctuary Education Traineeship Program. There were no exclusions. According to theory-based criterion sampling literature

(Marshall & Rossman, 2016), as many participants as fit the criteria for the study were included. However, participation was voluntary.

3.3 Role of the Researcher

In this project I had the complex identity of trainee supervisor, teacher-researcher, teacher, and mentor situated in full participatory research. This entailed different roles and interests. My role as the trainee supervisor put me in a position of power. After introducing the research and discussing the informed consent forms with the trainees, I left the room before they decided whether or not to sign them. I had the consent forms delivered in a sealed envelope directly to our senior educator. I did not open the envelope until after the semesters were over and their assessments had been submitted. In addition, I had prior observations and associations with several former trainees which could have led to assumptions about the trainee participants. It was important for me to differentiate between making observations based on what I was seeing and hearing with the new trainees and making inferences based on judgements of former trainees.

To address positionality in my role as teacher-researcher, my own use of reflective thinking in a research journal throughout the process helped to monitor my responses to participants and their responses. The reflections within it made me aware of any biases that could have affected the way results are presented. Finally, my role as a mentor has always been meaningful to me due to the personal connections I have established with the trainees, often staying their mentor even after they have left the program. As noted by Peshkin (1988), this “Nonresearch Human I” (p. 20) is the ‘subjective I’ that softens judgement as a result of affection created by a reduced distance between the researcher and the participant. I had to remember my obligation to the research and its readers and

took steps to manage my subjectivity with research journal entries documenting feelings and reactions. Although I could not remove myself completely from subjectivity, I was extremely attentive to it and managed it by being aware of what I observed and how I perceived those events.

3.4 Methodology

Purposive and theoretical sampling was guided by the structure of the Hawk Mountain Sanctuary education trainee program with a focus of inquiry on two small groups of Hawk Mountain Sanctuary education trainees. The strategy employed was a case study as described by Yin (2014) as "…research on a specific organization, program, or process (or some set of these) …" (as cited in Marshall & Rossman, 2016, p. 276).

Case studies are reports of data gathered through multiple methods. They offer many advantages such as incorporating multiple perspectives, data collection methods, and interpretive strategies (Marshall & Rossman, 2016). This case study utilized a variety of qualitative methods in order to acquire multiple data sources to best answer the research questions. The four components were: reflective journals, reflective in-depth interviews, trainee group seminars, and teacher feedback surveys.

The study included document analysis of trainees' reflective journal entries. This was an ongoing attempt by the trainees to reflect upon their practice. As stated by Anderson, Hess, and Nihlen (1994, p. 153), "The journal acts as a narrative technique and records events, thoughts, and feelings that have importance for the writer. As a record kept by the student, it can inform the teacher researcher about changing thoughts and new ideas and the progression of learning". All trainees were given the same list of prompts to aid in reflection.

Structured, in-depth reflective interviews with individual trainees were implemented weekly or biweekly dependent upon work schedules. Reflective interviewing is a method used to encourage reflective practice among novice teachers (Collier, 1999; Trumball & Slack, 1991). Interviews focused on trainees' impressions of the experience, specific elements of the program such as preparation and teaching strategies, and any feedback they had received. All participants were asked the same questions. The interviews were audiotaped and transcribed at a later time. I also took notes during and wrote analytical memos immediately following the interviews.

Group seminars can promote collaborative reflection among peers (Rudney & Guillaume, 1990). Seminars were held weekly and a topic was chosen for each week. After the new topic was introduced and discussed, time was dedicated to sharing of reflective journal entries to promote peer feedback, encouragement, and alternate perspectives (Rudney & Guillaume, 1990). Field notes of the group seminars were obtained with me as an active participant observer. I wrote analytical memos after each seminar.

Qualitative research survey questions were created in order to better understand the effects of differentiated instruction on learners in the programs. These were sent in the form of web-based feedback surveys to teachers and leaders of programs facilitated by trainees. Responses were open-ended and were focused on the teachers' perception of learner engagement and the appropriateness and effectiveness of the teaching strategies utilized by the trainees during the program. All teachers and leaders were sent the same survey.

Trainees also completed a participant survey at the conclusion of the study in an effort to collect feedback about the DI program and the participants' lived experiences during the study. This will allow for data-based decision making by the next director of education, in order that a positive, sustainable change in the organization's education department can be created.

3.5 Study Design

The action plan I developed was a case study based on the practical problem of reframing education trainees' perspectives from a "one size fits all" view of teaching to a "differentiated instruction" mindset of teaching in order to connect with the diverse students of a variety of learning profiles that they would encounter over the course of the traineeship. In order to address this problem, and to answer the questions of interest, an action research design was utilized.

A main objective of this study was to provide trainees with multiple ways to examine and reflect upon their own identities, values, beliefs, and attitudes about teaching. Three components were the basis for trainee reflection: reflective journals, reflective interviews (Trumball & Slack, 1991), and group seminars (Koskela, 1985). According to Zeichner (1987), there are at least six major strategies which have been used to enhance the reflective capabilities of preservice teachers. Two of these strategies are 1) writing and reflection and 2) supervision and reflective teaching. Inquiry-oriented supervisory approaches such as "partnership supervision" and "horizontal evaluation" (Zeichner, 1987, p. 570) are taking the place of traditional supervisory roles. Zeichner points to evidence that this type of supervision results in reflective discussions about teaching, such as in a reflective interview with a supervisor.

The amount of time required for both study trials was six months. The first group's traineeship was four months in length. The second group's traineeship was three months in length. Each semester began with a two-week team-building and orientation period. During that time, education trainees were introduced to the different types of education programs offered at the Sanctuary. The study also included the introduction of multiple intelligences theory and additional learning styles theories, a variety of teaching strategies through a differentiated instruction framework, and reflective journals as a self-assessment tool. These topics were discussed in weekly group seminars and implemented throughout the traineeship in both on and off-site programs.

Trainees first observed and shadowed educators, then performed a cameo appearance on a well-known topic, then co-taught with an educator, and finally individually taught programs to students and visitors of varying ages and abilities. Exposure to a variety of teaching strategies was accomplished through attendance at weekly group seminars which included readings, videos, TED Talks, activities, and sharing. In addition to direct instruction in seminars, educators modeled a number of interactive teaching strategies during programs. One program for each age range (ex: pre-K, K, elementary, middle level, high school, college, adult) and for each ability range (ex: gifted, visually impaired, deaf and hard of hearing, mobility impairments, developmental and cognitive development impairment) was implemented by the trainees whenever possible. This was possible because Hawk Mountain's accessible Silhouette Trail draws a large number of differently-abled individuals to the Sanctuary for programs.

I interviewed each trainee after their programs to reflect on the instructional strategies chosen and why. Teachers or group leaders were sent a program feedback survey to

complete. This was an attempt to assess the teaching strategies implemented during the program from an unbiased, objective, outsider perspective. Aided reflective journals were also be kept by trainees with entries after programs in order to assess the development of self-reflection skills. Key data sources were field notes from observations of trainee seminars, interview transcripts, teacher feedback surveys, and reflective journal entries.

3.6 Data Collection and Instrumentation

Data collection included written notes and audio recordings of individual interviews after programs, teacher feedback surveys on the teaching strategies implemented into programs by trainees, voluntarily shared reflective journal prompts, and written field notes from group seminars (Appendices A & B). Analytical memos were written after interviews and seminars. Analysis of the data occurred as it was gathered and at the conclusion of data collection.

Individual structured trainee interviews were recorded, transcribed, and entered into Google sheets. For each subsequent interview with the trainee, the same questions were asked and the answers from each question were compared in an effort to search for themes and for evidence of improvement in choice of teaching strategies for various program types and an increase in reflective thought and dialogue (Appendix C).

Teacher feedback online surveys were in the form of a google doc. Responses were automatically entered into a response spreadsheet. The responses were imported into an Excel document and were compared for each program, again searching for themes and evidence of increased effort to match teaching strategies with a variety of learning styles and additional demographics (Appendix D).

Voluntarily shared reflective journal entries were read, reread, and coded for themes and evidence of reflection on practice, specifically reflection on differentiating instruction for diverse learners. The journal entries were aided by the contribution of prompts (Appendix E). All note taking and coding was entered into Google sheets- not in the journals which will eventually be returned to the participants.

Field notes were recorded during trainee seminars. I did not record the seminars, only observed and wrote detailed descriptions of what was said, tone, and interactions between trainees. Note taking included all topics of conversation, but focused on dialogue about differentiation, learning styles, and reflection. These notes were coded for behavior patterns and themes and entered into Google sheets.

After collecting the data, I utilized analytical memos. I wrote out my thoughts on the back of seminar notes and interview forms. This allowed me to get my thoughts down quickly after a seminar or interview in an effort to generate insights about the data, including emerging themes in the data. Additional analytical memos were written and reflected upon during data analysis. This allowed for creative thought about the data, thus discovering additional categories and themes.

3.7 Data Analysis

This research project was a case study; therefore, I used a multi-instrument approach. These instruments included: in-depth interviews, participant observations, surveys, and document analysis. Comparative analyses between the four data sets using learning style theory, differentiated instruction theory, and reflective theory as the frameworks, was implemented after all of the data was collected. Reflective journal entries, seminar field notes, teacher surveys, and interview transcripts were analyzed three times for evidence

of implementation and improvement of differentiated instruction and reflective practice and for emergent themes.

Initial analysis of the qualitative data included two elemental methods of coding- theory-generated and open coding. Initially, I used the research questions as guidelines to suggest theory-generated categories. I also used open coding as a way to search the data for emergent themes. The second cycle of data analysis incorporated two affective methods of coding- emotions coding and values coding. I searched the data for evidence of emotions recalled or experienced by the trainees and participants. At the same time, I sought for inferences of trainees' values, beliefs, and attitudes. Both are subjective-laden data analyses, which was considered in order to reduce bias. The third cycle of data analysis included axial coding, followed by focused coding. Using axial coding, I searched for relationships between the codes and grouped them based on commonalities. Finally, focused coding was utilized to find the most frequent and significant codes. The coded data was then categorized based on similar concepts.

Initially, I created a guiding codebook. I accomplished this by selecting example quotes from within the data that best illustrated each code and included a description that captured the essential elements of the code (Table 3.1). Seminar field notes and journal entries were coded line by line and inserted into Google sheets. Teacher survey responses were in the form of Google documents. They were imported into Excel and coded line by line. Interview recordings were transcribed and inserted into Google sheets. However, I followed the example of DeCuir-Gunby, Marshall, and McCulloch (2011) who "After reading several interviews…realized that coding line by line and on the sentence level were often not meaningful. The paragraph level…featured a variety of themes making it

impossible to label with only one code" (p. 145). DeCuir et al. also decided to instead "…focus on the level of meaning" (p. 145). In this way, text can be "lumped" or "split" at any location as long as "the essence is the same" (MacQueen, McLellan-Lemal, Bartholow, & Milstein, 2008, as cited in DeCuir-Gunby et al., 2011, p. 145). Thus, a code didn't have to be a few words, sentences, or a paragraph from the interview transcriptions.

Similar codes were merged into conceptual categories (Appendix F) and then illustrated as a concept map (Appendix G). A chart of the coding methods and resulting categories was created for further analysis and to aid in affinity diagramming (Appendix H). Affinity diagramming was used to group categories in a variety of ways in order to organize them into themes aligned with the research questions. Finally, code weaving was used to integrate all of the data information for final analysis and reporting of the results.

Table 3.1: Theory-Driven Codes, Their Descriptions, and Examples

Code	Abbreviation	Core Description	Example
Trainee growth & learning	TGL	Trainee references new learning, applies new knowledge, modifies content or activities, mentions perspective or identity, seeks feedback	"The teacher was pointing and yelling at students. She yelled at me too. She said to me 'This class is notorious for being a shit show'. I remembered the child behavior chart and that they are just kids and they are just excited."
Teaching strategies	TS	Trainee references teaching strategies that she or another educator implemented.	"[The educator] didn't lecture to them. She knelt down and got down to their level. She had a discussion with them."
Trainee emotions	TE	Trainee expresses emotions felt before, during, or after facilitation	"Today's group was wiggly. The bird was nervous because of it and that made me nervous too."
Student emotions/reactions	SER	Trainee expresses emotions or reactions observed or expressed by a participant	"The little girl ran back to me and said 'I'm not running ahead to hurt your feelings, it's because I'm happy!".
Learning environment	LE	Trainee mentions how the learning environment felt or how she or an educator tried to affect it	"[The educator] explained *why* she was asking them to do things. She explained her rationale. She also gave them choices and options."
Learning styles	LS	Trainee references learning styles she or an educator addressed during facilitation	"[The facilitator] used a lot of humor, which is good for adults. His activities were good for lots of multiple intelligences [learning styles]- naturalist, spatial, bodily kinesthetic, interpersonal.
Trainee feedback	TF	Trainee seeks feedback from another trainee or an educator after facilitation	"We reflected after the program and talked about the Build-A-Bird part of the program. I need to find smoother transitions and not digress so much."
Trainee Skills	TSK	Trainee mentions newly developed or important skills such as planning, preparation, communication	"We discussed ahead of time and created a cheat sheet for who would do what and this time and we'll switch it up next time. We also arranged our props on the table by theme to guide us through the program with the flow we wanted."
Reflection	R	Trainee reflects during or after the program about her performance	"The first Boy Scout group I lectured to. When they left my station, I reflected on how I could make it more participatory. The next two groups I did more question and answer with."

3.8 Trustworthiness

In order to establish validity, I referred to Anderson, Hess, and Nihlen's (1994) Criteria for Validity in Action Research. The trustworthiness of this study was demonstrated in the coherence of the purpose of the study with its design, methods, analysis, and presentation of results. Internal validity was established using four methods. First, triangulation was built into the data collection process by using multiple methods of gathering data, which resulted in multiple data sources that were analyzed through multiple theoretical lenses (Appendix I). Second, three independent coders agreed on the coding of the content and applied similar coding schema prior to my writing the results. Third, through peer debriefing, emergent findings were shared with two critical friends who gave feedback for coding schemas and categorical considerations and offered alternative points of view. And fourth, I utilized member checking and shared the preliminary results with the trainees to get feedback and insights as to whether their views and experiences were accurately reflected. All six trainees confirmed that the initial results matched their thoughts and experiences.

Reliability of the data was accomplished through the use of overlapping data collection methods. Interview data contributed to what I observed in group seminars, read in reflective journal entries, and observed in trainee facilitated programs. Sources of error were eliminated as much as possible by administering the same data collection instruments to all of the trainees under the same conditions for every interview, group seminar, or journal entry request. Reliability was also maintained through the transparent collection and management of the data. Data gathering logs were maintained with written

descriptions of each data process (Appendices A & B). This project's audit trail allows readers to see the data as evidence and to trace the logic within the research.

In order to establish external validity, the research was conducted in a systematic, disciplined manner. Critical reflexivity was built into the research process. Assumptions and biases that could have caused me to present findings in a certain way, were managed through the use of critical friends and member checking. Objectivity was also maintained through triangulation of theoretical lenses, methods, and data sources. Alternative points of view were offered in the theoretical framework and alternative findings were presented in the summary. I also kept a research journal throughout the process to ensure critical self-reflection and to be able to go back to in order to establish confirmability.

This research would not be generalizable in a statistical-probabilistic model. The project consisted of a small number of participants in a specific program setting. However, in a qualitative model, this research could be transferable if used with a similar population (i.e. preservice teachers) in a similar context (i.e. small teacher education program). A detailed description of the setting was provided for this purpose. The project could thus be duplicated as part of another study.

3.9 Ethical Assurances

I did not actively recruit participants. I gained access to participants (trainees) through the normal Education Traineeship recruitment process. Trainees were given information about the research project during their first week's orientation. The study offered full and complete disclosure with nothing hidden from the trainees.

The trainees were not vulnerable because of their relationship with me. There were no credits, grades, or monetary compensations associated with the traineeship. A stipend was given monthly by the Business Manager regardless of participation.

The trainees were given an informed consent form which explained the doctoral program, the research project, and offered the option to opt out. They were also informed of their right to withdraw from the project if they opted in and then changed their minds during the traineeship. The informed consent form (Appendix J) was approved by the IRB.

In order to respect and protect the trainees, their identities were kept confidential. All direct identifiers were removed and pseudonyms were used instead. Only I had access to the coding key to their real identities. The data and coding key were stored anonymized. All data was aggregated as one dense group and not by season in order to increase confidentiality.

The research design chosen was carried out with no harm to the trainees or disturbance to those in their programs. There were no potential risks. One benefit of the research was that each trainee learned 1) developmental teaching strategies appropriate to teach school students and mixed public groups and 2) strategies for visitors of differing abilities, including both physical and cognitive differences. This improved the trainee's ability to facilitate programs effectively to a variety of audiences.

All data collected was protected. Data included field notes from group seminars, individual interviews after selected programs, teacher feedback forms on the selected teaching strategies, and voluntarily shared reflective journal entries. The field notes were typed up, coded, and saved. The saved notes were on two USB drives (in case one was

damaged) and locked in a rolltop desk drawer in my home. Only I had a key. The interviews were recorded. The responses were transcribed, coded, and saved onto the same two USB drives. The recordings were saved to a mini sim card and locked in the rolltop desk drawer as well. Teacher feedback forms were automatically transferred into a Google doc response form shared only to me. The trainees were allowed to view this information with me for constructive outsider feedback. Reflective journals were kept by the trainees until after the traineeship. Then they were stored in the rolltop desk drawer. The consent forms were scanned onto the same USB drives and the originals kept in the rolltop desk drawer.

