DIFFERENTIATED INSTRUCTION: A SURVEY STUDY OF TEACHER UNDERSTANDING AND IMPLEMENTATION IN A SOUTHEAST MASSACHUSETTS SCHOOL DISTRICT

A thesis presented

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Abstract

Given the implementation of the federal initiative Response to Intervention (RtI) many districts are exploring teaching philosophies and strategies to help close the achievement gap. Differentiated instruction is a teaching philosophy that has been known to help teachers assist students in reaching their highest academic potential.

The purpose of this quantitative study was to explore teachers’ understanding of differentiated instruction and their perceptions of their ability to implement DI in grades kindergarten through sixth. The survey was administered electronically through the Leighton Public Schools Google mail accounts. The survey had two parts and within part one there were two sections: A and B. Part I, Section A asked teachers to identify, using a Likert scale, their understanding of differentiated instruction. Part I, Section B asked teachers to identify, using a Likert scale their ability to implement differentiated instruction. Parts A and B were organized by the six components of differentiated instruction as developed by Carol A. Tomlinson and modified by Sandra Page: Student Interest, Assessment, Lesson Planning, Content, Process, and Product. Part II of the survey asked teachers demographic information such as what subject they taught, whether they were a general or special education teacher, current grade taught, their sex, age range, education level, how many years they had been teaching, and what types of training they had participated in regarding differentiated instruction. This quantitative study utilized a survey study methodology, which was sent to over 100 participants electronically.
The two research questions that guided this paper are: (1) *To what extent do K-6 teachers understand the concepts of differentiated instruction and the methods of how to differentiate classroom instruction in the Leighton Public Schools?* (2) *How do K-6 teachers at Leighton Public Schools implement components of differentiated instruction (student interest, assessment, lesson planning, content, process and product) as defined by Carol A. Tomlinson?*

Key words: Differentiated instruction, Response to Intervention, Assessment, Professional Development, Inclusion
Dedication

Dedicated with love and gratitude to my husband and daughter:

Gregory B. Whipple and Leighton Victoria Whipple

For all their love, support and sacrifices that made this possible
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Chapter One: Introduction

Statement of the Problem

Many school districts have implemented the federal initiative entitled Response to Intervention (RtI) to track the progress of all students, providing teachers with a plethora of data regarding students’ performance. RtI is a way for teachers to use a tiered approach to actively identify students’ needs. Differentiated instruction (DI) is a well-known teaching philosophy and methodology that is gaining popularity amongst school districts as a way to respond to the data collected (Tomlinson & Allan, 2000). Differentiated instruction places students at the center of learning, and is a way for teachers to provide students with different avenues to attain content knowledge as a response to the data gathered through formative assessments. Students’ abilities determine how content is delivered and students have more choice and flexibility when exhibiting their knowledge.

Flexibility in assessment benefits many students, because learners enter schools with diverse needs, abilities and skills and yet, they are expected to pass the same state exams. Tilling & Fadel (2009) write, "Sadly, students who have special learning needs, have difficulty in reading, or are second-language learners often perform poorly on all the standardized multiple choice tests because these tests are so dependent on reading skills" (p.131). This has become a problem because instruction is not always tailored to meet individual student’s needs. Because teachers are challenged with classrooms of students with mixed abilities, varied instructional strategies are necessary to meet the needs of all
students (struggling and advanced) to allow students access to the curriculum. This is a problem of practice for many districts because there still remains a gap between the standards the state requires of students, and the students’ actual academic achievement levels. This is especially true for English Language Learners, students who receive special education services, students from ethnic minority backgrounds, and economically disadvantaged students (Tomlinson & Allan, 2000).

The problem of practice became a focus four years ago in the Leighton Public Schools (LPS) as administrators implemented training to help teachers employ DI. Leighton is the pseudonym to protect confidentiality for the school district and pseudonyms have been assigned to the five schools involved in the study. At the time of this study, LPS serviced students of diverse needs and promoted differentiated instruction to reach all students’ learning needs. The schools involved were located in a suburban school district with a town population of just over 31,000 people.

As an assistant special needs team chairperson for the school district, the researcher was aware that some teachers struggled to implement DI despite the implementation of RtI. Teachers were provided with an extensive amount of data, but were at a loss in their efforts to close the achievement gap. This research study allowed the researcher to gather information about teachers’ understanding and implementation practices of DI in order to gain a better idea of what types of professional development and support are needed for the future.
Significance

In response to the Massachusetts Education Reform Act of 1993, the Massachusetts Comprehensive Assessment System (MCAS) was designed to test students annually in selected grades, including students with disabilities. At the time of this study, the MCAS was the tool being used to assess performance based on the learning standards of the Massachusetts curriculum frameworks. Many schools are searching for instructional strategies to meet the needs of all learners while adhering to the standards of the frameworks. DI is a way for teachers to provide instruction and track progress at each student’s instructional level in order to meet these standards. Levy (2008) suggests a systematic way of providing DI. He states, “Differentiated Instruction is a set of strategies that will help teachers meet each child where they are when they enter class and move them forward as far as possible on their educational path” (p. 162). Since each child enters school with individual needs, abilities and skills it is important for educators to universally screen each student and provide individualized instruction based on the data received from the screening. Universal screening is the first step to identify students who may have trouble in specific academic areas. In addition to DI, it is necessary to monitor students’ progress. “Progress monitoring requires the use of dynamic assessments to monitor the child’s mastery of specific learning objectives and to inform instruction” (Coleman & Hughes, 2009, p.16). Progress monitoring helps teachers assess and identify the level of instruction each student needs. Teachers set small goals for students to reach and monitor the progress. As teachers monitor their students, they may find they need to adjust their instructional strategies and/or materials.
In 1993 the Massachusetts Education Reform Law (MERA) mandated the development of learning standards and assessment of those standards. MERA requires schools and districts to demonstrate how well students are meeting the learning standards of the Massachusetts curriculum frameworks through performance on the MCAS. Under the No Child Left Behind Act of 2001 (NCLB), by 2014 all students must reach proficiency in reading and math. Zhou (2009) points out that “The cornerstone of NCLB is accountability through standardized testing in math and reading (p. 32). With demanding standards and challenging exams it is beneficial for teachers to adjust their instruction in ways that allow each student to learn at his/her level and pace. For example, in an inclusive classroom a teacher can provide reading materials on the same content but at different levels so every student is able to read and participate in the discussion. DI allows teachers the ability to implement appropriate instructional strategies, and monitor the students on a regular basis.

Over the years, education has changed dramatically. While the one room schoolhouse seems a distant memory, it truly isn’t. Each classroom today is filled with students of different abilities and needs. In reading, some students may be fluent readers who cannot comprehend, while others may struggle to decode, but in fact can comprehend. In mathematics, a student may have an excellent understanding of number sense while others have not mastered their basic facts. Given the differing abilities in a classroom, students work at different speeds and some may require extra time to process information. DI encourages teachers to embrace such diversity and tailor the instruction to meet all needs. “The reauthorized Individuals with Disabilities Education Improvement Act (IDEIA) of 2004 in the United States enables early identification of
students experiencing academic problems, most often in reading, and a multi-tier instructional plan before evaluating students for specific learning disabilities” (Dalhouse et al., 2009, p. 84). This early identification is helpful to teachers so they can design their instruction to each student individually. As a result, teachers can assist in closing the achievement gap and facilitate each student in reaching his/her potential. In addition, DI will allow advanced learners the ability to be challenged and move forward in their learning (Manning, Standford & Reeves, 2010).

Although many teachers have adapted their instruction to be more collaborative and hands-on, this does not necessarily meet the needs of all learners. At times students at both ends of the spectrum may suffer because regular education classroom teachers may teach toward the average student (Rock, Gregg, Ellis, & Gable, 2008). Some advanced students complete the work but are not challenged, while the struggling students continue to struggle and in some cases are referred for special education testing. As federal and state funding continues to be inconsistent and unpredictable, class size may increase which means each class is full of more diverse learners; therefore, teaching instruction will likely need to be adjusted.

Under NCLB’s annual requirement, many school districts, including middle class suburban communities, have had a difficult time making Adequate Yearly Progress (AYP), placing schools under tremendous pressure to attain standards and improve proficiency of all students (Rock, Gregg, Ellis, & Gable, 2008). Baglieri and Knopf (2004) state, “differentiated instruction can be designed for the education of all students” (p. 527). With the implementation of DI, teachers can provide instruction at students’
levels and implement individualized instruction to support all students. DI gives teachers the opportunity to provide choices for students, vary assessments and monitor academic growth.

Students may benefit from teachers who tailor their instruction to meet the needs of their students to improve student performance. This could result in schools making AYP and receiving funding. In the event schools do not make the necessary gains, the state has the ability to take over the leadership of the school. With continued progress monitoring of all students, teachers can easily gauge their students’ academic skills and implement instructional strategies to make academic gains.

**Research Questions and Goals**

The problem of practice in Leighton Public Schools was that teachers were requesting more innovative instructional strategies and training to apply in their classrooms in response to the data provided from RtI. By researching their understanding and implementation of DI, the researcher was able to uncover the knowledge, beliefs and needs of the teachers and design more specific and effective training strategies and support. The two research questions that guided this paper were:

(1) **To what extent do K-6 teachers understand the concepts of differentiated instruction and the methods of how to differentiate classroom instruction in the Leighton Public Schools?** (2) **How do K-6 teachers at Leighton Public Schools implement components of differentiated instruction (student interest, assessment, lesson planning, content, process and product) as defined by Carol A. Tomlinson?**
It is important to understand the extent to which teachers understand differentiated instruction prior to implementing any changes and training. Various factors can become barriers in the implementation of these instructional models and strategies. Some teachers may believe they are implementing effective strategies when in reality their strategies are not effective. For these reasons, it was important to survey teachers to understand key strategies to improve instruction.

The practical goal of this research study was to uncover teachers’ understanding and implementation of differentiated instruction and identify areas of weakness and strengths as reported by teachers. A future goal, that is not part of this study, is that the researcher hopes to work with a professional development planning committee to enhance knowledge and develop strategies to increase teachers’ effective implementation of differentiated instruction. A goal for the district will be the availability of specific trainings based on research data to help teachers increase their understanding of DI and feel more confident implementing it.

Summary

Schools and educators continue to be challenged by ever-changing federal legislation and school districts as they strive to close the achievement gap. This research study identified teachers’ understanding of DI and areas of support in which they require training in order to effectively implement DI in the classroom. To bridge the achievement gap, administrators have overall responsibility for working with their teachers to provide instruction that is appropriate for each student, and training educators
in ways to help monitor the students’ learning. With these protocols in place, teachers may feel supported to make the necessary changes in their classrooms.

Some school districts are struggling to meet the needs of special education and low-income students. However, not to be forgotten are average and advanced students. Once effectively implemented, the concept and strategy of differentiated instruction allows educators to identify each student’s learning needs and provide strategies to teachers to move all students forward. Differentiated instruction provides teachers with instructional tools to successfully teach all students within an inclusive classroom setting.

**Organization of the Document**

The remainder of this chapter addressed the theoretical framework, a literature review and research design. The theoretical framework presented identified the theories and helped articulate the problem of practice and research design. The literature review allowed the researcher to connect previously published literature to the problem of practice. Research design followed the literature review, which identified the research questions, methodology and validity of this research study. A discussion of protection of participants followed and lastly, a conclusion was provided.

**Theoretical Framework**

The research behind differentiated instruction is supported by several developmental theorists who focus on the importance of using student interests to hook learners, connecting learning with real life applications and providing instruction that is at students’ developmental level. Edwards, Carr, & Siegel (2009) state “Principals of differentiated instruction reflect research findings of Vygotsky and other educational
innovators, such as Howard Gardner (multiple intelligences, 1983), and Robert Sternberg (thinking styles/cognitive research, 1997), each of whom recognized the uniqueness of individuals” (p. 582). In addition, John Dewey believed making curriculum of interest and relating it to real life applications of education is meaningful and important to children of all ages.

The main theorists that supported this research were Lev Vygotsky, Howard Gardner, and John Dewey. Their written works and research coincided with Tomlinson’s philosophy of differentiated instruction and were important to understand. While exploring differentiated instruction these three theorists permeated.

Throughout the literature, Russian teacher and psychologist Lev Vygotsky and his theory of Zone of Proximal Development (ZPD) is commonly articulated as an important way to teach students. The ZPD is the distance between a child’s actual development level and the potential level. Vygotsky (1987) states that ZPD is “what the child is able to do in collaboration today he will be able to do independently tomorrow” (Kozulin, Gindis, Ageyev, & Miller, 2003, p. 40). Miller (2002) speaks specifically to the importance of assessment, scaffolding curriculum, the process of learning, flexible grouping and choice.

Figure 1.1 Zone of Proximal Development

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![Zone of Proximal Development](image)
Given ZPD theory, assessment plays a large role in establishing readiness and scaffolding material. By assessing a student’s readiness level teachers are able to provide instruction that is developmentally appropriate (Miller, 2002). Given the implementation of DI and the knowledge of ZPD teachers are able to assess his/her students and provide instruction rich in content at the student’s instructional level. Vygotsky believed as long as a knowledgeable person was collaborating with a child, that child could continue to move forward in their learning.

Scaffolding curriculum is a crucial aspect of Vygotskys theory of ZPD. Scaffolding can be described as the support a student needs to make progress. There are two ways scaffolding can take place. First the learning environment and tasks should be appropriately challenging. Second, by adjusting the level of teacher intervention in response to student needs. Scaffolding can look differently depending on the needs. In some instances it can be a teacher walking around the classroom monitoring students working and in other instances it can be one-on-one support (Miller, 2002, pp. 106-107).

Vygotsky believed, as Miller (2002) states, “Process is more important than product (for example, correct or incorrect answers). They looked directly at a child’s series of actions and thoughts as she tries to solve a problem and, in the process, advance her own thinking” (p. 378). It is important for a teacher to try to teach to all learning styles; this can become a daunting task if a teacher intends to lecture to his/her class. After a teacher has assessed a student’s learning needs and has begun to scaffold the material, the teacher then may understand the process a child takes to answer questions. It’s important for a teacher to show several ways to solve a problem so that each student
understands the process. By learning the process a child utilizes to answer a question, a teacher is able to identify the learning styles. Vygotsky (1978) states:

> To study it in the process of change….To encompass in research the process of a given thing’s development in all its phases and changes-from birth to death-fundamentally means to discover its nature; its essence, for it is only in movement that a body shows what it is. (p. 65)

The ideas of being flexible, providing choice and allowing for creativity are important aspects of DI and coincide with Vygotsky’s theory. “Some students may choose to work in pairs, small groups, or independently, but all are working toward proficiency on the same performance standards or curriculum objectives” (Anderson, 2007, p. 50). DI is known for its collaborative approach in that students are able to work with others and teachers are to provide flexible grouping. Vygotsky believed social interactions increased academic achievement (Miller, 2002). This allows student choice and flexibility from day to day, which tends to keep learning interesting for the students and maintains motivation. Vygotsky believed in the importance of social interaction and allowing children to work with others. This was seen as a positive way for children to learn. Miller (2002) quotes Vygotsky, “Learning awakens a variety of internal development processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers” (p. 377).

Howard Gardner (1983) is well known for his theory of Multiple Intelligences (MI), which was derived from cognitive science. Kelly (2008) states “Gardner defined intelligence as the biopsychological potential to process information that can be activated
in a cultural setting to solve problems or create products that are of value in a culture” (p. 310). Gardner’s theory suggests there are eight multiple intelligences, which include: Spatial-visual, Kinesthetic-movement, Linguistic-verbal, Musical-song or instrumental composition, Interpersonal—self and others, Intrapersonal—self, Naturalist and Mathematical-numbers (Gardner, 2011). This theory suggests these eight intelligences are prominent in each individual person however everyone has the ability to stimulate all of the intelligences in diverse situations (Kelly, 2008). Determining students learning styles would be advantageous to a teacher when providing instruction because the teacher is be able to instruct in a way the student can access the information best. Given the multiple intelligences Gardner also believed all people should be able to obtain a goal they desire. Gardner (1983) states,

To my mind, a human intellectual competence must entail a set of skills of problem solving-enabling the individual to resolve genuine problems or difficulties that he or she encounters and, when appropriate, to create an effective product-and must also entail the potential for finding or creating problems-thereby laying the groundwork, for the acquisition of new knowledge. (p. 60)

Anderson (2007) states, “Teachers who differentiated believe that every child is unique, with differing learning styles and preferences” (p. 50). By differentiating instruction, a teacher can take into account the child’s learning style, according to Gardner, and provide instruction that is most appropriate to the way they may process information. Using the learning style also allows a teacher to create lessons that are of
interest to the students, which as a result motivates the student to learn. Creativity is important when implementing DI and is also used when addressing the learning styles.

John Dewey, who is known as the “father of progressive education” believed in making curriculum relate to real life and using children’s interests as a basis of learning (Tyack, Anderson, Cuban, Kaestle, & Ravitch, 2001). He became well known for his idea of “learning by doing” (Tyack, et al., 2001, p. 67).

Dewey placed much weight on the issue of interest but he deciphers the difference between choice and interest. Wilson (2010) states Dewey believed interest was larger than choosing your favorite idea, but rather more about engaging in your community and the world around you. Based on individual choices, interest can change over time and it is “situational” in that it develops as a person engages with the world, which is continuously changing (p. 231). He also felt “highly individualized approach built around children’s interests and the social life of the children’s community would prove to be more educative than traditional academic studies” (Tyack, et al. 2001, p. 67).

Dewey (2001) said, “It would be permanently safe to give the principle of ‘interest’ any large place in school work” (p. 87). Differentiated instruction is centered around using student interest to guide instruction. Dewey suggests if educators make learning of interest to the children they are more likely to remember it, and it will become habit. Educators help students conform, which enables them to be prepared to learn. If educators use interests to guide instruction they will not only have students who are ready to learn, but they will have students who are interested in learning. They will be invested
in their education which will empower them to continue schooling and avoid early drop out.

**Chapter Two: Review of Literature**

Data has become an important component in today’s public school systems since the reauthorization and regulations of the Individuals with Disabilities Education Improvement Act (“Building the Legacy of IDEA 2004”, n.d.). This act has encouraged school districts to implement school wide interventions such as Response to Intervention. Administrators around the country are implementing strategies in response to the data they gather through RtI. The Leighton Public Schools implemented Response to Intervention and the district administered screenings three times a year to assess student-learning needs. Based on that data, teachers then progress monitored their students. Teachers received professional development on differentiated instruction, which is a philosophy used to help all students achieve progress. It was observed some teachers were struggling to implement DI. The following section will review the literature that supports differentiated instruction. This review of literature answered the following questions: Why use differentiated instruction?; What is differentiated instruction and how does it fit in the inclusive classroom?; and Why is professional development important?

