

A Comparison of Teacher Perceptions of Middle School Mathematics Textbooks in the United States and the United Kingdom

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Porscha Clonts
University of Central Florida

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A COMPARISON OF TEACHER PERCEPTIONS OF MIDDLE SCHOOL
MATHEMATICS TEXTBOOKS IN THE UNITED STATES AND THE
UNITED KINGDOM

by

PORSCHA N. CLONTS

A thesis submitted in partial fulfillment of the requirements
for the Honors in the Major Program in Elementary Education
in the College of Education and Human Performance
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at the University of Central Florida
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Thesis Chair: Dr. Janet Andreasen

Dedication

For my parents, Ken and Susan Clonts, you have supported me through all of life's challenges and decisions. You have always encouraged me to do my best and reach for the stars. I thank you for teaching me to trust God, for he has a path for us all. You have taught me to be strong and never take one minute for granted,

For my sister, Kelsi Clonts, who traveled with me to the United Kingdom. You are an amazing sister, great friend, and I am happy I got to experience the amazing adventure with you,

For Michael Miles, thank you for your support throughout the process of my research and thesis. You helped me by supporting me and encouraging me to take full advantage of the opportunities that came my way,

For my Aunt and Uncle, Mary Levell and John Levell, thank you for opening your home in the United Kingdom to Kelsi and me. We were blessed to have you both as our amazing tour guides,

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Abstract

This study was a qualitative research study dedicated to the deep investigation of a regular and advanced seventh grade mathematics textbook used in Florida and the United Kingdom. A questionnaire was created for a teacher in both locations, along with the researcher, to rate the textbooks according to different characteristics. The two research questions that were answered through the research include:

1. In what ways, if any, is diversity represented in the pages of each seventh grade mathematics textbooks examined?
 - a. In what ways is the diversity of each textbook comparable to the observed diversity of the country in which it is used?
2. How do the seventh grade mathematics textbooks in the United States and the United Kingdom compare with aspects of appearance, readability, illustrations, content, the teacher's guide/resources, and EL accommodations?

These research questions were answered through the questionnaire, follow up interview, as well as the observed environment. The conclusion to the research was that although these textbooks are from two different countries, they have qualities each teacher liked and disliked. When I completed the questionnaire I was only able to rate the textbooks according to visual perspectives, while the teachers in each location were able to base their ratings on tangible classroom experiences. To further my research, I would enjoy being able to teach for a year in each location and then complete the questionnaire again to compare the differences between my first time completing it and the second time.

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Chapter 1: Introduction

Background

“America has traditionally been referred to as a ‘melting pot,’ welcoming people from many different countries, races, and religions” (Millet, 2000, p. 1). We can look in our schools’ classrooms and see the diversity that symbolizes this melting pot metaphor. Diversity is defined as, and can be seen within, variations in students’ religion, socioeconomic status, heritage, language proficiency and other characteristics that define the students. Do the textbooks used in classrooms in the United States exemplify this diversity? What about other countries? How does the United States and another country’s textbook compare and do the countries have the same levels of diversity? Are these levels of diversity represented in the textbooks used in a mathematics classroom? Textbooks have accommodated for the increased use of technology within the school system because they have adapted ways that enable students to have the ability to participate in virtual field trips, videoconferencing, and multiple educational websites (Henningfeld, 2012). Has the inclusion of technology caused diversity within the textbooks’ pages to be eliminated or diminished? Along with this, have important qualities of the textbook been compromised in order to incorporate technology? To determine this we need to examine the appearance, readability, illustrations, content, and the teacher’s guide/resource of the textbooks used in the classrooms.

In order to meet the needs of students, teachers need to be able to judge students’ skills and abilities as well as their strengths and weaknesses (Johnson, 2011). Once this is done, textbooks can aid in accommodating for students. Textbooks also need to contain

accommodations for diverse student needs including English Learners (ELs). Knowing what is in the textbooks used in schools is important not only for students and teachers, but also for parents and the community. Everyone needs to be aware of what is being taught to children through the school system and the textbooks play a large role in that process.

Research Questions

Two main questions will be examined in this study.

1. In what ways, if any, is diversity represented in the pages of each seventh grade mathematics textbooks examined?
 - a. In what ways is the diversity of each textbook comparable to the observed diversity of the country in which it is used?
2. How do the seventh grade mathematics textbooks in the United States and the United Kingdom compare with aspects of appearance, readability, illustrations, content, the teacher's guide/resources, and EL accommodations?

It is believed that differences between the textbooks based on cultural differences will be detected between the two countries. The research questions will be addressed using a questionnaire completed by me and a middle school mathematics teacher in each country, as well as through a follow-up interview. For the sake of this research, diversity includes not only ethnicity and gender, but also cultural diversity, learning styles, learning disabilities and gifted students. The next chapter contains a review of the literature including adolescent development, teaching mathematics, diversity considerations, and assessment.

Chapter 2: Literature Review

Introduction

Research of adolescent development, teaching mathematics, diversity considerations, assessment, and levels of cognitive demand are all important when looking at the textbooks used in mathematics classrooms. Teachers should be aware of what characteristics the textbooks they use in their classrooms have and what characteristics they might lack. Being aware of this, teachers can have a more clear understanding of the actions they need to take in order to accommodate for all students and help all students learn in the best environment.

Adolescent Development

The way in which adolescents develop influences what teachers do in a classroom. This also influences the approach a textbook may take in teaching a lesson. Through the research of Piaget (1952), Bloom (1984), and Gardner (1983), we can better understand adolescent development. Piaget, Bloom and Gardner have all contributed different viewpoints on the development of youth. Piaget was a cognitive theorist, Bloom created a taxonomy we still reference today, and Gardner is known for his theories of multiple intelligences.

Piaget was a Swiss psychologist and cognitive theorist who impacted the way people thought about child development. He is known for his research on cognitive structure, schema, assimilation, accommodation, and the process of equilibrium. Piaget's theory on cognitive structure encompasses how knowledge is organized in the brain, while schema is the way we personalize information based on individual experiences, also known as a category system. Piaget explained that assimilation is when one adds new information to already created schemas,

while accommodation is when one changes their preconceived schema due to new information. This accommodation is an adjustment one makes when they learn new information that alters how they previously thought or understood something (Ultanir, 2012). Piaget went on to research the Cognitive Development Stages which humans progress through in development. These stages are broken down below:

- Sensorimotor (Birth-2)
- Preoperational (2-6)
- Concrete Operational (6-11), and
- Formal Operational (11-adulthood) (Scholastic, 2001).

The first stage, Sensorimotor, encompasses children's first understandings of the world around them while participating in simple reflexes such as sucking and grasping. Preoperational is when children are able to symbols and simple words to represent people and objects. School-aged children are in the third stage, Concrete Operations. In this stage children are able to organize objects with relation to their qualities. When we reach the last stage, we stay in this stage for the rest of our life. In the Formal Operational stage one is able to reason abstractly and solve theoretical problems. Due to students in the seventh grade reaching the last stage cognitively, textbooks should incorporate abstract thinking to enhance students' development within this stage. This research from Piaget gives a good insight to what material textbooks at this grade level should include.

Along with Piaget, Bloom (1984) is another educational theorist that contributed to our understanding of child development. In 1956 Bloom published the first volume of his taxonomy

entitled *Taxonomy of Educational Objectives Book 1: Cognitive Domain*. “Bloom’s taxonomy as it is often referred to, as a classification system for educational goals that could be used in the constructing of test items and in the formulation of instructional objectives by classroom teachers and educational leaders” (McBain, 2011, p. 4). Bloom defines this taxonomy, a hierarchy of brain development that encompasses six categories; knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1984). In 2000, the taxonomy transitioned to remember, understand, apply, analyze, evaluate and create (Krathwohl, 2002). From phase-to-phase the stages become more complex and exploit more brain maturity. The first stage, knowledge, is mental actions such as memorizing definitions and classifying/categorizing that exploits the least amount of complexity. Comprehension is the basic understanding of something by being able to interpret or translate it. Application deals with the ability to apply new knowledge learned while analysis is being able to break down subject matter into components and investigate each individually. Synthesis is the stage when one is able to put together all the previous parts and produce a plan to go along with the information learned. The highest step of Bloom’s taxonomy is evaluation. In this step, one is able to judge terms of internal evidence as well as external criteria (Bloom, 1984). These steps together create the levels of Bloom’s taxonomy which is important for textbooks to incorporate because of the importance of information being developmentally connected. Connecting information for students is discussed more in the literature review with further deliberation of the standards within Florida and the United Kingdom.

Another theorist that has contributed an abundance of research to the types of intelligences with which children learn is Gardner (Gurian, 2010). In his book, *Frames of Mind: The Theory of Multiple Intelligences*, he states “there must be more to intelligence than short answers to short questions-answers that predict academic success” (Gardner, 1983, p. 4). With this, Gardner expanded the original thought of child development to include areas of music, spatial relations, interpersonal knowledge, and the mathematical and linguistic ability (Brualdi, 1996). The intelligences he discusses are: logical-mathematical, linguistic, spatial, musical, bodily-kinesthetic and personal. Throughout time, intelligences have been integrated or taken out of his theory, but these six are the ones that have been consistent throughout each change. Gardner believed that the intelligences complement each other rather than operate independently. For this research, the logical-mathematical intelligence would correlate the best with mathematics, but as Gardner believed, other intelligences would correlate to the practice of mathematics as well (Brualdi, 1996). His theory “challenges the classical view of intelligence that most of us have absorbed explicitly or implicitly” (Gardner, 1983, p. 5). The explicit information Gardner brings up is that which we gain from psychology or educational references while the implicit information is what we gain by living in a culture with a restricted view of intelligence. Gardner explains that he believes it is possible to enhance a person’s educational opportunities and options at a young age by identifying their intellectual profile. When using textbooks in the classroom, they should include ways to incorporate Gardner’s seven intelligences due to the intelligences being intertwined.

Why is Piaget, Bloom and Gardner's research important when comparing textbooks?

Their research is important because it can be used by textbook publishers to align the textbook information and format. Piaget's research can be used to understand the development of individuals of different ages through his book *The Origins of Intelligence in Children* and the four stages in his Cognitive Development Stages. Piaget's research sets the stage for what students are capable of achieving through different stages in their lives. Bloom's taxonomy is a classification of learning levels that can help textbook publishers integrate higher comprehension question while also remembering lower comprehension questions. Gardner's research presents the different styles of learning that are in a school classroom and this can help textbook publishers incorporate multiple ways of teaching material that will meet the needs of the different learning styles. If textbooks publishers incorporate the research of Piaget, Bloom and Gardner, the textbooks will be rich in content and meet the needs of the students.