After the traineeships, I continued to be in contact with the trainees as their mentor. I kept them updated about the progress and findings of the study. I will continue to send them materials or resources that may be helpful to their instruction in the future. Lastly, the trainees anonymously assessed the program at the end of the traineeship in order to provide feedback about the program.

3.10 Limitations and Assumptions

There were limiting factors in this study that were out of my control. One limitation was the limited number of participants. Six trainees total is a small study size. However, limitations for increasing the trainee numbers included residence space, office space, and stipend budget. In addition, I resigned from my position unexpectedly. This resulted in a shortened second trial, which resulted in less data collected. A second limitation was the make-up of the trainee class. All of the trainees were white, middle-class, college educated females. This affected their personal perspectives. In response to this, I implemented identity mapping (Appendix Q), readings from James Bank's (1996)

knowledge typology which explained personal and cultural background knowledge, sociocultural videos and activities, aided self-reflection journals, and learning style assessments (Appendix R) in order to point out diversity even among the trainees.

A challenge in the collection of data was the imposition of time constraints within the trainee program. Originally, I had planned to observe the trainees during programs and take field notes; however, my position's responsibilities increased rapidly during the first group's traineeship, leaving me with less time to observe programs. To compensate for this, I observed seminars instead and took field notes and made analytical notes. A second challenge in data collection was the limited return of teacher feedback surveys after programs. To make a claim about a user group, the sample size must be large enough to capture statistically significant results. In an attempt to remedy this, I followed up with personal emails to teachers requesting their completion of the surveys. This had limited success as teachers have limited time for additional tasks. I did not receive at least one feedback survey for each trainee and received more than one for some trainees.

There are assumptions involved in action research. I had to assume that the trainees were participating willingly. The trainees provided self-reported data, which I also had to assume was provided honestly and without bias. Lastly, there is the problematic nature of transcribing data. Transcription is based on interpretations and judgements by the transcriber. In order to confirm that the transcription captured the true meaning and intent of the participants, I shared the transcripts and themes with them. This aided in ensuring that the data outcomes were authentic.

CHAPTER FOUR: FINDINGS

4.1 Introduction

In this section, I share the results from investigating the following two research questions:

1) How does the use of differentiated instruction training in an education trainee program influence how trainees design their own instruction?
2) How does the use of reflective practice support trainees in the development and implementation of differentiated instruction?

Results are presented in four sections of this chapter. First, a review of the data collection processes and analyses procedures is provided. This includes an explanation of how the emergent themes were determined. Second, the results for research question 1 are presented. Third, the results for research question 2 are presented. And fourth, analysis of data over time is provided. Included in this chapter are tables and graphics used to present code, category, and theme data, as well as quotes from data sources used to emphasize the themes and how they align with the research questions.

4.2 Review of Data Collection and Analysis

Results were based on the analysis of four data sources. Qualitative data from the six trainees included: 65 trainee reflective journal responses (Appendix K), 18 dialogic seminar field notes transcripts (Appendix L), 24 individual structured in-depth interview transcripts (Appendix M), and 6 teacher feedback surveys. Initial analysis of the data included two elemental methods of coding- theory-generated and open coding. Initially, I used the research questions as guidelines to suggest theory-generated categories. I also used open coding as a way to search the data for emergent themes. The second cycle of

data analysis incorporated two affective methods of coding- emotions coding and values coding. I searched the data for evidence of emotions recalled or experienced by the trainees and participants. At the same time, I sought for inferences of trainees' values, beliefs, and attitudes. The third cycle of data analysis included axial coding, followed by focused coding. Using axial coding, I searched for relationships between the codes and grouped them based on commonalities. Finally, focused coding was utilized to find the most frequent and significant codes.

As a result of this action research study, 99 initial codes were identified during the coding process. Subsequently, these initial codes were organized into categories based on their relationships to each other, or common concepts. This was accomplished through the use of affinity diagramming and resulted in a concept map of nine categories (Appendix G). These categories were then combined into theme-related components, which were grouped together based on similar meaning to create four themes. The themes that emerged were: effective teaching, a growth mindset, trainee reflection, and emotions and feelings.

The *teaching strategies* and *learning styles* categories were combined to create the *effective teaching* theme because both are indicative of DI and learning style theories. The categories of *trainee growth and learning* and *trainee skills* were combined to create the *growth mindset* theme because they described either new knowledge acquisition or improved skills related to that new knowledge. The categories of *reflection* and *trainee feedback* were merged to create the *trainee reflection* theme because both refer to the trainee seeking constructive communication from either another trainee, an educator, or themselves either verbally or written and are indicative of reflective theory. The last three

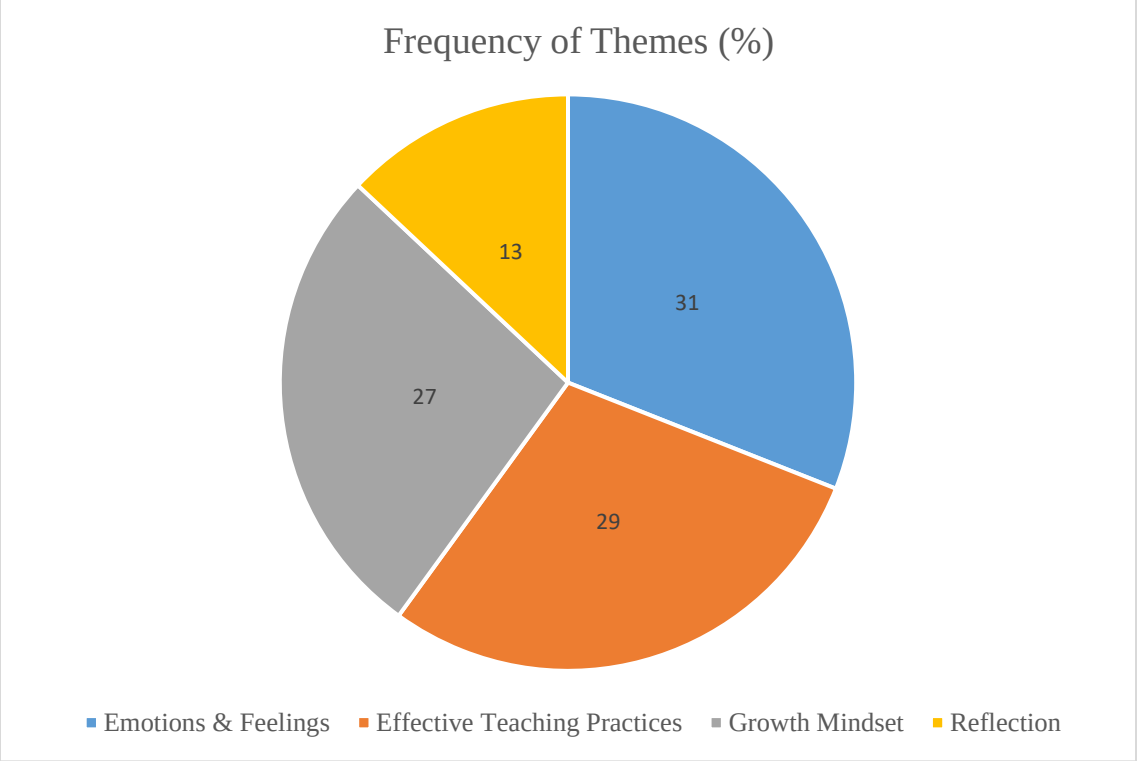
categories of *trainee emotions*, *student emotions and reactions*, and *learning environment* were united to create the *emotions and feelings* theme as each mention observed, communicated, felt, or desired emotions and feelings about the teaching and learning experience. This is indicative of reflective theory. This is visualized in Table 4.1.

Table 4.1: Themes and Supporting Data Sources

Themes (4)	**Effective Teaching**	**Trainee Reflection**	**Emotions & Feelings**	**Growth Mindset**
Categories (9)	Teaching Strategies	Trainee Feedback	Trainee Emotions	Trainee Growth & Learning
	Learning Styles	Reflection	Learners' Emotions/Reactions	Trainee Skills
			Learning Environment	
Data Sources (Evidence)	Trainee Interviews	Trainee Interviews	Trainee Interviews	Trainee Interviews
	Seminar Field Notes	Seminar Field Notes	Seminar Field Notes	Seminar Field Notes
	Reflective Journals	Reflective Journals	Reflective Journals	Reflective Journals
Theories Differentiated Instruction (DI) Learning Style (LS) Multiple Intelligence (MI) Reflective (R)	DI, LS, MI	R	DI, R	DI, R

An analysis of the themes was performed to search for a hierarchy among them. Figure 4.1 shows no real hierarchy present within the themes. The theme of *emotions and feelings* was most frequently mentioned at 31%, *effective teaching practices* second at 29%, *growth mindset* third at 27%, and *trainee reflection* fourth at 13%. Only 4 percentage points separated the first and third most frequent themes.

Figure 4.1: Hierarchy of Themes



In order to better understand why the frequencies were similar among three themes, each data source was analyzed for frequency of the nine categories. Figure 4.2 illustrates the frequency of categories found in the structured trainee interview transcripts. All trainees were asked the same questions in the same order during every interview. Thus, this data source was the most controlled and consistent in its data. The categories of

teaching strategies, *reflection*, and *trainee feedback* (tied), and *trainee emotions* were noted most within the transcripts.

Figure 4.2: Frequency of Categories in Structured Trainee Interviews

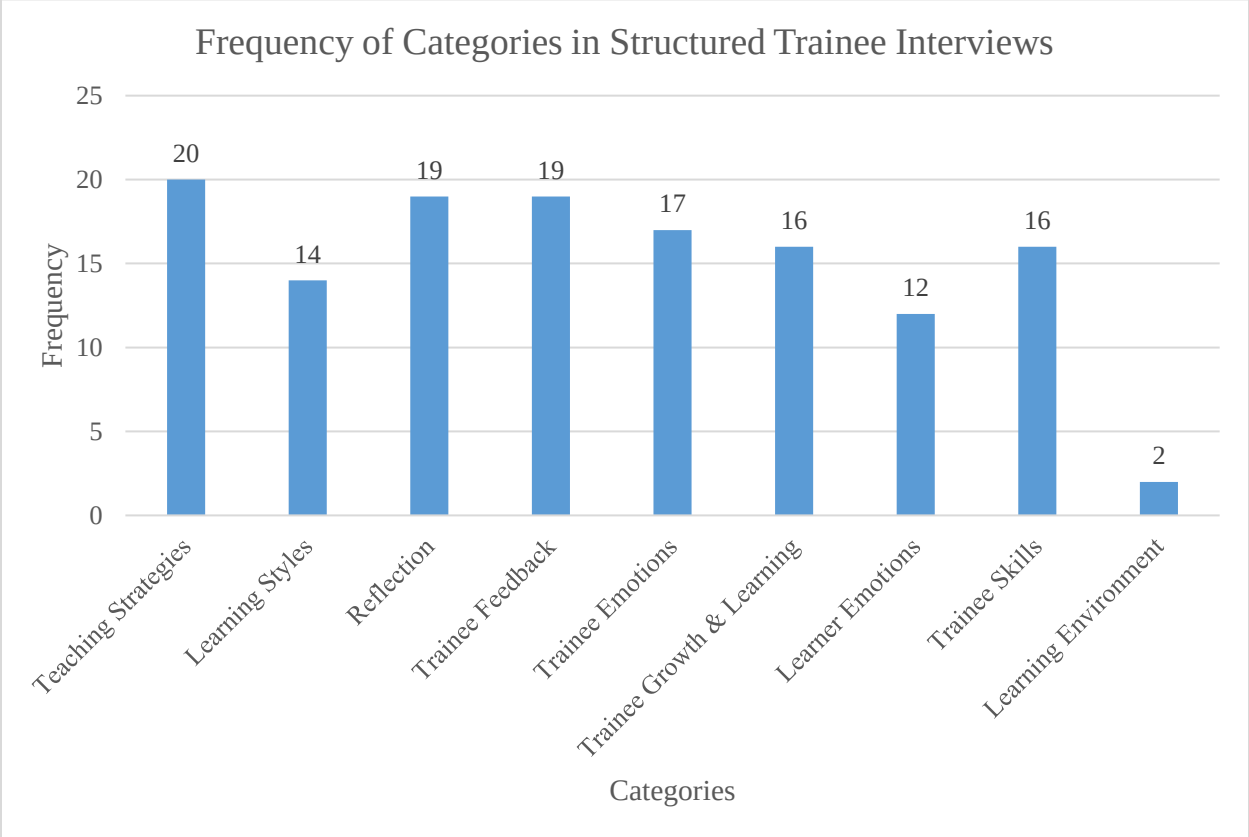


Figure 4.3 displays the frequency of categories found in the dialogic trainee seminar transcripts. Seminars consisted of review of the previous week's topic, introduction of a new topic, and each trainee sharing a journal entry of their choosing. Thus, this data source retained the same format each time, but discussion varied greatly. The categories of *teaching strategies*, *trainee growth and learning*, and *trainee emotions* were noted most within the field notes.

Figure 4.3: Frequency of Categories in Dialogic Seminar Field Notes

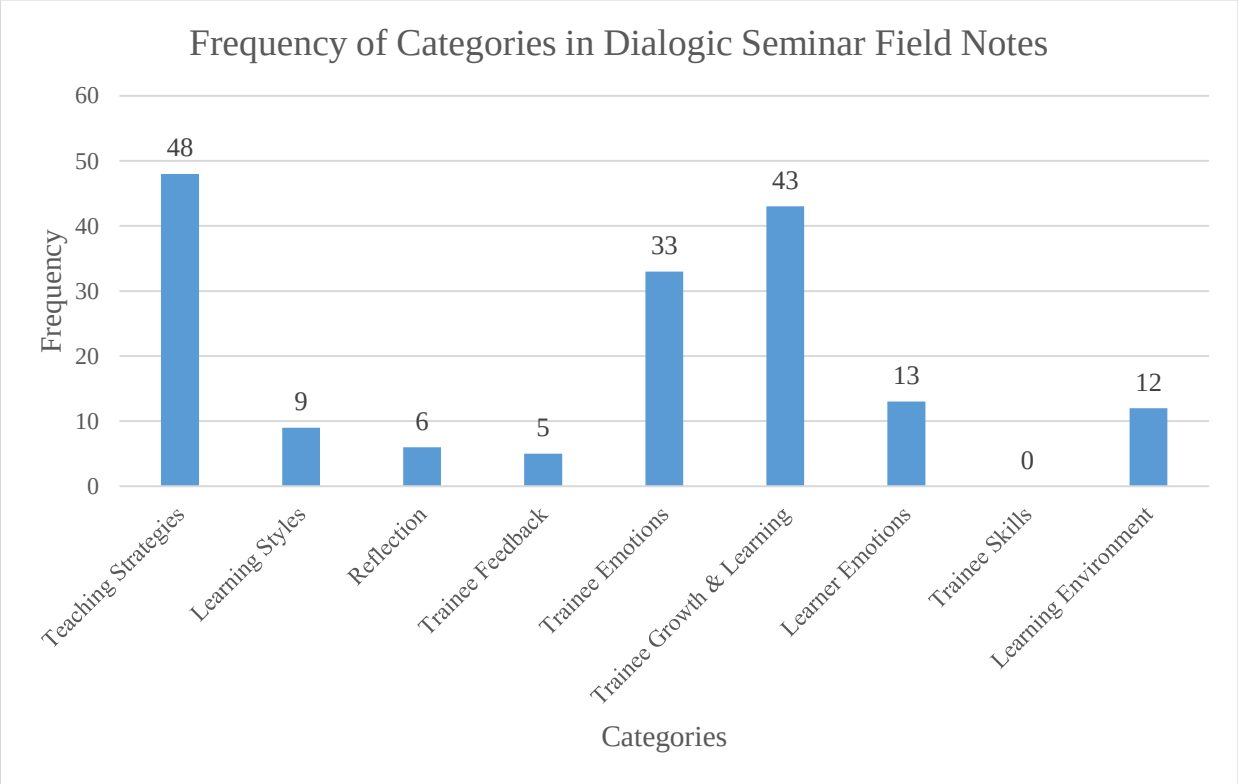


Figure 4 shows the frequency of categories found in the trainee reflective journal entries. The same journal prompt list was distributed to each trainee in order to aid reflection. However, the trainees were allowed to choose the prompts that best suited their teaching and learning experiences for the week. The categories of *teaching strategies*, *trainee growth and learning*, and *trainee emotions* were noted most within the field notes.