This review investigated the historical perspectives of differentiated instruction, what differentiated instruction actually is, its relationship to the inclusive classroom, and the importance of meaningful professional development. Three sections organized this review: (1) definition of terms; (2) historical perspectives; (3) differentiated instruction; (4) inclusion; (5) and professional development.
Definitions of Terms

**Content:** “The knowledge, understanding, and skills we want students to learn” (Tomlinson, 2010, p. 15).

**Differentiated Instruction:** “Classroom practice with a balanced emphasis on individual students and course content” (Tomlinson, 2010, p. 14)

**Interests:** “Topics or pursuits that intrigue students” (Tomlinson & Allan, 2000, p. 10)

**Learning environment:** “The way the classroom feels and functions” (Tomlinson & Eidson, 2003, p. 3)

**Process:** “How students come to understand or make sense of the content” (Tomlinson, 2010, p. 15)

**Products:** “How students demonstrate what they have come to know, understand, and are able to do after an extended period of time” (Tomlinson, 2010, p. 15).

**Readiness:** Ability levels or competencies for a given subject (Tomlinson, 2001).

**Historical Perspectives of Differentiated Instruction**

The first theme that is important to understand is the historical perspective because it articulates standards that have been put in place to make schools more accountable for closing the achievement gap (Murphy, 2010). In the 1990’s there was a movement towards standards and accountability, which produced school report cards, school choice with vouchers and charter schools, and the takeover of schools by local and state-level organizations. However, the achievement gap continued to widen and school communities continue to be somewhat economically segregated (Murphy, 2010).
Today, the United States is concerned with providing access to the core curriculum for all children, including students who receive special education services, students whom English is not their first language and students with diverse cultural backgrounds. Lavadenz and Armas (2008) suggest these specific students mentioned are struggling to access the curriculum. In addition, “The National Center for Education Statistics (NCES) (2001) reports that African American and Latino NAEP scores in reading and writing are lower than those of whites at every grade level, and that although the minority/white math gap narrows in elementary school, it widens again to a chasm in junior high” (Lavadenz & Armas, 2008, p.16). Federal legislative changes took place to make sure this concern was addressed. The No Child Left Behind (NCLB) act of 2001 (Public Law 107-110) and the 1997 Individuals with Disabilities Education Act (IDEA) articulate the necessity for schools to provide access for all students to the core curriculum and provide the least restrictive environment with appropriate services and supports.

Beecher and Sweeny (2008) state, “Another outgrowth of NCLB involves the adoption of high-stakes testing to measure achievement and evaluate school effectiveness” (p. 502). In response to the Massachusetts Education Reform Act of 1993, the Massachusetts Comprehensive Assessment System (MCAS) was designed to annually test students in selected grades, including students with disabilities. The MCAS is a tool used to assess performance based on the learning standards of the Massachusetts curriculum frameworks. Many schools are searching for instructional strategies to meet the needs of all learners while adhering to standards of the frameworks. “As a result school administrators and district personnel are scrambling to meet the needs of all their
students, while attempting to ensure that all teachers are highly qualified” (Santamaria & Thousand, 2004, p. 13) 

**Differentiated Instruction**

Differentiated instruction is a philosophy that has been generating popularity since the implementation of Response to Intervention. Districts are using DI along with other strategies to help students reach their highest learning potential.

Carol Ann Tomlinson is a well-known educator and researcher who focuses much of her time discussing the potential benefits DI has in the classroom and also how to implement it effectively. Tomlinson defines the terms and creates a sense of ease so educators can use DI to help close the achievement gap and reach all learners. She states, “Differentiated instruction is a philosophy of teaching purporting that students learn best when their teachers effectively address variance in students’ readiness levels, interests, and learning profile references. A key goal of differentiated instruction is maximizing the learning potential of each student” (Tomlinson, 2001, 2003, p. 263).

Tomlinson identifies six “underpinnings of effective differentiation” (p. 263). A safe and challenging environment is key. Students and teachers should feel safe and comfortable so learning can take place. “Teaching students to care about themselves and each other begins with providing the environment and the language they need to interact, both with students who are labeled and with those who are not” (Baglierei & Knopt, 2004, p. 526). She suggests teaching should be delivered in various methods such as whole group, small group and one on one. Teachers and students should fully understand and be able to articulate the learning goals for each lesson. Students should
receive pre-assessments as well as formative assessments along the way. Flexibility is key and student/teacher relationships share the responsibility of respect and an optimal learning environment. The following figure is a chart one should refer to when beginning to implement DI. The components of this chart will be discussed in more detail.

**Figure 1.2 Learning Cycle and Decision Factors Used in Planning and Implementing Differentiated Instruction**

(National Center On Accessible Instructional Materials At Cast, Inc. 2011)

**Assessment**

“Assessment is essential to effective teaching and learning” and is a common theme found when researching DI” (Heritage, Kim, Vendlinski, & Herman, 2009, p. 24). Assessments are used throughout the implementation of DI and are the driving force behind the specific instruction provided. When teaching with the philosophy of DI in mind teachers are asked to pre-assess students and provide formative assessments throughout the learning. This type of assessing is different than the typical form of assessments known as summative assessments (testing a child after each chapter or skill
taught) in that it informs teachers on how to continue teaching. However, it is important to keep in mind students’ learning styles because for students to benefit most from instruction and assessment, part of the instruction and assessment should match their learning style (Sternberg & Zhang, 2005, p. 245).

“Vygotsky’s notion of proximal development has important implications for how one assesses a child’s ability. A test for assessing intelligence, for example, should assess not what the child knows and understands right now, the typical approach of such tests, but what she can know and understand with help” (Miller, 2002, p. 406). In this quote Vygotsky refers to the scaffolding that takes place between the child and the teacher. This interaction is an informal way to assess a child. In DI teachers are asked to assess student levels as well. Levy (2008) states, “If we do not know where we are, how can we get where we are going? Students come to us with greatly varying abilities and experiences. The place to begin is with pre-assessments” (p. 162). By assessing students, general education teachers who are providing instruction in an inclusive classroom will be able to monitor student learning and provide instruction that is appropriate. McTighe and Brown (2009) agree in that students should demonstrate their knowledge in assessments instead of just recalling information. McTighe and Brown also agreed with John Dewey (2001) in that assessments should come in multiple forms and students should prove they have understood a concept by demonstrating it in a real-world application.

Levy defines three types of assessment that are vital components of implementing DI. First is the pre-assessment which Levy and King-Shaver (2008) agree is an informal way to help a teacher get a snapshot of where their students’ learning levels are in
conjunction with the curriculum being taught. Pre-assessments can range from KWL (what the students know, what they want to learn and what they have learned) charts to teacher-generated tests.

Next is formative assessment, which provides teachers with information during instruction that allows teachers to identify student weaknesses (Cauley & McMillan, 2010, p. 1). Heritage, et al. (2009) describe formative assessment as “a systematic process to continuously gather evidence and provide feedback about learning while instruction is under way” (p. 24). The data gathered from the formative assessments allows a teacher to identify the gaps between current level and desired level of learning. A teacher may ask if there are any questions while teaching but later finds out students are struggling when they begin independent work. Progress monitoring is another type of formative assessments. It allows teachers the ability to monitor students’ achievement throughout the lesson. Teachers may conduct formative assessments in multiple ways. Some may ask students for a written response, demonstrate what they know, observe or question a student or simply discuss content. In order for the assessment to be classified as formative the teacher must take action on the data gathered from the assessment. Also, students benefit most from formative assessments when teachers set clear expectations (Cauley & McMillan, 2010, p. 1).

Last, is summative assessment, which is a way for a teacher to see if a student has successfully learned the objective or skill being taught. They can include, but are not limited to, standardized tests, projects, teacher-generated quizzes or tests and oral reports. Overall, assessments can vary from student to student. This part overlaps with flexibility
in that teachers need to be flexible when providing assessments to students during all levels of instruction. It is best to incorporate the learning styles of each student and incorporate it into the students’ assessments.

**Readiness, Interest, Learning Profile**

A student’s readiness should not be based on actual intellectual ability but on that student’s attitudes, experiences and schooling (Santangelo & Tomlinson, 2009). The goal for establishing readiness allows teachers an entry point to begin instruction.

Tomlinson (2005) asserts,

> A task that’s a good match for student readiness extends that student’s knowledge, understanding, and skills a bit beyond what the student can do independently. A good readiness match pushes the student a little beyond his or her comfort zone and then provides support in bridge the gap between the known and the unknown. (p. 45)

Students who are struggling with their individual readiness often affect their learning progress. These students may benefit from opportunities for direct instruction or extra practice of skills and concepts. By determining the student’s zone of proximal development, according to Vygotsky’s theory, teachers are better able to assess readiness levels. Activities are modified and might include fewer steps, lower reading level, and more structure. (Houtven & Van d’ Grift, 2001, p. 395).

Keeping students motivated is often a challenge for teachers but when teachers utilize student interests, an idea that John Dewey suggested in the late 1800’s,
motivation increases. Interests can include personal experiences and strengths, cultural background, and areas of need (Tomlinson, & Imbeau, 2010, p.17).

Understanding students’ learning profiles is an integral aspect to teaching. Tomlinson (2010) suggests learning profiles be considered greatly when implementing DI. There are four elements according to Tomlinson that define learning profile: learning style, intelligence preference, gender, and culture.

Learning style articulates how a student prefers to learn. Do they like to work alone, in a group or with a partner? Does the student prefer a quiet environment to a loud environment? Some students may prefer to sit still while others prefer to move around.

Intellectual preference refers to Gardner’s theory of multiple intelligences, which includes verbal-linguistic, logical-mathematical, kinesthetic, interpersonal, intrapersonal, musical-rhythmic, spatial, analytical, practice, and creative (Gardner, 1983).

According to Gurian (2001) the gender of a student should be taken into consideration when providing instruction. Not all approaches work the same for males and females. Gender-based patterns exist for learning, and it may be critical to use teaching methods that can encompass both male and female preferences (Tomlinson & Imbeau, 2010)

Lastly, Tomlinson & Imbeau (2010) discuss the prominent role culture plays in a student’s ability to learn. It would be advantageous for teachers to study the variety of cultural backgrounds his/her students’ derive from. Once the teacher has an understanding, it would be beneficial to approach teaching in a way that encompasses
culture. For example, different cultures communicate, relate, celebrate, and respect differently.

**Content and Process**

Content and process are key components to the effectiveness of DI. Vygotsky’s theory of understanding the process a student takes to reach an answer can help teachers understand the importance of content and process. Teachers are provided with content that needs to be taught through their districts and the state standards. However, the process is up to each individual school and/or teacher. Schools that allow teachers to have more autonomy may have an easier time of implementing DI because the process is tailored to meet the needs of the students. Teachers are asked to “promote equity and excellence by differentiating high quality content, process, and product based on their understanding of students’ readiness levels, interests, and learning profiles” (Santangelo & Tomlinson, 2009, p. 308). Establishing an appropriate method for students to engage in content is important. Instead of modifying the content (although in some cases this is necessary) DI allows a teacher to be flexible with how content is delivered. For example, instead of a child reading a story, they could listen to it on tape or partner read. By doing this, the student is still receiving the required content knowledge, but the delivery of content tailored to meet their level of readiness.

**Inclusion**

“Inclusion is about creating a society in which all children and their families feel welcomed and valued” (Sapon-Shevin, 2008, p. 49). The implementation of No Child Left Behind Act (NCLB) of 2001 created a challenge to the success of inclusive
classrooms and differentiated learning. Since NCLB supports “research-based” methods, some schools have moved towards implementing programs that are proven to increase test scores and, as a result, teachers are sometimes discouraged from using philosophies such as DI in their inclusive classrooms (Baglieri & Knopf, 2004, p. 528). One goal of inclusion is to keep students on Individual Education Programs in their least restrictive environment (LRE). With the implementation of high-quality teacher and instruction, it is believed all students can succeed in an inclusion setting (Houtveen and Van de Grift, 2001, p. 396). Years ago special education students were often ostracized from the general education classroom. More recently, students on IEPs are included in the classroom to the fullest extent possible. Given this new movement, general educators are asked to work collaboratively with special education teachers and are being asked to provide instruction at different levels. By incorporating the philosophy of DI, teachers will be able to effectively provide instruction within their inclusion classroom.

The implementation of DI requires the support and collaboration from the administrative team, general and special educators as well as support staff. The Intelligence Community Collaboration (1999) study, defines collaboration “as the interaction among two or more individuals encompassing a variety of behaviors, including communication, information sharing, coordination, cooperation, problem solving, and negotiation” (as quoted in Santamaria & Thousand, 2004, p. 13). Co-teaching is also an important aspect to collaboration, which may involve team teaching between a general educator and a special educator. Servilio (2009) states, “Many professionals in the field of education know in order for instruction to be successful for students with disabilities, the general education teacher and the special education teacher
need to collaborate to design and implement effective strategies” (p. 3). Cahill and Mitra (2008) assert there needs to be a “willingness to share power and invest in the process” in order for collaboration to be successful (p. 150). For these reasons, administrators need to create time in the schedule for teachers to meet and collaborate.

“Collaborative teaching refers to an educational approach in which general and special educators work in a coactive and coordinated fashion to jointly teach academically and behaviorally heterogeneous groups of students in educationally integrated settings” (Jones, Michael, Mandala, Colachico, 2008, p. 203). The relationship between general education teachers and special educators is key to the success of their students. Collaborating requires shared thinking between each teacher as well as effective communication skills. In addition, the teachers who are working together need time to meet and plan lessons and discuss student needs. The success of the collaboration is reliant on each teacher’s individual work as well as the realization that each teacher’s performance affects the others (Jones et al., 2008). Research notes collaborative classrooms tend to be more active than classrooms lead by one teacher (Jones, et al., 2008). According to Heufner (1998) there are several benefits of collaborative classrooms for students and teachers. Some of those benefits include reduction of stigma for special education students, better understanding across disciplines, on the job training for general education teachers in special education skills and spillover benefits to general education students (Jones et al. 2008).

Much research has been done on the implications of inclusion. Houtveen and Van de Grift (2001) completed a study on inclusive and adaptive instruction in elementary
schools. They discussed the literature’s claim “ability grouping is detrimental to low achieving students” (p. 391). They review that ability grouping verses inclusion creates low achievers (Reezigt, 1989), academic elites (Barta & Allen, 1995; Bradock & Slavin, 1993; Rosenbaum, 1980), it doesn’t allow students mobility (Gamoran, 1992), creates a lessening of contact between students, teachers and guided practice (Gamoran, 1992; Slavin 1989), creates a less stimulating environment with lower achieving objectives and expectations (Bennett & Cass, 1989; Gamoran, 1992; Slavin, 1989) and lastly it is unlikely that the low achieving students are provided with the high qualified teacher (Gamoran, 1992).

Although this research states inclusion is more beneficial than ability grouping, there is research that articulates concerns regarding inclusion. Teachers voice apprehensions about their ability to meet the needs of the diverse learners in the classroom, the lack of necessary support and resources and the pressure to meet success on standardized tests (Baglieri & Knopf, 2004). This proclamation reinforces the importance of proper training, resources and the need to implement a philosophy such as differentiated instruction to help teachers feel more confident about teaching in inclusive classrooms. Professional development may be necessary to successfully implement a more collaborative approach to support the inclusive classroom.

**Professional Development**

Professional Development (PD) is one of the themes captured in the literature that may be beneficial when a school is implementing DI. Cave and Brown (2010) found that evidence suggests the quality of teachers is the largest factor influencing student
achievement. “Research has shown that quality professional development can change teachers’ practices and positively affect student learning” (Musanti & Pence, 2010, p. 73).

The literature agrees professional development is needed in order to implement DI successfully (Stover, Kissel, Haag, & Shoniker, 2011; Minott, 2010). With the increasing demands on student achievement and teacher quality, there has been a new interest in purposeful and productive PD. “Ongoing professional development is needed with attention to instruction, materials, and assessments that are especially appropriate for students with cultural and linguistic differences” (Drame & Xu, 2008, p. 86). An issue Leko and Brownell (2009) notice is the necessity to provide PD to address instructional strategies, specific school curriculum and the role of the special and general educators in the classroom. This research analyzes the important parts of PD. When describing effective PD, Leko and Brownell (2009) suggest it should be “coherent” and must “focus on content”. Teachers must be “actively engaged” so they can apply the skills taught while being “collaborative and including student data” (pp. 67-68). Given these attributes of PD, teachers need sustained support while they are implementing any new instructional strategy, but specifically DI, to ensure they are monitoring and instructing their students effectively.

As part of PD, reflection is a key component that needs to be addressed. Research suggests teachers reflect on their own teaching and the responses it provokes. Specifically, teachers can reflect on modifying and adapting curriculum to student needs,
which may affect the tools used in instruction. The use of questions and collaboration among teachers requires a reflective mindset.

Another area of reflection discussed in the literature is the use of action research to facilitate reflection. It can “empower teachers to examine their own beliefs, explore their own understanding of practice, foster critical reflection, and develop decision making capabilities that would enhance their teaching, and help them assume control over their respective situations” (Ginns, Heirdsfield, Atweh & Watters, 2001, p. 112). Teachers can employ action research as a means of studying the process and outcomes.

Professional development is often expensive for public schools so Dalhouse (2009) suggests utilizing the personnel within the district as a source of professional development. Research supports providing teachers opportunities to observe other teachers’ instruction as a way to reflect on their own practice and make changes they deem fit. “Observations and coaching by reading specialists are also recommended as follow-up options for supporting teachers and ensuring that the intervention principles are being implemented” (Dalhouse et al., 2009, p.86). Schools may have a coach to facilitate training throughout the year. They may also have a group of professionals to monitor the implementation. However, with the increasing budget cuts, curriculum coaches are sometimes eliminated. In this case, it would be important for teachers to observe each other and provide useful feedback to their instruction. Providing training to teachers observing teachers can be helpful and create a less threatening environment for all (Dalhouse et al, 2009, p.86).
Chapter 3: Research Design

Methodology

This section explains the procedures used to collect data regarding teachers’ understanding and implementation of differentiated instruction in grade kindergarten through grade 6. The following sections will be explored in more detail: Research Design Approach, Research Questions, Hypotheses, Site and Participants, Data Collection, Data Analysis, Validity and Protection of Human Rights.