Teaching Mathematics

In teaching mathematics, building on previously learned knowledge is important to keep in mind because self-regulated learning (SRL) is supported by student scaffolding (Devolder, van Braak, & Tondeur, 2012). The standards which curriculum is based upon recognize these connections and support scaffolding in the classroom. Two groups of standards are typically followed by mathematics teachers in the United States. The first standards were created by the National Council of Teachers of Mathematics and contained both content and process standards (NCTM, 2000).

In addition to guidelines for content that should be taught in K-12 schools, NCTM (2000) has developed five process standards which are essential for mathematics teachers. The five Process Standards are: problem solving, reasoning and proof, communication, connections, and representation. These represent the processes students should be using in learning mathematics.

- **Problem Solving:** This standard is achieved by building new information on previously learned knowledge and eventually developing new mathematical understandings (NCTM, 2000). In other words, asking the same question in multiple ways or seeking out multiple solutions to the same problem (Polya, 1945). To do this, students need to be able to understand the problem, make a plan to solve the problem, carry out the plan, and look back to review and discuss the solution (Polya, 1945). Through this process students are required to build new mathematical knowledge, evaluate problems that come up within mathematics, apply and adapt appropriate strategies when solving problems, and monitor and reflect on their processes (NCTM, 2000). Problem solving is an essential ability in the subject of mathematics (Boaler, 2008).
- **Reasoning and Proof:** In this standard, children are to explore mathematical inferences and develop and evaluate arguments by recognizing reasoning and proofs, making and investigating conjectures, developing and evaluating arguments and proofs, as well as selecting and using reasoning methods (NCTM, 2000).

- **Communication Standard:** Communication can occur through peer or teacher discussion. In this standard, students understand other's ideas and strategies through organizing and consolidating their thinking, communicating their mathematical thinking, analyzing and evaluating the strategies used, and using mathematical language (NCTM, 2000). Helping students understand that communication is an important part of the subject of mathematics is important, but not always recognized and enforced (NCTM, 2000).
- **Connections:** Through this standard, children are to recognize that the information learned can build into a much larger, coherent, component. This can be shown by the understanding and demonstration of mathematics being used outside the mathematics curriculum. Steps in achieving this standard include recognizing and using connections, understanding how mathematical ideas interconnect as well as build on one another, and recognizing and applying mathematics in context as well as outside the mathematical environment (NCTM, 2000).
- **Representation:** This standard is to represent knowledge learned by the students in various ways. Through this standard, children are required to apply what they learned. Representation is crucial for students because teachers are then able to gauge how the students are learning. To achieve this standard, students need to be open to creating and using representations; selecting, applying and translating mathematical representations; and using representations to model/interpret phenomena including physical, social, and mathematical ideas (NCTM, 2000).

The second set of standards is the Common Core State Standards for Mathematics which includes both content and practices (National Governors Association, 2010). Though the NCTM and CCSSM standards are similar, they do have some differences. Taken together, however, they are a representation of what is required of students in the mathematics classroom. The CCSSM have been adopted in forty-three states throughout the United States and were developed by the nation’s governors and education commissioners. CCSSM are important because they create consistency between states across the United States. The standards lay the foundation in which teachers can prepare our students to succeed in life. Florida has modified the CCSSM and calls them the Florida Standards, but a large majority of the standards have stayed consistent. The CCSSM are descriptors of the content students should be taught, and learned, in the correlating grade level along with the practices in which students should be engaged as they learn mathematics. There are eight Standards for Mathematical Practice which include: make sense of problems and persevere in solving them, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of structure, and look for and express regularity in repeated reasoning (National Governors Association, 2010). Before examining the content, it is important to note that the NCTM process standards parallel the CCSSM practice standards, as noted in the following table.

Table 1

Common Core State Standards for Mathematical Practice (CCSSM)	NCTM Process Standards (individual connection to each of the eight Standards for Mathematical Practice)
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<p>(National Governors Association, 2010).</p>	<p>(Koestler, Felton, Bieda, & Otten, 2013)</p>
<p>Standard #1:</p> <p><u>Make sense of problems and persevere in solving them:</u></p> <p>The first mathematical practice encourages students to be able to explain their processes with relation to solutions to a problem while also continually making sense of their work.</p>	<p>Problem Solving: Students are active in the sense-making process and are allowed to invent solution strategies by building on prior knowledge.</p> <p>Reasoning and Proof: Making and investigating conjectures aids students to develop knowledge that can be used to understand a problem, see how a problem is connected to other forms of mathematics, and learn new mathematics.</p> <p>Communications: Mathematical discussion should evolve around ideas and solutions strategies that focus on understanding rather than only solutions.</p> <p>Connections: Teachers can broaden their students' understanding of mathematics by integration into other subjects.</p> <p>Representation: Students should have opportunities to model different situations while using appropriate representations.</p>

<p>Standard #2:</p> <p><u>Reason abstractly and quantitatively:</u> In reasoning abstractly and quantitatively, students are to grasp the concept of quantities and relate it to situations with respect to decontextualizing and contextualizing.</p>	<p>Problem Solving: Problem-solving aids in abstract and quantitative reasoning development.</p> <p>Communications: Students should understand other students' explanations by connecting real-world and symbolic representations.</p> <p>Connections: Students should use mathematical symbols to represent situations with relation real-world contexts to aid in mathematical links.</p> <p>Representation: Mathematical language is imperative to represent a problem correctly while also symbolically understanding the representation of the problem.</p>
<p>Standard #3:</p> <p><u>Construct viable arguments and critique the reasoning of others:</u> The third practice is to have students break down situations and analyze them with a logical increase of statements to prove their case.</p>	<p>Reasoning and Proof and Communication: Students should build understanding by reasoning from various examples. Definitions, assumptions, and previously proven theorems should aid students debating their proof.</p> <p>Secondary level mathematics is more abstract than concrete and students should exhibit reasoning across empirical, preformal, and formal phases.</p>

<p>Standard #4:</p> <p><u>Model with mathematics:</u></p> <p>Modeling with mathematics is recognizing the ability to correctly apply mathematics in everyday life as well as be confident when making necessary mathematical assumptions or approximations.</p>	<p>Problem Solving: Opportunities for future learning is enhanced by modeling and problem solving.</p> <p>Communications: Modeling provides opportunities to strengthen mathematical communication and can be enforced explicitly when engaging student communication.</p> <p>Connections: Productive disposition occurs when students understand relations to mathematics and real-world situations.</p> <p>Representation: When students communicate their learnings and understandings to other individuals, they are given opportunities to create and refine their mathematical representation.</p>
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<p>Standard #5:</p> <p><u>Use appropriate tools strategically:</u></p> <p>Appropriate tools include paper and pencil as well as concrete models, a ruler, protractor, and calculator or other technology. Students are to understand the appropriate usage of these tools. In this standard, students are to identify purposeful resources in solving their problems.</p>	<p>Problem Solving: Tools are used by students to understand and represent mathematics. Students need to learn the usefulness of the tools when introduced, and working through concepts. It is not only the teachers' responsibility to make use of these tools.</p> <p>Representation: Teachers have the ability to help students make connections. These connections should encompass the students' personal strategies and the represented ways to which they use language, symbols, and representations.</p>
<p>Standard #6:</p> <p><u>Attend to precision:</u> Students need to be able to successfully communicate their understanding. This includes correct explanation of symbols used. Attend to precision is recognized by students being precise in mathematical processes as well as language.</p>	<p>Communications: Teachers should be encouraged, and willing, to help students learn the conventional modes of communication. This will allow students to be seen as skillful communicators in multiple aspects.</p> <p>Representation: It is important for students to grasp the fact that exactness plays a role in the subject of mathematics.</p>

<p>Standard #7:</p> <p><u>Look for and make use of structure:</u></p> <p>Being able to recognize a pattern or structure through a mathematical problem is discussed in the seventh standard. Students are to also be capable of adjusting their perspective for necessary situations.</p>	<p>Connections: Making connections at a conceptual, abstract level through different forms and ideas will help students condense different mathematical objects into a related set.</p> <p>Representation: When students grasp the importance of algebraic notion, they will be able to represent various relations that can be used in multiple situations.</p>
<p>Standard #8:</p> <p><u>Look for and express regularity in repeated reasoning:</u> Once students recognize patterns, they will be able to discover shortcuts that help students cut down on the time it takes to solve a problem while continually evaluating their results.</p>	<p>Reasoning and Proof: Engaging, encouraging, and allowing students to make generalizations enhances their ability to make sense of the mathematics. The ability for students to find relations and recognize patterns enables them to understand that mathematics can make sense.</p> <p>Connections: Students become more sophisticated with their mathematical use by engaging in practice, arguments, and justifications throughout the years.</p>

In addition to the practice standards, the CCSSM describe the mathematical content students should learn in each grade. The Common Core State Standards content that correlates to seventh grade, the grade level for this study, includes:

In Grade 7, instructional time should focus on four critical areas: (1) developing understanding of and applying proportional relationships; (2) developing understanding of operations with rational numbers and working with expressions and linear equations; (3) solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples (National Governors Association, 2010, p. 46).

This content is then further broken down into domains and standards which expand the content descriptions related to the specific grade level. Textbooks are to incorporate these standards because they were created to guide instruction to prepare quality students who could succeed in college and careers.

The United Kingdom also has standards for teaching mathematics. In the United Kingdom, grades are called years and the school where I conducted my research contained students from year 6 to year 11; which is equivalent to grade 6 to grade 11 in the United States. This school did not have a year 12, but rather a Sixth Form. Sixth Form is an extra year of schooling that some students attend to prepare them for higher education. Sixth Form would be equal to our 12th grade and if we also had a 13th grade. A law was passed in 2008 that mandated by 2013 all students in the UK have to stay in education, or training, until they are 18 years of age and Sixth Form helps them do this. Pupils could stay in full-time education, work-based learning, or part-time education along with mandatory volunteer work consisting of more than 20 hours a week (National Bureau for Students with Disabilities, n.d.).

The United Kingdom’s curriculum is broken down into four Key stages, plus a fifth Key stage for Sixth Form. The Key stages divide the curriculum into targets and the students are required to be assessed on these targets at the end of each Key stage. Below is a table for easier visualization of the Key stages.