Figure 4.4: Frequency of Categories in Aided Reflective Journal Entries

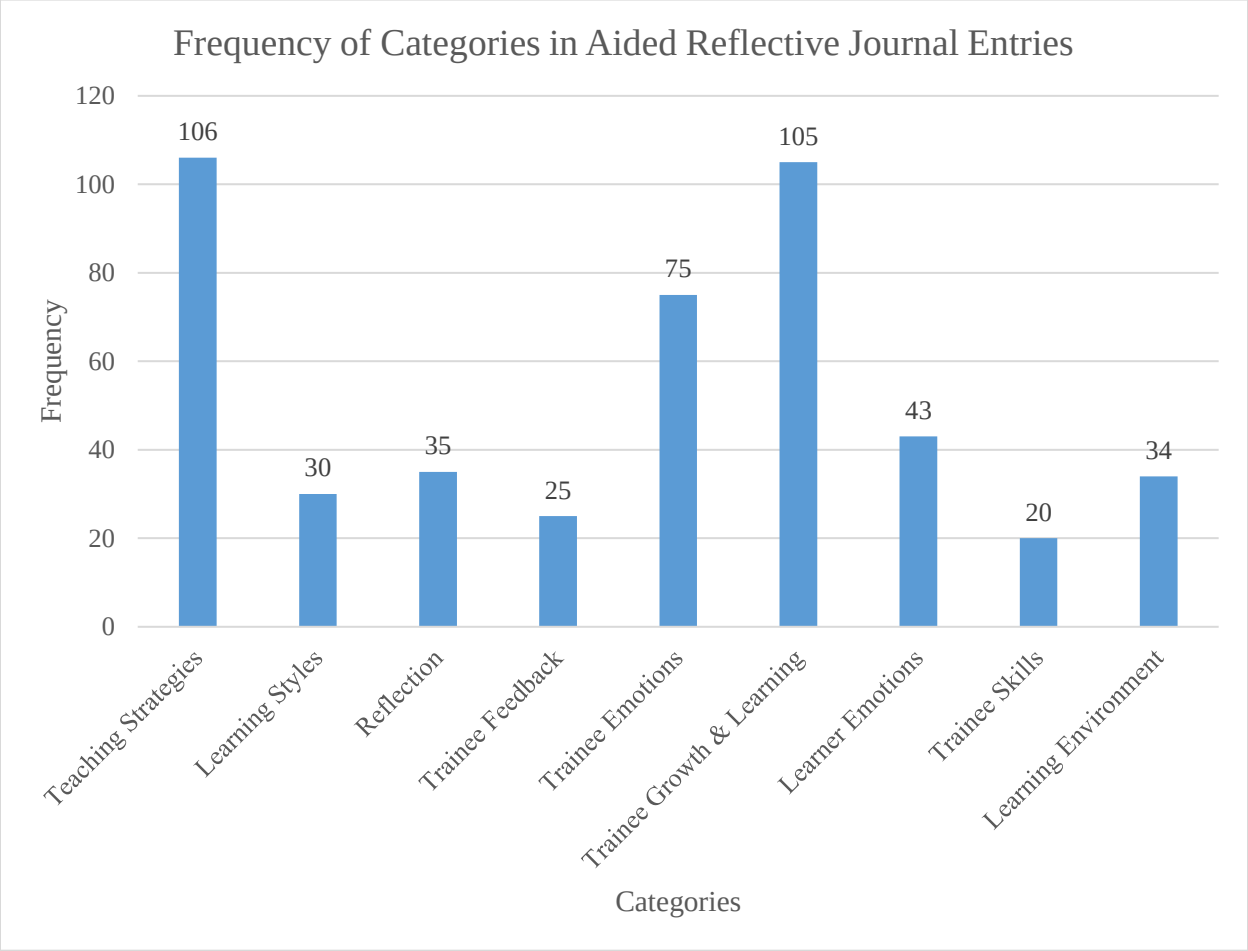


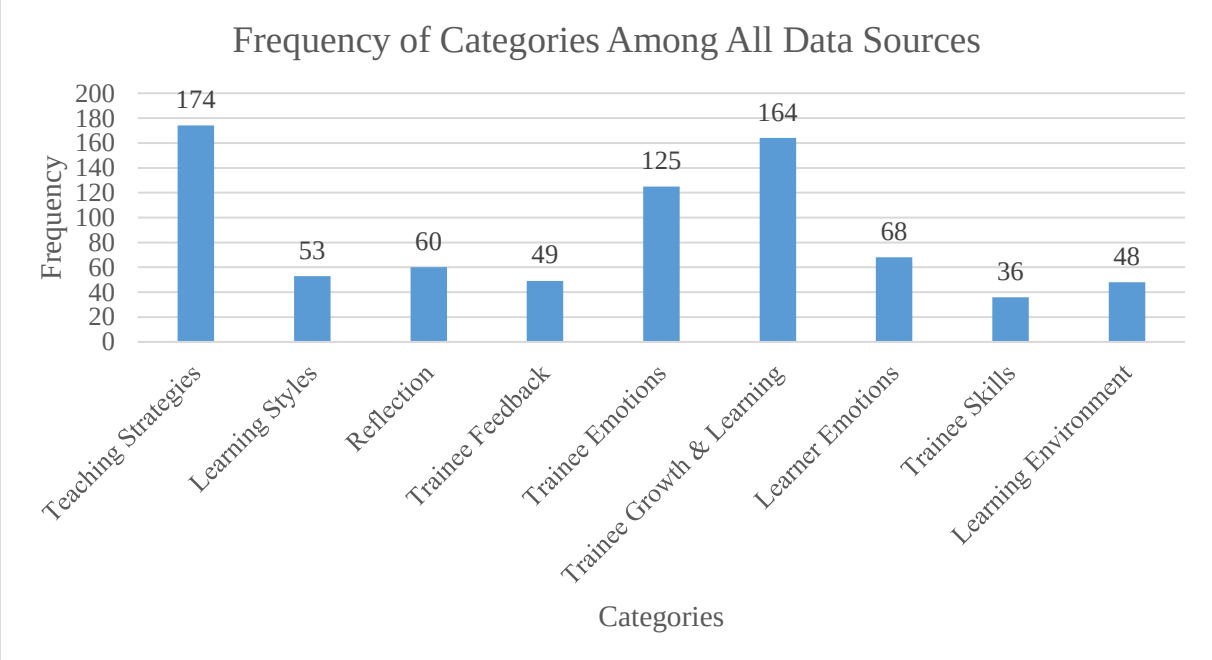
Table 4.2 compares the three most frequently noted categories found within each of the data sources against one another. It also displays the percent of the total categories that the top three categories make up for each data source. It should be noted that *growth and learning*, found as the second most common category within journal entries and seminar field notes, was fourth most common within the interview transcripts, but is not included on the table. This would explain why this category is still one of the top three themes presented within the data, as shown in Figure 1 previously.

Table 4.2: Most Frequent Categories Found Within Each Data Source

Frequency	Reflective Journal Entries	Seminar Field Notes	Interview Transcripts
1st	Teaching Strategies	Teaching Strategies	Teaching Strategies
2nd	Growth & Learning	Growth & Learning	Trainee Feedback & Reflection (tie)
3rd	Trainee Emotions	Trainee Emotions	Trainee Emotions
Percent of total codes for each source	60.5%	73.4%	43.0%

Figure 4.5 indicates the frequency of all nine categories found in all data sources combined. Again, *teaching strategies*, *trainee growth and learning*, and *trainee emotions* are most frequent.

Figure 4.5: Frequency of Categories Among All Data Sources Combined



Returning to the four most prevalent themes, the two themes of *effective teaching practices* and *a growth mindset* supported research question 1. The two themes of *trainee reflection* and *emotions and feelings* supported research question 2. The next two sections of this chapter provide evidence for the themes and how they align with the research questions.

4.2.1 Research Question 1 and Supporting Themes

The results for research question 1 are presented in two sections based on the two emergent themes of *effective teaching* and *a growth mindset*. All trainee names have been replaced with codes to provide anonymity.

4.2.1.1 Effective Teaching Theme.

The two categories of *teaching strategies* and *learning styles* were combined to create the *effective teaching* theme because both are indicative of differentiated instruction (DI). DI training included the topics of learning styles, multiple intelligences, and teaching strategies. Teaching strategies was mentioned a total of 174 times and learning strategies a total of 53 times in seminars, journals, and interviews. Thus, evidence to support the importance of this theme was found in all three data sources. Quotes highlighting the trainee's implementation of DI into her program or the trainee reflecting upon how to become a more effective teacher were chosen as evidence. The date of each quote is provided, as well as the date of the seminar when the referenced topic was taught. In parenthesis after each quote, the DI seminar (which served as the antecedent) is listed first and the date of the trainee (as proof of the consequence of that seminar's instruction) is listed second.

The homeschool group had a broad age range- 4 to 14 plus adults. There are a variety of learning styles and intelligences out there…I used auditory, visual, kinesthetic, spatial, cultural and folklore, a live raptor, and the hike was experiential.

(Learning strategies seminar, March 15; Trainee interview, March 28)

Homeschool programs are helping me to become a more effective teacher because of all the different ages and it forces me to cater to all ages and learning styles. Today I used hands-on and interactive, visuals, participatory, storytelling, and imaginative strategies.

(Learning styles seminar, March 15; Trainee seminar field note, May 22).

I used the picture-prompt activity (showing poster of thermal and updrafts) …observation-conversation strategies with [raptor] wings… I integrated inquiry-based learning, posed thought provoking questions, and encouraged students to ask questions. I always try to make programs as participatory and interactive as possible. This is easy with all of the …props and education tools we have in our 'grab-and-gos'.

(Teaching strategies seminar, April 4; Trainee journal entry, May 22).

I am starting to be able to observe the differences in learning types. Today was easy to do that because it was a small group of five kids…I picked up on the older kids really being visually oriented and enjoying participation activities. The six-year-old is pretty independent but is still okay reading with me if I ask her questions to keep her engaged.

(Learning styles seminar, March 15; Trainee journal entry)

We included discussion, question and answer, guessing and inferring, participation, interaction, and an interpretive walk. They were chosen because it's more fun for the kids. With inclusion, they have their own voice…We got an email from the teacher, unsolicited, and she told us directly that we really engaged the kids!

(Teaching strategies seminar, April 4; Interview with 2 trainees, June 2, 2019)

I learned a lot from both [educators]. Their audiences were adults and not children…They provided hands-on and up close and personal experiences and they incorporated humor…so not only did I learn about banding hummingbirds or black bears, I also learned effective teaching tools and styles. I also feel they used multiple intelligences in their teachings as well. A few come to mind- spatial, naturalist, interpersonal, and bodily kinesthetic…. It was great to see other educators teaching to a different kind of audience as well as engaging in multiple intelligences in their teaching styles.

(Learning styles seminar, June 13; Trainee journal entry, June 12)

4.2.1.2 A Growth Mindset Theme.

The two categories of *trainee growth and learning* and *trainee skills* were combined to create the *growth mindset* category because they described either new knowledge acquisition or improved skills related to that new knowledge. Trainee growth and learning was mentioned a total of 164 times and trainee skills a total of 36 times in seminars, journals, and interviews. Here again, evidence to support this theme was found in all three data sources. Quotes highlighting the trainee referencing or implementing new learning, learning from another educator, modifying or adapting content or an activity, or mentioning her own identity, bias, or perspective change were chosen as evidence. These actions relate not only to the growth mindset of the trainee, but also have an effect on instruction for the learner. The date of each quote is provided, as well as the date of the seminar when the referenced topic was taught. The DI seminar serves as the antecedent and the quote as proof of the consequence of that seminar's instruction.

> *I have personally witnessed …at HMS another physiological need not being met for a young student participating in a …program on a bitter, bitter dangerously cold day. …the student didn't even have a jacket or gloves so I gave her my gloves…and it was freezing and she didn't have proper clothes to protect her from weather…I'm sure she wasn't able to fully focus on the experience and reach higher levels…such as personal accomplishment or learning as her basic physiological needs…were not being met.*
>
> (Maslow's Hierarchy of Needs seminar, March 22; Trainee journal entry, April 3).

I tried going into this program like any other, not giving in to what I might have had as preconceived notions about "trouble kids". And that worked out well… When the kids arrived, they seemed eager to touch and ask questions about all the materials at the front on the table. I had to 'let go' and let them touch the materials ahead of the program, which is something I don't usually do. They were very respectful during the program and on the hike…It was very rewarding. I realized when it all came down to it, these were still just kids, wanting to learn and enjoy.

(Trainee journal entry, April 18)

The boys were from an alternative residence placement. I talked to [educator] before the program because of her life experiences with adjudicated youth. And then I talked to Erin about remembering the seminars and that they are "just youth" …And when they arrived they were asking me if we 'knew what kind of people we are'. Like, do you know our label? They're already aware of how they are perceived. I said 'yes, but we have all kinds of people that come here to learn'. I wanted to make them feel safe…It was an incredibly eye-opening experience. It was meaningful to them and to me…a shared experience.

(Identity and knowledge construction seminar, March 1; Identity and teaching and learning seminar, March 8; Trainee interview, April 17)

I liked the child behavior chart (Appendix N). *There was a teacher labeling students. She was pointing and yelling at kids. She yelled at me too. She said 'This class is notorious for being a shit show." I remembered that they were just excited.*

Another trainee added:

I've been reflecting on that now too. You always have that kid on your heels. It's not annoying anymore- the kid is just super interested.

(Labeling seminar, May 2; Trainee seminar, May 22).

[Educator] was not lecturing to them. She knelt down to their level. She broke the authority teacher barrier. It was a conversation versus a lecture.

(Trainee journal entry, May 29)

[Educator] explained <u>why</u> she was giving directions. She was treating them like humans…they were learning through participating. She gave them choices, which was like treating them like adults.

(Identity and knowledge construction seminar, May 29; Trainee journal entry, June 12)

There was a wide-range and a variety of thinking skills in one audience. I decided to start at level 1, then level 2, then level 3. I created questions from each level as I went. The group was engaged…

(Bloom's Taxonomy seminar, June 19; Trainee journal entry, July 19)

4.2.2 Research Question 2 and Supporting Themes

The results for research question 2 are presented in two sections based on the two emergent themes of “trainee reflection” and “emotions and feelings”. All trainee names have been replaced with codes to provide anonymity.

Research question 2: How does the use of reflective practice support trainees in the development and implementation of differentiated instruction?

4.2.2.1 Trainee Reflection Theme.

The two categories of *reflection* and *trainee feedback* were combined to create the *trainee reflection* category because both refer to the trainee seeking constructive communication regarding improvement of teaching from either another trainee, an educator, or themselves either verbally, written, or from literature assigned for readings. Reflection was mentioned a total of 60 times and trainee feedback a total of 49 times in seminars, journals, and interviews. Once again, evidence to support this theme was found in all three data sources. Quotes highlighting the trainee’s efforts at reflecting-in-action, reflecting after a program, personal or professional reflection, adaptability, changes in instruction, or actively seeking feedback were chosen as evidence. These types of reflective practice affect the present moment and future instruction of the trainee. Reflection seminars began early in both groups’ traineeship. The seminar serves as the antecedent and the quote as proof of the consequence of that seminar’s instruction.

Many of the items in the reading ring true, but two items I saw as an interesting contrast. One, the teacher should embrace diversity and offer encouragement for differences. But, two, the role of the teacher is that of a shepherd. Which is it or is it both?

(Seminar on April 4- A reflection on DI reading; Trainee seminar notes, April 11)

Because the group was interactive and asking lots of questions, I chose do to more question and answer and discussion and less lecture or telling… On the trail the group seemed really into the hiking, I chose to do less interpretive stops on the way to the lookout.

(Reflection-in-action seminar, March 8; Trainee interview, April 15)

…and then the other thing that we ended up doing, but I realized after we started doing it that it probably wasn't the best choice because of their hearing, was that we did the wing flapping. But there was this one [old] woman who at the end of me walking around and flapping the wing asked me, 'What were you just doing?'. So halfway through I thought that they probably couldn't hear the difference between the two [wings]". So then, after explaining it again, I walked by and they all looked at the serrations and ran their fingers along it, which I think helped them to make sense of it- especially for those who couldn't hear it well.

(Reflection-in-action seminar, March 8; Trainee interview, April 30)

I shadowed [educator] because the program was on geology. I was impressed with her content knowledge, how she uses all of the space in the room, the topo map. I reflected afterwards with [staff member] and she gave me the geology of HMS from an educator guide. I discussed choosing wording carefully with [educator] because creationists might not agree with the content presented as fact.

Another trainee added:

I had a program about adaptations with a Mennonite group at [another site]. I used the word 'evolution'. I tried to mix the two theories of evolution and creation, but it was awkward. My own religious background was very strict and so I thought about it while teaching. I need to think about the wording I'll use in future programs.

(Reflection after program seminar- two separate trainees, March 8; Trainee seminar notes, May 13)

I think that to become a better educator for all learners, taking notes and/or writing reflections directly after each program is something I will keep trying…I've never been the 'journaling' type, but being able to look back and read thoughts about specific things I notice or encounter in a particular program could only be beneficial in the long run.

(Reflection after program seminar- reflection on reflective journaling, March 8; Trainee journal entry, May 22)

> *We reflected with [educator] after the program. She gave us tips for not digressing during Build-A-Bird and finding smoother transitions. We also talked about my being super nervous.*
>
> (Reflection seminar- trainees seeking feedback, March 8; Trainees' seminar notes, June 27)

4.2.2.2 Emotions and Feelings Theme.

The three categories of "trainee emotions", "student emotions and reactions", and "learning environment" were combined to create the "emotions and feelings" category because each mention either positive or negative dialogic, observed, inferred, or desired interactions between the trainee and the learners. Trainee emotions was mentioned a total of 125 times, student emotions and feelings a total of 68 times, and learning environment a total of 48 times in seminars, journals, and interviews. Emotions are defined as the bodily reaction to a stimulus and feelings are defined as the reaction to or conscious experience of that emotion. Evidence to support this theme was found in all three data sources. Quotes highlighting the trainee's emotions, references of student emotions or feelings and reactions either observed or communicated, and references to the learning environment were chosen as evidence. Quotes chosen also make references to future instruction or improvement due to the emotions, feelings, and/or reactions of themselves or the participants. The date of each quote is provided. If a seminar topic is referenced, the date of that seminar is included.

I had a lot of anxiety because we were running out of time and I didn't think it through ahead of time- about each portion of the program… I struggled with the trail to South Lookout, which made me feel inadequate as a leader in front of my peers. I'm mad at myself for second guessing everything…I have to walk the trail again with someone else who knows it. I can't keep avoiding it. I need to co-teach at the education building more often.