Research Design Approach

The purpose of this quantitative study was to articulate current practices in the area of differentiated instruction of curriculum and instruction in K-6 classrooms in Leighton Public Schools. The researcher utilized a cross-sectional survey meaning the data was collected at one point in time (Creswell, 2009, p. 146). A survey study “provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. From sample results, the researcher generalizes or makes claims about the population” (Creswell, 2009, p. 145). This research method was chosen because it allowed the researcher to anonymously gather the participants’ opinions and beliefs to answer the research questions. It was the researcher’s belief teachers would be more honest with an anonymous survey. Also, surveys are often used at the Leighton Public School as a means to gather a large amount of data quickly. Since teachers are accustomed to completing surveys, the researcher perceived survey study would be the most efficient method to collect data. In addition, surveys allow for a “rapid turnaround in data collection” (Creswell, 2009, p. 146). Fowler (2009) states, “The
purpose of the survey is to produce statistics, that is, quantitative or numerical descriptions about some aspect of the study population” (p.1).

**Research Questions**

The problem of practice for this research study was to uncover the K-6 teachers’ understanding and implementation of differentiated instruction. The researcher was focused on the extent of teachers’ understanding of how to implement DI in the classroom, and also their ability to implement the components of DI. The results of the survey allowed the researcher to identify areas of need for future professional development.

The primary research question that guided this study was: (1) *To what extent do K-6 teachers understand the concepts of differentiated instruction and the methods of how to differentiate classroom instruction in the Leighton Public Schools?* The secondary question was (2) *How do K-6 teachers at Leighton Public Schools implement components of differentiated instruction (student interest, assessment, lesson planning, content, process and product) as defined by Carol A. Tomlinson?* These six components were identified on the survey. They are the foundations, according to Tomlinson (2010), to differentiated instruction. Tomlinson has researched these components and they are vital to understand when implementing DI. Therefore, it will be crucial to uncover teachers’ understanding and implementation of each component.

This research study consisted of independent and dependent variables. According to Creswell (2009) “Independent variables are those that (probably) cause, influence, or affect outcomes” (p. 50). The independent variables in this study were the six
components of DI defined by Tomlinson: student interest, assessment, lesson planning, content, process and product. Also included in the independent variables is whether teachers had received training or not and whether the participants are special education teachers or general education teachers. Creswell (2009) states, “Dependent variables are those that depend on the independent variables; they are the outcomes or results of the influence of the independent variables” (p. 50). The dependent variables in this study were the overall teacher understanding and the overall implementation of DI by teachers in the classroom.

“A hypothesis is a hunch derived from an informed reading of the literature, a theory, or personal observations and experience, and it must be capable of being tested” (Nardi, 2006, p. 44). The follow hypotheses are considered a positive one-directional hypothesis because as Nardi (2006) states, “both variables are hypothesized to change together, or co-vary, in the same direction” (p. 47).

**Hypotheses**

1. There will be a variation in responses in teachers’ understanding of DI concepts among the participants.
2. There will be variation in responses in teachers’ implementation of DI concepts among the participants.
3. Teachers who have participated in DI training will have a higher level of understanding of the overall process of DI.
4. Teachers who have participated in DI training will have a higher level of implementation of the overall process of DI.
5. There will be a significant difference in the *understanding* of differentiated instruction between special education and general education teachers.

6. There will be a significant difference in the *implementation* of differentiated instruction between special education and general education teachers.

**Table 3.1 Hypotheses and Correlations on the Survey**

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Items on Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>There will be a variation in responses in teachers’ understanding of DI concepts among the participants</td>
<td>Part 1 Section A compared to participants</td>
</tr>
<tr>
<td>There will be a variation in responses in teachers’ implementation of DI concepts among the participants</td>
<td>Part 1 Section B compared to participants</td>
</tr>
<tr>
<td>Teachers who have participated in DI training will have a higher level of understanding of the overall process of DI.</td>
<td>Part 1 Section A compared to Part II Question 34</td>
</tr>
<tr>
<td>Teachers who have participated in DI training will have a higher level of implementation of the overall process of DI.</td>
<td>Part 1 Section B compared to Part II Question 34</td>
</tr>
<tr>
<td>There will be a significant difference in the understanding of differentiated instruction between special education and general education teachers.</td>
<td>Part 1 Section A compared to Part II Question 28</td>
</tr>
<tr>
<td>There will be a significant difference in the implementation of differentiated instruction between special education and general education teachers school and participants</td>
<td>Part 1 Section B compared to Part II Question 34</td>
</tr>
</tbody>
</table>

Schools will continue to strive toward closing the achievement gap as the population of classrooms continues to diversify. Leighton Public Schools continue to look for ways to assist teachers in closing these academic gaps. The survey results articulate the level of *understanding* and the level of *implementation* of differentiated
instruction that is currently taking place in the classroom(s). Also, the survey results identify the level of training teachers have been exposed to, and whether or not it was effective to change practice(s) in the classroom. Lastly, the results identify whether general education or special education teachers require more training in differentiated instruction. With the knowledge gained through this survey study, Leighton Public Schools will be able to implement professional development that meets the teachers’ needs more effectively in the area of differentiated instruction.

Site and Participants

This research study took place at Leighton Public School District, a suburban community in southeastern Massachusetts. The sample included 141, both special education and general education, teachers who have been teaching between one and 25 years. The researcher requested all teachers in the sample to participate in an electronic survey administered through the school district’s electronic system.

Table 3.2 Schools and Participants

<table>
<thead>
<tr>
<th>Schools</th>
<th>General Education Teachers</th>
<th>Special Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantique Middle School</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>Fair Harbor Elementary School</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Ocean Bay Park Elementary School</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>OceanBeach Elementary School</td>
<td>29</td>
<td>6</td>
</tr>
<tr>
<td>Seaview Elementary School</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Totals:</td>
<td>112</td>
<td>29</td>
</tr>
<tr>
<td>Total Participants:</td>
<td></td>
<td>141</td>
</tr>
</tbody>
</table>
Leighton Public Schools is situated in a suburban neighborhood with a population of just over 31,000 people. In 2007, five years ago, Leighton Public Schools was engaged in differentiated instruction professional development. It was a year-long curriculum endeavor where teachers spent three full days and three half-days in training. In addition, some of the schools had independently explored differentiated instruction within their schools. The purpose of the training was to educate teachers so they could implement DI with fidelity in their classrooms. However, since the training, the district has hired new teachers, so not all teachers being surveyed had the training Leighton Public Schools offered. This research was conducted at Leighton Public Schools because there has been question of whether or not the training provided was significant enough for teachers to be able to implement DI. The results of this survey allowed the researcher to identify areas of strengths and weakness in regards to DI. In addition, DI is part of Atlantique Middle School’s school improvement plan. The administrator in the building needed more information to move forward in providing professional development.

The survey was conducted at the Leighton Public Schools. The researcher received written permission from the superintendent and the individual building principals to conduct a survey study. The sample design was single stage because the researcher had access to the specific names of all participants that were surveyed. Creswell (2009) states, “A single-stage sampling procedure is one in which the researcher has access to names in the population and can sample the people (or other elements) directly” (p. 148). The target population was the general education and special education teachers. General education teachers were defined as teachers teaching grades K-6,
reading specialists, title 1 teachers and academic support teachers. All of these teachers had direct contact with students and provide general education services. The special education teachers were defined as teachers who work as inclusion teachers and self-contained classroom teachers. They had direct contact with students but provided specially designed instruction to the students on Individualized Education Programs. The names and teaching positions of all participants were available to the researcher through the school website and building principals. All general education teachers and special education teachers in the participating schools were asked to participate in the survey study, however participation was voluntary. The five schools involved in the study were: four elementary and one middle school. The four elementary schools were: Fair Harbor School, Seaview School, Ocean Beach School, Ocean Bay Park School and the middle school was Atlantique Middle School.

This research was geared towards a specific population. “A population is the total collection of units or elements you want to analyze” (Nardi, 2006, p. 108). The unit of analysis was the general and special education teachers in grades K-6. Unit of analysis “is the element about which you are observing and collecting data, such as a person responding to a questionnaire, a school, an editorial, or a local business” (Nardi, 2006, p. 109). The population parameters were the data collected from all participants. However, there was a chance not all teachers asked to participate would complete the survey. Therefore, the researcher made inferences based on the data collected. Population parameter is the “information about the variables in this population of works” (Nardi, 2006, p. 109). The participants were chosen through purposeful sampling which “involves designating a group of people for selection because you know they have some
traits you want to study” (Nardi, 2006, p.119). The researcher purposefully chose these teachers to participate because they had direct contact and instruct students on a daily basis, but their participation was strictly voluntary.

All teachers K-6 in the Leighton Public Schools were recruited to participate in the DI survey. The researcher hoped teachers would be motivated to complete this study because the results of the study could help inform professional development and their practice. The researcher has a collegial relationship with some of the teachers in the district because of the researcher’s participation in committees, trainings and collaborative work. The researcher attended one staff meeting in each building to introduce the survey and its purpose, and was available to answer any question. In addition, the researcher sent a letter stating her position, the purpose and importance of the study and confidentiality guideline when the survey was disbursed. As a follow up, the researcher asked the building principals to encourage full participation. The researcher was hopeful these relationships and safeguards would ensure a strong rate of participation.

The special education teachers were paired with the general education teachers in an inclusive classroom model, thus were considered in the same population. This allowed the researcher to collect upwards of 88 surveys to provide statistical validity. As part of the demographic information, teachers identified their grade level and whether they were employed as a general education or special education teacher to allow for specific statistical correlations to be made. The participants varied in educational background, years of teaching experience, subjects taught, age and grade level experience.
participants were asked to complete a demographic section on the survey that also identified the subject and grade they teach, gender, age range, years of experience, education level, years taught, and level of training in DI. The survey identified two areas regarding differentiated instruction: understanding of DI concepts and level of implementation of DI.

Data Collection

The researcher collected quantitative data through a computerized survey sent through Google Documents involving mostly closed-ended questions. A survey research design allowed the researcher to “administer a survey or questionnaire to a sample or to the entire population of people in order to describe the attitudes, opinions, behaviors, or characteristics of the population” (Creswell, 2005, p. 599). The survey was cross-sectional which means the data was collected once and not over time (Creswell, 2005, p. 146). The superintendent of the school and the building principals granted the researcher permission to institute the survey. Next, a formal letter was sent to the building principals explaining in more detail the purpose of the survey. The researcher discussed an appropriate time for the survey to be sent out. This was crucial to encourage participation. Principals were asked to announce the survey, its importance and purpose at a staff meeting a week prior to the researcher sending the survey to the participants. Next, the survey was sent to participants in a Google group list that teachers have access to through their work e-mail. The group list only included the teachers the study was interested in surveying so the researcher specifically created the grouping. Specialists teachers such as physical education, library, music, etc, were not included in this study therefore those teachers did not receive the survey. All of the participants had either a laptop or access to
a computer lab, so they were able to easily access the survey. Teachers responded twice to 26 questions using a Likert scale. First they identified their level of understanding of DI concepts and second they identified the level of implementation of DI. The researcher also sent out a follow-up email to remind teachers of their opportunity to participate.

The figure below is a flow chart detailing how the data was collected.

**Figure 3.1 Data Collection**

The Survey Questionnaire was originally modified from the Teacher Self-Reflection on Differentiation for Staff Development Planning Survey (Page, 2007). Sandra Page received permission to modify the survey from Carol A Tomlinson, renowned researcher and author on DI (Tomlinson & Allan, 2000). The survey questions corresponded with the essential elements of differentiated instruction.
To increase validity, the survey was piloted with teachers at another school who were not part of the original research. There were ten participants in the pilot group. Each participant completed the survey in paper and pencil format. The results of the pilot survey did not indicate any issues with the survey. The researcher also interviewed the pilot group individually to ensure the survey was clear. The only comments teachers made about the survey was that it was lengthy. However, the participants reported the length did not limit their responses to the survey items. Carol A. Tomlinson and Sandra Page gave permission for the researcher to use the survey through email correspondence.

**Data Analysis**

The researcher coded the survey and entered the data into a statistical software program. “A code is a set of rules that translate answers into numbers and vice versa” (Fowler, 2009, p. 146). The researcher used a numerical code to analyze the data. Codes were consistent and were assigned to missing data and when possible “fit numbers in the real world” (Fowler, 2009, p. 147). Most importantly, the code was “unambiguously assign[ed] each answer to one and only one code number” (Fowler, 2009, p. 147). The data were displayed in text, graphs, and tables. The analysis provided a calculation of descriptive statistics showing frequencies and percentages for each response. In addition, means and correlations were calculated to prove the hypotheses.

The data from the survey were entered in to SAS® for Windows v9.2 for statistical analysis. In the first and second hypotheses, the researcher predicted there would be variation in participant responses in regards to understanding and implementing DI. The researcher utilized descriptive statistics to examine the variation in participants’
responses across the 26 items in Section I, Part A, Understanding of the survey. The third and fourth hypotheses sought to examine the differences in understanding and implementation of DI concepts among the participants of the Leighton Public Schools. The researcher analyzed it by using the non-parametric Kruskal-Wallis Test (a generalized form of the Wilcoxon Two-Sample Test). Hypotheses five and six sought to determine the difference between special education teachers and general education teachers and were analyzed by using the non-parametric Kruskal-Wallis Test (a generalized form of the Wilcoxon Two-Sample Test).

Given the expected ratings and relatively small sample size overall, and particularly the small sample size expected for two of the groups of interest (i.e., special education teachers and teachers with extensive DI training), a real concern was whether the sample size was sufficient to accurately detect differences between the groups. Power tests were conducted to estimate the sample size needed to correctly reject the null hypothesis of no difference between the groups when it is false. Across overall understanding and implementation scores as well as subcategories within each, results of the power tests indicated that with expected minimum sample sizes of 20-25 a power of .80 could be maintained with a value of alpha (level of significance) between .05 and .10. In this study, results of statistical tests were reported as significant when the probability was .10 or lower.

Validity: Limitations and Delimitations

There are several limitations that affected the validity of the research. Participants who did not complete the survey could have been a threat to the validity of
the survey research (Gall, Borg & Gall, 1996). There could have been a difference between the participants who completed the survey verse the ones who did not. Having the building principals discuss the importance and purpose of the survey should have helped diminish this issue. In addition, the email accompanying the survey, and the reminder email sent out, should have ensured a high level of participation.

Honesty could have threatened internal validity. Teachers may have been hesitant to articulate they had limited understanding of DI and limited ability to implement DI in the classroom. This was addressed by stressing the purpose and importance of the survey. Also, the researcher iterated the results would remain anonymous. People were more likely to be truthful on a survey rather than face-to-face discussion (Weiss, 1975). In addition, the researcher worked closely with the building principals discussing the purpose of the survey. The principals, who have a relationship with the participants, reinforced the purpose and importance of the survey at staff meetings.

A limitation to consider was the lack of males working at the elementary and middle school level. Due to the fact there are more females than males in the school, males were underrepresented. The researcher was unable to change the lack of males but it was important to keep in mind when analyzing the data.

At the time of this study, the researcher was an employee in this district, specifically at one of the schools that data was retrieved from and her position had changed from special education teacher to Assistant Team Chair. Although the researcher is still contractually a teacher, other teachers could have felt threatened by this researcher since she holds an administrative role within one of the buildings in the district. The
researcher also held biased views about specific teachers because previously, as a special education teacher, she had the opportunity to work with many of the general education teachers. The building principal of the school in which the researcher was employed was focusing on DI as part of the school improvement plan at the time of this study. As a result, the principal reinforced the importance of the survey, not only for the researcher, but also for the school and district as a whole.

The original survey was validated prior to this research. However, it was also piloted before it is administered to the Leighton Public Schools so suggestions could be taken into account and add to the validity of the survey. This study was expanded to other schools within the district where the researcher has no affiliation, thus minimizing any suspicions or reluctance to participate. The researcher discussed the purpose of the survey with all participants at a staff meeting. By doing this it minimized preconceived ideas about the purpose of the research. All responses to the survey were kept confidential and the surveys remained anonymous.

**Protection of Human Rights**

In 1991, the United States Department of Education and seventeen federal departments and agencies adopted a set of regulations known as the Federal Policy for the Protection of Human Subjects also known as “Common Rule” (U.S. Dept. of Education, 2004). This research was completed following these regulations.

Participants were protected by anonymity and they were informed about the research study prior to participating. In addition, the researcher received consent from all building principals and the superintendent of schools prior to the start of this survey.
research. This research was strictly voluntary. Participants were able to contact the researcher at any time with questions and/or clarification of the study. The survey results were made available at the conclusion of the study for anyone who wanted a copy.

The researcher submitted an application to Northeastern University’s Institutional Review Board for approval to conduct human subject research. Letters of permission, approved consent forms, survey questions and cover letters, advisor approval forms, and other supporting documents are contained in the Appendix.

Conclusion

The goal of this study was to understand what the teachers at the four elementary schools and one middle school at Leighton Public Schools understood about the concepts of differentiated instruction and if they implemented the methods and strategies in their classrooms. It was not the researchers intent to judge the schools based on the data collected, but to use the data to help inform professional development and increase support for teaching staff.

An electronic survey was used to collect the data. Once the data were collected and analyzed, results were shared with the building principals of the participating schools and the superintendent in the district. The principals may use the data to assist in planning for future professional development. Since some of the teachers had access to training in differentiated instruction, this information is important so teachers didn’t feel inundated by the same training they once received. The data may be used to help provide the teachers with specific techniques and strategies to help close the achievement gap in their classrooms. In addition, the data analysis will be used to help structure and design
the Atlantique Middle School’s improvement plan, required under Massachusetts Department of Elementary and Secondary Education.

Chapter 4: Report of Research Findings

Design Approach

The purpose of this research investigation was to uncover the level of understanding and level of implementation that teachers have regarding differentiated instruction in grades kindergarten through sixth in a suburban community in Southeastern Massachusetts. This study employed a survey methodology that focused on general education teachers and special education teachers, K-6th grade at the Leighton Public Schools.