Table 2

Key stage	Year	Ages
1	1 and 2	5-7
2	3, 4, 5 and 6	7-11
3	7, 8 and 9	11-14
4	10 and 11	14-16
5	Sixth Form	16-18

For the purpose of this research, I will be focusing on Key stage 3 because it is the stage correlating with year 7. Below are the three curriculum standards for pupils at Key stage 3:

- “Become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- Can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems

into a series of simpler steps and persevering in seeking solutions.” (Department of Education, 2014, p. 2)

The first standard consists of the pupils being able to consolidate their numerical and mathematical capability from Key stage 2, select appropriate calculation strategies, and use algebra to generalize, substitute values, as well as use language precisely. The second standard, reason mathematically, includes understanding number system, extending and formalising knowledge, identifying variables, making and testing conjectures, and being able to reason deductively in geometry. The last standard, solving problems, includes developing mathematical knowledge, use of formal mathematical knowledge to interpret and solve problems, modeling situations mathematically, and selecting appropriate concepts (Department of Education, 2014).

No matter if the standards are used in Florida or the United Kingdom, they should involve five practices that are important for facilitating inquiry in the classroom. The five practices consist of anticipating, monitoring, selecting, sequencing, and connecting (Smith & Stein, 2011). The practice of anticipating is when the teacher is able to foreshadow what the students might do and how they might solve specific problems. Monitoring is when the teacher observes the students and how they work through their problems. Selecting relates to using students’ work to increase the class understanding in certain areas. Sequencing refers to selecting the students’ work, but then organizing the presentation of the examples for best support. Connecting is when teachers need to make connections for the students in ways that

will maximize their understanding and mastery. These five practices aid in students achieving high-demanding material and objectives while also supporting students' cognitive demand.

The standards, and the five practices, apply to all students, no matter their diversity, background, or ability. Though these standards address the material to be taught, the methods for delivery including aspects of diversity also need to be included in the mathematics textbooks used in classrooms.

Diversity Considerations

One might ask what diversity is and how is it considered in mathematics textbooks. Diversity encompasses aspects of gender, cultural diversity, and much more. Through the aspect of gender, Gurian (2010) outlines ten nuances of learning that offer differences between boys and girls, including: deductive and inductive reasoning; abstract and concrete reasoning; use of language, logic and evidence; likelihood of boredom; use of space; movement; sensitivity and group dynamics; use of symbolism; and use of learning teams (Gurian, 2010). Understanding these ten nuances and having them incorporated in the textbooks used in the classroom will aid in success of all students.

When looking at multicultural education, there are four major goals which consist of: increasing academic achievement for all students; instilling positive attitudes towards different cultural, racial, ethnic, and religious groups; building confidence with academic and societal aspects in students; and broadening students' perspectives on other groups (Riskowski, 2010). Textbooks can aid in supporting teachers and making it easier for them to adjust their lesson plans to meet the needs of all students.

Cultural diversity is an aspect of diversity that plays a large role in the mathematics classroom. According to Neel (2005), John Dewey once said “Diversity is one word, but many things. It could describe students from diverse backgrounds and refer to ethnicity, culture, gender, language, learning style, socioeconomic level, intellectual ability, and physical capability” (p. 54). John Dewey wrote a book in 1916 where he expressed his opinion that diversity of populations, languages, religions, traditions, and moral codes is apparent in both modern and ancient times (Dewey, 1916). The diversity we see in classrooms has been around for many years, but we are now more aware of how accepting and integrating diversity impacts teachers’ classrooms. A mathematics classroom can be comforting for all aspects of diversity if the teacher creates “a safe and accepting environment for learning where students can deepen their understanding by communicating, reasoning, and discussing their thinking with others” (Neel, 2005, p. 55). In order for a classroom to look like this, there needs to be reflection and connection to students’ prior knowledge. Teachers can encourage students to accept their diversity by constructing mathematical knowledge and linking “background knowledge, values, and practices in their culture and community with new learning” (Neel, 2005, p. 56). Textbooks can aid in bringing diversity into the classroom by giving the teachers opportunities to expand on their students’ point of views. Dewey argued that a teacher who does not permit and encourage diversity is building blinders for themselves and their students. These blinders restrict vision to a single path that the teacher approves of (Dewey, 1916). Having a textbook that supports cultural assortment and integration will help teachers encourage the acceptance of diversity in their classrooms. It is also beneficial for teachers to know their students. Knowing their students,

teachers are able to incorporate each individual's diversity in the lessons. Textbooks need to have segments that allow incorporation of individualism; therefore all students feel that their personal diversity is as important as the student's sitting next to them.

Along with understanding how boys and girls might differ in the classroom and cultural diversity, reaching out to parents and guardians, in cases of unexcused absences, tardiness, disrespectful behavior, as well as respectful behavior and achievement is essential. Parents need to know that teachers appreciate their efforts and that they are working together rather than against each other (Johnson, 2011). Students need to feel safe inside the classroom and parents need to feel encouraged to have a positive, professional relationship with teachers because this will help teachers learn more about their students. These actions cannot be done by the aid of a textbook, but textbooks can offer activities adapted for all students that will help teachers have something to talk to parents about. Though it is essential for teachers to keep in contact with parents, they need evidence to share with parents. Textbooks can aid in presenting examples of student's work. Understanding that not all students will have the same home life is essential. The diversity in the classroom is not apparent only in the school environment, but rather the world outside of school as well. Textbooks can support this by adapting for a variety of home lives and situations.

Another important impact in the classroom is that everyone learns differently and those who have learning disabilities (LD) may be required to have special assistance. Students that have LDs may struggle to comprehend mathematical concepts that other students might not struggle with in the learning environment. "Students with LD typically have deficits in attention,

memory, background knowledge, vocabulary, language processes, strategy knowledge and use, visual-spatial processing, and self-regulation” (Jitendra & Star, 2011, p. 13). Important practices that textbooks should incorporate include systematic and explicit instruction, student think-alouds, visual representations, peer assisted learning opportunities, and formative assessments to provide feedback to both teachers as well as students” (Jitendra & Star, 2011, p. 13).

Incorporating aspects into daily lessons will help those with LD, and will not hinder, but will often help, other students. If textbooks were to incorporate aids for students with LD teachers would not have to take extra time to find resources outside of the textbooks.

Recognizing these different forms of diversity in the classroom, teachers can use strategies like differentiated instruction to meet the needs of all students in the classroom (Hall, 2002). To achieve differentiated instruction teachers need to clarify key concepts and generalizations, use assessment as a teaching tool to extend versus merely measure instruction, emphasize critical and creative thinking, engage all learners, and provide a balance between teacher-assigned and student-selected tasks (Hall, 2002). Through differentiating instruction, it is best if textbooks demonstrate activities for students of all levels no matter their “spectrum of learning readiness, personal interests, culturally shaped ways of seeing and speaking of the world, and experiences in the world” (Tomlinson, 1999, p. 1). Higher level thinking questions are included in a lesson for students to challenge themselves. Through this instruction, students who are struggling will excel if there are multiple ways of solving a problem because through differentiated instruction you start teaching not where the curriculum says to start, but rather where your students are (Tomlinson, 1999). If textbooks were to incorporate these strategies, it

would save the teacher time. Along with the aid of a textbook, steps when implementing differentiated instruction include: knowing your students, having a repertoire of teaching strategies, identifying a variety of instructional activities, and identifying ways to assess or evaluate student progress (Hall, 2002).

Notably, gender, cultural diversity, parent involvement, and learning disabilities have impacts upon a classroom. Another area of consideration is the different assessments that can be used in the classroom. While diversity encompasses multiple aspects of the classroom, textbooks can, and often do, aid in supplying teachers with assessments to meet the needs of all children.

Assessment

Three different forms of assessments are commonly accepted: formative, summative, and informal. Formative assessments are used to gauge the learning process and may be graded or non-graded (Dodge, 2009). Summative assessments are such assessments that are graded, such as exams conducted after a unit has been taught (Dodge, 2009). These assessments are given to gain knowledge of how much the students have learned and if they learned what was intended to be learned. Informal assessments include observation of student activities and other non-graded methods of assessing student progress. Many assessments can be used either formally or informally, such as a student journal. A student journal can be used as a formal assessment because it can represent students' work from point A to point B and it can be used as an informal assessment if the students keep the journal and the teacher reads and responds to the journals. With these, the teacher can have the students write about what they learned on a

particular day, how they liked the lesson, or if they need more guidance. When reviewing the journals, teachers should make at least one comment, not correct every grammar error, and with permission from the student read some of the journals aloud (Johnson, 2011). One type, called an assessment for learning approach, is considered a formative assessment and involves two parts (Dodge, 2009). Part one includes student knowledge about what is being taught and what will be taught next. The second part of the approach is called “assessment for learning” and not “assessment of learning”. This assessment for learning “is designed to promote learning and all the information that is gained from assessment is made helpful to individual learners to propel them to greater levels of success” (Boaler, 2008, p. 99).

Assessment for learning is a strategy that aids students who are struggling because “teachers set out mathematical goals for students, not a list of chapter titles or tables of contents, but details of the important ideas and the ways they are linked” (Boaler, 2008, p. 99). This strategy helps break down a large goal into smaller, easier to achieve, objectives. Students are able to make their own goals and therefore have more pride in their achievement. If a student is struggling in accomplishing their goal, teachers work with the student to make an interim goal that will eventually lead them to the ultimate goal. Having students make multiple goals is better than being overwhelmed by one large goal and inevitably not achieving it. This form of assessment is regarded like a homework assignment and it is used to check for understanding throughout a lesson or unit. These assessments guide teachers in their decision making of the next steps in their instruction (Dodge, 2009).

With understanding formative, summative and informal assessments, teachers can better understand that assessments do not always have to take the form of a test. Assessments can be in the structure of discussion, activities, and games. Though these assessments are important, teachers alone cannot create all the necessary assessments and this is where textbooks come into play. Textbooks can provide prompts to help teachers utilize learning logs/journals so that testing the students as the only assessment measure in the classroom is avoided.

Levels of cognitive demand

Textbooks can include levels of cognitive demand in their assessments to ensure that quality learning is taking place. Although textbooks can incorporate these demands, teachers are responsible for being critical examiners of each assessment used in their classrooms, and even of the textbooks themselves. For example, if a teacher chose to skip a section of a unit, and they use the unit exam provided in the textbook, it is essential that the teacher verifies if there are any questions in the assessment that were not addressed in the lessons. Teachers are to confirm if the assessment they are going to use is assessing the learning goals that were taught. Also, teachers are responsible for evaluating the cognitive demand in the assessments used. Teachers are responsible for making sure that there is a variety of low level and high level cognitive demand questions. Having textbooks that are aligned with these qualifications will help teachers be able to focus on teaching, and not so much on creating assessments.