(Trainee interview, April 24)

I feel fantastic after my first full program! There was a lot of teamwork…and they were active and creative and excited to be there. I was not particularly nervous since a) I was well prepared and not alone and b) it was wee ones… I felt supported…so I would love to do another one, sure thing.

(Trainee journal, May 2)

…we saw a tiny inch worm hanging by a thin thread so it looked like it was just floating there. The kids couldn't believe it! 'Is it flying? How is it doing that? That's crazy!' They were mesmerized by it. It was so amazing that a small little worm could make the kids freak out…Also, to make the day even more fantastic, a little boy gave us a hug and thanked us for today. It almost made me cry and I hope I get to experience this more.

(Trainee journal, May 23)

I spoke with one student on our hike down and he told me he has never done anything like this before and wants to come back with his mom once he is out of placement so he can 'reflect and take in the scenery in silence'…. you could tell that the experience really made him feel something. That is the rewarding part of teaching for me.

(Trainee journal entry, April 18)

During the program, a teacher was yelling at the kids for getting questions wrong. Saying things like 'We just learned this in class, how could you get it wrong?'. We work so hard on improving ourselves and creating a positive learning environment. It was frustrating and made me angry. How do you respond?

(Trainee journal entry, May 23)

Some of the guardians decided to stay for the workshop… One of the girls gave a good guess to a question, but immediately the guardian went 'No!' and shook her head. Also, she would whisper answers…into her ear not giving her a chance to figure it out on her own. I am starting to pick up on these things that I may not have noticed before because now I'm starting to realize how important a positive learning environment is.

(Trainee journal entry, June 13)

A little girl kept running ahead of the group and one time she ran back and said to me "I'm not running ahead to hurt your feelings, it's because I'm happy.

(Child behavior chart, May 2; Trainee seminar notes, May 22)

4.2.3 Performance Analysis of Selected Longitudinal Data

In addition to looking at the frequency of codes in the data sources and quotes in transcripts, analysis was performed of selected data over the course of the research project. This was done in order to assess if there was evidence to support research question 1, which asks if the trainee's instruction changed over the course of the traineeship as a result of differentiated instruction training. Three sets of data from interviews were analyzed in order to answer this question.

The first two sets of data that were analyzed looked at preparation by the trainees for programs. First, question 2 from the interview transcripts was analyzed. It asked "How much time did you spend preparing for this program?". Every trainee was asked this same question in every interview. Appendix M, column 3, shows that there was no change in the amount of time taken to prepare for a program by any of the trainees. Next, a second data set regarding program preparation from the interview transcripts was analyzed. Question 4 asked, "In what *ways* did you prepare for the program?". Again, every trainee was asked this same question in every interview. Table 4.3 shows the results of this analysis. Trainee performance at the beginning of the traineeship was found to include shadowing or meeting with an educator about the program ahead of time or researching and refreshing content knowledge. The trainee then either stayed that course throughout the traineeship *or* later in the traineeship referenced the registration form

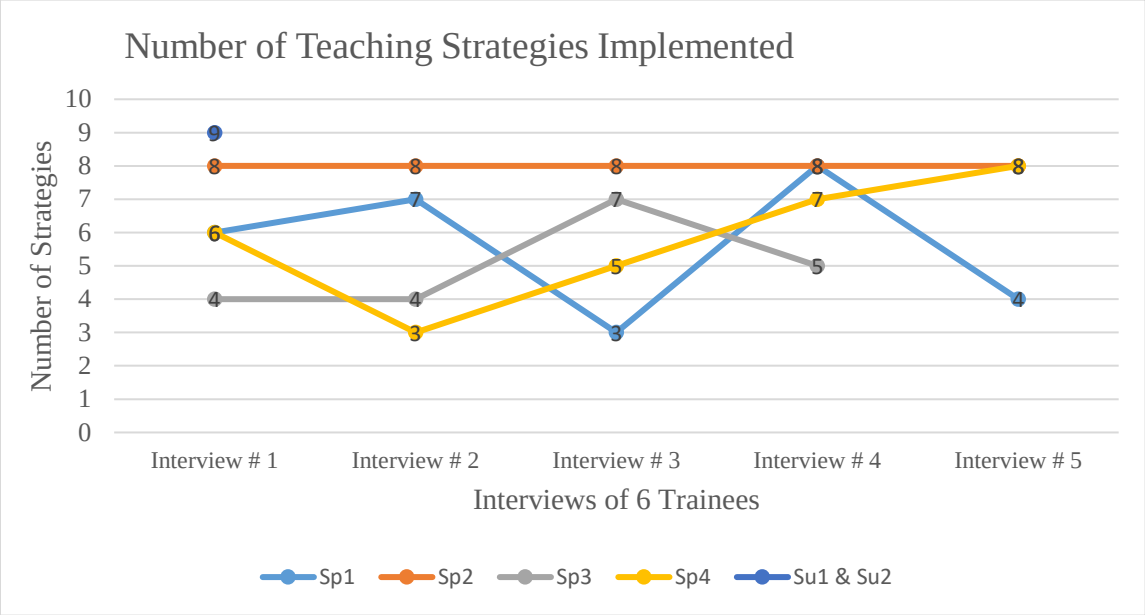
online or reached out to a teacher directly. Appendix O contains additional information directly from the interview transcripts that explains more fully the trainees' preparation decisions.

Table 4.3: Change in Program Preparation Strategies by Trainees

Trainee	Interview # 1	Interview # 2	Interview # 3	Interview # 4	Interview # 5
Sp1	Met with Educator	Met with Educator	Met with Educator	Met with Educator	Met with Educator
Sp2	Research/Refresh	Met with Trainee	Met with Trainee	Registration Form	Teacher Outreach
Sp3	Research/Refresh	Met with Educator	Met with Educator	Registration Form	N/A
Sp4	Research/Refresh	Met with Educator	Met with Trainee	Registration Form	Teacher Outreach
Su1 & Su2	Shadowed Educator and Met with Trainee				

The third set of data that was analyzed was also taken from interviews. However, this question looked at the implementation of teaching strategies. Question 12 asked, "What teaching strategies did you use in this program?". Figure 6 illustrates the results from this analysis. The results show that the number of teaching strategies implemented by the trainees varied across the three-month period. One trainee maintained a constant number of teaching strategies. For the other trainees, this number neither steadily increased nor decreased over time. A discussion of the longitudinal interview data sets, as seen in Table 4.6, will be discussed in chapter five in response to research question 1.

Figure 4.6: Number of Teaching Strategies Implemented



4.3 Conclusions

This chapter contains the results of analysis and connects those results back to the research questions. Six white, female, college graduates enrolled in the education trainee program were the participants for this study. The data collection consisted of structured in-depth interviews, dialogic seminar field notes, and aided reflective journal entries. Seminars were structured to implement differentiated instruction training over the course of the traineeship. Journals were aided with a list of reflective prompts for reflection on seminars, programs, literature, and personal experiences within the traineeship. Interviews were structured to generate collaborative constructive reflection on all aspects of programming. Teacher surveys were created to obtain feedback from teachers about the effectiveness of the teaching strategies employed by the trainees with their students. Few surveys were returned, even after repeated requests. This was a limitation in the gathering of objective feedback.

Within a framework of differentiated instruction (DI) theory, learning style theory, and reflective theory, there were four cycles of analysis. The elemental methods of theory-generated and open coding were followed by the two affective methods of emotions and values coding. Axial coding analysis was followed by focused coding. Ninety-nine codes emerged as a result of analysis. Affinity diagramming resulted in a concept map of nine categories. These categories were then compared against the theoretical framework with a result of four themes based on similar meanings and theories.

The four themes that resulted from this study can be divided into two groups, which align with the research questions. The themes of *effective teaching* and *a growth mindset* are direct results of the effects of DI theory training on trainee instruction, as proposed in research question 1. The themes of *trainee reflection* and *emotions and feelings* are the products of trainee reflection and directly impact future instruction, as posed in research question 2.

There was no evidence of an increase in the amount of preparation by trainees for a program, nor for the number of teaching strategies implemented into a program over time. However, there was evidence to suggest that the *ways* trainees prepared for a program changed over the course of the traineeship. Chapter five includes the summary for the critical analysis and discussion of the four themes.

CHAPTER FIVE: DISCUSSION

"These seminars have been interesting and enriching."

~Trainee reflection journal

5.1 Summary

The purpose of this action research study was to 1) investigate the effects of the inclusion of multiple learning strategies in an education trainee program on how trainees chose instructional methods for future programs and to 2) investigate how the inclusion of reflective practice in the education trainee program affected the ability of trainees to assess and adjust future instruction. Recognizing that education trainees came to the traineeship with a "one size fits all" view of teaching instead of a "differentiated" mindset of teaching, the study incorporated the teaching and modeling of critical thinking skills and a working knowledge of diverse teaching strategies that related to how individuals understand and process information differently. In addition, reflective journaling was incorporated into the trainee program throughout the semester in the form of responses to programs and weekly seminar curricula. Personal interviews about trainee facilitated programs also included reflection questions.

In order to study this problem of practice, I proposed two research questions employing a framework of learning style theory, differentiated instruction theory, and reflective theory.

1) How does the use of differentiated instruction training in an education trainee program influence how trainees design their own instruction?
2) How does the use of reflective practice support trainees in the development and implementation of differentiated instruction?

With these questions guiding the study, four qualitative data sources were used to measure the consequential effectiveness of both the differentiated instruction (DI) training and the use of reflective practice on the trainees' own instruction. Aided trainee reflective journal responses, dialogic seminar field notes transcripts, individual structured in-depth interview transcripts, and teacher feedback surveys were collected during the course of the study. Initial analysis of the data included theory-generated and open coding, followed by a second cycle utilizing emotions and values coding, and then a third and final cycle which included axial and focused coding.

In this section, the study's findings are discussed as they relate to the research questions. Also included is discussion of implications for theory and research, implications for practice, the limitations of the study, and suggestions for future research. It concludes with a summation of final thoughts.

5.2 Interpretation of the Findings

While variations existed among the individual trainees' journeys through the traineeship, four themes were common to the reflective journals, seminar discussions, and interviews of all six participants. These themes included: effective teaching practices, a growth mindset, emotions and feelings, and trainee reflection. The themes all suggest a shift in consciousness by the trainees over the course of the study. For this study, consciousness is defined as "… an individual's state of awareness of their environment, thoughts, feelings, or sensations" (Lumen Learning, 2020), all of which were referenced and documented in all three data sources and compromise much of theme three. The motivation of the trainee shifted from the self to others. In this case, *from* focusing on how well the trainee performed in the delivery of content *to* focusing on the learners'

responses, their level of engagement, and the consequential level of learning that was attained. An explanation of how consciousness shifts were assessed follows the descriptions of the themes in the following sections. Themes were interpreted based on the evidence provided in the results section of this study and how they aligned with the research questions. Two themes provided answers for each research question. Discussion of the themes as they relate to the theoretical framework of this study is found within the implications for theory and research section of this chapter.

5.2.1 Research Question 1

Analysis was performed of selected data over the course of the research project. This was done in order to assess if there was evidence to answer research question 1, which asked if the trainee's own instruction changed over the course of the traineeship as a result of differentiated instruction training. Three sets of longitudinal data from interviews were analyzed in order to answer this question. One data set regarding program preparation from the interview transcripts provided evidence to support a cause and effect related to this research question.

Interview question 4 asked, "In what *ways* did you prepare for the program?". Every trainee was asked this same question in every interview. Table 4 exhibited the results of this question over time. What it showed was that trainee performance at the beginning of the traineeship was found to include shadowing or meeting with an educator about the program ahead of time or researching and refreshing content knowledge. The trainee then either stayed within that familiar and comfortable course throughout the traineeship *or* later in the traineeship became more autonomous and confident and referenced the registration form online or reached out to the teacher directly.

Both personality and instruction played a role in this trend. The trainee who stayed the course had a cautious personality and was hesitant to make mistakes, thus consulting with an educator for advice the duration of the program. The other trainees were more confident as they progressed through the traineeship. Each made the decision to go ahead and find the demographic information themselves or to reach out to the teacher directly. They also reached out to a peer (another trainee) if they needed advice and became more independent in their decisions about programs.

Differentiated instruction training also played a role. DI training began in the third week of the seminars. Learning style theories, followed by the models of Bloom's Taxonomy (Barton, L.G., Anderson, L.W., & Krathwohl, D.R., 2017) and Maslow's Hierarchy of Needs (Cadiat, A.& Pichère, P., 2015), and a variety of teaching strategies were presented as reasons for needing to know your audience's demographics ahead of time. Trainees were taught that knowing general information such as race, ethnicity, gender, age, education level, SES, language preferences, cognitive and physical abilities, and more about the participants ahead of time would allow for the creation of appropriate learning objectives, motivation strategies, and instructional strategies specifically for that group. As a result, trainees began to value this as important information for effective teaching and most began to research their audiences' demographics ahead of time (Appendix P). There is also evidence for this in two of the themes.

5.2.1.1 Theme 1- Effective Teaching Practices.

The theme of effective teaching practices (henceforward called theme 1) was a result of the merging of two categories of codes called *teaching strategies* and *learning styles*. These categories included 24 teaching strategy codes such as *active learning* and

open-ended questions and 12 learning style codes such as *kinesthetic* and *interpersonal*. A total of 36 codes made up these two categories. These particular categories were merged together as one theme because they are both necessary components of effective teaching as a large body of research shows "…how congruence of teaching and learning styles affects student outcomes and satisfaction with different aspects of the educational process" (Spoon & Schell, 1998, p. 42). The 36 codes making up theme 1 were mentioned a total of 227 times within the three data sources- 34 times in interviews, 57 times in seminars, and 136 times in journals. Teaching strategies was the most discussed and reflected upon category of the nine. It can be inferred from the data that trainees were most concerned about how to be effective teachers as a result of differentiated instruction training. The trainee concern that resonated from this data was "How can I best reach my audience?", which is in direct alignment with research question 1.

> *Homeschool programs are helping me to become a more effective teacher because of all the different ages and it forces me to cater to all ages and learning styles. Today I used hands-on and interactive, visuals, participatory, storytelling, and imaginative strategies.* (Learning styles seminar, March 15; trainee seminar field note, May 22).

5.2.1.2 Theme 2- A Growth Mindset.

The theme of a growth mindset (henceforward called theme 2) was a result of the merging of two categories of codes called *trainee growth and learning* and *trainee skills*. These categories included 9 trainee growth and learning codes such as *mentions new learning* and *perspective* and 4 trainee skills codes such as *organization* and *communication*. A total of 13 codes made up these two categories. These particular

categories were merged together as one theme because they both described either new knowledge acquisition from DI training or improved skills related to that new knowledge. Trainees were referencing or implementing new learning, learning from another educator, modifying or adapting content or an activity, or mentioning her own identity, bias, or perspective change. These actions relate not only to the growth mindset of the trainee, but also have an effect on instruction for the learner. The 13 codes making up theme 2 were mentioned a total of 200 times within the three data sources- 32 times in interviews, 43 times in seminars, and 125 times in journals. Trainee growth and learning was the second most discussed and reflected upon category of the nine. It can be deduced from the data that trainees were acquiring, applying, and reflecting on new knowledge related to differentiated instruction in an effort to improve practice and better teach learners. The trainee concern that resonated from this data was "How can I improve my teaching practice?".

> *There was a wide-range and a variety of thinking skills in one audience. I decided to start at level 1, then level 2, then level 3. I created questions from each level as I went. The group was engaged…*
>
> (Bloom's Taxonomy seminar, June 19; Trainee journal entry, July 19)

In sum, the answer to the research question of "How does the use of differentiated instruction training in an education trainee program influence how trainees design their own instruction", is this: *based on the most common codes found in the data, education trainees were most concerned with effective teaching practices and showed a growth mindset focused on taking their newly acquired DI knowledge and applying it in their own practice in an effort to engage every learner.*

5.2.2 Research Question 2

A main objective of this study was to provide trainees with multiple tools to examine and reflect upon their teaching and learning. Three components were the basis for trainee reflection: reflective journals, reflective interviews (Trumball & Slack, 1991), and group seminars (Koskela, 1985). According to Zeichner (1987), there are at least six major strategies which have been used to enhance the reflective capabilities of preservice teachers. Two of these strategies are 1) writing and reflection and 2) supervision and reflective teaching. Writing and reflection were implemented using reflective journals. Supervision reflection occurred during reflective interviews between me and the trainees.

Document analysis of the trainees' reflective journal entries revealed an ongoing attempt by the trainees to reflect upon their practice. As stated by Anderson, Hess, and Nihlen (1994, p. 153), "The journal acts as a narrative technique and records events, thoughts, and feelings that have importance for the writer. As a record kept by the student, it can inform the teacher researcher about changing thoughts and new ideas and the progression of learning". Self-reflection in the journals focused on teaching strategies (106 times), trainee growth and learning (105 times), and trainee emotions (75 times). This data supports the claims of Anderson et al. (1994) that the journal can inform the teacher researcher about the progression of learning as evidenced by the 105 references to such. Trainees also asked themselves reflective questions within the journals and noted what they "needed to work on". The references to new learning and how it was being applied by the trainee was the main focus of the journals.