Differentiated instruction is a teaching philosophy that places students at the center of learning and encourages teachers to teach students at their instructional learning level. Teachers are encouraged to use a variety of materials in order to reach their highest academic potential. The focal point of differentiated instruction is to teach students at their instructional learning level. Tomlinson (2003) states, “The idea of differentiating instruction to accommodate the different ways that students learn involves a hefty dose of common sense, as well as sturdy support in the theory and research of education. It is an approach to teaching that advocates active planning for student differences in classrooms” (p. 1).

Furthermore, Tomlinson states,
Differentiation is an individual-focused approach to teaching. It is the manifestation of a conviction that every student is both unique and of prime importance as a learner and as a human being. It is an affirmation that human differences are normal and desirable, and that excellent teachers plan, teach, and reflect with those differences in mind. (p. 37).

Tomlinson (2010) identifies six components to DI that are key elements of differentiated instruction: student interest, assessment, lesson planning, content, process and product. Teachers were asked to rate their level of understanding and level of implementation of these six components.

Chapter three detailed the overview of the methodology that was used for this study and the rationale for choosing a quantitative survey research method. Chapter four includes a more detailed narrative of the research method as well as the results of the research study. This chapter will be organized by the following sections: (1) quantitative approach, (2) description of site and participants, (3) research questions, (4) hypotheses and data results, (5) validity and credibility, and (6) conclusion.

**Quantitative Approach**

A survey research study was employed to collect opinions, beliefs and practices of teachers using differentiated instruction in the classrooms. “A survey is a systematic method for gathering information from (a sample of) entities for the purpose of constructing quantitative descriptors of the attributes of the larger population of which the entities are members” (Groves et al., 2009, p. 2). A quantitative approach was deemed to be the most appropriate design to gather data in a non-threatening, confidential manner.
The survey questionnaire, *Teacher Survey on Differentiated Instruction*, was originally modified from the Teacher Self-Reflection on Differentiation for Staff Development Planning Survey (Page, 2007). Sandra Page from The Association for Supervision and Curriculum Development or ASCD had received permission from Carol A. Tomlinson to modify the survey (Tomlinson & Allan, 2000). The survey items correspond with the components of differentiated instruction. The researcher was granted permission to use the survey for a research study from both Sandra Page and Carol A. Tomlinson.

The survey consisted of three sections: Section I, Part A: Understanding; Section I, Part B: Implementation; and Section II: Demographics. Section I, Part A was a series of questions that used a four-point Likert scale (labeled not important, somewhat important, fairly important, very important) with questions related to participants’ level of understanding about Tomlinson’s (2010) six components (*student interest, assessment, lesson planning, content, process* and *product*) of differentiated instruction. Section I, Part B also used a four-point Likert scale (labeled hardly ever/never do this, sometimes/have used on a few occasions, frequently use this, use intentionally and often) with questions related to participants’ level of implementation of differentiated instruction in regards to the six categories (*student interest, assessment, lesson planning, content, process* and *product*) identified by Tomlinson. Section II was comprised of demographic questions such as current subject area and grade taught, age range, type of teacher (general or special education), education level, years of teaching experience and DI training experience.
The researcher used Survey Monkey to collect survey responses. Survey Monkey is an Internet-based company that allows users to create their own web-based surveys. The researcher inputted the survey information into Survey Monkey and then sent the link to the participants. Once the researcher closed the survey, Survey Monkey compiled data. The researcher used the data collected through Survey Monkey to run statistical tests. The researcher also used the SAS® for Windows v9.2 to analyze the data. “SAS is an integrated system of software solutions that enables you to perform tasks” such as statistical and mathematical analysis (SAS Institute, 2012).

Given the expected ratings and relatively small sample size overall, and particularly the small sample size expected for two of the groups of interest (i.e., special education teachers and teachers with extensive DI training), a real concern was whether the sample size was sufficient to accurately detect differences between the groups. Power tests were conducted to estimate the sample size needed to correctly reject the null hypothesis of no difference between the groups when it is false. Across overall understanding and implementation scores as well as subcategories within each, results of the power tests indicated that with expected minimum sample sizes of 20-25 a power of .80 could be maintained with a value of alpha (level of significance) between .05 and .10. In this study, results of statistical tests will be reported as significant when the probability is .10 or lower.

Participants and Site

The research was conducted at the Leighton Public Schools, a suburban school district in the Southeastern Massachusetts. Leighton Public Schools is comprised of 4
elementary schools (Fair Harbor, Ocean Bay Park, Ocean Beach, and Seaview) that service students in kindergarten through 4th grades. Students then attend Atlantique Middle School that is comprised of grades 5 and 6. Following middle school, students attend junior high for grades 7 and 8 and then complete their secondary education at the high school which services students 9th grade through 12th grade. For the purposes of this study, the following schools were surveyed: Fair Harbor, Ocean Bay Park, Ocean Beach, Seaview and Atlantique. The researcher chose to survey these schools because of the grade levels and the fact that the elementary schools are self-contained and the middle school is made up teams with two team teachers and self-contained classrooms.

Each building principal and the superintendent of schools granted the researcher permission to conduct the survey. The researcher had conversations with each building principal and the superintendent letting them know the purpose of the research. After receiving Institutional Review Board approval from Northeastern University, the researcher attended one staff meeting at each of the five buildings to introduce herself and the study.

The purpose and goals of the research study were explained to the teachers. Teachers were encouraged to voluntarily participate in the survey and the researcher reiterated that the survey would be confidential and they would be granted anonymity. After the meeting with each of the five schools, the researcher sent the survey to identified teachers, utilizing the electronic software program, Survey Monkey, through the Google email accounts provided by the school district. After a week, the researcher sent a reminder email for the teachers to encourage them to participate in the survey.
After another week, the researcher sent an email to the teachers thanking them for their participation and advising them there were five more days to participate in the survey. Concluding three weeks of opportunity for participants to complete the survey, the survey was closed and data were analyzed using the SAS System. The participants who received the survey were purposefully chosen to take part in the survey because they have direct contact and instruct students on a daily basis. Some of these teachers were part of the district wide professional development in differentiated instruction, while others may or may not have had training outside of the district. All participation was voluntary. The survey was sent to 141 educators, which included general education teachers and special education teachers in grades kindergarten through sixth. Of those 141, there were a total of 88 teachers who responded to the survey. Overall, 3 males and 78 females participated in the survey, however 7 respondents skipped the question asking them to identify their sex. The following tables represent the specific information about the population that is important to acknowledge based on the research questions and hypotheses.

**Table 4.1 Types of Teacher**

<table>
<thead>
<tr>
<th>Types of Teacher</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Teacher</td>
<td>74.1%</td>
<td>60</td>
</tr>
<tr>
<td>Special Education Teacher</td>
<td>25.9%</td>
<td>21</td>
</tr>
<tr>
<td>Answered question</td>
<td></td>
<td>81</td>
</tr>
<tr>
<td>Skipped question</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>
Table 4.1 illustrates the response rate from general education teachers and special education teachers. The table represents the difference between general education teachers and special education teachers. There were 60 general education teachers and 21 special education teachers who participated in the survey.

**Table 4.2 Differentiated Instruction Training**

<table>
<thead>
<tr>
<th>Differentiated Instruction Training</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1.2%</td>
<td>1</td>
</tr>
<tr>
<td>Some</td>
<td>63.0%</td>
<td>51</td>
</tr>
<tr>
<td>Extensive</td>
<td>35.8%</td>
<td>29</td>
</tr>
<tr>
<td>Answered question</td>
<td></td>
<td>81</td>
</tr>
<tr>
<td>Skipped question</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

Table 4.2 represents the level, “none”, “some”, or “extensive”, of differentiated instruction training that the participants reported. There was one participant who reported they did not have any DI training, while 51 participants had “some” training and 29 participants had “extensive” training.

Table 4.3 indicates the highest level of education that participants reported having obtained.
Table 4.3 Highest Education Level

<table>
<thead>
<tr>
<th>Highest Education Level</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor’s Degree</td>
<td>13.6%</td>
<td>11</td>
</tr>
<tr>
<td>Master’s Degree</td>
<td>51.9%</td>
<td>42</td>
</tr>
<tr>
<td>Master’s Degree plus 30</td>
<td>33.3%</td>
<td>27</td>
</tr>
<tr>
<td>CAGS</td>
<td>2.5%</td>
<td>2</td>
</tr>
<tr>
<td>Doctoral Degree</td>
<td>1.2%</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>3.7%</td>
<td>3</td>
</tr>
<tr>
<td>Answered question</td>
<td></td>
<td>81</td>
</tr>
<tr>
<td>Skipped question</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

This table illustrates that 13.6% of the participants highest level of education is a Bachelor’s Degree. 51.9% of the participants have a Master’s Degree as their highest level of education. There were 33.3% participants who have a Master’s Degree plus 30 credits while 2.5% participants have a CAGs Degree. 1.2% of the participants have a doctoral degree and 3.7% of the participants answered the have other degrees. The comments were as follows: one indicated that he/she was working on a doctorate degree, two participants reported they had masters degree plus 60, and one participant added that they had Wilson reading.

In looking at the frequency documentation there were several participants who answered that they had more than one degree. The frequencies indicated that there were 9 participants, 10.23%, who did not answer the question. One participant, 1.14%, stated they had a doctorate degree while two participants, 2.27%, stated they had a CAGS degree. There were 27 participants, 30.68%, who stated they had a Masters Degree plus
Research Questions

The purpose of this survey research study is to uncover the understanding of the concepts and methods that teachers have regarding differentiated instruction and to identify how teachers implement differentiated instruction within their classrooms. The information gathered from the survey may help heighten awareness of practices and help inform future trainings in the area of differentiated instruction. The two research questions that guided this study are: (1) To what extent do K-6 teachers understand the concepts of differentiated instruction and the methods of how to differentiate classroom instruction in the Leighton Public Schools? (2) How do K-6 teachers at Leighton Public Schools implement components of differentiated instruction (student interest, assessment, lesson planning, content, process and product) as defined by Carol A. Tomlinson?

In this chapter, the findings are presented based on each research question and the hypotheses are analyzed. All survey responses were downloaded from SurveyMonkey and analyzed using SAS® for Windows v9.2. SAS was used to recode the data, calculate total scores and subscores within sections of the survey, and compute both descriptive and inferential statistics.

Hypotheses 1 and 2 look for variability among the components of DI in regards to understanding and implementation. These hypotheses also serve to set up hypotheses 3, 4, 5, and 6 because if there was no variation in scores it would be impossible to find the
significant differences that were predicted in hypotheses 3, 4, 5, and 6. As a result, hypotheses 1 and 2 addressed the variability in the level of understanding and level of implementation of differentiated instruction.

Hypotheses 3 and 4 addressed the significant difference in understanding and implementation between teachers with different levels of training in differentiated instruction. Hypotheses 5 and 6 addressed the significant difference in understanding and implementation of differentiated instruction between general education teachers and special education teachers. Original plans called for the use of two-sample t-tests to determine the significance of the differences between group scores. Given the nature of the survey data and the small sample sizes of two of the groups (20 special education teachers and 29 teachers with extensive training) there were concerns about violating the t-test assumptions of interval level data and an underlying normal distribution of the sample means. For those reasons, it was determined that the non-parametric Wilcoxon Two Sample test would be more appropriate than the t-test for this analysis. Using PROC NPAR1WAY in SAS, the Kruskal-Wallis test, a generalized form of the Wilcoxon Two Sample test, was used to determine the significance of group differences for hypotheses 3 through 6. PROC NPAR1WAY performs tests for location and scale differences based on Wilcoxon scores of response variable and also provides tests that use the raw input data as scores (SAS Institute, 2012).

Hypotheses

The following hypotheses were formulated to assist in answering the quantitative research questions.
Hypothesis 1: There will be a variation in responses in teachers’ understanding of DI concepts among the participants.

Hypothesis 2: There will be variation in responses in teachers’ implementation of DI concepts among the participants.

Hypothesis 3: Teachers who have participated in DI training will have a higher level of understanding of the overall process of DI.

Hypothesis 4: Teachers who have participated in DI training will have a higher level of implementation of the overall process DI.

Hypothesis 5: There will be a significant difference in the understanding of differentiated instruction between special education and general education teachers.

Hypothesis 6: There will be a significant difference in the implementation of differentiated instruction between special education and general education teachers.

**Hypothesis 1.** There will be a variation in responses in teachers understanding of DI concepts among the participants. The researcher utilized descriptive statistics to examine the variation in participants’ responses across the 26 items in Section I, Part A, Understanding of the survey. The following values were assigned to the response categories: 1-not important, 2- somewhat important, 3-fairly important, and 4-very important. Individual item responses were summed across the 26 questions to find a total score on understanding. The following table shows the variation between the number of
people and their total scores. Total scores ranged from 58 to 104 with a median of 94 and semi-interquartile range of 15. The mean score on understanding was 92.12 with a standard deviation of 9.56. Overall, there was variation in understanding of DI concepts among the participants.

This figure represented the variability between the number of participants and their level of understanding for differentiated instruction. For instance, one participant had an overall score of 66 and six participants had an overall score of 85.

Figure 4.1. Frequency Distribution of Participant Scores on Understanding
**Hypothesis 2.** *There will be variation in responses in teachers’ implementation of DI concepts among the participants.* The researcher utilized descriptive statistics to examine the variation in participants’ responses across the 26 items in Section I, Part B, implementation of the survey. The following values were assigned to the response categories: 1-hard ever/never do this, 2-sometimes/have used on a few occasions, 3-frequently use this, and 4-use intentionally and often. Individual item responses were summed across the 26 questions to find a total score on *implementation*. The following table shows the variation between the number of people and their total scores. The total scores range from 58 to 104; equivalent to average scores of 2.23 to 4.00. The median for *implementation* was 88 with a mean of 86.56 and a standard deviation of 10.47. Overall, there was variation in the *implementation* of DI concepts among the participants. The researcher used a frequency distribution to articulate the variation. Figure 4.2 illustrates variability between the number of participants and their opinion on their level of *implementation* of differentiated instruction. For instance, two participants had a total score of 58 and five participants had a score of 76.

**Figure 4.2. Frequency Distribution of Participant Scores on Implementation.**
Hypothesis 3. *Teachers who have participated in DI training will have a higher level of understanding of the overall process of DI.* This hypothesis is looking for a comparison within two groups: people who have participated in training as compared to people who have not participated in training. Survey question 20, I would describe my differentiated instruction training as: none, some, or extensive, collected information on participants level of training. Based on responses to question 20, participants were classified into two groups for the purpose of examining this hypothesis: “some” training (51 participants) and “extensive” training (29 participants). Only one participant reported having no training in differentiated instruction and seven participants did not respond to this question.
Figure 4.4 represents a comparison between teachers who reported they had “extensive” training verse teachers who reported they had “some” training. Each one of Tomlinson’s categories of DI was analyzed.

**Figure 4.4 Extensive Training vs. Some Training: Understanding**

<table>
<thead>
<tr>
<th>Extensive Training vs. Some Training: Understanding</th>
<th>N(Ext)</th>
<th>N(Some)</th>
<th>Chi-square</th>
<th>DF</th>
<th>Pr</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall (1-26)</td>
<td>26</td>
<td>46</td>
<td>4.06</td>
<td>1</td>
<td>0.044</td>
<td>.05 level</td>
</tr>
<tr>
<td>Interest (1-4)</td>
<td>28</td>
<td>50</td>
<td>4.26</td>
<td>1</td>
<td>0.039</td>
<td>.05 level</td>
</tr>
<tr>
<td>Assessment (5-9)</td>
<td>29</td>
<td>50</td>
<td>4.82</td>
<td>1</td>
<td>0.028</td>
<td>.05 level</td>
</tr>
<tr>
<td>Planning (10-14)</td>
<td>29</td>
<td>49</td>
<td>3.93</td>
<td>1</td>
<td>0.048</td>
<td>.05 level</td>
</tr>
<tr>
<td>Content (15-18)</td>
<td>27</td>
<td>48</td>
<td>3.67</td>
<td>1</td>
<td>0.055</td>
<td>.10 level</td>
</tr>
<tr>
<td>Process (19-22)</td>
<td>28</td>
<td>51</td>
<td>2.30</td>
<td>1</td>
<td>0.130</td>
<td>No</td>
</tr>
<tr>
<td>Product (23-26)</td>
<td>27</td>
<td>50</td>
<td>4.22</td>
<td>1</td>
<td>0.040</td>
<td>.05 level</td>
</tr>
</tbody>
</table>

Participants with “extensive” training had a mean overall understanding score of 96.23 (sd = 6.26) and a median of 98.00. Participants with “some” training had a mean overall understanding score of 91.13 (sd = 9.68) and a median of 93.00. A Kruskal-Wallis Test (a generalized form of the Wilcoxon Two-Sample Test) was utilized to analyze the difference in understanding between participants with “some” and “extensive” training. The results of the test indicated a significant difference between the groups at the .05 level, $\chi^2(1, N=72) = 4.06, p<.05$. Overall, participants with “extensive” training had a higher level of understanding of differentiated instruction concepts.

In addition to the participants’ overall level of understanding (Section I, Part A of Survey), additional tests were conducted to examine the level of understanding in the major subcategories defined by Tomlinson in the survey. In analyzing student interest
there were 28 participants, a mean score of 15.36 (sd = 0.99) and a median of 16.00, who had “extensive” training and 50 participants, a mean score of 14.76 (sd = 1.33) and a median score of 15.00, who had “some” training. A Kruskal-Wallis Test was utilized to analyze the difference in student interest (Part I, Section A: Understanding) between participants with “some” and “extensive” training (Part II: Demographics). The results indicated a 0.5 significant difference, 05 level, $\chi^2(1, N=78) = 4.26, p<.05$.

The second category listed on the survey was *assessment*, which had 29 participants, a mean score of 18.55 (sd = 1.74) and a median of 19.00, who had “extensive” training and 50 participants, a mean score of 17.58 (sd = 2.01) and a median score of 18.00, who had “some” training. A Kruskal-Wallis Test was utilized to analyze the difference in *assessment* (Part I, Section A: Understanding) between participants with “some” and “extensive” training (Part II: Demographics). The results indicated a 0.05 significant difference, .05 level, $\chi^2(1, N=79) = 4.48, p<.05$.

The third category listed on the survey was *lesson planning*, which had 29 participants, a mean score of 18.62 (sd = 1.21) and a median of 19.00, who had “extensive” training and 49 participants, a mean score of 17.65 (sd = 2.01) and a median score of 18.00, who had “some” training. A Kruskal-Wallis Test was utilized to analyze the difference in *lesson planning* (Part I, Section A: Understanding) between participants with “some” and “extensive” training (Part II: Demographics). The results indicated a 0.05 significant difference, .05 level, $\chi^2(1, N=78) = 3.93, p<.05$.