Smith and Stein (1998) have researched levels of cognitive demand and have expanded on lower and higher-levels of demand. The lower-level demands include memorization and procedures without connections. The higher-level demands include procedures with connections

and doing mathematics. The act of memorization has no tangible connections to what is being learned and the act of memorization cannot be followed through a set of procedures because no steps exist due to the simplicity of memorization. Although procedures without connections are algorithmic, they require a limited amount of cognitive demand. Those in this level of demand are focused on the product of their reasoning rather than developing understanding of the mathematical concept. An example of a lower-level cognitive demand is solving the problem $\frac{2}{3} \times \frac{3}{4}$ through a set of rules and procedures. Visual diagrams, manipulatives, and problem situations help one make connections to their learning which entails a higher-level of cognitive demand. When analyzing and examining a task at hand, one is participating in a higher-level of demand because they are pulling from prior knowledge and experiences to reason. An example of a higher-level demand would be having the students solve the multiplication problem from above but using an explanation without using a specific rule or reasoning through the problem rather than giving an answer because that is what one memorized (Smith & Stein, 1998). It is imperative that students are encouraged to use both their lower-level and higher-level demands and that assessments include a balance of lower- and higher-level cognitive demand. Textbooks can incorporate both demands in mathematical practice as well as organized assessments for teachers to use in the classroom.

Conclusion

Through the review of related literature that correlates to this study, this chapter included the areas of: adolescent development, teaching mathematics, diversity considerations, and assessment. In consideration of adolescent development, I explained the importance of Piaget,

Gardner, and Bloom's research. Within teaching mathematics, this chapter examined how the National Council of Teachers for Mathematics (NCTM) and Common Core State Standards for Mathematics (CCSSM) have influenced what is taught in mathematics classrooms. This chapter also highlighted the diversity aspects and assessments that will be the basis of examination of the textbooks through this research. In the following chapter, I discuss the participants, procedures, and questionnaire instrument that were used in this research study.

Chapter 3: Methodology

This study was a qualitative research study which sought to answer the following questions:

1. In what ways, if any, is diversity represented in the pages of each seventh grade mathematics textbooks examined?
 - a. In what ways is the diversity of each textbook comparable to the observed diversity of the country in which it is used?
2. How do the seventh grade mathematics textbooks in the United States and the United Kingdom compare with aspects of appearance, readability, illustrations, content, the teacher's guide/resources, and EL accommodations?

This chapter will describe the methodology which was used to answer these questions.

Participants

Institutional approval was granted for the study through the Institutional Review Board (IRB) of the university (see Appendix A). One mathematics teacher in Florida and one mathematics teacher in the United Kingdom were asked to participate in this study. The seventh grade mathematics teacher in Florida was entering her third year of teaching while the grade seven mathematics teacher in the United Kingdom had been a mathematics teacher for four years. For the sake of this study, Mary will be used for the United States' teacher's name and Katie will be used for the United Kingdom's teacher's name. The schools in which the teachers were working were both public. I traveled to both locations to meet with the participants to complete the questionnaire.

Textbooks Used

When starting this study, I narrowed down the grade level I was going to research by examining the grade in which Algebra was taught. I chose Algebra because it is my favorite type of mathematics and I wanted to work with mathematics textbooks that contained topics that interested me. Once I decided on the grade level in which I wanted to complete my research, I talked with two mathematics teachers in Florida to figure out the textbooks they used in their classrooms. After I talked with the Florida teachers, I contacted a year seven mathematics teacher in the United Kingdom to find out which textbooks were used in their classrooms. After I was given the names of the textbooks used in the Florida regular and advanced classroom as well as the United Kingdom advanced and regular classroom, I purchased the textbooks so I would have them for my research. The two mathematics textbooks used by the Florida teacher were the Holt McDougal Mathematics Course 2 and Course 3 textbooks. The United Kingdom textbooks were the Collins Maths Frameworking Pack 2 and Pack 3.

Questionnaire Instrument

After researching the information covered in the literature review, I created a questionnaire to explore and compare two seventh grade textbooks used to teach seventh grade mathematics in Florida to two textbooks used to teach grade seven mathematics in United Kingdom. The items covered in the questionnaire included important qualities needed in seventh grade mathematics textbooks based on the related literature. Along with determining if diversity is a focus in these textbooks, questions that concentrated on the appearance, readability, illustrations, content, and the teacher's guide or resource book were created. The questionnaire

also assessed the extent to which the text provided accommodations for English Learners (EL). Piaget (1952), Bloom (1984), and Gardner (1983) have all contributed to the understanding of adolescent development. It is important that the textbooks used in the mathematics classroom include the findings of these three researchers and the questionnaire sought to include these areas.

The questionnaire was completed by me and the teachers that use the seventh grade mathematics textbooks because obtaining different perspectives is imperative to this research. Traveling to the locations was an important factor for the research because the observed diversity influenced the ratings on some of the characteristics. The breakdown of the instrument characteristic questions was:

Table 3

Category	Number of Questions
Appearance	2
Readability	12
Illustrations	9
Presentation of Content	16
Teacher’s Guide and Resources	7
Resources for Struggling Learners	4
Resources for English Learners	4
Total	54

The questionnaire can be found in Appendix B.

Procedure

I contacted the potential participants, through email, a week before I traveled to complete the research with either participant. Once the final consent had been made, I met with each participant for approximately one hour to complete the questionnaire where I asked the teachers

to rate their textbooks in several areas as described above (see Appendix B). Each participating teacher was asked to complete a questionnaire for two textbooks they use in their classroom. The textbooks from Florida that were examined included Holt McDougal Mathematics course 2 and 3 (Bennett, et al., 2011). In United Kingdom, the textbooks were Harper Collins Maths Frameworking: Year 7 Pack 2 and Pack 3 (Evans, Gordon, Senior, & Speed, 2002). The Florida course 2 and the United Kingdom level 2 textbooks were for the standard level 7th grade classrooms and the course 3 and level 3 textbooks were for the advanced 7th grade classrooms.

I completed the same questionnaire for each of the textbooks prior to meeting with the teachers. Once I met with each teacher in a personal, face-to-face, meeting, the teacher was to complete the questionnaire and then I examined the participating teachers' responses compared to mine. This detailed review was purposeful to record any differences between the participants' questionnaire responses and mine. Follow-up questions were asked to obtain information as to the cause of different ratings or to explore specific aspects of the questionnaire. Examples of the general follow-up questions that were asked of each participant included: "Why did you rate this characteristic low/high?", "What qualities did you take into consideration when rating this characteristic?", and "Why do you think XXX textbook scored lower/higher than XXX textbook?".

After the questionnaire and follow-up questions were completed, I took the information gained and compared each questionnaire along with the follow-up questions in order to answer the research questions. The intense exploration of the questionnaire and follow-up interview questions revealed support of the second research question: "How do the seventh grade

mathematics textbooks in the United States and the United Kingdom compare with aspects of appearance, readability, illustrations, content, the teacher's guide/resources, and EL accommodations?". I typed the two participants' responses to the follow-up questions for more evidence which are included in Chapter 4. The first research question included a sub-question: "In what ways is the diversity of each textbook comparable to the observed diversity of the country in which it is used?". In order to answer this question, I compared the textbook diversity used in each location to the diversity of the country itself. This was done because it is important that the textbooks reflect the environment in which they were used.

Conclusion

This study was designed to research characteristics of textbooks used in Florida and the United Kingdom. These characteristics included: appearance, readability, illustrations, content, and the teacher's guide/resource of the textbooks used in the classrooms as well as accommodations for English Learners (EL). Through this chapter, I have discussed my research questions, participants, instruments, and procedures I used to answer these questions. The next chapter will examine the data collected as well as how the research questions were answered through the data.

Chapter 4: Data and Results

Introduction

This chapter will comprise of the data collected to answer the following research questions.

1. In what ways, if any, is diversity represented in the pages of each seventh grade mathematics textbooks examined?
 - a. In what ways is the diversity of each textbook comparable to the observed diversity of the country in which it is used?
2. How do the seventh grade mathematics textbooks in the United States and the United Kingdom compare with aspects of appearance, readability, illustrations, content, the teacher's guide/resources, and EL accommodations?

Through the use of a questionnaire and follow-up interviews, these research questions have been addressed and this chapter will detail the data collected and analyzed.

Data Collection

Understanding the demographics of each location helped exemplify the importance of certain criteria that has been included in the questionnaire. The questionnaire was completed by the undergraduate researcher (me), one seventh grade teacher in the United States (Mary), and one year seven teacher in the United Kingdom (Katie). I traveled to each location to sit with the teacher for approximately one hour. In this hour, the teacher completed the questionnaire, follow-up questions were asked for the items in which the teacher's rating and my rating differed, by two or more points, and the demographics of each school and their surrounding area

was discussed. The discussion of the demographics was incorporated to better understand the importance of certain items in the textbooks. For example, Florida textbooks can include images of the beach and the students would be able to use their prior knowledge to put themselves in the image, but if the illustration is of a snow storm, some students would not be able to make a connection because they may have never seen snow. I was not familiar with the United Kingdom prior to the research, but I was extremely familiar with Florida because of living there. After this realization, I understood the importance of traveling to the United Kingdom to do my research because I would be able to have a better perspective of this research project, particularly the aspects of diversity.

As mentioned earlier, Mary is going to be the name used when discussing the United States' teacher (Florida more specifically) and Katie is going to be used for the teacher in the United Kingdom. When I met with Mary, she mentioned that she would give both the Holt McDougal Mathematics Course 2 and Course 3 textbooks the same rating for each item on the questionnaire because they were prepared by the same publishers (Bennett, et al., 2011). The same thing occurred when I met with the teacher in the United Kingdom. Katie agreed that she would give both the Harper Collins Maths Frameworking: Year 7 Pack 2 and Pack 3 textbooks the same ratings (Evans, Gordon, Senior, & Speed, 2002). This decision of giving the two textbooks in each location the same rating helped save time because I was able to focus on receiving more specific answers on the follow-up questions because my time with each participant was not as limited.