Structured, in-depth reflective interviews with individual trainees were implemented biweekly. Reflective interviewing is a method used to encourage reflective practice

among novice teachers (Collier, 1999; Trumball & Slack, 1991). Interviews focused on trainees' impressions of the experience, specific elements of the program such as preparation and teaching strategies, and any feedback they had received. Interviews were collaborative constructive reflection sessions. Teaching strategies were mentioned the most (20 times) during interviews, followed by reflection and feedback (19 times each). These findings align with the statements of both Collier and Trumball and Slack that reflective interviewing could encourage reflection by novice teachers. Interestingly, this method of reflection provided the most evidence for reflection-in-action by the trainees. Once again, teaching strategies were the main focus of reflection.

Group seminars can promote collaborative reflection among peers (Rudney & Guillaume, 1990). Seminars were held weekly and a topic was provided each week. After the new topic was introduced and discussed, time was dedicated to sharing of reflective journal entries to promote peer feedback, encouragement, and alternate perspectives. The data from seminars did not support the claims made by Rudney and Guillaume. Reflection and feedback rarely occurred in this space (11 times in 18 seminars). As found in the other data sources, seminars tended to focus on teaching strategies (48 times), followed by trainee growth and learning (43 times), and trainee emotions (33 times).

From the three aforementioned data sources, the themes of *emotions and feelings* and *trainee reflections* emerged and offer possible answers to research question 2.

5.2.2.1 Theme 3- Emotions and Feelings.

The theme of emotions and feelings (henceforward called theme 3) was a result of the merging of the three categories of *trainee emotions*, *student emotions and reactions*, and *learning environment*. These three categories were grouped together because each

one mentioned either positive or negative dialogic, observed, inferred, or desired interactions between the trainee, the learners, and others in the learning environment. These categories included 16 trainee emotions codes such as *rewarding* and *inadequate*, 11 student emotions codes such as *engaged* and *excited*, and 12 learning environment codes such as *positive* and *mutual respect*. A total of 39 codes made up these three categories. The 39 codes making up theme 3 were mentioned a total of 241 times within the three data sources- 31 times in interviews, 58 times in seminars, and 152 times in journals. Trainee emotions was the third most discussed and reflected upon category of the nine and learner emotions was the fourth.

Besides mentioning dialogic, observed, inferred, and desired interactions between the trainee, the learners, and others in the learning environment, trainees also made references to future instruction or improvement due to their own emotions, feelings, and reactions as well as those of the learners. The trainee concern that resonated from this data was "How are the learners feeling and reacting to the learning experience and environment that I am providing?", which is in direct alignment with the improvement and development of their DI skills as a result of reflection and feedback. It can be suggested from the data that reflection on the learners' observed feelings and reactions to both instruction and the learning environment supports trainees in their continued improvement and development of DI skills- providing an answer to research question 2.

> *A little girl kept running ahead of the group and one time she ran back and said to me "I'm not running ahead to hurt your feelings, it's because I'm happy.*
>
> (Child behavior chart, May 2; Trainee seminar notes, May 22)

5.2.2.2 Theme 4- Trainee Reflection.

The theme of trainee reflection (henceforward called theme 4) was a result of the merging of the two categories of *trainee feedback* and *reflection*. These categories were grouped together because both refer to the trainee seeking constructive communication regarding improvement of teaching from either another trainee, an educator, or themselves either verbally, written, or from literature assigned for readings. These categories included 7 trainee feedback codes such as *teacher feedback* and *educator feedback* and 4 reflection codes such as *reflection in action* and *personal reflection*. A total of 11 codes made up these two categories. The11 codes making up theme 4 were mentioned a total of 109 times within the three data sources- 38 times in interviews, 11 times in seminars, and 60 times in journals. Reflection was the fifth most discussed and reflected upon category of the nine.

The trainees actively sought feedback from other trainees, educators, and teachers in order to improve their instruction. They also reflected on their practice personally through journal writing and constructive interviews focused on reflection of practice. The trainee's efforts at reflecting-in-action, reflecting after a program, personal and professional reflection, adaptability, changes in instruction, and actively seeking feedback are types of reflective practice that affect both the present moment and the future instruction of the trainee. The trainee concern that emerged from this data was "How did I perform and what do I need to do to improve?", which is in direct alignment with the improvement and development of their DI skills as a result of reflection and feedback. It can be proposed from the data that trainee reflection on teaching performance and effectiveness combined with reflection on ways to improve supports trainees in their

continued development and future implementation of DI- providing another answer to research question 2.

> *I think that to become a better educator for all learners, taking notes and/or writing reflections directly after each program is something I will keep trying…I've never been the 'journaling' type, but being able to look back and read thoughts about specific things I notice or encounter in a particular program could only be beneficial in the long run.* (Reflection after program seminar-reflection on reflective journaling, March 8; Trainee journal entry, May 22)

In sum, the answer to the research question of "How does the use of reflective practice support trainees in the development and implementation of differentiated instruction" is this: *based on the data, trainees were concerned with the observed feelings and reactions of the learners to the learning experience and the environment that they were providing. Peer feedback and trainee reflection on teaching performance provided trainees with a platform for improvement and continued development of DI techniques.*

5.2.3 Assessing a Shift in Consciousness

During the course of both traineeships, shifts in consciousness by the trainees were shown through language and actions. In seminar discussions, interviews, and reflective journals, verbal and written language was the primary method of assessment. Trainees were questioning, naming differently, calling attention to things that happened in programs that had been emphasized in previous seminars, reflecting back on past relevant topics, and using new language in their discussions with each other. In interviews with me, trainees discussed how they were feeling, what they were thinking, what they were learning, and sharing what they felt they needed to do differently in order to become

more effective teachers. The use of the same questions in each interview, allowed for comparison of *what* the trainee was feeling, thinking, learning, and doing differently over time. In their reflective journals, these same topics were reflected upon but weren't as easily compared because of the free choice of prompts by trainees. However, based on what the trainees were reflecting back in their journals, I was able to tell how much they were critiquing theories, models, or their own practice. Again, as noted by Anderson et al (1994, p.153), "The journal acts as a narrative technique and records events, thoughts, and feelings that have importance for the writer…it can inform the teacher researcher about changing thoughts and new ideas and the progression of learning." The increased reflections on the emotions and feelings of their program participants and in the importance of a positive learning environment suggests a shift in awareness from self to learners.

One action-based evidence piece was the development of trainees' own new activities to implement within programs where they observed a gap or room for improvement in order to better engage their participants. Another was the use of a variety of teaching strategies throughout the traineeship, even when the programs grew more frequent, larger, or more diverse. This usually occurred after the trainee's first solo program, something of a peak experience which spurred reflection and growth. This new growth and resulting shift in consciousness was due to the continuous constructive feedback and support from trusted educators and fellow trainees in a low-risk safe environment. The reasons behind these actions are documented in interview and seminar notes as well as in reflective journal entries.

> *I feel fantastic after my first full program! There was a lot of teamwork…and they were active and creative and excited to be there. I was not particularly nervous since a) I was well prepared and not alone and b) it was wee ones… I felt supported…so I would love to do another one, sure thing.*
>
> (First solo program; Trainee journal, May 2)

5.3 Implications for Theory and Research

Sections I and II included a framework and discussion of several theories and models used in educational research with pre-service teachers. These included: reflective practice theory, learning styles theory, and differentiated instruction theory. How the themes of this study supported or contradicted these theories and models is described in the following sections.

5.3.1 Reflective Practice Theory

Baker & Shahid's (2003) study with pre-service teachers found that the use of reflective journal prompts encouraged students to reflect on issues that they may not have reflected upon on their own. The researchers modeled a number of interactive instructional methods for student teachers to use in their classrooms with their diverse learners. They found that these methods encouraged student teachers to "…think carefully about the *effects* of their teaching on the learners and the fact that one instructional size does not fit all" (Baker & Shahid, 2003, p. 7). Students reported that having numerous strategies allowed them to accommodate differences in learning styles and to engage all learners. Requiring students to respond to prompts rather than submitting unstructured journal entries encouraged reflection on practice; however, when paired with instruction of a variety of teaching methods, practice was also improved.

The results of this study support the results of the Baker and Shahid (2003) study, which was a model for this study. The trainees referenced the *effects* of their new learning of teaching strategies and learning styles on students in reflective journals, seminars, and interviews (theme 3). They were concerned with effective teaching practices in order to accommodate and engage all learners (theme 1). This growth mindset (theme 2) was similar to Baker & Shahid's students' reporting on teaching strategies and learning styles and their ability to engage all learners, a direct result of the use of prompts to focus reflection on the learner and improvement of practice (theme 4).

In the initial reflective journal training, the trainees were introduced only to the Rolfe, Freshwater, and Jasper's (2001) model for reflective writing practice, which is based upon three simple questions: "What? So what? Now what?". This model suggests that student teachers would ultimately move to an explanation of what was learned and how it can be applied in the future as action. Instead, the trainees actually followed the reflective pathway offered by Max van Manen (1977) which proposes three levels of reflectivity that indicate process of thought. The first level is concerned with the means rather than the ends. In the early data, trainees were focused on the application of knowledge and principles- the content. At the second level, the teacher is seeking to understand the nature and the quality of the educational experience and wants to make choices based on a framework for teaching. Midway through the traineeship, the trainees were reflecting upon learning styles and teaching strategies (theme 1). At the third level, the teacher is reflecting on social justice issues that affect education. At the end of the traineeship, the data showed the trainees concerned with the effects of the learning environment on the learners and whether or not the learners were making connections with the teacher, the

other learners, and the place- especially urban youth and differently abled youth. They were also reflecting on the feelings and reactions of the learners (theme 3). This lends support to the reflective pathway used by van Manen with student teachers.

The last reflective theory to be supported by this research was that of Donald Schön (1991), who argues that professional education should be centered on enhancing the practitioner's ability for reflection-in-action, not solely reflection afterwards. Reflection-in-action is learning by doing, followed by developing the ability to problem solve in action. Schön states that this is the mark of an experienced and cognizant teacher; however, there is evidence in the data of trainees reflecting-in-action at the end of their short four-month traineeships. This may have happened sooner for a trainee than a pre-service teacher because of the ability in a nonformal teaching environment to be more frequently coached by an experienced mentor in a variety of settings for an increased number of diverse audiences. Schön does advocate for a return to the tradition of learning by doing in a low risk, supportive environment with a coach who is able to reflect-in-action. Schön also states that because of a teacher's dilemma for "rigor or relevance" (p. xi), a result of the pressure to cover content in order to meet educational standards as mandated by the school, that teachers may often have a knowing-in-action, but not act upon it in the moment. In nonformal education, relevance takes precedence over rigor thus allowing the educator or trainee to more readily both reflect and act in the moment (theme 4), as seen in the data.

5.3.2 Learning Styles Theory

Multiple intelligences (MI) theory was introduced to the trainees as one of several learning style theories. Gardner (2006) believes that human intelligence is better

described in terms of abilities, talents, or skills, then as a number. His MI theory provides evidence that individuals not only learn in different ways, but that each learner has some ability for all eight intelligences. This implies the necessity for teachers to address all intelligences through a variety of teaching strategies in order to reach all students. According to Abdi et al. (2013), MI based instruction is holistic and inclusive and lends itself to cross-curricular links and helps teachers to integrate different learning styles and abilities. The results of this study confirmed both Gardner's and Abdi et. al.'s assertions. Journal entries, seminar notes, and interview transcripts all contain trainee reflections and discussion about attempting to integrate as many relevant teaching strategies as possible in a program in order to engage as many learners as possible (theme 1). The holistic, cross-curricular nature of MI based instruction was also referenced in the data. Trainees taught geography, math, biology, ecology, and geology in their programs. The use of maps, graphs and charts, hands-on props, audio calls, historical photos, storytelling, costumes, live animals, and interpretive, experiential hikes were strategies used to teach all of these topics because of the trainees' attempts to address all eight intelligences (theme 1).

Armstrong (2018) asserts that the theory of multiple intelligences is fair because it moves teaching beyond the traditional linguistic and logical methods of teaching and addresses more than the visual and auditory learners. This is also supported by this study. Trainees moved from the familiar comfort of the traditional style lecture with props in their earliest programs to discussion, question and answer, interactive, and experiential methods of teaching in their later programs. Some trainees even created their own interactive activities designed to promote inferencing, deduction, and analysis of data,

maps, photos, and specimen mounts while learning indoors and experiential, exploratory activities for outdoor program components such as guided hikes. This confirmed the assertion that MI based instruction can cause teachers to step outside of the comfortable familiar methods of traditional teaching to the sometimes uncomfortable innovative, nontraditional teaching methods needed to reach all learners and where professional growth occurs (theme 2).

5.3.3 Differentiated Instruction Theory

Trainees were introduced to differentiated instruction (DI) theory through the work of DI expert Carol Ann Tomlinson (2016), who states that the hallmark of differentiated instruction theory is "…to engage students in instruction through different approaches to learning…" (p. 3). Teachers who differentiate their instruction, approach learning with a variety of instructional strategies, modify their curriculum or content, provide clear learning goals, offer a supportive and respectful environment, and are flexible in order to ensure that all students are successful learners (Tomlinson, 2016). The data gathered from this study confirms Tomlinson's assertions. As a result of DI training and mentoring, the trainees implemented multiple teaching strategies as they progressed through their traineeships (theme 1). Their reflections and discussions included having to modify program content and activities, flexibility of schedules, the importance of cultivating a positive learning environment, and providing a clear outline of what was expected in terms of learning and behavior (themes 2 and 3).

Differentiated instruction, informed by multiple intelligences theory, works because students are offered a variety of learning experiences and are therefore interested and engaged in the learning process. As a result, students retain more knowledge because

they fully understand the material in multiple ways. “Teachers should be educated in ways to infuse their curriculum with a multiple intelligences framework to create more authentic and engaging learning experiences for learners” (Abdi et al., 2013). Teachers call upon a range of instructional strategies in order to provide an engaging learning experience. Here again, the data gathered from this study supports the research of Abdi et al. The trainees implemented an increasing number of instructional strategies in their programs (theme 1). Journal reflections and interview responses to questions about learner engagement support the notion that the combination of a MI framework driving DI in programs results in more engaged learning experiences for learners. The trainees wrote about and discussed the importance of improving and modifying their teaching techniques in order to provide their learners with a meaningful and engaging learning experience (themes 1 and 2). The topics of learner feelings, reactions, and engagement were frequent within the data (theme 3).

5.4 Implications for Practice

The implications of this study’s results on practice attempted to address the “gap” that this project sought to fill. This action research project combined theories, models, and studies from formal education and implemented them as a guiding framework in a non-formal education setting. The results of this research project have the potential to significantly contribute to the field of non-formal education. It is significant in that it will address three common problems of practice typically found within non-formal education programs and training.

Non-formal educators and interns do not recognize the differences among learners and thus are unaware of the social and ethical implications of their teaching decisions upon

them. Most non-formal education program coordinators gather registration information for visiting groups. When the group arrives, they are treated as if they are one being- not many individual beings. It's a "one size fits all" view of teaching the group. Programs are usually memorized and presented daily with little variation. "Getting in all of the information" is the priority, with content as the focus. Switching the focus to the learners could begin with a phone call or email to the teacher ahead of time to discuss the demographics of the students, the class in general, and the school. Discussion with the teacher of any students with developmental disorders or students who are differently-abled, students with behavioral plans, ELL students, and the overall cognitive range of the students should also be included. The implementation of Bloom's Taxonomy (Bartone, L.G. et al., 2017) and Maslow's Hierarchy of Needs (Cadiat, A. & Pichère, P., 2015) into the training of non-formal educators and interns would be a start to addressing the needs of all of the learners in a visiting group. By merging the information gathered from the teacher with the information provided from these two resources, appropriate learning objectives and motivation strategies can be created specifically for that group; thus, beginning to address the social and ethical implications on students. These were the first two models introduced in the trainee seminars and they were reflected upon throughout the traineeship by all of the trainees. These models are included in formal teacher programs, but typically not in non-formal training programs.

Non-formal education tends to focus on an instructor who decides the content, the objectives, the instruction, and the outcomes of the program before the students even arrive. Differentiated instruction based on learning style theory ensures powerful curricula and engaging, responsive instruction (Tomlinson, 2014). Incorporating learning

style theory and differentiated instruction theory in non-formal educator and intern training would result in flexible and responsive instruction centered on the learners instead of the instructor. These theories are included in formal education programs, but rarely in non-formal education training. Both theories were included in trainee seminars and modeled by educators. Both were reflected upon and discussed by trainees in interviews throughout the course of the traineeship.

Reflective practice is not a priority in non-formal education programs. There can be many reasons for this including lack of time, interest, or knowledge about the topic. I would advocate for the implementation of Donald Schön's (1987) reflective model if an experienced, reflective coach or mentor were available to model reflection-in-action to new educators or interns. Because non-formal education does not place emphasis on the academic rigor that formal education must, there is the opportunity to have a more relaxed and supportive environment for modeling and mentoring reflective practice in action. This study showed that in this type of environment, reflection-in-action, a proactive strategy, could be achieved rather quickly. If a coach or mentor is not available, then I would advocate for the reflective model of Max van Manen (1995). The inclusion of differentiated instruction and learning style theories within this model will move educators and interns from a concentration on content to a focus on understanding the quality of the educational experience for each learner. With reflection as a continued priority, the social justice and equity issues within the programs could be addressed, as was the case in this study.

The information from this study can be delivered to non-formal educators and interns using a variety of methods. Knowledge dissemination could be in the form of

professional development workshops, training sessions, seminars, and conferences. This study's results were presented at the North American Association of Environmental Educators (NAAEE) annual conference held at the Lexington Convention Center in Lexington, KY. The theme of the conference was *Educating for a Just and Sustainable Future*. It was presented in the *Linking Research and Practice to Increase Impact* strand. The presentation was attended by non-formal educators interested in implementing a similar program with their education interns. The presentation focused mostly on the trainee program's curricular design, methodology, and resources. This included sociocultural theory with identity mapping and knowledge construction, reflective theory and aided self-reflective journaling, learning style theories and instruction in multiple learning styles, and experiential and differentiated instruction theories with modelling of a variety of effective instructional methods.