The next category to be analyzed is *content*, which had 27 participants, a mean score of 15.26 (sd = .94) and a median of 16.00, who had “extensive” training and 48
participants, a mean score of 14.58 (sd = 1.44) and a median score of 15.00, who had “some training”. A Kruskal-Wallis Test was utilized to analyze the difference in content (Part I, Section A: Understanding) between participants with “some” and “extensive” training (Part II: Demographics). The results indicated a 0.10 significant difference, .10 level, $\chi^2(1, N=75) = 3.67, p<.0.1$. Participants with more “extensive” training showed a higher level of understanding of the content of differentiated instruction. One thing that could be expected to be impacted by training, would be understanding of content.

The fifth category to be analyzed is process, which had 28 participants, a mean score of 14.21 (sd = 1.57) and a median of 14.50, who had “extensive” training and 51 participants, a mean score of 13.41 (sd = 2.12) and a median score of 13.00, who had “some” training. A Kruskal-Wallis Test was utilized to analyze the difference in process (Part I, Section A: Understanding) between participants with “some” and “extensive” training (Part II: Demographics). The results indicated that there was no significance level between participants who had “extensive” verse “some” training. This could be because participant rated the four categories similarly.

The last category to be analyzed is product, which had 27 participants, a mean score of 14.00 (sd = 1.78) and a median of 14.00, who had “extensive” training and 50 participants, a mean score of 12.80 (sd = 2.42) and a median score of 12.50, who had “some training”. A Kruskal-Wallis Test was utilized to analyze the difference in product (Part I, Section A: Understanding) between participants with “some” and “extensive” training (Part II: Demographics). The results indicated a 0.05 significant difference, .05 level, $\chi^2(1, N=77) = 4.22, p<.05$. 
**Hypothesis 4.** *Teachers who have participated in DI training will have a higher level of implementation of the overall process of DI.* This hypothesis is similar to hypothesis 3, however it refers to *implementation* rather than understanding of the process. This hypothesis looked for a comparison within two groups: participants who have participated in training as compared to people who have not participated in training. Survey question 20, I would describe my differentiated instruction training as: none, some, or extensive, collected information on participants level of training. Based on responses to question 20, participants were classified into two groups for the purpose of examining this hypothesis: “some” training (48 participants) and “extensive” training (25 participants). Only one participant reported having no training in differentiated instruction. Overall there were 25 participants; a mean score of 91.08 (sd = 7.09) and a median of 98.00, who reported that they had “extensive” training while 48 participants, a mean score of 84.31 (sd = 11.01) and a median of 87.00, reported that they had “some” training.

Table 4.5 represents a comparison between teachers who reported they had “extensive” training and those teachers who reported they had “some” training. Each one of Tomlinson’s categories of DI was analyzed.
Table 4.5. Extensive Training vs. Some Training: Implementation

<table>
<thead>
<tr>
<th>Extensive Training vs. Some Training: Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>N(Ext)</td>
</tr>
<tr>
<td>Overall (1-26)</td>
</tr>
<tr>
<td>Interest (1-4)</td>
</tr>
<tr>
<td>Assessment (5-9)</td>
</tr>
<tr>
<td>Planning (10-14)</td>
</tr>
<tr>
<td>Content (15-18)</td>
</tr>
<tr>
<td>Process (19-22)</td>
</tr>
<tr>
<td>Product (23-26)</td>
</tr>
</tbody>
</table>

A Kruskal-Wallis Test (a generalized form of the Wilcoxon Two-Sample Test) was utilized to analyze the difference in overall *implementation* between participants with “some” and “extensive” training. The results of the test indicated a significant difference between the groups at the .05 level, $\chi^2(1, N=73) = 5.52, <.05$. Overall, participants with “extensive” training had a higher level of implementation of differentiated instruction concepts. In addition to the participants’ overall level of *implementation*, additional tests were conducted to examine the level of *implementation* in the major subcategories defined in the survey.

In analyzing *student interest* in regards to *implementation* of DI, there were 28 participants with “extensive” training, a mean score of 14.39 (sd = 1.29) and a median of 14.50, and 50 participants stated they had “some” training, a mean score of 12.98 (sd = 1.70) and a median score of 13.00. This means that more participants responded with having “some” level of training instead of “extensive” training. A Kruskal-Wallis Test was utilized to analyze the difference in *student interest* between participants with
“some” and “extensive” training. The results of the test indicated a significant difference between the groups at the .01 level, $\chi^2(1, N=78) = 12.06, <.01$. Overall, participants who have had “extensive” training have an increased understanding of *implementation* of *student interest*.

In analyzing *assessment* in regards to implementation of DI, there were 29 participants with “extensive” training, a mean score of 17.52 (sd = 1.79) and a median of 17.00, and 50 participants stated they had “some training”, a mean score of 16.16 (sd = 2.87) and a median score of 17.00. A Kruskal-Wallis Test was utilized to analyze the difference in *assessment* between participants with “some” and “extensive” training. The results of the test indicated a significant difference between the groups at the .10 level, $\chi^2(1, N=79) = 3.57, <.10$.

The third category on the survey was *lesson planning* which had 28 participants with “extensive” training, a mean score of 17.36 (sd = 1.73) and a median of 17.00, and 50 participants stated they had “some training”, a mean score of 16.24 (sd = 2.30) and a median score of 16.00. A Kruskal-Wallis Test was utilized to analyze the difference in *lesson planning* between participants with “some” and “extensive” training. The results of the test indicated a significant difference between the groups at the .05 level, $\chi^2(1, N=78) = 4.36, <.10$.

*Content* was the fourth category on the survey to be analyzed which had 28 participants with “extensive” training, a mean score of 14.79 (sd = 1.26) and a median of 15.00, and 49 participants stated they had “some” training, a mean score of 14.33 (sd = 1.88) and a median score of 15.00. A Kruskal-Wallis Test was utilized to analyze the
difference in content between participants with “some” and “extensive” training. The results of the test indicated that there was not a significant difference in this category between participants who had “some” training and participants who had “extensive” training. The results of the test indicated that there was not a significant difference between the groups.

Next to be analyzed was the category of process which had 28 participants with “extensive” training, a mean score of 14.25 (sd = 1.86) and a median of 14.50, and 51 participants stated they had “some training”, a mean score of 12.75 (sd = 2.20) and a median score of 13.00. A Kruskal-Wallis Test was utilized to analyze the difference in process between participants with “some” and “extensive” training. The results of the test indicated a significant difference between the groups at the .01 level, $\chi^2 (1, N=79) = 8.78$, <.01.

The last category to be analyzed was product, which had 28 participants with “extensive” training, a mean score of 12.93 (sd = 1.84) and a median of 13.00, and 50 participants stated they had “some” training, a mean score of 11.64 (sd = 2.73) and a median score of 12.00. A Kruskal-Wallis Test was utilized to analyze the difference in product between participants with “some” and “extensive” training. The results of the test indicated a significant difference between the groups at the .05 level, $\chi^2 (1, N=78) = 4.47$, <.05.

**Hypothesis 5.** There will be a significant difference in the understanding of differentiated instruction between special education and general education teachers. The survey was sent out to 112 general education teachers and 29 special education teachers.
Overall, 53 general education teachers, 47.21%, and 20 special education teachers, 68.97%, completed the questions pertaining to the understanding of DI. There was a significance level of .10. The mean score for general education teachers was 91.83 (sd = 9.31) and a median of 94.00, and the mean score for special education teachers was 96.15 (sd = 1.49) and a median of 97.50.

Table 4.6 represents a comparison of overall understanding of differentiated instruction between general education teachers and special education teachers.

Table 4.6 General Education Teacher vs. Special Education Teacher:

<table>
<thead>
<tr>
<th>Understanding</th>
<th>N(General)</th>
<th>N(Special)</th>
<th>Chi-square</th>
<th>DF</th>
<th>Pr</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall (1-26)</td>
<td>53</td>
<td>20</td>
<td>2.74</td>
<td>1</td>
<td>0.098</td>
<td>.10 level</td>
</tr>
<tr>
<td>Interest (1-4)</td>
<td>58</td>
<td>21</td>
<td>5.69</td>
<td>1</td>
<td>0.017</td>
<td>.05 level</td>
</tr>
<tr>
<td>Assessment (5-9)</td>
<td>59</td>
<td>21</td>
<td>6.59</td>
<td>1</td>
<td>0.010</td>
<td>.01 level</td>
</tr>
<tr>
<td>Planning (10-14)</td>
<td>58</td>
<td>21</td>
<td>1.36</td>
<td>1</td>
<td>0.244</td>
<td>No</td>
</tr>
<tr>
<td>Content (15-18)</td>
<td>56</td>
<td>20</td>
<td>0.82</td>
<td>1</td>
<td>0.364</td>
<td>No</td>
</tr>
<tr>
<td>Process (19-22)</td>
<td>60</td>
<td>20</td>
<td>8.56</td>
<td>1</td>
<td>0.003</td>
<td>.01 level</td>
</tr>
<tr>
<td>Product (23-26)</td>
<td>58</td>
<td>20</td>
<td>0.46</td>
<td>1</td>
<td>0.497</td>
<td>No</td>
</tr>
</tbody>
</table>

Overall, the data illustrates that special education teachers reported having an increased level of understanding of differentiated instruction than general education teachers.

**Hypothesis 6.** There will be a significant difference in the implementation of differentiated instruction between special education and general education teachers. The
survey was sent out to 112 general education teachers and 29 special education teachers. Overall, 56 general education teachers, 50%, and 18 special education teachers, 62.07%, completed the questions pertaining to the implementation of DI. There was a significance level of .10. The mean score for general education teachers was 85.52 (sd=10.96) and a median of 87.00, and the mean score for special education teachers was 90.78 (sd = 6.96) and a median of 91.50.

Table 4.7 illustrates the results of the Wilcoxon Two-Sample Test (Kruskal-Wallis Test).

Table 4.7 General Education Teacher vs. Special Education Teacher: Implementation

<table>
<thead>
<tr>
<th></th>
<th>N(GenEd)</th>
<th>N(SpecEd)</th>
<th>Chi-square</th>
<th>DF</th>
<th>Pr</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall (1-26)</td>
<td>56</td>
<td>18</td>
<td>2.73</td>
<td>1</td>
<td>0.099</td>
<td>.10 level</td>
</tr>
<tr>
<td>Interest (1-4)</td>
<td>58</td>
<td>21</td>
<td>1.39</td>
<td>1</td>
<td>0.239</td>
<td>No</td>
</tr>
<tr>
<td>Assessment (5-9)</td>
<td>59</td>
<td>21</td>
<td>8.00</td>
<td>1</td>
<td>0.005</td>
<td>.01 level</td>
</tr>
<tr>
<td>Planning (10-14)</td>
<td>59</td>
<td>20</td>
<td>1.64</td>
<td>1</td>
<td>0.200</td>
<td>No</td>
</tr>
<tr>
<td>Content (15-18)</td>
<td>58</td>
<td>20</td>
<td>0.30</td>
<td>1</td>
<td>0.581</td>
<td>No</td>
</tr>
<tr>
<td>Process (19-22)</td>
<td>60</td>
<td>20</td>
<td>4.86</td>
<td>1</td>
<td>0.027</td>
<td>.05 level</td>
</tr>
<tr>
<td>Product (23-26)</td>
<td>59</td>
<td>20</td>
<td>0.11</td>
<td>1</td>
<td>0.733</td>
<td>No</td>
</tr>
</tbody>
</table>

Overall, the data indicated that special education teachers reported implementing differentiated instruction more often than general education teachers.

Supporting Research Question 1

To what extent do K-6 teachers understand the concepts of differentiated instruction and the methods of how to differentiate classroom instruction in the Leighton
Public Schools? Carol A. Tomlinson suggests understanding these six components of DI in order to assist each student in achieving success. Tomlinson (2010) states, “It is the classroom teacher who has an unspoken contract with each learner to make productive use of time spent in the classroom” (p. 9). Overall, the data reveal that teachers have a general understanding of differentiated instruction. The overall mean for understanding the concepts of differentiated instruction was 92.11, an average item rating of 3.54.

Each component of differentiated instruction had per item ratings of 3 or higher. Content category was scored as having the highest level of understanding. The total mean score across the four items was 14.64 (SD = 1.55), an average item rating of 3.66. Lesson Planning scored the 2nd highest level of understanding. The total mean score across the five items was 17.90 (SD = 1.95), an average item rating of 3.58. The third category was assessment, which had a total mean score across the five items as 17.81 (SD = 2.09), an average item rating of 3.56. Process was the fourth highest rating with a total mean score across the four items of 13.64 (SD = 1.98), an average item rating of 3.41. The fifth category was interest, which had a total mean score across the four items of 14.92 (SD = 1.26), an average item rating of 3.37. Last was product which had a total mean score across four items of 12.95 (SD = 2.45), an average item rating of 3.24.

Based on the results of survey data, teachers reported that they have a general understanding of the six components of differentiated instruction. However, there was variability among the individual concepts. The following categories were rated, high to low, in regards to understanding: content, lesson planning, assessment, process, interest, and product.
Supporting Research Question 2

How do K-6 teachers at Leighton Public Schools implement components of differentiated instruction (student interest, assessment, lesson planning, content, process and product) as defined by Carol A. Tomlinson? Tomlinson (2010) states, “Quite simply, the classroom teacher is an irreplaceable leader in moving differentiation from an abstract idea on paper or in a professional development session to a fundamental way of life in the classroom” (p. 9). The data suggest that teachers implement differentiated instruction. Overall, the total mean score was 86.56, an average item rating of 3.33.

There was less scatter between implementation than understanding. By looking at the specific categories, each area rated items across as a 3 or higher. Content was rated the highest with a total mean score across the four items of 14.47 (SD = 1.67), with an average item rating of 3.62. Interest was second with a total mean score across the four items of 13.51 (SD = 1.70), with an average item rating of 3.38. The next three categories, process, lesson planning and assessment, had the same average item rating of 3.32. Process had a total mean score across four items of 13.27 (SD = 2.19). Lesson planning had a total mean score across five items of 16.60 (SD = 2.30) and assessment had a total mean score across five items of 16.62 (SD = 2.62). Last was product which had a total mean score across four items of 12.13 (SD = 2.53), with an average item rating of 3.03.

Based on the results of survey data, teachers reported that they implement the six components of differentiated instruction. However, there was some variation among the individual concepts. The following categories were rated, high to low, in regards to
implementation: content, interest, (the next three scored the same) process, lesson planning, assessment, and last was product.

Validity and Credibility

The original survey was implemented by Page (2007) and Tomlinson (2000) prior to this research. Additionally, it was piloted with a representative group of teachers before it was administered to the Leighton Public Schools to ensure validity. As suggested by Nardi (2006), the researcher administered the survey to a pilot group of participants that were similar to the sample being studied (p. 96). There were 10 participants in the pilot group. Once the pilot group completed the survey, the researcher read over the responses looking for “incorrect answers or marks left on the page” (Nardi, 2006, p. 96). The paper copies used for the pilot group did not indicate any confusion or questions, but the researcher chose to interview the participants individually. During the interviews, the pilot group members reported that the survey seemed logical and used vocabulary that was easily understood. They stated the wording seemed appropriate and they felt the directions were clear. In addition, the researcher asked participants in the pilot group to interpret a few of the items on the survey and they were able to do so successfully. Three of the participants mentioned that the survey seemed to be lengthy, however they said it did not affect their responses. As a result of the pilot, no changes were made to the survey.

In order to receive a valid response rate, the researcher met with each school to discuss the survey. In addition, the building principals supported the study and researcher and asked teachers to participate in the survey because it might help inform future
trainings in the area of differentiated instruction. By addressing the purpose and importance of the survey, the researcher was able to get more responses had she not met with each school. Of the sample, there was a 62% response rate. There could be non-response bias with the 37% of the sample that chose not to participate in the survey. Malaney (2002) states, “Generally around 60% response rates are acceptable, although Dillman (1978, 2000) encourages closer to 80% while acknowledging that such high rates are very difficult to obtain. It is also important that the demographic data (e.g. age, sex, race, class year) of the sample closely matches the demographic data of the population that the sample is intended to represent” (p. 1). The next paragraph will discuss the sample and the variety amongst the participants to show that the demographic data does in fact represent the demographic data of the participants that the sample was meant to represent.

The sample was a purposeful sample so it was limited to general education teachers and special education teachers in grades kindergarten through sixth. The following tables indicate the variety across the sample. The variety in current subject taught, current grade taught, age range, and years of teaching experience indicate that the group of participants were diverse.

Table 4.8 illustrates how participants responded to a question regarding the current subject taught. The table identifies the response percent and response count for the subject being taught.
Table 4.8 Current Subject Taught

<table>
<thead>
<tr>
<th>Current Subject Taught</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>86.4%</td>
<td>70</td>
</tr>
<tr>
<td>Writing</td>
<td>87.7%</td>
<td>71</td>
</tr>
<tr>
<td>Mathematics</td>
<td>77.8%</td>
<td>63</td>
</tr>
<tr>
<td>Social-Studies</td>
<td>63.0%</td>
<td>51</td>
</tr>
<tr>
<td>Science</td>
<td>64.2%</td>
<td>52</td>
</tr>
<tr>
<td>Other</td>
<td>18.5%</td>
<td>15</td>
</tr>
<tr>
<td>If Other, please specify</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Answered question</td>
<td></td>
<td>81</td>
</tr>
<tr>
<td>Skipped question</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

This data indicate that there was an array of subjects taught by the teachers who participated. People who wrote ‘other’ gave the following responses as additional areas of subjects taught: elementary teacher, all subjects, sometimes science and social studies, technology, communication, specialized reading, and social issues.

Table 4.9 indicates the variety of grade levels that the participants teach. The table illustrates the response percent and response count per grade level of participants. Each grade level surveyed had some level of participation.
Table 4.9 Current Grade Taught

<table>
<thead>
<tr>
<th>Current Grade Taught</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>21.0%</td>
<td>17</td>
</tr>
<tr>
<td>1st</td>
<td>23.5%</td>
<td>19</td>
</tr>
<tr>
<td>2nd</td>
<td>24.7%</td>
<td>20</td>
</tr>
<tr>
<td>3rd</td>
<td>25.9%</td>
<td>21</td>
</tr>
<tr>
<td>4th</td>
<td>22.2%</td>
<td>18</td>
</tr>
<tr>
<td>5th</td>
<td>23.5%</td>
<td>19</td>
</tr>
<tr>
<td>6th</td>
<td>16.0%</td>
<td>13</td>
</tr>
<tr>
<td><strong>Answered question</strong></td>
<td></td>
<td>81</td>
</tr>
<tr>
<td><strong>Skipped question</strong></td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

Table 4.10 represents the variety of ages among the participants that completed the survey. The table indicates the response percent and the response count. Illustrated in the table are the responses from the participants regarding their ages.