After I talked with each teacher in both locations, I decided to combine Mary's ratings, Katie's ratings, and my ratings into one document, rather than having one document for Florida's results and one document for the United Kingdom's results. Therefore, Appendix C has the side-by-side comparison of the questionnaire instrument with five columns. The first column has the characteristics that was to be rated and the second column is the ratings from Mary; for both Course 2 and Course 3 textbooks, and the third column is my ratings for both textbooks. The fourth column is Katie's ratings; for the Pack 2 and Pack 3, and the last column is my ratings for these two textbooks. I decided to combine all of the ratings because it was easier to compare and contrast the ratings. This juxtapose is described in depth in Chapter 5. This structure assisted in an easier analysis of the data collected.

The follow-up questions that were asked included, but were not limited to, "Do you have an example to demonstrate why you think this rating should be so high/low?"; "What do you think could be improved by the publisher to encourage you to rate this higher in the future?". Although I planned on asking the follow-up questions for only the ratings we had significant differences; such as an item I rated a 1 or 2 and the teacher rated it a 4 or 5, I ended up asking the questions for most of the ratings, except the ones that were exactly the same. By doing this, I was able to gain more information on how the textbooks were used in the classroom and more about the teacher's teaching style. I chose to think of ratings 1-2 of being low, ratings of 3 being fairly mediocre, and ratings of 4-5 as high when I critically analyzed the ratings.

Research Question #1

The first research question was “In what ways, if any, is diversity represented in the pages of each seventh grade mathematics textbooks examined?”. The sub-section of this research question was “In what ways is the diversity of each textbook comparable to the observed diversity of the country in which it is used?” In order to understand the importance of diversity within the textbooks, I needed first to look at the demographics of each location.

Demographics

The two Holt McDougal textbooks that were rated by the United States teacher are used in a large urban district in Florida. Therefore, in addition to looking at the demographics of the United States, Florida’s statistics offered more specific understanding of the location to which the textbooks were used. The statistics for the United States, Florida and the United Kingdom included information about the total population, gender, race, and language spoken within the location. The United States and Florida’s statistics were taken from the 2010 census found on the United States Census Bureau website (U.S. Census Bureau, 2010). The United Kingdom’s statistics were taken from the Office for National Statistics website (Office for National Statistics, 2012) as well as the *UK News* website (Evans N. , 2013).

Though Florida is one of the 50 states within the United States of America, the culture of Florida itself is drastically different than that of other states in the United States. Below is a breakdown of the United States of America and Florida’s demographic facts from the 2010 census (U.S. Census Bureau, 2010) as well as demographic statistics for the United Kingdom (Evans N. , 2013; Office for National Statistics, 2012). The chart below was created to aid in

understanding the demographic differences between the United States, Florida, and the United Kingdom.

Table 4

	USA	Percentage	FL	Percentage	UK	Percentage
Total Population	308,745,538		18,801,310		63,182,000	
Population of Males	151,902,807	49.2%	9,189,355	48.9%	31,028,000	49.1%
Population of Females	156,842,733	50.8%	9,611,955	51.1%	32,154,000	50.9%
Population of White	223,553,265	72.4%	14,100,983	75.0%	54,336,520	86.0%
Population of Asian	14,674,252	4.8%	451,231	2.4%	4,738,650	7.5%
Population of Black	38,929,319	12.6%	3,008,210	16.0%	2,085,006	3.3%
Population of Mixed Race	9,009,073	2.9%	470,033	2.5%	1,390,004	2.2%
Population of Other Race	19,107,368	6.2%	564,039	3.0%	631,820	1.0%
English Spoken	245,452,703	79.5%	13,668,552	72.7%	49,800,000	92.3%
Other Language Spoken	63,292,835	20.5%	5,132,758	27.3%	4,200,000	7.7%

Table 5

	USA	Percentage	FL	Percentage (of total population)
Hispanic or Latino	50,477,594	16.3%	4,223,806	22.5%
Not Hispanic or Latino	258,267,944	83.7%	14,577,504	77.5%

Table 4 represents that the United States has a large population of Whites (72.4%), but the African American population (12.6%) is also large in comparison to the other race population statistics. Other race statistics that were not included in the table above include the population of Asian Indians, Chinese, Filipino, Japanese, Korean, Vietnamese, and Native Hawaiians. Florida's population of whites is large (75.0%) compared to the other ethnicities within the state. The United Kingdom's majority population is predominantly white (86.0%). The first table also shows statistics for the language spoken. Although each location's English language population is very large, we can see that there are a significant percentage of other languages spoken in the United States and Florida. The United States has 20.5% of the population with different languages spoken at home and Florida has 27.3% of the population. The second table provides the statistics for the Hispanic/Latino population within the whole population of the country/state. With this information, we can see that the Florida textbooks need to consider the various aspects of diversity, while the United Kingdom's textbooks may result in a smaller focus on diversity due to their represented statistics.

Now that this thesis established an analysis of the demographics within the United States, Florida and the United Kingdom, one can see the importance of textbooks having traits that include these various attributes. Textbooks need to include these characteristics to ensure all students see cultural connections to the mathematics they are learning. The first research question was “In what ways, if any, is diversity represented in the pages of each seventh grade mathematics textbooks examined?”. When looking into the demographics of the locations, statistics represent that there is a larger population of females than males as well as a very large white population in Florida and the UK. When looking at the language statistics, the language of English is spoken mostly in the United States, Florida, and the United Kingdom, but the United States and Florida also have a large population of other languages spoken. The textbooks need to take into consideration these large populations. With the United Kingdom only having 7.7% of individuals speaking another language, it is not as vital.

The subsection of the first research question is “In what ways is the diversity of each textbook comparable to the observed diversity of the country in which it is used?”. Although there is a lot that can be concluded from statistics, the observation of the populations in which use the seventh grade textbooks provided me with more understanding of each culture. I have lived in the United States my whole life, and therefore understand the United States’ lifestyle with great detail, but am very limited with knowledge of the United Kingdom’s. When being immersed in the culture of the United Kingdom, I was able to better understand the responses of the teacher completing the questionnaire and support the research. For example, if I were to e-mail the questionnaire to the teacher in the United Kingdom, I would not have learned about the

different key stages used in the school system. Without these key stages, I would not have been able to appropriately assess the textbooks because the grade's instructional criteria would have been unknown.

The completion of the questionnaire was first conducted in the United States. I completed the questionnaire before Mary rated the textbooks. When completing the questionnaire and going through each characteristic, I was only able to rate the textbooks on a mostly visual perspective. When Mary rated the textbooks, I noticed we had different ratings for a good number of the characteristics. I tended to rate the textbook more leniently while she did not give as high of ratings, which was based upon her use of the textbooks in practice.

While focusing upon the first research question, I used the last section of the questionnaire for data. The English for Speakers of Other Languages (ESOL) section of the questionnaire consisted of four characteristics: native-language support, as well as support for beginning, intermediate, and advanced English Learners.

Mary and I spoke mostly about the support for Spanish speakers due to the Spanish language being the second most common language spoken in Florida (U.S. Census Bureau, 2010). When interviewing Mary, she informed me of her perspective on English Learner (EL) support within the textbook. She mentioned that the only EL support she knew of was a Spanish version of the textbook. Her opinion of the small amount of accommodations for EL learners was that if there were biased examples included in the English version, the Spanish textbook would address the issue with the same bias because it is only a translation of the information to Spanish.

A few weeks after the research was conducted in Florida, I traveled to the United Kingdom to conduct the rest of my research. When I arrived at the United Kingdom school, I did not see any significant differences in the appearances of the schools in the United States and in United Kingdom. Although the architecture was very intricate in the United Kingdom secondary school, I later found out that most schools in United Kingdom were not designed in this way, but rather this school was built during a time when there was enough money to include architecture that resembled that of the old English Gothic era when designing schools. The school I went to opened within the past ten years, but yet the architecture gave the feeling of the school being centuries old.

I was to arrive at the school in the United Kingdom at the beginning of the day and meet with Katie shortly after my arrival. Once I met with Katie, and we introduced ourselves, she completed the questionnaire. After Katie finished rating the Harper Collins textbooks I looked at the major differences within mine and her ratings on the questionnaire. We both rated the EL support characteristic very low. When I asked about EL support, the teacher told me she did not think there were any English Learner (EL) aids. One reason behind why this might be true is because 92.3% of the population speaks English, but I worry about the other 7.3% of the population that does not speak English. Those that do not speak English in the United Kingdom might not be a part of the school population, and if this is so, not having English Language supplements would suffice because they would not be used by the English Learners. This is drastically different than in the United States where 20.5% of the population speaks another language other than English.

Another aspect of diversity that was discussed in the literature review, and was included in the questionnaire, was learning abilities. Both Mary and Katie rated the characteristic “includes suggestions for teaching handicapped/developmentally delayed” a rating of one for the textbooks they use in their classrooms. The interesting aspect of this characteristic was that I also rated it a one. Neither the teachers that use the textbooks, nor me as an observer, were able to locate accommodations for those with learning disabilities. The textbooks did not have these accommodations readily visible, easily located, or easily accessible for use.

Other diversity factors such as diversity within the illustrations and content interest for all races, ethnic groups, and both genders are examined through Research Question #2: “How do the seventh grade mathematics textbooks in the United States and the United Kingdom compare with aspects of appearance, readability, illustrations, content, the teacher’s guide/resources, and English Learner (EL) accommodations?”.

Research Question #2

The second research question is “How do the seventh grade mathematics textbooks in the United States and the United Kingdom compare with aspects of appearance, readability, illustrations, content, the teacher’s guide/resources, and English Learner (EL) accommodations?”. This question was answered by reflecting on the information gained by the questionnaire along with the follow-up questions. The majority of the questionnaire focused on answering this research question.

Mary believed that in regard to the Hold McDougal textbooks, “A lot of times, in the textbook, it randomly places mathematical terms”. The teacher and I discussed that many terms

used in the textbook were not used in her classroom; therefore, when the students looked in the textbook, they came across words that were foreign to them because they were accustomed to different terminology. This could be counterproductive if the terminology in the textbook is indicated in the standards, and would thus be included in assessments. Perhaps the terminology in the textbook should be used more or other terminology would be more appropriate. Mary rated the textbook margins' characteristics low because her opinion was that the students often had to push the textbook down in order to see the words that were near the textbook binding. When looking at the Florida textbooks, I did not notice this, but this teacher had seen multiple students experience trouble with this characteristic. Page arrangements were rated low by Mary because she mentioned that she taught the textbook out of order. Mary did not think the textbooks were "instructionally sound" because she had to jump around the book to organize her teaching. Teaching the textbook out of order was the teacher's decision, but the district's sequence, discussed later in this chapter, also calls for the textbook to be taught out of order. Mary also believed that the textbook did not make the information relatable for the students. Mary mentioned that she would like the textbooks to be organized with an example and then directly below the example, a few problems for the students to work through rather than have all the examples at the beginning of the section and the problems after. She explained that this would be beneficial because when "examples after examples" are in the beginning, she noticed the students lose concentration and have to flip back a few pages to find an example that pertains to the problem they are working on.