5.5 Limitations and Challenges

As with any research study, this action research project had some challenges and limitations that should be acknowledged. The first limitation was the small sample size. The first trainee group consisted of four trainees and the second consisted of two. This could affect reliability and external validity of the results. However, the sample size was limited due to funding and housing. The first trainee group funding came from an established trainee fund donation. Typically, three trainees are the maximum for the trainee budget. In this case, though, three of the four trainees did not reside on site which freed up extra funding, which allowed for the hire of a fourth trainee. The second trainee group funding came from a foundation grant that was written for a maximum of two trainees. The largest sample size possible was recruited. A second limitation related to

this was the demographics of the trainees. All six were White, female, middle class, college graduates. A lack of diversity could result in limited perspectives within the data. Less diversity affects the generalizability of the data as it does not reflect population diversity within education. Online recruitment efforts consisted of postings on the Hawk Mountain Sanctuary website, the Pennsylvania Association for Environmental Educators website, the North American Association of Environmental Educators website, and Pennsylvania conservation district websites. Higher education career fairs were attended by former trainees and educators and postings were made on their online portals. In addition to these efforts, electronic flyers were distributed to professors and researchers working with Hawk Mountain Sanctuary in either science or education. All applicants were White, middle class, college graduate males and females. Those best qualified were selected.

A third challenge was the return rate of teacher surveys. After a trainee facilitated program, the teacher or leader of the group would be sent a Google survey about the program to complete and submit. Most did not return their survey, resulting in a limited amount of unbiased outsider feedback from educators. Attempts were made to increase the rate of return through email reminders and phone calls, but this had little effect. The data was not used in analysis because the responses were so few and there wasn't feedback for every trainee, reducing the confidence level of the data. It was fortunate that the three other data sources provided a wealth of relevant data for analysis.

A fourth challenge was the unexpected change in the scope of my position at the Sanctuary. New leadership meant a new vision for the education department. Emphasis was placed on increased programming and earned income without the addition of staff.

This meant that I had to facilitate more programs in lieu of supporting and assessing trainee programs as I had done in the past. Thus, the possibility of observing trainees teaching and to take field notes was not feasible. Fortunately, this was not problematic as the study did not propose program field notes as a data source; however, their inclusion would have been valuable from a researcher's standpoint.

Finally, the last limitation of the study was the new expectations of my position, which resulted in my resignation three weeks before the end of the second traineeship. Data was collected throughout the eight weeks that I supervised the second traineeship. The number of journal entries and seminar notes was nearly the same as the first trainee group, but the number of interviews was much lower. The interview data was included in the results as it was still relevant.

5.6 Suggestions for Further Research and Action Research Plan

If this study were to be conducted again, a larger and more diverse sample size would be suggested in order to reflect current classroom populations. The ethnic makeup of United States public schools is shifting. According to U.S. Department of Education data (2009), the number of white students is decreasing and the number of minority students is increasing. It is estimated that by 2023, white students will make up 45 percent of public-school students and Hispanic students will make up 30 percent. "Compounding the problem is that the vast majority- 82 percent- of public-school teachers are white. As of 2012, just 8 percent of teachers were Hispanic, seven percent were black, and 2 percent were Asian" (Chen, 2018). Active recruitment and inclusion of international trainees and trainees of various races would result in a more diverse perspective of data collected from the trainees as they taught and reflected on their diverse audiences.

Based upon what I learned from the research, a new topic that should be included in future trainee seminars would be to *define "learning environment", the types, the elements, and how to differentiate for a positive learning environment.* Trainees were very interested in the learning environment- the feel of the place, the program, the educators. The point about the learning environment came up often towards the end of both traineeships. This may be due to a combination of two things. One, as they completed more programs, the trainees became more comfortable with their new teaching methods and switched their focus to their audience as stated by Baker and Shahid (2003). Two, as they completed more programs, the trainees were exposed to a larger number of teachers, adults, and parents and their varying teaching, chaperoning, and parenting styles. These various styles can affect the learning environment in either positive, negative, or null ways. The trainees were concerned with how to create and maintain a positive learning environment. Based on this information, a future action research plan would be to include positive learning environment strategies and techniques into the trainee seminars in order to cultivate a positive learning environment for program participants.

This would be a new initiative. This topic was not included within the DI training seminars of this study- only differentiation of content and process. However, the data showed that the theme of the *learning environment* was referred to by the trainees in all three data sources. It was mentioned 34 times in the reflective journals and 12 times in seminar discussions. The structured interviews did not include a question on the learning environment, which explains why it was not discussed as much in the interviews. In fact, it was mentioned only twice. Clearly, for a topic that was not introduced in the seminars

to be referred to 48 times means this was a topic of interest and concern for the trainees. In the future, at least one question concerning the learning environment should be included within the interview questions.

The learning environment can be differentiated and would thus be an appropriate addition to the current trainee program and a focus of future research. The learning environment can be diverse physical locations, contexts, and cultures in which students learn. It can also encompass the culture of the school [organization]. It can include the ways educators may organize an educational setting to facilitate learning (Great Schools Partnership, 2013). There are four types of learning environments (Waldman, 2016). This initiative would move HMS programs closer to a community-centered learning environment. Most important to this type of learning environment is to create a climate of trust where it is okay to make mistakes and risk-taking is more important than being right. Everyone is learning together in an intellectual community with collaboration over competition (Clint, 2019). This would be an appropriate choice because it is based on the trainee feedback about 1) wanting to create a space where learners could be wrong, but still be applauded for trying and 2) wanting to prevent teachers and parents and adults from admonishing learners for getting answers wrong.

One way to create a positive community-centered environment is to incorporate differentiated instruction (DI) focusing on the process via a variety of learning styles and teaching strategies. These are studied by the trainees already through the lenses of Gardner (2006) and Tomlinson (2014). Another way is to differentiate focusing on content. The trainees already study Bloom's taxonomy and incorporate it into programs. Thus, past trainees only differentiated content and process, they did not differentiate the

learning environment. This would entail using management techniques that support a safe and supportive learning environment. It would also mean flexible seating arrangements and choice of individual, small group, or large group activities (Weselby, 2017). This could be accomplished in many ways. There are four management techniques that could 1) speak to what past trainees wanted to address and 2) that future trainees could easily incorporate. These would include: creating rules together and explaining why, providing positive and honest feedback to the learners, trainees self-reflecting on their own mindset to make sure it is positive, and being objective about learners' actions (Howard, 2018). In addition, making teachers and adults aware (via conversations when they register for programs and confirmation emails with links to the Association of Learning Environments) of the new initiative and how they can help, would work to reduce the number of negative teachers and parents/adults admonishing learners.

5.7 Conclusion

A common problem of practice for novice teachers is a "one size fits all" mentality to teaching. This is true for pre-service teachers, first year teachers, education interns, and education trainees. While it is more likely that formal educators will receive instruction on learning styles and teaching strategies which may prevent this mentality, it is unlikely that non-formal educators will receive similar instruction or training. This study sought to provide a training program in differentiated instruction and reflection to non-formal education trainees in an effort to encourage trainees to progress from the all-purpose method of teaching to an adaptable form of teaching.

A framework of critical thinking, reflective journaling, instruction in multiple learning styles, and the modelling of a variety of effective instructional methods guided the study.

The topics of reflective practice, learning styles, and teaching strategies were introduced through instructional seminars and implemented and reflected upon by the trainees throughout the traineeship. The objective of the training was to provide the opportunity for professional growth of the education trainees through self-evaluation, multiple teaching experiences with diverse audiences, and reflection on practice.

In order to measure the success of the study, the following research questions were employed using a framework of learning style theory, differentiated instruction theory, and reflective theory:

1) How does the use of differentiated instruction training in an education trainee program influence how trainees design their own instruction?
2) How does the use of reflective practice support trainees in the development and implementation of differentiated instruction?

Based on the data, it was found that education trainees were most concerned with effective teaching practices and showed a growth mindset focused on taking their newly acquired DI knowledge and applying it in their own practice in an effort to engage every learner. It was also found that during their programs, trainees were attentive to the observed feelings and reactions of the learners to the learning experience and the environment. Peer feedback and trainee reflection on teaching performance provided the trainees with a platform for improvement and continued development of DI techniques.

The results of this study demonstrate that incorporating learning style theory and differentiated instruction theory, combined with reflective practice, in a non-formal educator or intern training can result in flexible and responsive instruction centered on

the learners instead of the instructor, thus solving a common problem of practice and significantly contributing to the field of non-formal education and learners everywhere.

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APPENDIX A

Data Gathering Log for Seminars, Interviews, & Teacher Surveys

Location	Participants- # Present (Individual Data Coded)	Activity	Topic Explored	Type of Data Collected
Conference Room	Spring Trainees- 4	Seminar	Knowledge Construction & Identity Mapping	Field Notes
Conference Room	Spring Trainees- 4	Seminar	Reflective Journaling	Field Notes
Conference Room	Spring Trainees- 4	Seminar	Learning Styles	Field Notes
Conference Room	Spring Trainees- 4	Seminar	Maslow's Hierarchy of Needs & Bloom's Taxonomy	Field Notes
Conference Room	Spring Trainees- 4	Seminar	Differentiated Instruction	Field Notes
Conference Room	Spring Trainees- 4	Seminar	Differentiation and the Brain	Field Notes
Conference Room	Spring Trainees- 4	Seminar	Journal Entries and Reflective Conversation	Field Notes
Conference Room	Spring Trainees- 4	Seminar	Journal Entries and Reflective Conversation	Field Notes
Conference Room	Spring & Summer Trainees- 6	Seminar	Journal Entries and Reflective Conversation	Field Notes
Conference Room	Spring & Summer Trainees- 5	Seminar	Journal Entries and Reflective Conversation	Field Notes
Conference Room	Spring & Summer Trainees- 5	Seminar	Knowledge Construction & Identity Mapping	Field Notes
Conference Room	Summer Trainees- 2	Seminar	Reflective Journaling	Field Notes
Conference Room	Summer Trainees- 2	Seminar	Learning Styles	Field Notes
Conference Room	Summer Trainees- 2	Seminar	Maslow's Hierarchy of Needs & Bloom's Taxonomy	Field Notes
Conference Room	Summer Trainees- 2	Seminar	Differentiated Instruction	Field Notes

Conference Room	Summer Trainees- 2	Seminar	Differentiation and the Brain	Field Notes
Conference Room	Summer Trainees- 2	Seminar	Journal Entries and Reflective Conversation	Field Notes
Conference Room	Summer Trainees- 2	Seminar	Journal Entries and Reflective Conversation	Field Notes
N/A	Teacher	Google Survey	Journal Entries and Reflective Conversation	Survey Responses
N/A	Teacher	Google Survey	Teaching strategies feedback	Survey Responses
N/A	Teacher	Google Survey	Teaching strategies feedback	Survey Responses
N/A	Teacher	Google Survey	Teaching strategies feedback	Survey Responses
N/A	Teacher	Google Survey	Teaching strategies feedback	Survey Responses
N/A	Teacher	Google Survey	Teaching strategies feedback	Survey Responses
Researcher's Office	Sp1	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp1	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp1	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp1	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp1	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp2	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp2	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp2	Interview	Program Implementation & Reflection	Interview Responses

Researcher's Office	Sp2	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp2	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp3	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp3	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp3	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp3	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp3	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp4	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp4	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp4	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp4	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Sp4	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Su1	Interview	Program Implementation & Reflection	Interview Responses
Researcher's Office	Su2	Interview	Program Implementation & Reflection	Interview Responses

Education Building	Su1 & Su2 together	Interview	Program Implementation & Reflection	Interview Responses
Conference Room	Su1 & Su2 together	Interview	Program Implementation & Reflection	Interview Responses

APPENDIX B

Data Gathering Log for Reflective Journals

Participant (Individuals Coded)	Type of Data	Date Range of Entries	Number of Entries
Sp1	Reflective Journal Entries	3 months	11
Sp2	Reflective Journal Entries	3 months	12
Sp3	Reflective Journal Entries	3 months	10
Sp4	Reflective Journal Entries	2.5 months	10
Su1	Reflective Journal Entries	2 months	13
Su2	Reflective Journal Entries	2 months	14

APPENDIX C

Interview Questions for Collaborative Constructive Reflection

Date of interview:

Trainee name:

Date and location of program:

Program type:

Group type:

Age range:

Number of participants:

Group demographics:

1. When did you begin preparing for the program?
2. How much time did you spend preparing? Was that enough time to prepare?
3. If no, what will you do next time to prepare?
4. In what ways did you prepare for the program?
5. Did you have all of the necessary materials?
6. If no, what did you need or do you need for future similar programs?
7. Were there any special needs?
8. If yes, were they known to you ahead of time?
9. If yes, did this effect your program planning? In what ways?
10. If no, how did this make you feel? What did you do to accommodate without notice?
11. What could you do next time to ensure this didn't happen again?
12. What teaching methods/strategies did you use in the program?
13. Why did you choose these strategies?
14. On what precedent did you choose these strategies?
15. Were they effective? How do you know?
16. Did you receive any feedback from participants or teachers/leaders?
17. If yes, what was the feedback? Do you agree with it?
18. Would you use the same strategies? Which ones and why?
19. Would you choose different or additional strategies? Which ones and why?
20. What would be helpful to you in preparing and implementing future programs?
21. Would you like to facilitate another program similar to this one? Why or why not?

APPENDIX D

Teacher Feedback Survey Questions

Thank you for choosing to visit Hawk Mountain Sanctuary. Please fill out this form to provide feedback that will allow us to continue to improve our programs.

* Required

1. What is the name of your school? *

2. Did you find the visual aids used during the program effective? *
YES
NO
If yes, which ones?

3. Did the program align or connect with your classroom curriculum? *
YES
NO
If yes, please mention the specific theme or topic.

4. Were the teaching strategies used during the program appropriate for the age and/or level of learning of your students? (Ex: hands-on, sensory, experiential, inquiry) *
Yes
No

5. Please list teaching strategies used during the program which you found useful to students. *

6. Are there any teaching strategies you would have liked to have seen implemented during the program? *

7. How was the program effective? *

8. Was there adequate staffing? *
YES
NO

9. Were the various needs of your students, including those with different learning needs or who are differently-abled, addressed before and during the program? *
Yes
No
Not Applicable
If NO, please describe what was not addressed.

10. Were you provided with the appropriate information to be prepared for your field trip, whether on-site or virtual? *
YES
NO
If NO, what additional information would you have appreciated receiving?

11. Was the Hawk Mountain staff welcoming and accommodating? *
YES
NO

12. How would you rate your overall experience? *
- "Excellent and I would return or recommend this to someone else."
- "Average and I might return and would consider going somewhere else in the future."
- "Poor and I felt the experience needed many improvements."

APPENDIX E

Reflective Journal Prompts

Part One: A Suggested Model to Follow

Rolfe et al.'s (2001) reflective model best suits the purpose of the traineeship program. The model is based upon three simple questions: **What? So what? Now what?** The **'what'** is simply describing the situation. The **'so what'** is analysis of the situation based on knowledge gained from seminars. The **'now what'** is an explanation of what was learned and how it can be applied in the future... future action. This aligns with Wolf's (1996) often quoted statement "Reflection is what allows us to learn from our experiences. It is an assessment of where we have been and where we want to go next." This format could be used for intellectual or emotional reflection.

An example of this model:

Problem: Today a student asked me a question I couldn't answer.

Model in use:

What? You were asked a question you couldn't answer.

So what? Description about how you responded.

Now what? Describe how you will answer the next time this question is asked. Describe what will you do the next time you are asked a question you don't know the answer to.

Try it yourself:

Problem: Today a student asked me a question I couldn't answer.

Model in use:

What?

So what?

Now what?

Part Two: Prompts

One of the most challenging parts of journaling is figuring out what you are going to write about on any given day. So we have come up with journal prompts for you…

Possible Prompts- Programming

What effect or impact did the lesson have on student learning?
What were the strengths of the lesson?
What, if anything, would you change about the lesson?
Do you think the lesson was successful? Why?
Which conditions were important to the outcome?
What, if any, unanticipated learning outcomes resulted from the lesson? Ex: teachable moment.
Can you think of another way you might have taught this lesson?
Can you think of other alternative approaches to teaching this lesson that might improve the learning process?
Do you think the content covered was important/meaningful to the students?
Did any moral or ethical concerns occur as a result of the lesson?
Did the students learn anything today? Why or why not?
What did I learn today? How did I learn it?
How will what I learned today help me in future teaching situations?
What skills are you learning from watching other educators teach?
How did you feel after your first teaching experience? Discuss at least one thing that seemed effective. How do you know?
How did your first FULL program go? Were you nervous? Did that feeling change as the program progressed? Why or why not?
List the great things from today's program, and at least two things you want to improve.
What are your goals for the day?
What is your greatest strength?
What challenges you most about teaching?
What is the most rewarding thing about teaching for you?
What is one activity you would love to try, but haven't yet?

How would you describe your teaching style?

If you had no traditional teaching supplies at all, what would you use to teach your students?

What motivated you the most today?

Was your demeanor and attitude towards the class/group today effective for student learning?

Which types of students benefited from this activity?

Which types of students did not benefit from this activity?