Table 4.10 Teacher’s Age Range

<table>
<thead>
<tr>
<th>Teachers' Age Range</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>21-25 years</td>
<td>1.2%</td>
<td>1</td>
</tr>
<tr>
<td>26-30 years</td>
<td>6.2%</td>
<td>5</td>
</tr>
<tr>
<td>31-35 years</td>
<td>22.2%</td>
<td>18</td>
</tr>
<tr>
<td>36-40 years</td>
<td>4.9%</td>
<td>4</td>
</tr>
<tr>
<td>41-45 years</td>
<td>18.5%</td>
<td>15</td>
</tr>
<tr>
<td>46-50 years</td>
<td>17.3%</td>
<td>14</td>
</tr>
<tr>
<td>51-55 years</td>
<td>11.1%</td>
<td>9</td>
</tr>
<tr>
<td>56-60 years</td>
<td>14.8%</td>
<td>12</td>
</tr>
<tr>
<td>60+ years</td>
<td>3.7%</td>
<td>3</td>
</tr>
<tr>
<td><strong>Answered question</strong></td>
<td></td>
<td>81</td>
</tr>
<tr>
<td><strong>Skipped question</strong></td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>
Table 4.11 indicates the variety of years of teaching experience.

**Table 4.11 Years of Teaching Experience**

<table>
<thead>
<tr>
<th>Years of Teaching Experience</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3 years</td>
<td>6.2%</td>
<td>5</td>
</tr>
<tr>
<td>4-10 years</td>
<td>27.2%</td>
<td>22</td>
</tr>
<tr>
<td>11-15 years</td>
<td>19.8%</td>
<td>16</td>
</tr>
<tr>
<td>16-20 years</td>
<td>13.6%</td>
<td>11</td>
</tr>
<tr>
<td>21-25 years</td>
<td>19.8%</td>
<td>16</td>
</tr>
<tr>
<td>26-30 years</td>
<td>11.1%</td>
<td>9</td>
</tr>
<tr>
<td>30+ years</td>
<td>2.5%</td>
<td>2</td>
</tr>
<tr>
<td>Answered question</td>
<td></td>
<td>81</td>
</tr>
<tr>
<td>Skipped question</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

The question regarding years of experience had seven choices to select from, which are the labels in the table on the left. The table indicates that each category was chosen at least twice. The majority of participants have been teaching for 4-10 years and the least amount of participants have been teaching for 30 plus years.

One concern, which related to internal validity for the study was whether the respondents would answer truthfully on the survey. The researcher felt there might be a greater chance of receiving honest responses by attending the staff meetings and letting the participants know that the results of each survey would remain confidential.

Another concern was the lack of males working at the elementary and middle school level. As a result, males in general were underrepresented. The researcher was unable to change the lack of males but it was important to keep in mind. As mentioned
earlier, 3 males, 3.7%, and 78 women, 96.3%, participated in the survey. However, the survey was sent to 12 males and 129 females thus resulting in a 25% return rate from male teachers and a 60% return rate from the female teachers. Also, it is important to note that 7 of the participants did not identify if they were male or female.

Conclusion

Differentiated instruction is a highly effective means of educating whereby teachers can meet the unique learning needs of all students in their charge (George, 2005). This research study was focused around Carol A. Tomlinson’s research and literature on differentiated instruction. This survey research study investigated teachers’ understanding and level of implementation of differentiated instruction as defined by Tomlinson. General education teachers and special education teachers in grades Kindergarten through sixth were asked to participate in the electronic survey. The researcher introduced herself and presented the survey and its purpose at staff meetings at the five different schools prior to administering the survey. The researcher sent the survey to a total of 141 participants through their Google work email. The researcher provided them with a link directing them to the Survey Monkey website where they were asked to complete the survey.

Overall, 88 teachers chose to participate in the survey. There was variety in grade level taught, highest education level, age, current subjects taught and years of teaching experience.

The data were analyzed using the SAS® for Windows v9.2. A Kruskal-Wallis Test (a generalized form of the Wilcoxon Two-Sample Test) was used to analyze data.
Hypotheses 1 and 2 predicted a variation in understanding and implementation of DI concepts among the participants. The researcher utilized descriptive statistics to examine the variation in participants’ responses. Overall, there was variation between the number of people and the total scores. The total scores for understanding ranged from 58 to 104 with a median of 94 and semi-interquartile range of 15. The mean score on understanding was 92.12 with a standard deviation of 9.56. The total scores for implementation ranged from 58 to 104; equivalent to average scores of 2.23 to 4.00. The median for implementation was 88 with a mean of 86.56 and a standard deviation of 10.47.

Hypotheses 3 and 4 asked if teachers who had participated in DI training had a higher level of understanding and implementation of the overall process of differentiated instruction. A Kruskal-Wallis Test was utilized to analyze the difference in understanding between participants with “some” and “extensive” training. The results of the test indicated a significant difference between the groups at the .05 level, $\chi^2(1, N=72) = 4.06, p<.05$. Overall, participants with “extensive” training had a higher level of understanding of differentiated instruction concepts. The researcher utilized A Kruskal-Wallis Test to analyze the difference in overall implementation between participants with “some” and “extensive” training. The results of the test indicated a significant difference between the groups at the .05 level, $\chi^2(1, N=73) = 5.52, <.05$. Overall, participants with “extensive” training had a better understanding of the implementation of differentiated instruction concepts.
Each one of Tomlinson’s components of DI were analyzed to determine if there was a significant difference in participants with “some” training verses participants with “extensive” training. A Kruskal-Wallis Test was utilized to analyze the difference between participants with “some” and “extensive” training. Considering the category of student interest in regards to understanding and implementation there was a .05 level of significance. For assessment there was a .05 significant level in understanding and .01 level for implementation. The third component to be analyzed was lesson planning which had a .05 level of significance for understanding and implementation. Next was content, which resulted in a .10 significant level for understanding, however there was no significance level in implementation. Process was analyzed and for understanding there was not a significance level, however for implementation there was a .01 level of significant. Last to be analyzed was product and there was a .05 level of significance for both understanding and implementation. Given the six components of differentiated instruction, there was a significance level indicated for five out of the six in regards to understanding and implementation.

Hypotheses 5 and 6 predicted there would be a significant difference in the understanding and implementation of differentiated instruction between special education and general education teachers. For understanding, there was a significance level of .10. The mean score for general education teachers was 91.83 (sd = 9.31) and a median of 94.00, and the mean score for special education teachers was 96.15 (sd = 6.17) and a median of 97.50. For implementation, there was a significance level of .10. The mean score for general education teachers was 85.52 (sd = 10.96) and a median of 87.00 and the mean score for special education teachers was 90.78 (sd = 6.96) and a median of
91.50. The study showed that, overall, special education teachers reported that they understand and implement the six components of differentiated instruction more than the general education teachers.

Regarding the first research question, K-6 teachers in the Leighton Public Schools overall understand the concepts of differentiated instruction and the methods of how to differentiate classroom instruction. The overall mean for understanding the concepts of differentiated instruction was 92.12, an average item rating of 3.54. In descending order, the teachers rating their level of understanding for each category in the following order, Content, Lesson Planning, Assessment, Process, Interest and Product. This illustrates that teachers have different levels of understanding amongst the six components of DI.

The second research question asked how K-6 teachers at Leighton Public Schools implement components of differentiated instruction (student interest, assessment, lesson planning, content, process, and product) as defined by Carol A. Tomlinson. The overall mean for implementation was 86.56, an average item rating of 3.33. By looking at the specific categories, the teachers rated Content and Interest the highest, meaning they implement those components of DI more often. The following categories had average item ratings of 3.32, Assessment, Lesson Planning, and Process. Lastly, product was rated the least in implementation of DI with an average item rating of 3.24. There was less variability among the six components of DI in regards to implementation. However, the data revealed that the participants reported that they understand differentiated instruction more than they implement it.
Tomlinson (2010) has published literature about teachers being leaders within the classroom as an effective way to implement differentiated instruction. She states,

Teachers who are most effective with differentiation operate from strong (and growing) knowledge bases that are rooted in a philosophy of what classrooms could be like if they maximized the capacity of each leader. These teachers invite learners to help them construct such a classroom and to attend to its health as the academic year progresses. For these teachers, differentiation is not a set of strategies but rather a demographically necessary, ethically focused, pedagogically informed and empirically tested way of thinking about the work they do. (p. 10)

Chapter four summarized the data collected and analyzed in regards to the research questions and hypotheses. In the last and final section, Chapter Five, the researcher will draw conclusions regarding the data and make recommendations.

**Chapter 5: Discussion of Research Findings**

This chapter is a summary of the research findings rooted within a discussion that brings together the research of the literature and the theoretical framework shaping this study. The findings will be presented to inform kindergarten through sixth grade teachers and administrators within the school district the level of overall understanding that general education teachers and special educations teachers have in the area of differentiated instruction (DI) and the level of implementation of DI in their classrooms.
This chapter will be organized in the following sections: (1) Statement of the Problem, (2) Purpose and Research Questions, (3) Research Procedures, (4) Summary and Discussion of Findings, (5) Implications, (6) Validity, and (7) Summary.

**Statement of the Problem**

RtI is a federal initiative many school districts have implemented to track the progress of all students. It provides teachers with an abundant amount of data regarding students’ performance. RtI encourages teachers to use a tiered approach to identify student needs. Differentiated instruction is a teaching philosophy and methodology many districts are using in response to RtI. Tomlinson and Imbeau (2010) state “Differentiation can be accurately described as classroom practice with a balanced emphasis on individual students and course content” (p. 14).

The problem of practice was a focus four years ago in the Leighton Public Schools (LPS) when administrators implemented professional development to help teachers understand and learn about DI. Since the training, teachers have had more access to data and are encouraged to monitor student programs (a term called “progress monitor”) and differentiate instruction in the classroom. In addition, many new teachers have been hired and have not had the training opportunity that LPS once offered. This research study allowed the researcher to gather information about teachers’ understanding and implementation practices of DI in order to gain a better idea of what types of professional development and support are needed for the future. As a special needs team chairperson for the middle school, the researcher’s position focuses on assisting teachers and parents with creating individualized education programs (IEP) that provide specially designed instruction to the meet the needs for students with special needs. Often, this
results in teachers needing to differentiate instruction in order to have all students access the general education curriculum.

**Purpose and Research Questions**

The purpose of this survey research study was to uncover how much teachers understood the concepts of DI and how often they implemented DI strategies into their classroom preparation and planning in an effort to design more specific and effective training strategies. The two research questions guiding this research paper were: (1) *To what extent do K-6 teachers understand the concepts of differentiated instruction and the methods of how to differentiate classroom instruction in the Leighton Public Schools?* (2) *How do K-6 teachers at Leighton Public Schools implement components of differentiated instruction (student interest, assessment, lesson planning, content, process and product) as defined by Carol A. Tomlinson?* These two questions were viewed within a theoretical framework of the following theorists: Lev Vygotsky, John Dewey and Howard Gardner. The theories studied are linked to the importance of differentiated instruction and its purpose in the classroom. The questions and hypothesis will be framed around the theories.

It is essential to understand the extent to which teachers understand differentiated instruction prior to implementing any changes and training. Various factors, such as lack of planning time and materials, can become barriers in the implementation of these instructional models and strategies. The implementation of DI can be inconsistent so it was important to survey teachers as a way to assess their understanding of key strategies to improve instruction.
The practical goal of this research study was to uncover teachers’ *understanding* of differentiated instruction and reveal the strengths and weaknesses of the participants in order to determine what training may be needed. A future goal, that is not part of this study, is for the researcher to work with a professional development planning committee to enhance knowledge and develop strategies to increase teachers’ effective implementation of differentiated instruction. A goal for the district will be to implement effective trainings based on research data to help teachers increase their understanding of DI, help increase their commitment to the strategies and feel more confident implementing DI.

**Validity and Credibility**

**Validity**

The Teacher Survey on Differentiated Instruction was originally modified from the Teacher Self-Reflection on Differentiation for Staff Development Planning Survey (Page, 2007). Sandra Page from ASCD had received permission from Carol A. Tomlinson to modify the survey. The survey was employed in a previous research study and some questions were modified for this research study.

Prior to its implementation, the survey was piloted by a sample of respondents similar to the target population. The pilot group received the survey in paper format. The researcher interviewed each person in the pilot group to ensure the survey was clearly articulated. Some commented the survey was long, but also stated the length did not affect their survey responses. Therefore, as a result of the pilot group, no changes were made to the survey.
The concepts on the survey were created by Carol A Tomlinson, a well known researcher in differentiated instruction. The six components of DI (student interest, assessment, lesson planning, content, process and product) discussed in the survey are supported by Tomlinson (2010).

**Reliability**

The researcher met with each of the five schools to discuss the research purposes and answered any questions. This occurred with the permission of the building principals and during a scheduled staff meeting. During this meeting both the principal and researcher stressed the importance of honesty when answering the survey questions and reassured staff the responses would remain anonymous.

The survey was sent to staff through electronic software (Survey Monkey), which reduced the risk of data input error. After the data was collected, the researcher was able to download the data and input it into a statistical software program, SAS.

**Research Procedures**

This quantitative survey research study examined the level of understanding and implementation of differentiated instruction across six categories: student interest, assessment, lesson planning, content, process, and product. The following sections highlight the methods used to complete the research study: (1) Design Approach, (2) Instrumentation, (3) Site and Participants, and (4) Data Analysis.
Design Approach

Survey research was utilized to uncover the understanding and implementation of DI across several grades and schools throughout the Leighton Public Schools. The researcher chose survey research in an attempt to gain a large amount of responses. Rea and Parker (2005) states, “The ultimate goal of sample survey research is to allow researchers to generalize about a large population by studying on a small proportion of that population” (p. 4).

Instrumentation

The survey questionnaire (see appendix A) Teacher Survey on Differentiated Instruction, created by Carol A. Tomlinson and Susan D. Allen (2000), was originally modified from the Teacher Self-Reflection on Differentiation for Staff Development Planning Survey (Page, 2007). Sandra Page from The Association for Supervision and Curriculum Development or ASCD received permission from Carol A. Tomlinson to modify the survey. Tomlinson (2000, 2001, 2003, 2006, 2010) is a renowned researcher and author of several books focusing on differentiated instruction. The survey items correspond with the components of differentiated instruction that Tomlinson established. The researcher was granted permission to use the survey for a research study from both Sandra Page and Carol A. Tomlinson (see appendix E).

The researcher piloted the survey prior to being administered to the purposeful sample. The pilot group was made up of ten participants. The researcher administered the survey in paper and pencil format rather than through the internet. After analyzing the paper responses, the researcher did not find a reason to modify the survey. In addition,
the pilot group was individually interviewed to further determine the opinion of survey length, format, wording, and content. Three participants of the pilot group noted it was lengthy however it did not change their responses. As a result, the survey was not modified for this research study.

The survey (see appendix A) was sent to participants through the school district internet provider utilizing Survey Monkey software. Teachers were asked to participate through an email approved by the Institutional Review Board of Northeastern University.

**Site and Participants**

This survey research study was administered at the Leighton Public Schools, a suburban community in southeastern Massachusetts. The district is situated in a suburban region with a population of just over 6,000 people. The following elementary schools, grades kindergarten through sixth, were asked to participate in the survey research: Fair Harbor, Ocean Bay Park, Ocean Beach, and Seaview. After elementary school the students attend Atlantique Middle School for grades five and six. The general education and special education teachers at Atlantique Middle School were also asked to participate in the survey.

The researcher received permission from the Superintendent of Schools (see appendix D) and all five building principals to conduct research at their schools. In order to encourage the maximum number of responses, the researcher attended one staff meeting at each of the five buildings to introduce herself and the study. After the meetings, the researcher sent the survey, via Survey Monkey, through the staff Google email accounts. After a week, the researcher sent a reminder email for the teachers to
participate in the survey. Concluding three weeks of opportunity for participants to complete the survey, the survey was closed and data were analyzed using the SAS® for Windows v9.2.

The survey was sent to 141 teachers, general education and special education teachers. According to the demographic information the researcher collected, there were a total of 88 teachers who completed the survey, although there were 7 participants who skipped answering selected questions. There were 60 general education teachers, 74.1%, and 21 special education teachers, 25.9%, who completed the survey. Of those participants, 3 of them, 3.7%, were male and 78 of them, 96.3% were female. Among the participants, there was a variety of age range, grade level taught, highest education level, number of years teaching, and level of differentiated instruction training.

**Data Analysis**

The SAS® for Windows v9.2 was used to analyze the data gathered from the Teacher Survey on Differentiated Instruction. Several aspects of DI were analyzed including the overall differences between understanding and implementation, differences between amount of training verse specific components of differentiated instruction and identified demographic information. In addition, differences between understanding and implementation with regards to whether the participant was a general education teacher or a special education teacher were analyzed.

**Summary and Discussion of Findings**
The summary and discussion of the findings will emulate the format used in Chapter 4 in which the findings were presented based on the research questions and hypotheses. However, the findings will be grouped according to understanding and implementation. The first section will address the primary research question and hypotheses 1, 3, and 5 as they focus on the level of understanding. The second section will address the secondary research question and hypotheses 2, 4, and 6 as they focus on the level of implementation. Both sections will be analyzed and related to data collected, theoretical framework and literature review.

Research Question 1

To what extent do K-6 teachers understand the concepts of differentiated instruction and the methods of how to differentiate classroom instruction in the Leighton Public Schools?

Carol A. Tomlinson (2010) identifies six areas as components of differentiated instruction: student interest, assessment, lesson planning, content, process, and product and states, “Differentiated instruction is a philosophy - a way of thinking about teaching and learning. It is, in fact, a set of principles” (p. 13). The general education and special education teachers were asked to participate in a survey inquiring of their level of understanding regarding the 6 components.