Mary perceived the illustrations with the following quote; “The pictures are completely outdated”. She gave evidence to her statement by explaining how the illustrations consisted of young children in clothes that she perceived the students using the textbooks would not wear because they were not in fashion anymore. Mary also explained that often times the illustrations in the textbooks were not close to their descriptions.

This teacher believed the developmental levels of the students did not correlate to how the textbook was organized. “If you don’t build from one concept to the next and tie in one unit to the next, then the students get this idea that ‘I’m done with this chapter test; I can empty my brain and get ready for the new stuff, but they don’t understand that math starts from the beginning and ties everything all the way through to the end of the year”. As we can see in the table below, the district determined scope and sequence and the Course 3, Advanced, textbook is aligned fairly accurately, while the Course 2, Regular, scope and sequence and textbook is not aligned as precisely. For example, the scope and sequence for Course 2 calls for expressions and equations to be taught within the second nine weeks, but the textbook shows multi-step equations and inequalities at the end of the textbook, in chapter ten. After reviewing the two organizations of structures, we can see that the textbooks are not aligned exactly with the district suggested sequence which therefore causes the mathematics teachers to work through the textbook out of order. The Grade 7 Mathematics Scope and Sequence from the school district for the Regular and Advanced seventh grade mathematics 2014-15 school year as well as the textbooks’ chapter organization were set up as follows:

Table 6

Florida Grade 7 Scope and Sequence (regular)		
Nine Weeks	District Suggested Topics to be Covered	Holt McDougal Mathematics Course 2 Textbook Chapters
First	<ul style="list-style-type: none"> - Adding and subtracting integers - Multiplying and dividing integers - Rational numbers 	1) Algebraic Reasoning 2) Integers and Rational Numbers 3) Applying Rational Numbers
Second	<ul style="list-style-type: none"> - Rates and proportionality - Proportions and percent - Expressions and equations - Inequalities 	4) Proportional Relationships 6) Percents 10) Multi-Step Equations and Inequalities
Third	<ul style="list-style-type: none"> - Modeling geometric figures - Circumference, area, and volume - Random samples and populations 	5) Graphs and Functions 8) Measurement and Geometry
Fourth	<ul style="list-style-type: none"> - Analyzing and comparing data - Experimental probability - Theoretical probability and simulations 	7) Collecting, Displaying, and Analyzing Data 9) Probability

Table 7

Florida Grade 7 Advanced Scope and Sequence		
Nine Weeks	District Suggested Topics to be Covered	Holt McDougal Mathematics Course 3 Textbook Chapters
First	<ul style="list-style-type: none"> - Expressions and equations - Inequalities - Modeling geometric figures - Circumference, area, and volume - Random samples and populations 	1) Principles of Algebra 2) Rational Numbers 3) Graphs and Functions

	<ul style="list-style-type: none"> - Analyzing and comparing data - Experimental probability 	
Second	<ul style="list-style-type: none"> - Theoretical probability and simulations - Real numbers - Exponents and scientific notation - Proportional relationships - Non-proportional relationships - Writing linear equations 	<ul style="list-style-type: none"> 4) Exponents and Roots 5) Proportionality and Measurement 6) Percents
Third	<ul style="list-style-type: none"> - Functions - Solving linear equations - Solving systems of linear equations - Transformations and congruence 	<ul style="list-style-type: none"> 7) Multi-Step Equations and Inequalities 8) Linear Functions
Fourth	<ul style="list-style-type: none"> - Transformations and similarity - Angle relationships in parallel lines and triangles - The Pythagorean theorem - Volume - Scatter plots - Two-way tables 	<ul style="list-style-type: none"> 9) Geometry and Measurement 10) Data and Statistics 11) Polynomials and Quadratic Functions

After discussion of the alignment, Mary explained that she felt the textbook was not integrated with language arts and science. Though the textbook may incorporate a map of the United States or the students may have to read word problems, she mentioned that this is not integration of Social Studies or Reading in itself. Mary believed that the subject of Social Studies is more than learning how to read maps; therefore, she would agree that the textbooks did not integrate other subjects as well as it should. “We should be talking about things a language arts teacher could be teaching”. I thought it was interesting how she told me that at this particular school, in her particular experiences, rather than teachers of all subjects coming

together and having their lessons correlate, only the math teachers worked together to use the same pacing guide in the mathematical classrooms. Mary reasoned that the teachers should be able to reference other classes and subjects the students are learning in their other classes. She also mentioned that the career opportunities that are portrayed in the textbooks are not careers that all students might be interested in. Students need to understand that even if they go to technology schools, they need to know math. When I asked about the class discussion and its inclusion in the textbook, she mentions that the textbook does not include collaborative discussion, but rather straight-forward questions that cannot engender debates and higher level thinking.

“They have review for mastery, but they do not enrich the students in any way”.

Although the textbook might not directly provide enrichment activities, I wondered what additional resources were used by, and offered to, the teachers. Specially ordering books in a translated version was available, and I wondered what manipulatives were also available to help enrich students of all levels. Were there manipulatives that this teacher was not aware about or did not choose to use? Although learning objectives were provided, no mention of how to evaluate them was included. Mary’s perception of the objectives in the book was that the objectives were not thought-provoking enough.

Now that I have examined the Florida teacher, Mary’s, response to the questionnaire in regards to the Hold McDougal Mathematics Course 2 and Course 3 textbooks’ characteristics that answer the second research question, a detailed examination of the United Kingdom teacher, Katie’s, responses to the characteristics on the questionnaire will be examined.

When looking at the questionnaire, I rated the appearance higher than Katie had. I rated the two appearance questions a 3 and 2 while she rated them both 1 because she stated “when you look at the books, I don’t think they are particularly appealing”. In the readability sections, Katie mentioned that “sometimes the language is a little more complicated and maybe it could be simplified”. She mentioned that the students struggle most with the questions that are “wordy”. Other than that, she mentioned that the textbooks seemed to be at a good reading level for the students.

Katie stated that there were way too many problems in each section for the students to work on. She stated that “if I got them to do every single question, they would never get on to any in which are slightly more challenging”. When she pointed this out, I realized that most textbooks do have this format. The easier questions are usually first and then they gradually get harder as you go through the pages. If students are to do a majority of the beginning problems, they will run out of time and not get to the ones that require more skill and higher order thinking. Although this is true, having a large variety of practice problems is helpful for students who are struggling because they are able to obtain extra work in the areas of need, and those that are excelling can move to the extensions for more challenging work. This format is a wonderful way for teachers to differentiate their assignments because they can have each student work on problems that will help them learn best, which means not all students will be working on the same set of problems. There are extensions in each section that the students are encouraged to do.

When I asked Katie to explain her rating on the font size, she mentioned that she did not realize that the type size needed to be a little larger until this year's group of students. With this, I rated this question a 5 and that is because I was reviewing the textbooks as an outsider and I do not use them. The margins were not consistent on each page. The information sometimes would start in one place and the margin would be uneven in the end. I next asked about the organization of the textbooks and Katie told me that "Sometimes you need to go out of order". In her years of teaching with these textbooks, she made an executive decision to skip some chapters, or teach them out of order because she believed the students would learn better in the order she decided to teach them. When talking about the chapters in the Harper Collins Maths Frameworking: Year 7 Pack 2 and 3 she stated that she believed "some of them are too brief".

The most interesting part of the questionnaire was that the United Kingdom textbooks did not have any illustrations. The only pictorial representations the textbooks had were the shapes in the geometry sections. The teacher noted that "when I looked at the maths illustrations, I think they are fairly good". When looking at the mathematical illustrations, such as the geometry figures or the different graphs, they are clear and understandable as well as placed near the text, but there are no pictures of students or illustrations to entice the pupils. "I think that maybe that adds to it not being child-friendly", she said.

When looking at these United Kingdom textbooks, I noticed they had very little "teaching" exercises in them. The pages consisted of mostly questions to be solved and little to none suggestions for teachers when teaching the lessons. The textbooks did not have "enrichment" or "support" material included.

The textbooks did not aid in interesting both genders. We both agreed that neither gender would feel more connected or interested when working with these textbooks. There was no table of contents, index or glossary in the two textbooks used in the United Kingdom classrooms. I rated the question about additional support materials high, 5, while Katie rated it low, 2. After a few minutes of thought, she explained that “we have an online program... I can choose the topics, the level of questions I want incorporated, and I can make up a test paper based on exactly what I want”. This is called a “resource bank” and it will also tell you how long the test you created will take the pupils to finish. I mentioned how the program seemed to be a resource that would be helpful and asked why she rated the section so low. Her response was that she had to think about resources available rather than immediately being able to tell me about it, therefore she rated it low. The key stage 3 sequence set by the United Kingdom Department of Education is not to be followed as precisely as the Florida Department of Education (FDOE) expects from the Florida curriculum sequence. The United Kingdom teachers are expected to teach their pupils the following information, but there is not a sequence that has to be strictly followed. Students are expected to work mathematically by developing fluency, reasoning mathematically, and solving problems. In the United Kingdom, the subject content is broken down into number, algebra, ratio, proportion and rates of change, geometry and measures, probability, and statistics (Department of Education, 2014). Katie’s ability to have the freedom to teach her lessons in any order supports her opinion of rating some of the content characteristics in the questionnaire high. One characteristic would be: the appropriate developmental level of students which she rated a 4. The national curriculum for mathematics in

the United Kingdom requires the pupils to be fluent in mathematics, reason mathematically and solve problems within the subject.

After further discussion with the Mary and Katie, I understand their perspectives and ratings for each characteristic on the questionnaire. If I were to go back and redo the questionnaire, I would lower some of my ratings because I am more informed on the textbooks' qualities and classroom implementation. The teachers pointed out characteristics that I was previously unaware of.

Conclusion

This chapter has encompassed the research that relates to each research question, as well as contained detailed responses from both the Florida teacher and the United Kingdom teacher. As shown above, both textbooks have qualities that the teachers in both locations believe could be stronger. Although these perspectives are taken from only one individual, they have given me a better understanding of how the textbooks are used in the classroom and how some of my ratings were because of my lack of classroom usage knowledge with the textbooks. The next chapter will contain a detailed look at the similarities and differences between the Florida's teacher's response and the United Kingdom's teacher's responses as well as how I could further my research.