What evidence do you have that the students learned, not just listened?

In what area of teaching can you still improve professionally?

What's preventing you from improving in that area?

What are your fears and joys in teaching and learning?

What you have learned about yourself and your teaching this week? Today?

Compare teaching styles between another educator and yourself.

Name an area in which you need to grow & develop the most in order to be an effective teacher.

What are your feelings about teaching, now that you are teaching often?

What learning occurred for you in this experience?

Who was your favorite teacher when you were in school? What was it about him/her that resounded with you?

What strategies are you using in order to minimize unacceptable behavior and to reinforce acceptable behavior?

Describe the varied strategies/techniques you used during the teaching portion of the program.

How did you pace the program appropriately to accommodate for different ability levels and learning styles of the students?

How did you present key information in different ways repetitively during the course of the program?

Were the activities and materials/teaching aids used during the lesson age appropriate and engaging?

What are your favorite activities to implement? Why? Materials to use? Why?

What are you least favorite activities and materials to implement? Why?

Were the activities you chose based on what you knew about the students ahead of time?

Were the activities you implemented an extension of the lesson and do they reinforce skills/topics taught during the speaking portion of the program?

Was technology used or described at all in your program? Why or why not?
How did you assess students to assess their understanding? Did you use more than one strategy?
How did you modify tasks for students who have additional or different needs?
Describe your initial impressions of the program. What challenges and opportunities do you see for yourself as an educator? How do you expect to meet these?
How can you become familiar with students' or visitors' abilities, interests, backgrounds?
How will you assess their learning? How might you modify for different learning styles within the same group? Different ability levels?
What resources will you use for assistance to ensure learning?
Analyze the program you taught. Identify the strategies you used that were effective for ALL learners. Given the opportunity to reteach it, what would you modify?
Analyze the program you taught. Identify the activities, materials, technology you used that were effective for ALL learners. Given the opportunity to reteach it, what would you modify?
Identify successful strategies you used and speculate why they were successful.
What have you learned about effective teaching practices? How do you know they are effective?
How do you plan to become more effective as a teacher for all learners?
Who was your favorite teacher? What was it about him or her that you were drawn to?
Was there a question asked that you didn't know the answer to? How did you answer it? What have you done since then to find the answer?

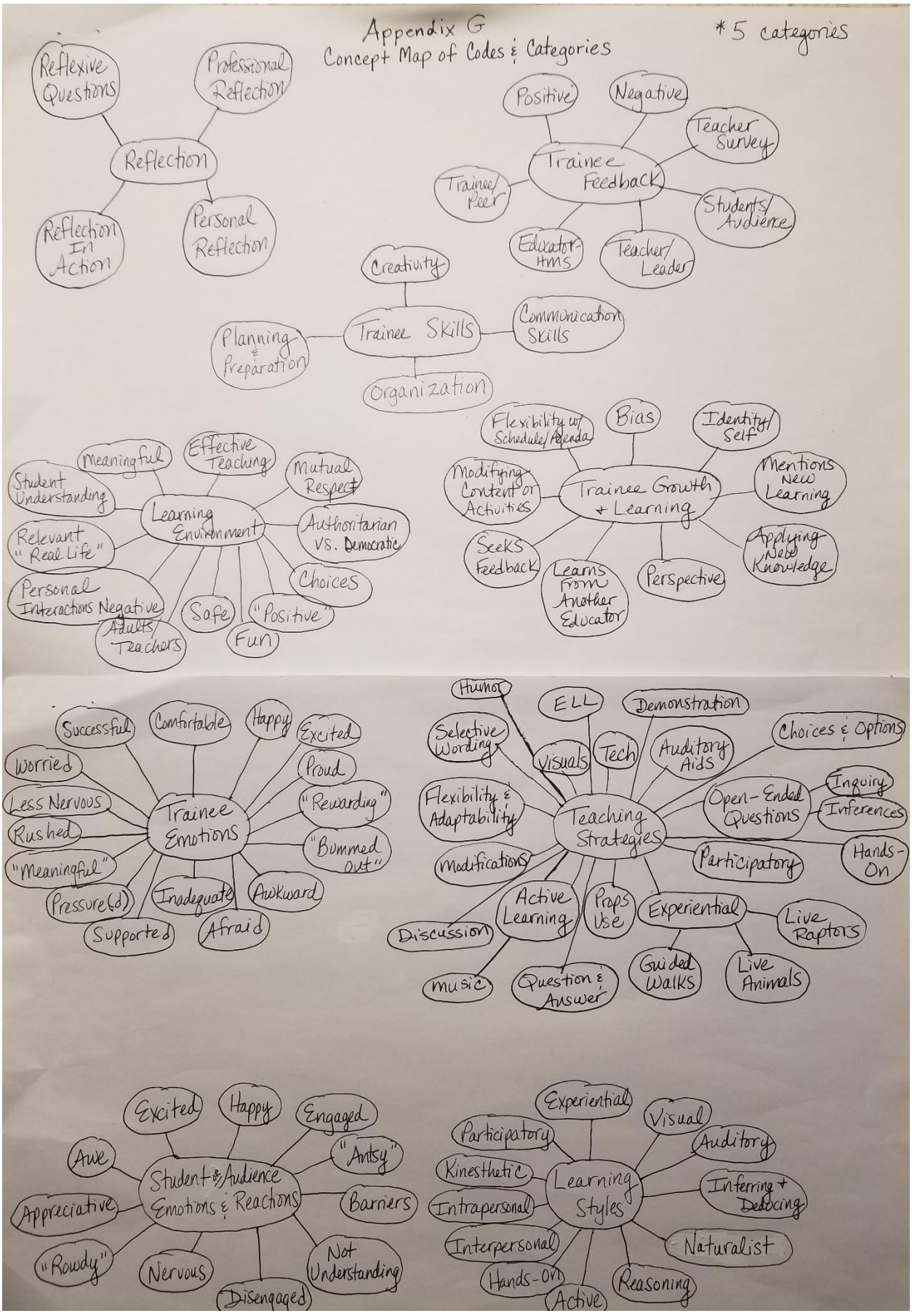
Possible Prompts- Seminars

Respond to the journal article or TED Talk or…
How can you apply what you have learned in this seminar as you think about your teaching?
What did you learn in this seminar that might be a challenge for you as a new teacher?
Are there alternative interpretations in this session for you to consider?
What are you learning about yourself as a learner?
How do you judge your ability to reflect on a topic?
About what would you like to learn more, related to this seminar topic?
A topic I would like to learn more about is…
I am afraid to try….
I would like to try...

APPENDIX F

Emergent Categories and Corresponding Coded Topics

Teaching Strategies	Trainee Growth & Learning	Trainee Emotions	Learners' Emotions/ Reactions	Learning Styles	Learning Environment	Trainee Feedback	Reflection	Trainee Skills
Demo	Flexibility-schedule	Successful	Excited	Visual	"Positive"	Survey	Professional	Communication
Open-ended questions	Modifying-content	Comfortable	Happy	Experiential	Safe	Teacher	Personal	Creativity
Hands-on	Modifying-activities	Happy	Engaged	Auditory	Effective teaching	HMS Educator	Reflection-in-Action	Organization
Music	Learns from educator	Excited	"Antsy"	Kinesthetic/ Active	Mutual respect	Trainee	Asking questions	Planning & Preparation
Participatory	Perspective	Proud	Unclear	Intrapersonal	Choices	Student		
Q&A	Constructive feedback	Rewarding	Awe	Participatory	Student understanding	Participant		
Discussion	Applying new learning	"Bummed out"	Appreciative	Reasoning	Negative teacher/adult	Positive		
Humor	Identity	Worried	"Rowdy"	Interpersonal	Fun	Negative		
ELL	Mentions new learning	Supported	Nervous	Inferring	Personal interactions			
Experiential	Bias	Inadequate	Quiet	Deduction	Meaningful			
Live raptors		Afraid		Hands-on	Relevant			
Props use		Awkward		Music	"Real life"			
Choices		Pressure		Art	Experiential			
Active learning		Rushed						
Modifying		Meaningful						
Adapting		Less nervous						
Auditory		"Loved it"						
Visuals		"What the #%$&"						
Technology								


Appendix G
Concept Map of Codes & Categories
*5 categories
Reflexive Questions
Professional Reflection
Reflection
Reflection In Action
Personal Reflection
Positive
Negative
Teacher Survey
Trainee Feedback
Trainee/ Peer
Students/ Audience
Educator-tems
Teacher/ Leader
Creativity
Trainee Skills
Communication Skills
Planning & Preparation
Organization
Meaningful
Effective Teaching
Student Understanding
Mutual Respect
Learning Environment
Authoritarian vs. Democratic
Relevant "Real Life"
Choices
Personal Interactions Negative
Safe
"Positive"
Adults/ Teachers
Fun
Flexibility w/ Schedule/ Agenda
Bias
Identity/ Self
Modifying Content or Activities
Trainee Growth + Learning
Mentions New Learning
Seeks Feedback
Applying New Knowledge
Learns From Another Educator
Perspective
Successful
Comfortable
Happy
Excited
Worried
Proud
Less Nervous
"Rewarding"
Trainee Emotions
Rushed
"Bummed Out"
"Meaningful"
Pressure(d)
Inadequate
Awkward
Supported
Afraid
Humor
ELL
Demonstration
Selective Wording
Choices & Options
Visuals
Tech
Auditory Aids
Flexibility & Adaptability
Inquiry
Open-Ended Questions
Inferences
Teaching Strategies
Modifications
Participatory
Hands-On
Active Learning
Props Use
Experiential
Discussion
Live Raptors
Guided Walks
Live Animals
Music
Question & Answer
Excited
Happy
Engaged
Awe
"Antsy"
Student & Audience Emotions & Reactions
Barriers
Appreciative
"Rowdy"
Nervous
Not Understanding
Disengaged
Experiential
Visual
Participatory
Auditory
Kinesthetic
Learning Styles
Inferring + Deducing
Intrapersonal
Interpersonal
Naturalist
Hands-On
Reasoning
Active

APPENDIX H

Table of Categories, Coding Method, and Coding Type

First Cycle data analysis included both *theory-generated* and *open* coding.

Second Cycle data analysis included both *emotion* and *values* coding.

Third Cycle data analysis included *axial coding*, followed by *focused coding*. This can be seen in the concept map found as Appendix G, which was formed from merging similar codes into the categories represented here.

Elemental Method **Structural Coding** **(Theory-Generated)**	Elemental Method **Initial Coding** **(Open Coding)**	Affective Method **Emotion Coding**	Affective Method **Values Coding**
Teaching Strategies	Trainee Feedback	Trainee Emotions	Learning Environment
Learning Styles	Trainee Skills	Learner Emotions & Reactions	
Reflection	Trainee Growth & Learning		

Note: Nine categories were formed from three cycles of coding.

APPENDIX I

Triangulated Data Matrix

Research Question	Data Source #1	Data Source #2	Data Source #3	Data Source #4
How does the use of differentiated instruction training in an education trainee program influence how trainees design their own instruction?	Structured Interviews with Trainees	Reflective Journal Entries of Trainees	Seminar Field Notes	
How does the using reflective practice support trainees in the development and implementation of differentiated instruction?	Structured Interviews with Trainees	Reflective Journal Entries of Trainees	Seminar Field Notes	Teacher Surveys

APPENDIX J

Education Trainee Consent Form

I am currently enrolled in the doctoral program Transformational Teaching and Learning at Kutztown University and am in the process of my research study. The study is entitled The Effect of Instructing Education Trainees in Differentiated Instruction (DI) Strategies on the Quality of Education Programs at Hawk Mountain Sanctuary.

The study is to instruct Education Trainees in a variety of teaching strategies in order to reach diverse audiences. Trainees will learn strategies appropriate to teach students of pre-K, K-12, and college levels. They will also learn strategies for teaching adult groups, seniors, family groups, mixed general public groups, and special needs groups to include both physical, cognitive, and behavioral differences. This research was chosen due to the request of every trainee from 2014 to the present for DI training and their desire to facilitate programs to a variety of audiences.

DI training will begin during orientation and continue throughout the semester in the form of group seminars and individual interviews and evaluations in order to offer feedback after selected programs. Trainees will keep reflective journals to track their growth and will have a final online assessment to complete in order to provide their own feedback about the program and training. Teachers and coordinators of selected programs facilitated by trainees will receive a feedback form about the effectiveness of the teaching strategies, not the individual. Receiving feedback from teachers and coordinators will improve our programming, in particularly programs for special needs groups as this is a niche that the education program should expand upon in order to accommodate differently abled guests.

No identifying information will be included in the results and trainees will be offered the chance to review the data before the final results are submitted. If deemed successful, based on the cumulative data, the DI training will continue for future semesters of trainees. **If you agree to participate in this study, please print and sign your name below.** You do not have to participate in the study; however, DI will continue to be implemented in the Education Trainee program. This form will be signed or not signed after I leave the room. The forms will be collected and placed in a sealed envelope and kept by a staff member until after your traineeship.

Thank you.

Erin Brown, Director of Education

Participant printed name _____ Date _____

Participant signature _____ Date _____

APPENDIX K

Reflective Journals Data

Frequently Mentioned Concepts	Number of Times	Code	Emergent Themes and Code	Total Times Mentioned
Teaching strategies (DI)	62	TS	Teaching strategies TS	106
Kids excited/positive reaction	43	SER	Trainee growth & learning TGL	105
Trainees mention new learning	40	TGL	Trainee emotions TE	75
Audience types/Know your audience	36	TS	Students emotions & reactions SER	43
Trainees applying new knowledge	30	TGL	Reflection R	35
Learning styles	30	LS	Learning environment LE	34
Trainees felt positive/excited about student reaction	23	TE	Learning style LS	30
Need to work on	20	R	Trainee feedback TF	25
Trainees felt proud/positive about teaching	20	TE	Trainee skills TSK	20
Trainees learn from educator	19	TGL		
Trainees learning about themselves/Identity	16	TGL		**473**
Planning	10	TSK		
Communication skills	10	TSK		
Trainees felt pressured	10	TE		
Student understanding of experience priority	10	LE		
Learning environment	9	LE		
Trainees feel nervous	9	TE		
Feedback from students	9	TF		

Feedback from educators	9	TF		
Effective ways of teaching	8	TS		
Trainees asking themselves questions	8	R		
Kids don't get this experience often	7	LE		
Successful	7	TE		
Trainees reflect with each other	7	R		
Feedback from teacher	7	TF		
Trainees worried	6	TE		
Understanding students and needs	5	LE		
Negative teachers/adults	3	LE		
	473			

APPENDIX L

Seminar Field Notes Data

Seminar Number	# Trainees Attending	Theme	Number of Times	Themes & Code	Total Times Mentioned
1	3	Student emotions/reactions	1	Teaching strategies TS	48
		Teaching strategies	4	Trainee growth & learning TGL	43
		Trainee emotions	4	Trainee emotions TE	33
		Trainee growth	2	Student emotions/reactions SER	13
				Learning environment LE	12
2	4	Student emotions/reactions	4	Learning styles LS	9
		Trainee emotions	7	Reflection R	6
		Trainee feedback	3	Trainee feedback TF	5
		Trainee growth	3		
					169
3	4	Learning styles	1		
		Teaching strategies	9		
		Trainee emotions	4		
		Trainee feedback	1		
		Trainee growth	12		
4	3	Learning environment	3		
		Student emotions/reactions	5		

		Teaching strategies	16		
		Trainee emotions	3		
		Trainee growth	10		
		Reflection	3		
5	3	Teaching strategies	4		
		Trainee emotions	2		
		Trainee growth	2		
6	2	Learning environment	3		
		Student emotions/reactions	2		
		Teaching strategies	2		
		Trainee emotions	5		
		Trainee growth	3		
		Reflection	3		
7	2	Learning environment	3		
		Teaching strategies	6		
		Trainee emotions	3		
		Trainee feedback	1		
		Trainee growth	2		
8	2	Learning environment	3		

		Teaching strategies	7		
		Trainee growth	2		
9	2	Learning styles	8		
		Student emotions/reactions	1		
		Teaching styles	1		
		Trainee emotions	4		
		Trainee growth	7		
			169		

APPENDIX M

Structured Interviews Data

Trainee	When did you begin to prep?	Which teaching strategies?	Why these strategies?	Were they effective?	What would be helpful in preparing and facilitating next time?	Challenges?	Reflection? RAP= after practice RIA= in-action
sp1	1 week	Discussion, Live birds, Hands-on, Q&A, Visuals, Humor, Guided walk	Age (high school), Quiet so humor	Hard to gauge	Video clips of our biologists in the field doing research.	Students quiet	Reflection-in-action because quiet- birds out longer; Talk to teacher ahead of time to learn more about students next time.
	1 week	Co-taught, Q&A, Live bird, Discussion, Guided walk, Visuals, Hands-on	Age range (cyberschool), Interactive group	Yes	Nothing	None	Reflection-in-action because interactive students- more Q&A inside and less outside.
	5 months	Choices/options, Hands-on, Discussion	Teacher workshop for pre-k students	Yes- email from director	Trainees appreciated for preparation- do this again; Scaled down version.	None	Reflection after program- might be her favorite demographic to teach.
	1 week	Co-taught, Q&A, Live bird, Discussion, Guided walk, Visuals, Hands-on, Tech	Age range (college)	Yes	Nothing	Weather	Reflection-in-action because of prior knowledge and weather.
	1 week	Co-taught, Q&A, Discussion, Guided walk	Group- peers on site to see HMS education	Probably	Should have walked the trail ahead of time; Time management.	No time to hike trails	Reflection after program at home self-critiquing- "I'm hard on myself."
	No change	Choice/options, tech = new; 10 total strategies	Age, Demographic, Response to the group dynamic	Gave evidence once	Time management; Should have walked unfamiliar trail; Talk to teacher before program.	Time; Students quiet	RAP = 2; RIA = 3
Trainee							