Overall, the teachers who participated in the survey had a high level of understanding of the concepts of differentiated instruction and the methods of how to differentiate in the classroom. The 77 responses scored a mean score of 92.12, a standard deviation of 9.51 and a median score of 94.00, meaning that all participants have an
overall *understanding* of DI. Next, each category will be analyzed in more depth to understand the level of *understanding* per component. The categories will be listed by order of highest understanding. Table 5.1 illustrates the data for each component.

**Table 5.1 The Six Components of DI: Understanding**

<table>
<thead>
<tr>
<th>Components</th>
<th>Average Per Item Rating</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>3.66</td>
<td>14.64</td>
<td>1.55</td>
<td>15.00</td>
</tr>
<tr>
<td>Lesson Planning</td>
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<td>1.95</td>
<td>18.00</td>
</tr>
<tr>
<td>Assessment</td>
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<td>17.81</td>
<td>2.09</td>
<td>18.00</td>
</tr>
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<td>Process</td>
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<td>1.98</td>
<td>14.00</td>
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<tr>
<td>Interest</td>
<td>3.37</td>
<td>14.92</td>
<td>1.26</td>
<td>15.00</td>
</tr>
<tr>
<td>Product</td>
<td>3.24</td>
<td>12.95</td>
<td>2.45</td>
<td>13.00</td>
</tr>
</tbody>
</table>

**Content**

The first component to be analyzed was content and there were four items the participants were questioned about. Teachers were asked to rate their level of *understanding* regarding what the curriculum is based on, if they articulate what they want students to know, use a variety of materials and if they provide a variety of support materials. Tomlinson (2010) defines content as, “The knowledge, understanding, and skills we want students to learn” (p. 15). Differentiated instruction focuses on using varied methods to achieve the same content. However, Tomlinson notes at times students may need to review previously learned content in order to move forward. Teachers are
often overloaded with content to teach their students and can be left feeling overwhelmed with what they should and should not teach given the time constraints. Tomlinson and McTighe (2006) suggest a three-stage plan by planning backwards regarding content: “Stage 1. Identify desired results”, “Stage 2. Determine acceptable evidence”, and “Stage 3. Plan learning experiences and instruction” (pp. 28-29). This plan can help teachers stay focused on the “big picture”.

Overall, content was rated the highest meaning teachers understand this area the best. The content category contained four survey items rated on a one to four scale for a possible total score of 4 to 16. Given the 81 teachers who participated in this section, there was a mean score of 14.64, a standard deviation of 1.55 and a median score of 15.00. An average item rating for content was 3.66 out of 4.00. This means that participants on average chose 3 or higher, which put content in first place for understanding. Tomlinson and McTighe (2006) make a strong statement about the importance of content, which underscores the fact it was rated as the most understood component important, “Clarity about content reveals our awareness that human beings seek to make sense of their world and that the big ideas of the disciplines reveal the big ideas of life. Inevitably, to grasp the key concepts and principles of any subject also help us better understand ourselves, our lives, and our world” (p. 38).

**Lesson Planning**

Lesson planning was the third category on the survey teachers were asked to rate their level of understanding. There were five items focused on teaching up to all learners, having varied materials, scaffolding, having learners take a role in designing learning
activities, and providing assessments that require students to apply skills. When teachers are planning lessons it is important for them to acknowledge Vygotsky’s theory of zone of proximal development and well as Howard Gardner’s theory of multiple intelligences. By considering these theoretical frameworks, it becomes easier to teach towards all learning styles and to identify varied materials. “The zone of proximal development has proved to be an intuitively attractive concept for helping teachers understand the proper sequencing of learning experiences and the appropriate distance to try to cover between where a child is and what it is reasonable to expect the child to learn next” (Darling-Hammond & Bransford, 2005, p.105). Gardner (1983) agrees with Vygotsky’s theory of zone of proximal development and articulates that a student may have to overcome some obstacles prior to learning a new concept. Gardner (1983) states, “For the educator, the challenge consists in planning the steps-the hurtles that the child must overcome so that he an progress satisfactorily through the domain, until he reaches the next phase.” (p. 389).

There were five survey items rated on a one to four scale for a possible total score of 5 to 20. There were 84 teachers who answered questions related to lesson planning and of those 84 there was a mean score of 17.90 out of 20.00, a standard deviation of 1.95 and a median score of 18.00. Of the 6 components, lesson planning scored second highest in understanding DI with an average item rating of 3.58 out of 4.00.

Assessment

Assessment was the next category that is a key component to differentiated instruction. There are several aspects of assessment Tomlinson (2010) feels are
important such as pre-assessing before instructing, pre-assess readiness to adjust lessons, provide formative and summative assessments and assess learning styles. Tomlinson (2010) also suggests high-quality assessments are a tool to “guide students in understanding essential learning outcomes, their status relative to those outcomes, and ways in which they can work effectively to maximize their growth toward and beyond those outcomes” (p. 21). Assessing throughout a lesson is important in order to determine students’ abilities to learn the content and to determine the next steps. Darling-Hammond and Bransford (2005) state, “A teacher who understands the zone of proximal development appreciates how to assess and support readiness for learning, how to use that readiness to challenge a child to learn, and, as a result, how to enable a child to make developmental progress” (p. 105).

There were five survey items rated on a one to four scale for a possible total score of 4 to 20. There were 86 teachers who responded to the five items related to assessment. Of those 86, there was a mean score for understanding assessment of 17.81 out of 20.00, a standard deviation of 2.09 and a median score of 18.00. Out of the six components of DI, assessment scored 3rd with an average item rating of 3.56 out of 4.00.

**Process**

*Process* addresses the rate of instruction, using learner preference groups, grouping students based on readiness and setting up a structured classroom environment. Knapp (1992) states, “Teachers who established ‘orderly and enabling’ learning environments were most likely to teach for meaning and understanding” (p. 13). *Process* can be referred to the “sense-making activities” students engage in order to “retain, apply,
and transfer content” (Tomlinson & Imbeau, 2010, p. 15). As this quote suggests, activities should be ones that allow students to actively engage and allow them to understand rather than memorize. Vygotsky (1978) states, “…an essential feature of learning is that it creates the zone of proximal development; that is, learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers” (p. 158). Vygotsky believed, as stated by Miller (2002), “Process is more important than product (for example, correct or incorrect answers). They looked directly at a child’s series of actions and thoughts as she tries to solve a problem and, in the process, advance her own thinking” (p. 378).

There were four survey items rated on a one to four scale for a possible total score of 4 to 16. When teachers rated their level of understanding for process it came in fourth with a mean score of 13.64 out of 16.00, a standard deviation of 1.98 and a median score of 14.00. Teachers had an average item rating for process of 3.41 out of 4.00. This is an area of concern because in order to effectively implement differentiated instruction, a classroom must be structured and as Knapp (1992) states, “orderly”.

**Student Interest**

Using student interest when teaching is a vital component to differentiated instruction because “when student interest is engaged, motivation to learn is heightened, and learning is enhanced” (Tomlinson, 2010, p. 16). Carol A. Tomlinson (2010) suggests teachers understand student culture, individual student life situations and to students’ learning abilities and disabilities. In addition, teachers should acknowledge students’
personal experience as those factors can lead to teaching towards individual interests, which can allow for further learning. Dewey (1938) states, “Only by extracting the full meaning of each present experience are we prepared for doing the same thing in the future” (p. 49). Dewey suggests by using personal experience, one is able to maintain what they have learned and Dewey (2001) said, “It would be permanently safe to give the principle of ‘interest’ any large place in school work” (p. 87).

There were four survey items rated on a one to four scale for a possible score of 4 to 16. There were 84 teachers who responded to the four items related to student interest. Of those 84, there was a mean score for understanding student interest of 14.92 out of 16.00, a standard deviation of 1.26 and a median of 15.00. By looking at the six components of DI, student interest came in 5th with an average item rating of 3.37 out of 4.00. This indicates student interest is one of the least understood components of DI according to the survey results.

Product

The last category on the survey asked teachers to rate their level of understanding was product. This category had four items for teachers to rate, which asked if they provide multiple modes of expression, provide students with the choice to work along, in groups or pairs, if the product connects to student interest and if a variety of assessments are used. Traditionally, teachers use a summative assessment to determine students’ level of understanding. Tomlinson suggests an approach that is more encompassing. She states (2010), “A product is not something students generate in a single lesson or as a result of
an activity or two. Rather, it is a rich culminating assessment that calls on students to apply and extend what they have learned over a period of time” (p.15).

The category of product placed last, sixth, for teachers’ ability to understand. This is concerning because if teachers allow students to use a variety of tools throughout the lesson but then fail to vary the product, there may not be a high level of understanding for the students. There were four items rated on a one to four scale for a possible total score of 4 to 16. Of the 84 responses, product had a total mean score of 12.95 out of 16.00, a standard deviation 2.45, and a median score of 13.00. There was an average per item rating of 3.24 out of 4.00.

Overall, teachers have a general understanding of differentiated instruction, but there are components teachers understand more thoroughly based on the categorical statistics. In descending order the following components were understood best by respondents to the survey: content, lesson planning, assessment, process, interest, and product.

**Hypothesis 1:** *There will be a variation in responses in teachers understanding of DI concepts among the participants.*

Hypothesis 1 made the claim there would be variation in the understanding ratings. Therefore, the researcher attempted to show there was some spread or variation in the ratings summed across items and across individual items as noted in Figure 4.1. Hypothesis 1 served to set up hypothesis 3, 4, 5, and 6. Had there not been variation in the scores in regards to understanding, it would have been impossible to find the differences that were reported in hypotheses 3, 4, 5, and 6.
Hypothesis 1 supports the first research question as it shows variation across the 26 items on Part 1, Section A: Understanding of the survey. The data indicates teachers at Leighton Public Schools do have a general level of understanding of the concepts of differentiated instruction and the methods of how to differentiate classroom instruction.

**Hypothesis 3:** Teachers who have participated in DI training will have a higher level of understanding of the overall process of DI.

Participants were asked to describe their differentiated instruction training within the last three years. They were given the choice to answer None, Some, or Extensive. They were also asked to identify the types of training they had and the choices were as follows (including the codes): (1) course from college or university, (2) teleconference, (3) learned on my own through readings, (4) mentored by a colleague, (5) in-service activity, and (6) conferences, meetings, or workshops. If the choice was not listed they were asked to choose (7) other and to specify. In general and overall, teachers with “extensive” training have .05 significance level higher rate of understanding than teachers with “some” training. The total mean score for understanding DI for teachers with “extensive” training was 96.23 and the total mean score for understanding DI for teachers with “some” training was 91.13.

By looking at the frequency procedure, which was generated by the SAS System, of the 74 answers provided, 16 people said their training was through a ‘course from college or university’. The second highest rated category with 15 responses was ‘learned on my own through readings’. Third, was ‘conferences, meetings, or workshops’ and ‘in-service activity’ with 14 responses. Fourth was ‘mentored by a colleague with 12
responses and three teachers put “other”. The responses from others were as follows: “many years in special education”, “summer workshops”, and “on the job training”.

Professional development and training are key components to implementing a new instructional practice or methodology. Minote (2010) states, “Knowledge, which results in improved teaching and learning, is gained by reflecting on practice and employing a process of inquiry in one’s working environment” (p. 326). As noted here, not only is training crucial but time to reflect and collaborate is necessary to improve teaching.

Across the six components to DI, as stated by Tomlinson, the differences between teachers with “extensive” training and “some” training were significant. Five of six categories: interest, assessment, lesson planning, and product were significant at the .05 level. In the area of content a .10 significance level was noted. Only in the area of process was there no significant difference in understanding of teachers with “extensive” training verse teachers with “some” training. There may not have been a significant difference for process because the median was 14.50 for “extensive” and 13.00 for “some” training categories.

Hypothesis 5: There will be a significant difference in the understanding of differentiated instruction between special education and general education teachers.

The data illustrated that there was a significant level of .10 between understanding of DI between special education teachers and general education teachers. Special education teachers had a mean score of 96.15 while general education teachers had a mean score of 91.83.
On Part II, item 21 of the survey, asked the participants to describe their differentiated instruction training experience in the last three years. There were three comments. One of the comments said “many years in special education”. Special education teachers are typically trained to differentiate because they are often working with students of varied abilities and disabilities.

Given the mean scores, special education teachers 96.15 and general education teachers 91.83, it seems the data supports the first research question in that teachers at Leighton Public Schools understand the concepts of differentiated instruction and the methods of how to differentiate in the classroom. In regards to the hypothesis, special education teachers reported understanding DI more than general education teachers. The figure below shows the difference in special education teachers verse general education teachers in regards to understanding and implementation.

**Figure 5.1 General and Special Education Teachers Understanding Vs. Implementation**
Research Question 2

How do K-6 teachers at Leighton Public Schools implement components of differentiated instruction (student interest, assessment, lesson planning, content, process and product) as defined by Carol A. Tomlinson?

Understanding differentiated instruction is important but this researcher’s second purpose was to see if teachers understand DI, are they able to implement it in their classrooms. Carol A. Tomlinson (2010) states, “Learning to differentiate instruction well requires rethinking one’s classroom practice and results from an ongoing process of trial, reflection, and adjustment in the classroom itself” (p. 13).

Overall there were 75 participants who answered questions regarding their level of implementation. The total mean score was 86.56 with a standard deviation of 10.47 and a median score of 88.00. There was a lower mean score for implementation than there was for understanding. Based on the data, teachers have a better understanding of DI than the ability to implement DI. Next, each category will be analyzed to decipher the areas of strength and weakness. Table 5.2 illustrates the data for each component.
Table 5.2 The Six Components of DI: Implementing

<table>
<thead>
<tr>
<th>Components</th>
<th>Average Per Item Rating</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>3.62</td>
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<td>1.67</td>
<td>15.00</td>
</tr>
<tr>
<td>Interest</td>
<td>3.38</td>
<td>13.51</td>
<td>1.70</td>
<td>14.00</td>
</tr>
<tr>
<td>Assessment</td>
<td>3.32</td>
<td>16.62</td>
<td>2.62</td>
<td>17.00</td>
</tr>
<tr>
<td>Lesson Planning</td>
<td>3.32</td>
<td>16.60</td>
<td>2.30</td>
<td>17.00</td>
</tr>
<tr>
<td>Process</td>
<td>3.32</td>
<td>13.27</td>
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<tr>
<td>Product</td>
<td>3.03</td>
<td>12.13</td>
<td>2.53</td>
<td>12.00</td>
</tr>
</tbody>
</table>

**Content**

*Content* was rated first in the area of *implementation*, with four items to be assessed by 79 teachers. This category contained four survey items rated on a one to four scale for a possible total score of 4 to 16. There was a total mean score of 14.47 out of 16.00, a standard deviation of 1.67 and a median score of 15.00. Teachers had an average per item rating of 3.62 out of 4.00, which puts *content* as the highest component of DI to be *implemented* by teachers. There was a difference per item rating of .04 (understanding being higher) however; it was rated number one in both categories, understanding and implementation.

**Student Interest**

The first category on the survey to be assessed was *student interest*, which had a total of 80 responses across the four items. The *student interest* category contained four
survey items rated on a one to four scale for a possible total score of 4 to 16. *Student interest* had a total mean score of 13.51 out of 16.00, a standard deviation of 1.70 and a median score of 14.00. The average per item rating was 3.38 out of 4.00. Given these numbers, *student interest* was rated as the second most implemented area of differentiated instruction. The component of student interest was rated higher in *implementation* than in *understanding*.

There were three categories that tied for third place: *assessment, lesson planning,* and *process*.

**Assessment**

*Assessment* was the third most highly implemented component and was assessed by 81 teachers. There were five survey items to be assessed on a one to four scale for a possible total score of 4 to 20. Assessment scored a mean score 16.62 out of 20.00, a standard deviation of 2.62 and a median score of 17.00. Teachers had an average item rating of 3.32 out of 4.00, which placed *assessment* as the third most *implemented* component of DI long with *process* and *lesson planning*. *Assessment* was rated .24 higher in understanding than implementation, but overall it came in third in both categories.

**Lesson Planning**

There were 80 teachers who responded to the category of *lesson planning*. There were five survey items rated on a one to four scale for a possible total score of 4 to 20. There was a total mean score of 16.60 out of 20.00, a standard deviation of 2.30, and a
median score of 17.00. Teachers had an average per item rating of 3.32 out of 4.00, similar to assessment, which placed lesson planning as the third most implemented component of DI. Lesson planning was rated .26 more per item rating in understanding verse implementation.

Process

Process also tied for third place and was assessed by 81 teachers. This section asked teachers how often they implement items such as pace of instruction, learning preference groups, grouping students based on readiness and if they have a structured classroom environment to support a variety of activities. This category contained four survey items rated on a one to four scale for a possible total score of 4 to 16. The mean score across the four items was 13.27 out of 16.00, with a standard deviation of 2.19 and a median score of 14.00. The average per item rating was 3.32 out of 4.00, similar to lesson planning and assessment, meaning that process is the third most implemented component of DI. There was an average per item rating difference of .09, making understanding higher than implementation.

Product

Last to be analyzed was the component product that had four items to rate on a one to four scale for a possible total score of 4 to 16. There were 80 teacher responses with a total mean score of 12.13 out of 16.00, a standard deviation of 2.53, and a median score of 12.00. Teachers had an average per item rating of 3.03 out of 4.00 making product the least implemented component of differentiated instruction. Teachers understood the component of product more by an average rating per item difference of
However, product was rated as the least understood and the least implemented component of DI.

Overall, teachers generally implement the six components of differentiated instruction, however the data reveals they understood more than they implemented. In descending order of implementation teachers rated the following items as follows: content, interest, process and lesson planning and assessment, and last product.

**Hypothesis 2:** There will be variation in responses in teachers’ implementation of DI concepts among the participants.

Hypothesis 2 made the claim there would be variation in the implementation ratings. Therefore, the researcher attempted to show there was some spread or variation in the ratings summed across individual items as noted in Figure 4.2. Hypothesis 1 and 2 served to set up hypothesis 3, 4, 5, and 6. Had there not been variation in the scores in regards to implementation, it would have been impossible to find the differences that were reported in hypotheses 3, 4, 5, and 6.