Chapter 5: Conclusions and Further Research

Introduction

This chapter will expand upon how the two research questions were answered as well as compare and contrast the two teacher's ratings within the questionnaire. My research questions were:

1. In what ways, if any, is diversity represented in the pages of each seventh grade mathematics textbooks examined?
 - a. In what ways is the diversity of each textbook comparable to the observed diversity of the country in which it is used?
2. How do the seventh grade mathematics textbooks in the United States and the United Kingdom compare with aspects of appearance, readability, illustrations, content, the teacher's guide/resources, and EL accommodations?

After summarizing the research questions, I will cover the main limitation I encountered while completing my research. I will cover my thoughts through this study and any further research.

Research Questions

My first research question was "In what ways, if any, is diversity represented in the pages of each seventh grade mathematics textbooks examined?". The sub-question of this research question was "In what ways is the diversity of each textbook comparable to the observed diversity of the country in which it is used?". The questionnaire represents each teacher's perspective on the native language support offered by the textbook as well as the beginning, intermediate, and advanced EL accommodations.

The Florida teacher, Mary, informed me of her opinion of the lack of English Language (EL) support by the textbooks. She mentioned that the textbooks could be obtained in another language while the United Kingdom teacher, Katie, informed me that she was not aware of any EL support given to the teachers by the textbooks. Katie explained that she was not aware of a translated version of the textbook offered as an instructional resource. Katie informed me that she had not taught a student that did not speak English, and was not aware of any accommodations for EL learners. This statement can be verified through looking at the native language statistics for the United Kingdom in Chapter 4.

The availability of a translated version of the textbook is relevant for Mary because Spanish is a common language spoken in the state of Florida; this statistic can also be verified in Chapter 4. After discussion with the two teachers, I would say both of them would support the statement that diversity in aspects of ethnicity, gender, cultural diversity, learning styles, learning disabilities and gifted students is not represented to its best ability in the pages of the textbooks. Florida's statistics represent many different ethnicities, but after discussion with Mary, I discovered that this cultural diversity is not represented in the textbooks themselves. The statistics show that the majority of the population in the United Kingdom is white and incorporating the diversity in aspects of ethnicity would be simpler to do in the United Kingdom because of the large percentage of whites and smaller percentage of other ethnicities.

There was also discussion about students with learning disabilities and how all students learn differently. Both teachers rated their textbooks they used in their classroom a rating of 1 for this learning diversity characteristic that relates to suggestions for teaching students with

handicaps/developmental delays. There were enrichment activities, but the teachers did not seem to be aware of any recommendations for those with learning disabilities. I was also not able to find accommodations when rating each of the textbooks; therefore, I also gave this characteristic a rating of one.

The second research question is “How do the seventh grade mathematics textbooks in the United States and the United Kingdom compare with aspects of appearance, readability, illustrations, content, the teacher’s guide/resources, and EL accommodations?”. The majority of the questionnaire answered this research question. There were many characteristics that the teachers in both locations rated similarly. For the sake of this study, I have broken down the questionnaire by the characteristics the two teachers rated low (ratings of 1-2) or high (ratings of 3-5). There are three tables below. The first two tables are separated by the characteristics the teachers rated similarly, one table is for the similar low ratings and the second table is for the similar high ratings. The third table is the characteristics that are inconsistent between the teachers’ ratings; keeping in mind that ratings 1-2 are low and ratings 3-5 are high.

Table 8

<u>Textbook Ratings</u>	Florida Teacher- Course 2 & 3	United Kingdom Teacher- Course 2 & 3
<ul style="list-style-type: none"> • Similar Low Ratings (1-2) 		
<u>Appearance</u>		
Textbook is attractive to children	2	1
Textbook is appealing to children	2	1

<u>Illustrations</u>		
Contribute to meaningfulness of the content	2	1
Interesting illustrations	1	1
Attractive illustrations	2	1
Appropriate to the grade level	2	1
Current illustrations	1	1
<u>Content</u>		
New information is built on previous information learned	1	2
Readily integrated with language arts, social studies, and science	2	1
Relates mathematics to career opportunities	2	1
Uses class discussion	2	1
<u>Provides resources for struggling children</u>		
Suggests remedial and enrichment activities	2	1
Includes suggestions for teaching handicapped/developmentally delayed	2	1

Table 9

<u>Textbook Ratings</u>	Florida Teacher- Course 2 & 3	United Kingdom Teacher- Course 2 & 3
<ul style="list-style-type: none"> • Similar Moderate/High Ratings (3-5) 		
<u>Readability</u>		

Reading level of text is appropriate for age level	3	4
Page layout is easy to follow	3	3
Type size is easy to read	4	3
Type style is easy to read	4	3
Textbook margins contribute to attractiveness	3	3
Durable backings	4	3
Good quality paper	4	4
<u>Content</u>		
Develops a positive attitude towards mathematics	3	3
<u>Teacher's Guide and Teacher's Resource Book</u>		
Provides overview for entire program	4	4
Provides goals for entire program	3	5
States learning objectives for each chapter/unit	4	5
Includes supplementary material- posters, computer disks, etc.	4	4
Includes home involvement material for parent/guardians	3	4
<u>Provides resources for struggling children</u>		
Offers help in planning and implementing text material	3	5

Table 10

<u>Textbook Ratings</u> <ul style="list-style-type: none"> • Inconsistent Ratings (1-2 is low and 3-5 is high) 	Florida Teacher-Course 2 & 3	United Kingdom Teacher-Course 2 & 3
<u>Readability</u>		
Textbook margins contribute to readability	3	2
Textbook page arrangements contribute to readability	1	3
Textbook itself is suitable size for easy handling	1	4
Adequate spacing	2	4
<u>Illustrations</u>		
Illustrations are mathematically accurate	3	2
Clearly produced	4	2
Clear in meaning	3	2
Illustrations are placed near the text they illustrate	3	2
<u>Content</u>		
Appropriate for the developmental level of students	2	4
Includes interests for both genders	3	1
Each lesson contains clear explanations of the processes	2	3
Contains usable table of contents	4	1
Contains usable index	4	1

Glossary with mathematical terms clearly defined	3	1
Portrays each sex in a fair, realistic manner	3	1
Portrays each race in a fair, realistic manner	4	1
Portrays each ethnic group in a fair, realistic manner	4	1
Follows a logical sequence	2	4
Uses divergent as well as convergent questioning	3	1
<u>Teacher's Guide and Teacher's Resource Book</u>		
Lists additional support materials	4	2
Suggests adaptations for Florida's/England's environment	3	1
Includes home involvement material for parent/guardians	3	4
<u>Provides resources for struggling children</u>		
Provides evaluation techniques correlated to learning objectives	2	4
<u>English for Speakers of Other Languages (ESOL)</u>		
Provides native-language support (translated editions, etc.)	4	1
Textbook accommodates beginning ELs' access to book content	4	2
Textbook accommodates intermediate ELs' access to book content	4	2
Textbook accommodates advanced ELs' access to book content	4	1

After I studied the ratings that the Florida and the United Kingdom teacher gave each characteristic, I was able to conclude that, in their opinion, some of the research in the literature review was either included, or not included, in the mathematical textbooks used in the classrooms. The Florida teacher rated the characteristics that relate to adolescent development low. Therefore, the teacher might agree that Piaget, Bloom and Gardner's research was not fully incorporated into the textbooks used in the Florida mathematics classroom. Each of Mary's textbook's ratings for the Teacher's Guide and Teacher's Resource Book were mostly high (ratings of 4-5), with regard to the one characteristic the Florida teacher rated low (ratings of 1-2). This represented that the teaching methods covered in the literature review were incorporated in the textbooks. When I took into consideration Mary's ratings on the illustrations of each textbook, I realized that she would agree that diversity was not portrayed as strong as it should have been. The deficiency of remedial and enrichment activities could be the reason why the teachers perceived the textbooks to have a lack of differentiated learning for all students. This deficiency could be considered a lack of cognitive demand the textbooks perceive because supplements for students on all cognitive levels were not available. Both Mary and Katie believed that each of their textbooks had their strengths and weaknesses. The literature review covered a lot of research, and incorporating every aspect of the reviewed research in the textbooks used in the classrooms could be difficult for textbook companies.

Limitations

Though I was able to gain a great deal of information by having a teacher in each location complete the questionnaire, the main limitation I encountered was that only one teacher per

location filled out the questionnaire. Therefore, I only received the perspective of one teacher in each location. If I had more teachers in each location fill out the questionnaire, I would have gained a greater perspective of opinions. If two of the three teachers were to rate certain characteristics low, and only one rated it high, I would have investigated further to find out more information on the outlier's reasoning.

Conclusion

The textbooks in Florida have some characteristics that are better than that of the United Kingdom textbooks, and vice-versa. The Florida textbooks were hard back, which was good for quality, but a negative when thinking about their weight. Although the illustrations might be out of date, such as students wearing overalls and the boys having bowl haircuts, at least they have illustrations. The United Kingdom textbooks were half the size of the ones used in the Florida, but they had very little practice problems, detailed explanations, or illustrations.

I have enjoyed participating in gathering the research related to my thesis. Traveling to the United Kingdom was not only exhilarating, but educational. I believe that the experience has opened my eyes to how another country's education systems function. When reflecting on the questionnaire, I realized that I made assumptions when the teacher and I had similar ratings. I had assumed that since we had similar ratings, we had the same reasoning. I did not ask the follow-up questions for those ratings that were similar, but it would have been interesting to also ask follow-up questions for the ones that were similar to see if we had the same reasoning behind the ratings. For example, Mary and I both rated the characteristic of "contains usable table of contents" a 4 or 5, and I did not ask why she rated it high. I know that I rated it high because

there was a table of contents, but Mary could have had stories about the students and their success with using the table of contents. When I talked with Katie I could have asked her to talk more about the characteristic of “textbook is appealing to children”. I rated it a 2 and she rated it a 1, but it would have been interesting to hear if she rated it low for the same reasons as I did; no illustrations or color.

Understanding the demographics aided in giving me a better perspective of the research. Although the questionnaire could have been done electronically, I was able to gain a better perspective of the culture in the United Kingdom because I was able to travel to the country. The experiences and interactions in the United Kingdom gave me a better understanding of the school system. If I had not traveled to the UK, these experiences would not have been gained and I would not have had a good foundation to write my thesis.