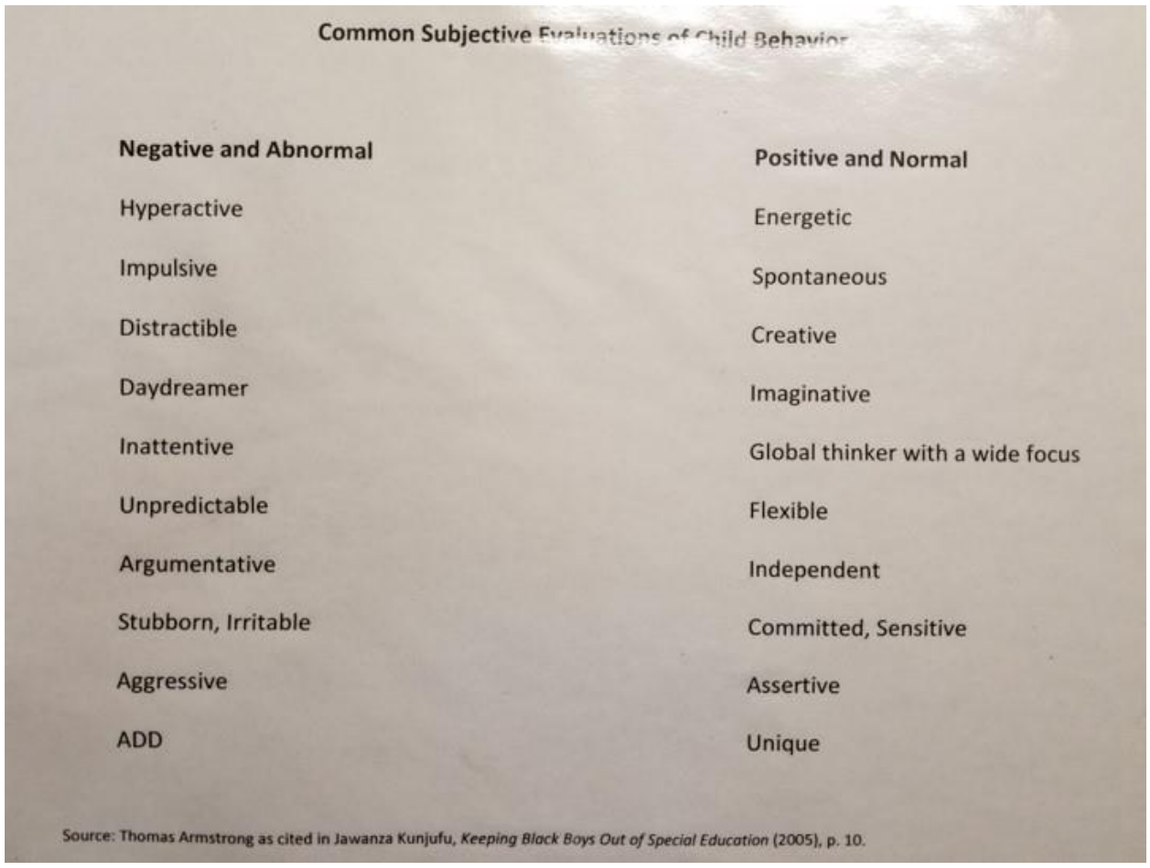
sp2	Day before	Discussion, Q&A, Live bird, Hands-on, Guided walk, Participatory, Tech, Visuals	Age range (homeschool), Learning styles	Yes- 2 became members	Advance notice; Better communication with peer; Uninterrupted time.	Time; Communication	Reflection after program about "why I was so annoyed"- angry because no communication prior to program by peer.
	2 days before	Hands-on, Visuals, Inquiry, Kinesthetic, Live birds, Verbal, Q&A, Demonstration	Age range (cyberschool), Learning styles	Yes	Team mtg with other trainees; Auditory props.	Time for prepping newer trainees	None given
	Day before	Hands-on, Visuals, Inquiry, Kinesthetic, Live birds, Verbal, Q&A, Demonstration	Age (high school), Quiet so participatory	Yes	Vehicle available to get larger raptors from cages.	Vehicle use; Weather	Reflected with trainees after the program about getting older students to be volunteers.
	Day before	Hands-on, Visuals, Inquiry, Kinesthetic, Live birds, Verbal, Q&A, Demonstration	Adjudicated youth- HS age	Yes	Nothing	Time because they arrived late	Reflection after program about not knowing enough about the trails and out of shape.
	1 month	Co-taught, Q&A, Live bird, Discussion, Guided walk, Visuals, Hands-on, Tech alone	Age range (college)	Yes- email from professor	Better ways to communicate between departments on short notice.	Weather; Time for communication	Reflection after program that "I wish I wouldn't have gotten annoyed at the professor". Perspective.
	No change	Tech alone= new, new vocabulary 11 total strategies	Age, Demographic, Learning styles, Response to group dynamic	Gave evidence twice	More advance notice; Better communication or meetings.	Time; Communication; Weather	RAP = 4
Trainee							
sp3	Earlier in the week	Inquiry-based questions, Discussion, Observations with Inference, Guided walk	Cyber school (time to socialize), Watching others teach	Yes	Walking trails myself to practice and observe.	None	Reflected after program about getting more practice for pace of walking and talking.
	Earlier in the week	Kinesthetic, Lecture, Discussion, Reflection	Teacher workshop for pre-k students	Yes	Time to study up when content is unfamiliar.	None	Reflected after first program so made changes for second program and it ran more smoothly.

	1 week	Discussion, Hands-on, Visuals, Kinesthetic, Guided walk, Live bird, Q&A	Adjudicated youth- HS age	Yes	Making trail conditions known to adults.	Time- must leave at a strict set time	Reflected after program so she was more comfortable on the second day with the youth.
	3 weeks	Live bird, Q&A, Visuals, Storytelling, Co-taught	Nursing home residents- seniors	Yes- nurses stated that they stayed awake	Would like to know if nursing home, rehabilitation, or senior living center ahead of time.	Hard of hearing & vision	Reflection-in-action that the seniors couldn't hear "wing flapping", so let them feel the breeze from it instead.
	More prep time before programs	Storytelling, co-taught = new; 13 total strategies	Age, Demographic, Watching educators & peers	Gave evidence once	Time to prepare; Time to walk trails more often; Demographic info.	Time; Participants elderly	RAP=3; RIA=1
Trainee							
sp4	2 days before	Observation, Inquiry-based questions, Co-taught, Live bird, Discussion, Guided walk	Age range (cyberschool), Educator recommended	Yes	Prior knowledge of students from their teacher; What are they learning now.	None	Reflection after program that she would like to have more knowledge about more natural history topics because then all of the students would hear something of interest.
	1 month	Kinesthetic, Creative thinking, Problem solving	Event type (Glow egg hunt), Mixed ages	Yes	Knowing the budget from the beginning; Intentions of the hunt.	Weather- plan B; Budget unknown	Reflection after program that she would split the ages if held outside to be fair to students.
	1 week	Live bird, Q&A, Visuals, Storytelling, Co-taught	Nursing home residents- seniors	Yes- nurses stated that they stayed awake	Would like to know if nursing home, rehabilitation, or senior living center beforehand.	Hard of hearing & vision	Reflection-in-action that seniors couldn't see so brought screech owl up close to them.
	2 weeks	Art, Auditory, Visual, Hands-on, Kinesthetic, Discussion, Guided walk	Age (wee ones)	Yes- registered for next program	Didn't know it was just her until a week before, so communication.	None	Reflection-in-action that there would be extra time because of weather and asked an educator for an extra activity that was

							good for getting the wiggles out.
	2 weeks	Visuals, Props, Participatory, Visuals, Hands-on, Guided walk, Discussion, Q&A	Age (HS)	Yes- teacher suggested teaching	Didn't know it was just her until 2 days before because rescheduled, communication.	Time because they arrived late	Reflection-in-action because asked teacher (arrived early) what they were studying now; Quiet so made them volunteers.
	More prep time before programs	Participatory, auditory = new; 15 total strategies	Age, Demographic, Educator recommendations	Gave evidence three times	More advance notice; Prior knowledge of students; Didn't know about printed registration forms.	Time; Participants elderly; Weather	RAP = 2; RIA = 3
Trainees							
su1 & su2	Weekend before and a lunch	Q&A, Inferring, Participatory, Guided walk, Kinesthetic, Visuals, Hands-on, Co-taught; Live bird	Inclusion, Students have voice & choice, Age (elementary), Watching others	Yes- teacher sent email	Continue shadowing educators for programs with a variety of participants.	None	Reflection after program with each other- liked switching up who taught what topic.
	Not enough data	9 total strategies	Age, Inclusion of multiple types of learners, Watching educators & peers	Gave evidence once	Time to observe other educators with variety of participants.	None	RAP = 1

APPENDIX N

Subjective Behavior Chart



Common Subjective Evaluations of Child Behavior

Negative and Abnormal	Positive and Normal
Hyperactive	Energetic
Impulsive	Spontaneous
Distractible	Creative
Daydreamer	Imaginative
Inattentive	Global thinker with a wide focus
Unpredictable	Flexible
Argumentative	Independent
Stubborn, Irritable	Committed, Sensitive
Aggressive	Assertive
ADD	Unique

Source: Thomas Armstrong as cited in Jawanza Kunjufu, *Keeping Black Boys Out of Special Education* (2005), p. 10.

APPENDIX O

Structured Interview Responses by Trainees

Question # 4: "In what ways did you prepare for the program?"

Trainee	Interview 1	Interview 2	Interview 3	Interview 4	Interview 5
Sp1	Consulted with [educator] because I haven't done that many high school groups.	Asked [educator] about the age range because it was a cyber school group and I wasn't familiar with the cyber school dynamic.	Met with [educator] to plan and to become familiar with the Head Start program and their types of students.	Met with [trainee] because we were co-teaching. Met with [educator] for group information because they were college students.	Met with [trainee] because we were co-teaching. Met with [educator] for group information because they were environmental educators.
Sp2	Read the [educator] notes. Then I researched activities, and videos because I was unfamiliar with the topic and it was my first time working with this demographic.	Met with [trainees] a day or two ahead of time because we were co-teaching.	Met with [trainees] ahead of time because it was a demographic that I had worked with before, but they hadn't. I also walked an unfamiliar trail ahead of time.	Looked over the registration form and the Google doc for demographics. Prepared for wheelchair user.	Team meeting a week ahead because it was a group of college students and we were co-teaching. Reached out to teacher for current content in classroom.
Sp3	Walked the trail the day before with [educator] for interpretive sites.	Asked [educator] about the lesson and demographic. I researched and familiarized myself with the information.	Met with [educator] ahead of time because I never taught alternatively placed youth before, but she had. I talked to [educator] too about what to expect and we discussed seminar readings.	Met with [trainee] because we were co-teaching. We decided who would teach what topic. Checked registration paper for more information about the group.	N/A

Sp4	Met with [educator] because the program type was new to me. I also researched to see what others did.	Met with [educator] to learn the content. I also walked the trail ahead of time.	Met with [trainee] because we were co-teaching. We decided how to split up the topics.	Looked in the registration book to see how many little ones signed up. Met with [trainee] who had done program before for feedback about the program.	Met with [trainee] because we were supposed to co-teach, but then [trainee] couldn't assist. Talked to teacher ahead of time about what they were learning in the classroom because high school age students.
Su1	Shadowed [educator] last week because same type of program as this one was. Met with [trainee] because we were co-teaching.				
Su2	Met with [trainee] because we were co-teaching. We created a cheat sheet to see who and when for the program. We also arranged props by theme to help guide us through the program.				

APPENDIX P

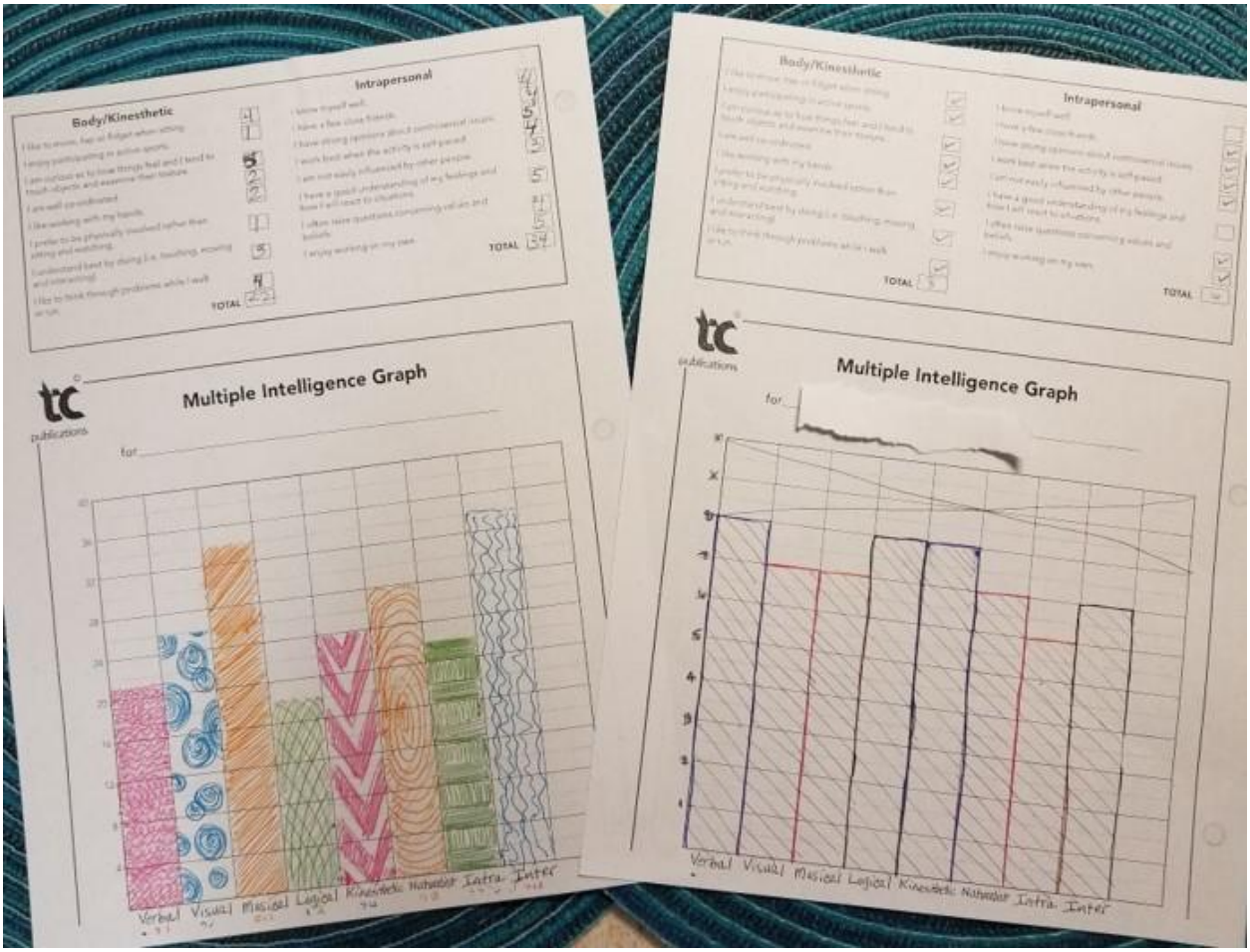
Trainee Preparation Using Post It Notes

APPENDIX Q

Trainee Identity Maps

APPENDIX R

Trainee Multiple Intelligences Graphs



CURRICULUM VITAE

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Education:

College or University	Degree	Date
College of Charleston	B.S. Biology	1994
Kutztown University	M.Ed. Curriculum & Instruction	2006
Kutztown University	Teaching Certificate, Secondary Ed, Biology	2007
Kutztown University	Ed.D. Transformational Teaching & Learning	2020

Honors:

Alpha Epsilon Lambda Honor Society of Graduate and Professional Students 2005

Professional Experience:

1996-2007	Environmental Education Specialist, Tuscarora & Locust Lake State Parks, Bureau of State Parks, DCNR
2008-2014	Life Science Teacher, Springhouse Middle School, Parkland School District
2014-2019	Director of Education, Hawk Mountain Sanctuary

Publications:

Percy the victorious vulture (2017), Hawk Mountain Sanctuary Association. *https://www.hawkmountain.org/who-we-are/news/hawk-mountain-sanctuary-publishes-new-children-s-book/page.aspx?id=6775*

The effect of differentiated instruction on the instructional strategies of education trainees. Dissertation thesis. Research Commons. Submitted for publication April 2020.

Presentations:

American Kestrel Webcam Curriculum: Streaming Raptors into the Classroom. Pennsylvania Association for Environmental Educators Annual Conference, Sandy Lake, PA. 13 March 2017.

The Benefits of Distance Learning for Underserviced Groups. Pennsylvania Association for Middle Level Educators Annual Conference, Kutztown, PA. 8 Oct 2018.

Distance Learning and Raptor Travelling Trunks: Alternative Methods to Reaching Students. Hawk Migration Association of North America International Conference, Detroit, MI. 12 Oct 2018.

The effect of differentiated instruction on the instructional strategies of education trainees. Dissertation thesis. North American Association of Environmental Educators Annual Conference, Lexington, KY. 18 October 2019.

March 2020