The researcher utilized descriptive statistics to examine the variation across the 26 items in Section 1, Part B, implementation of the survey. Overall, there was variation in the implementation of DI concepts among the participants as noted in Figure 4.2 in chapter 3. This hypothesis supports the second research question as it shows teachers abilities to implement Carol A. Tomlinson’s (2010) six components of differentiated instruction on some level.
**Hypothesis 4:** *Teachers who have participated in DI training will have a higher level of implementation of the overall process of DI.*

As previously stated, participants were asked to describe their differentiated instruction training within the last three years. They were given the choice to answer None, Some, or Extensive. They were also asked to identify the types of training they had and the choices were as follows (including the codes): (1) course from college or university, (2) teleconference, (3) learned on my own through readings, (4) mentored by a colleague, (5) in-service activity, and (6) conferences, meetings, or workshops. If the choice was not listed they were asked to choose (7) other and to specify. The responses from “others” were as follows: “many years in special education”, “summer workshops”, and “on the job training”.

In general and overall, teachers with “extensive” training indicated a higher rate of *implementation* than teachers with “some” training. The total median score for *implementation* was 92.00. Teachers with “some” training had a median score of 87.00.

Across the six components to DI, as stated by Tomlinson, the differences between teachers with “extensive” training and “some” training were significant in the five of six categories: *lesson planning* and *product* were significant at the .05 level: *student interest* and *process* were significant at the .01 level. In the area of assessment a .10 significance level was noted. Only in the area of *content* was there no significant difference in *implementation* of teachers with “extensive” training verse teachers with “some” training.

**Hypothesis 6:** *There will be a significant difference in the implementation of differentiated instruction between special education and general education teachers.*
The data illustrated there was a significant level of .10 between *implementation* of DI between special education teachers and general education teachers, similar to *understanding* of DI. Special education teachers had a mean score of 90.78 while general education teachers had a mean score of 85.52.

Given the mean scores, special education teachers, 90.78, and general education teachers, 85.52, the data supports the second research question in that teachers at Leighton Public Schools *implement* the components of differentiated instruction. In regards to the hypothesis, special education teachers reported *implementing* DI more than general education teachers. This result could indicate the type of training that special education teachers receive in college as compared to general education teachers. Special education teachers may be provided with classes that focus more on differentiated instruction. In addition, special education teachers typically have students with varied abilities and disabilities forcing them to differentiate often. As a result, their hands-on experience could be a factor in the results of the data.

**Conclusions**

Overall, there were differences noted in the level of understanding of differentiated instruction according to participant responses. This is significant as future professional development may be designed to expand the areas of DI content that are the least understood. With the implementation of differentiated instruction by teacher in the classroom, there was also variation among responses. This information will be helpful when training is designed to support teachers with implementing differentiated instruction.
There was a general level of *understanding* and *implementation* of differentiated instruction among the participants at the Leighton Public Schools. However, as noted above, there was variation between the six components. In regards to *understanding* it appears *process, interest* and *product* are the three least understood concepts. This indicates teachers may be struggling with understanding how to initiate DI, how to use *student interest* and allowing varied products.

In regards to implementation, there was a lower rate of *implementation* compared to *understanding*. The data illustrate *student interest, process, lesson planning, assessment* and *product* have a lower level of implementation. The data indicate teachers may be struggling with being able to teach using *student interest*, implementing the *process* of DI, varying lesson plans and scaffolding learning, assessing through the *process* and allowing students to use varied *products* to show what they have learned.

According to the responses from general education teachers and special education teachers, it was noted that special education teachers reported having a higher level of understanding of differentiated instruction. This response was similar to implementation of differentiated instruction as special education teachers responded that they implement the six components of DI to a greater degree than general education teachers.

**Implications for Practice**

Differentiated instruction is a well-known philosophy to help students achieve personal success at their readiness level. However, it is a complicated concept to understand and implement. The results of this research study will be shared with the Leighton Public School teachers and administrators. Administrators will be encouraged
by the researcher to use the data to help inform future professional development and the researcher will make recommendations, based on the data, for the district.

The data from this research study suggests that it is important for teachers to receive thorough and specific training that is on-going throughout the school year. Also, teachers may profit from the opportunity to observe each other’s teaching so that a later discussion can be had in regards to what worked and what did not work. This may improve planning and implementing differentiated instruction in the classroom. Time is crucial and teachers may need more time in order to fully understand differentiated instruction and may require additional time throughout the day to ensure they have opportunity to continue to develop their understanding of DI.

Although this study did not measure the level of importance administration has in regards to DI, it may be important that all administrators within the district understand and support DI. Teacher beliefs or self-efficacy are very important and teachers may need to see that administration holds DI as a priority. Cayci (2011) states, “When the studies on teacher self-efficacy in the literature are examined, it has been found out that teacher self-efficacy is related to variables such as student success, student motivation, self-management, creating a productive school environment, students’ self-efficacy belief, teachers classroom management strategies and student disorderly behaviors” (p. 403). Therefore, administrative support may help ensure DI is implemented correctly and teachers may feel their time is well spent. This research study is a contribution to practice for both the researcher and the school district. Research studies are not often implemented in the school district and the study itself was of great interest and
importance to both teachers and administrators. In particular, DI is a part of the school improvement plan for the middle school. With a focus on Differentiated Instruction, awareness of concepts and classroom practices has been heightened among staff members. Since permission was received from the superintendent of schools, this study afforded the researcher an opportunity to interact and reflect with supervisors that was not anticipated. This research study is a contribution to the wider education field by expanding and extending review of Carol A. Tomlinson’s concepts of Differentiated Instruction. The gap between teachers’ understanding and implementation of DI needs to be bridged if this intervention, which has been adopted system wide, is going to impact student achievement in a meaningful way.

**Implications for Further Research**

Although the information gathered in the research study provides data suggesting teachers have a general level of *understanding* and level of *implementation* of differentiated instruction, it might be beneficial to continue the research by completing observations to answer the following two questions:

1. What do specific differentiated instruction lesson plans and activities look like in both general education and special education classrooms at the Leighton Public Schools?

2. What is the most effective way to enhance the level of differentiated instruction at the Leighton Public Schools?
In addition, future studies might look at how administration supports teachers with implementing differentiated instruction in the classroom. This study might involve studying administrative views and opinions on DI and how those views affect the implementation of DI.

Another study might involve looking at teacher training in the lowest scoring areas with follow-up classroom observations. For example, in the area of understanding the three least understood components were process, interest, and product. And the four least implemented components of DI were process, lesson planning, assessment and product. Future studies could hone in on these specific components and provide observations and interviews to gather more data to improve these areas.

The last future study recommended might be to look at different models of training (peer coaches, courses, observations, etc). This research study focused meeting students individual needs, but when it comes to training teachers, their learning needs should be acknowledged as well. Teachers may want to have input in the type of training that is offered. It may be important to research which trainings were most effective to plan for future professional development and trainings.

These questions and studies would assist educators and administrators in determining how to best move forward in facilitating support for differentiated instruction in the classroom.
Recommendations

Based on the data reviewed in this study, it appears teachers have a general level of *understanding* and level of *implementation* of DI. As a result, teachers have the general ability to create classroom environments that foster DI. However, there is a disconnect between *understanding* and *implementing*. The following are recommendations based on the data gathered in this research study. Table 5.3 below identifies five recommendations based on the data provided.

**Table 5.3 Recommendations**

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<thead>
<tr>
<th>Recommendations</th>
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<tr>
<td>1. Implement common planning time for general education and special education teachers who work together to discuss students’ needs and curriculum.</td>
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<tr>
<td>2. Implement professional development/training for all general education and special education teachers in each building focusing on the least understood components of DI (understanding: <em>process</em>, <em>interest</em>, and <em>product</em>; implementation: <em>process</em>, <em>lesson planning</em>, <em>assessment</em> and <em>product</em>)</td>
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<tr>
<td>3. As identified by building staff, provide on-going training through the year with built-in supports within each building.</td>
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<td>4. Provide time to analyze student data to help coordinate and plan instruction.</td>
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<tr>
<td>5. Provide opportunities for all teachers to provide feedback throughout the year to assess how differentiated instruction is being implemented and highlight successes.</td>
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</table>
The first recommendation is to provide time for teachers to collaborate and plan with other teachers who share the same students. Although the survey did not address teacher’s opinion on planning time, research shows that teachers and students could benefit from more time to collaborate and share ideas. Mertens and Flowers (2010) state, “Teachers in schools that are engaged in teaming with high levels of common planning time reported statistically higher levels of both interdisciplinary team and classroom practices” (p. 53). The data reveal special education teachers responded with a higher level of understanding and implementation than general education teachers. Common planning time could be scheduled so the general education teachers and special education teachers who work together can meet and collaborate to discuss students and curriculum. This would allow for teachers who are rich in content to plan with teachers who are rich in strategies. Common planning time could take place weekly and include a level of accountability. Formal lesson plans could be developed and possibly shared with others during staff meetings.

In addition to implementing scheduled planning blocks, teachers may benefit from further professional development/training to implement DI more readily and effectively. It would be important to determine the learning styles of the teachers so the training is provided effectively. Since there is a general level of understanding and implementation of DI, the recommendation would be to focus on the weakest areas identified in the data. For instance, in understanding the three weakest components were process, interest, and product and in implementation, and the four weakest components were process, lesson planning, assessment and product. The training should be focused on these areas since teachers identified them as weaknesses.
To follow-up with the professional development, a third recommendation is to provide on-going training throughout the year. Sometimes training is provided once without follow-up and teachers are expected to change their instructional approach after a one day training session. Teachers may need several check-ins throughout a school year. Professional development/training can become expensive so it may be helpful to appoint a few teachers in each school as peer mentors. For example, teachers who are strong in differentiating instruction could be appointed as peer mentors to encourage and assist other teachers to implement DI by doing peer observations and discussing DI with their colleagues.

The fourth recommendation is to provide teachers with time to analyze data to assist in using the data to drive instruction. The Leighton Public Schools uses response to intervention and as a result has a significant amount of student achievement data. Teachers may need time to look at the data, understand the data, and plan using the data to help progress monitor students and plan instruction.

Lastly, a recommendation has been made for administrators to check-in with teachers throughout the year to assess how the differentiated instruction is going. A positive way to encourage DI would be for administrators to acknowledge and highlight positive outcomes of differentiating instruction. Teachers could bring success stories to staff meetings and the strategies used could be discussed so that other teachers could try the strategies.
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Appendix A

Differentiated Instruction Survey

Part I: Teacher Survey on Differentiated Instruction (Sections A & B)

Part II: Background Demographics Data

I. Teacher Survey on Differentiated Instruction
I am conducting a Survey Research study as a doctoral student at Northeastern University. This data will help me complete my Doctoral Thesis and it will be helpful information to have when planning professional development for the Leighton Public Schools. By completing this survey accurately you will help the Leighton Public Schools understand what training is needed in the area of differentiated instruction.

This survey serves two purposes.
Section A: to see what teachers understand about differentiated instruction and,
Section B: to see how differentiated instruction is being implemented across the district in grades kindergarten through sixth.

Please read each question carefully and accurately answer the following items by circling the number in the left column indicating the level of importance for each item in Section A. In Section B circle the number indicating the level of use. Your participation is voluntary, confidential and greatly appreciated!
### Section A: Understanding of Differentiated Instruction

(1) Not Important  (3) Fairly Important  
(2) Somewhat Important  (4) Very Important

<table>
<thead>
<tr>
<th>Student Interest</th>
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<tr>
<td>1. I know individual student interest and can relate it to instruction.</td>
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<tr>
<td>2. I know individual student culture and expectations and can relate to instruction.</td>
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<td>3. I know individual student life situations and how it may impact their learning.</td>
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<td>4. I am aware of student's learning disabilities and handicaps and how to address them in lessons so as not to impair their learning.</td>
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<td>5. I pre-assess students before instructing.</td>
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<td>6. I pre-assess readiness to adjust the lesson.</td>
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<td>7. I assess during the unit to gauge understanding.</td>
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<td>8. I assess at the end of the lesson to determine knowledge acquisition.</td>
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<td>9. I determine student’s learning styles.</td>
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<td>10. I teach up by assuring each student works towards their highest potential.</td>
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<td>11. Materials are varied to adjust to students’ reading/interest abilities</td>
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<td>12. Learners play a role in designing/selecting learning activities.</td>
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<td>13. I adjust for diverse learner needs with scaffolding, tiering instruction &amp; provide student choice in learning activities.</td>
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<td>14. I provide tasks that require students to apply and extend understanding.</td>
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<td>15. The curriculum is based on major concepts and generalizations</td>
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<td>16. I clearly articulate what I want students to know, understand and be able to do.</td>
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<td>17. I use variety of materials other than the standard text.</td>
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<td>18. I provide a variety of support strategies (organizers, study guides, study buddies).</td>
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<td>19. The pace of instruction varies based on individual learner needs.</td>
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<td>20. I use learner preference groups and/or learning preference centers</td>
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<td>21. I group students for learning activities based on readiness, interests, and/or learning preferences.</td>
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<td>22. The classroom environment is structured to support a variety of activities including group and/or individual work.</td>
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<td>23. I provide multiple modes of expression in the final product.</td>
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<td>24. I provide students with the choice to work alone, in pairs or small group.</td>
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<td>25. The product connects with student interest.</td>
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<td>26. I provide variety of assessment tasks.</td>
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Section B: Implementation of Differentiated Instruction

(1) Hardly ever/Never do this  (2) Sometimes/Have used on a few occasions
(3) Frequently use this             (4) Use intentionally and often

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1. I know individual student interest and can relate it to instruction.
2. I know individual student culture and expectations and can relate to instruction.
3. I know individual student life situations and how it may impact their learning.
4. I am aware of student's learning disabilities and handicaps and how to address them in lessons so as not to impair their learning.
5. I pre-assess students before instructing.
6. I pre-assess readiness to adjust the lesson.
7. I assess during the unit to gauge understanding.
8. I assess at the end of the lesson to determine knowledge acquisition.
9. I determine student’s learning styles.
10. I teach up by assuring each student works towards their highest potential.
11. Materials are varied to adjust to students’ reading/interest abilities
12. Learners play a role in designing/selecting learning activities.
13. I adjust for diverse learner needs with scaffolding, tiering instruction & provide student choice in learning activities.
14. I provide tasks that require students to apply and extend understanding.
15. The curriculum is based on major concepts and generalizations
16. I clearly articulate what I want students to know, understand and be able to do.
17. I use variety of materials other than the standard text.
18. I provide a variety of support strategies (organizers, study guides, study buddies).
19. The pace of instruction varies based on individual learner needs.
20. I use learner preference groups and/or learning preference centers
21. I group students for learning activities based on readiness, interests, and/or learning preferences.
22. The classroom environment is structured to support a variety of activities including group and/or individual work.
23. I provide multiple modes of expression in the final product.
24. I provide students with the choice to work alone, in pairs or small group.
25. The product connects with student interest.
26. I provide variety of assessment tasks.
Section II: Background Demographics Data

Please complete the following questions:

13. Current subject area taught:
   ___Reading ___Writing ___Mathematics ___Social-Studies ___Science ___Other
   If other, please specify _____________________________

14. What type of teacher are you?
   ___General Education Teacher ___Special Education Teacher

15. Current grade taught
   ___K ___1st ___2nd ___3rd ___4th ___5th ___6th

16. Gender
   ___Male ___Female

17. Your age range is:
   ___21-25 years ___26-30 years ___31-35 years ___36-40 years ___41-45 years
   ___46-50 years ___51-55 years ___56-60 years ___60+ years

18. Education Level (check all that apply)
   ___Bachelor’s Degree ___Master’s Degree
   ___Master’s Degree plus 30 ___CAGS
   ___Doctoral Degree ___Other Please specify ____________________________

19. How many years have you been teaching?
   ___1-3 years ___4-10 years ___11-15 years ___16-20 years
   ___21-25 years ___26-30 years ___30+ years

20. I would describe my differentiated instruction experience as:
   ___None ___Some ___Extensive

21. If you have been trained, what type of training have you had (click all that apply)?
   ___Course from college or University
   ___Teleconference
   ___Learned on my own through readings
   ___Mentored by a colleague
   ___In-service activity
   ___Conferences, meetings, or workshops
   ___Other: Please specify ____________________________

22. Please expand on the training you had
   ____________________________________________________________
Appendix B

Permission from Sandra Page

Hello, Kerri Ann,
You are welcome to use the modified format for the teacher self-assessment.

Best wishes,
Sandra

Sandra Page
Educational Consultant and ASCD Faculty
bookpage@nc.rr.com
919/929-0681 H
919/636-1450 C
350 Warren Court
Chapel Hill, NC 27516

Permission from Carol A. Tomlinson

From: "Tomlinson, Carol (cat3y)" <cat3y@virginia.edu>

To: KerriAnn Brennan <kerriannbrennan@yahoo.com>

Sent: Tuesday, August 9, 2011 3:18 PM

Subject: RE: Permission to use survey

Hi Kerri Ann-

I think you’re fine to sue this survey—at least from my perspective.

Carol Tomlinson
Appendix C

Superintendent Permission

February 1, 2012

Human Subject Research Protection
Northeastern University
960 Renaissance Park
360 Huntington Avenue
Boston, MA 02115-5000

RE: Permission for Kerri Ann Brennan to Conduct Research

To Whom It May Concern:

Kerri Ann Brennan has my permission and support to recruit educators and utilize the schools’ facilities to conduct her research. I am looking forward to learning about Kerri’s findings as a result of her research once she is able to begin her study.

Please contact me by email mdupuis@falmouth.k12.ma.us or telephone should you need additional information.

Yours truly,

Mark P. Dupuis
Superintendent of Schools

MPD:gr

cc: K. Brennan
Appendix D

Email Letter sent to Principals asking for permission

My name is Kerri Ann Whipple and I am currently the Assistant Team Chair at Morse Pond School and have been a special education teacher at Morse Pond for 5 years. I am enrolled in the doctoral program at Northeastern University and completed my coursework last May. For my dissertation I am completing a survey research study and my focus will be on differentiated instruction. My goal is to utilize an online survey of all K-6 direct instruction staff (general and special education teachers) in _________. I would be grateful to gain your permission to survey your staff. Of course, their participation is strictly voluntary. With your permission, the online survey will be administered early in 2012. Throughout my research the individuals, schools and district will remain anonymous.

The two research questions that will guide my research are: (1) To what extent do K-6 teachers understand how to differentiate classroom instruction? (2) How do K-6 teachers implement components of differentiated instruction (curriculum content, lesson planning, instructional practices, student processing, and student assessment/product)?

I would be more than happy to talk to you in more detail about my study if you would like. I would also appreciate it if you could email me back to grant permission for me to survey your staff.

Thank you for your consideration and time.

Kerri Ann Whipple