In the future, I would enjoy furthering my research by traveling to the United Kingdom again and teaching at the school I did my research. I think that being able to teach in the school environment, rather than just being a spectator, would give me a great deal of information and observable characteristics I might not have received when just visiting. After teaching in the United Kingdom for a year, I would rate the textbooks used in the United Kingdom and compare my ratings the first time I completed the questionnaire, without experience, and the second time, after teaching and using the textbooks. I can predict that significant differences will exist in my ratings of the characteristics in the two times I completed the questionnaire. I predict this because I will have tangible experiences with using the textbooks the second time, rather than the first time when I was only able to rate the textbooks based on visual perspectives. For example, I

might have the experience Mary had with the margins being too close to the binding and I would then give a lower rating to that characteristic. I could also use the test bank that Katie talked to me about and see if it was helpful or if I end up doing what she did and not use it.

This research has broadened my perspective on students that come to our country for the first time. Although the United Kingdom's main language is English, I was still able to experience how it felt to be an individual from another country. There were idioms and terminology used in the UK that I had never heard. For example, those in the United Kingdom call the students pupils, therefore whenever I said "student" I was corrected, and that happened many times. While I was on the school's campus, I felt alone because I was from a country that was foreign to the faculty and students. Coming to the United States, with no friends, little understanding of our language or our culture is why many EL students are intimidated by the adjustment. I am proud to say that I have experienced a week in their shoes. I walked the halls of a school that was uncommon to me. I made many mistakes and did not understand much about how the school functioned. I believe this learning opportunity has helped me understand the fear and anxiety many EL students go through. While I was nervous when I first went to the school, I was able to think about all the students that come to the United States and are enrolled in a school and many times the language the child speaks is not the same as the language spoken in the United States' school. I know I felt anxiety and discomfort, and I only experienced the culture for one week! I believe that this experience will help me feel compassion and understanding when I have a student join my future class that is from another country.

It is essential to take from this research that textbooks are important tools used in school classrooms. Although they are not the only tool used, they are a large implication of how students are taught. Now that I have completed my research, I realize some items I would alter in the textbooks used in the Florida and United Kingdom classrooms. I would love to change the Florida textbook backings from hard to soft and add illustrations and color in the United Kingdom textbooks. I would be willing to agree to not incorporate illustrations in the United Kingdom textbooks if color was added through the pages. This inclusion could be achieved by making the examples a color other than black, along with the “Key Word” boxes in each section. This little addition of color can help the textbooks become more “kid friendly”. To me, the perfect textbook would be one that takes the backings of the United Kingdom textbooks, but the many colors of the Florida textbooks and combining them into one textbook.

Appendix A
IRB Approval



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: UCF Institutional Review Board #1
FWA00000351, IRB00001138

To: Janet B. Andreasen and Co-PI: Porscha Clouts

Date: February 28, 2014

Dear Researcher:

On 2/28/2014, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review: Exempt Determination
Project Title: A comparison of middle school textbooks in the U.S. and England.
Investigator: Janet B. Andreasen
IRB Number: SBE-14-10120
Funding Agency:
Grant Title:
Research ID: N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewska, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 02/28/2014 02:17:03 PM EST

A handwritten signature in black ink that reads "Joanne Muratori".

IRB Coordinator

Appendix B

Textbook Questionnaire

Textbook Questionnaire:

Ratings are as follows:

- 1- Characteristic lacking or only occasionally evident
- 2- Characteristic present but below average
- 3- Average evidence of the characteristic
- 4- Above average evidence of the characteristic
- 5- Characteristic superior in all aspects

Textbook Name: _____

<u>Textbook Ratings</u>	1	2	3	4	5
<u>Appearance</u>					
Textbook is attractive to children					
Textbook is appealing to children					
<u>Readability</u>					
Reading level of text is appropriate for age level					
Page layout is easy to follow					
Type size is easy to read					
Type style is easy to read					
Textbook margins contribute to readability					
Textbook margins contribute to attractiveness					
Textbook page arrangements contribute to readability					
Textbook margins contribute to attractiveness					
Textbook itself is suitable size for easy handling					
Durable backings					
Good quality paper					
Adequate spacing					
<u>Illustrations</u>					

Contribute to meaningfulness of the content					
Interesting illustrations					
Attractive illustrations					
Illustrations are mathematically accurate					
Clearly produced					
Appropriate to the grade level					
Clear in meaning					
Current illustrations					
Illustrations are placed near the text they illustrate					
<u>Content</u>					
Appropriate for the developmental level of students					
Includes interests for both genders					
Each lesson contains clear explanations of the processes					
New information is built on previous information learned					
Contains usable table of contents					
Contains usable index					
Glossary with mathematical terms clearly defined					
Readily integrated with language arts, social studies, and science					
Relates mathematics to career opportunities					
Portrays each sex in a fair, realistic manner					
Portrays each race in a fair, realistic manner					
Portrays each ethnic group in a fair, realistic manner					
Follows a logical sequence					
Develops a positive attitude towards mathematics					

Uses class discussion					
Uses divergent as well as convergent questioning					
<u>Teacher's Guide and Teacher's Resource Book</u>					
Provides overview for entire program					
Provides goals for entire program					
States learning objectives for each chapter/unit					
Includes supplementary material- posters, computer disks, etc.					
Lists additional support materials					
Suggests adaptations for Florida's/United Kingdom's environment					
Includes home involvement material for parent/guardians					
<u>Provides resources for struggling children</u>					
Suggests remedial and enrichment activities					
Includes suggestions for teaching handicapped/developmentally delayed					
Provides evaluation techniques correlated to learning objectives					
Offers help in planning and implementing text material					
<u>English for Speakers of Other Languages (ESOL)</u>					
Provides native-language support (translated editions, etc.)					
Textbook accommodates beginning ESOLs' access to book content					
Textbook accommodates intermediate ESOLs' access to book content					
Textbook accommodates advanced ESOLs' access to book content					

Appendix C

Textbook Questionnaire Comparison

Florida and United Kingdom Textbook Questionnaire Results:

Ratings are as follows:

- 1- Characteristic lacking or only occasionally evident
- 2- Characteristic present but below average
- 3- Average evidence of the characteristic
- 4- Above average evidence of the characteristic
- 5- Characteristic superior in all aspects

Textbook Name: Holt McDougal Mathematics Course 2 and Course 3 and Harper Collins Maths
Frameworking: Year 7 Pack 2 and Pack 3

<u>Textbook Ratings</u>	Researcher- Course 2 & 3	Florida Teacher- Course 2 & 3	Researcher- Course 2 & 3	United Kingdom Teacher- Course 2 & 3
<u>Appearance</u>				
Textbook is attractive to children	4	2	3	1
Textbook is appealing to children	4	2	2	1
<u>Readability</u>				
Reading level of text is appropriate for age level	5	3	5	4
Page layout is easy to follow	5	3	4	3
Type size is easy to read	5	4	5	3
Type style is easy to read	5	4	5	3
Textbook margins contribute to readability	5	3	5	2
Textbook margins contribute to attractiveness	5	3	5	3
Textbook page arrangements contribute to readability	5	1	4	3
Textbook itself is suitable size for easy handling	1	1	5	4
Durable backings	5	4	3	3
Good quality paper	3	4	5	4
Adequate spacing	4	2	3	4

<u>Illustrations</u>				
Contribute to meaningfulness of the content	5	2	4	1
Interesting illustrations	4	1	1	1
Attractive illustrations	4	2	1	1
Illustrations are mathematically accurate	3	3	4	2
Clearly produced	4	4	3	2
Appropriate to the grade level	4	2	1	1
Clear in meaning	3	3	1	2
Current illustrations	4	1	1	1
Illustrations are placed near the text they illustrate	5	3	1	2
<u>Content</u>				
Appropriate for the developmental level of students	5	2	5	4
Includes interests for both genders	5	3	2	1
Each lesson contains clear explanations of the processes	5	2	4	3
New information is built on previous information learned	5	1	4	2
Contains usable table of contents	5	4	1	1
Contains usable index	5	4	1	1
Glossary with mathematical terms clearly defined	5	3	1	1
Readily integrated with language arts, social studies, and science	5	2	2	1
Relates mathematics to career opportunities	5	2	1	1
Portrays each sex in a fair, realistic manner	5	3	1	1
Portrays each race in a fair, realistic manner	2	4	1	1
Portrays each ethnic group in a fair, realistic manner	2	4	1	1
Follows a logical sequence	5	2	5	4

Develops a positive attitude towards mathematics	4	3	3	3
Uses class discussion	5	2	2	1
Uses divergent as well as convergent questioning	5	3	1	1
<u>Teacher's Guide and Teacher's Resource Book</u>				
Provides overview for entire program	5	4	5	4
Provides goals for entire program	5	3	5	5
States learning objectives for each chapter/unit	4	4	5	5
Includes supplementary material- posters, computer disks, etc.	4	4	4	4
Lists additional support materials	5	4	5	2
Suggests adaptations for Florida's/United Kingdom's environment	5	3	5	1
Includes home involvement material for parent/guardians	4	3	1	4
<u>Provides resources for struggling children</u>				
Suggests remedial and enrichment activities	4	2	5	1
Includes suggestions for teaching handicapped/developmentally delayed	3	2	1	1
Provides evaluation techniques correlated to learning objectives	3	2	4	4
Offers help in planning and implementing text material	4	3	5	5
<u>English for Speakers of Other Languages (ESOL)</u>				
Provides native-language support (translated editions, etc.)	5	4	1	1
Textbook accommodates beginning ELs' access to book content	5	4	1	2
Textbook accommodates intermediate ELs' access to book content	5	4	1	2
Textbook accommodates advanced ELs' access to book content	5	4	4	1

References

- Bennett, J., Burger, E., Chard, D., Hall, E., Kennedy, P., Renfro, F., . . . Waits, B. (2011). *Mathematics: Course 2 and Course 3*. Geneva, TX: Holt McDougal.
- Bloom, B. (1984). *Taxonomy of Educational Objectives Book 1: Cognitive Domain* (2 ed.). Boston, MA: Addison Wesley Publishing Company. From ProfessorEvans.
- Boaler, J. (2008). *What's Math Got To Do With It?* New York, NY: Penguin Group.
- Brualdi, A. (1996). Multiple intelligences: Gardner's theory. *ERIC Digest*, 1-6.
- Department of Education. (2014, July 16). *Mathematics programmes of study: Key stage 3 National curriculum in England*. Retrieved September 12, 2014, from GOV.UK: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/239058/SECONDRY_national_curriculum_-_Mathematics.pdf
- Devolder, A., van Braak, J., & Tondeur, J. (2012). Supporting self-regulated learning in computer-based learning environments: Systematic review of effects of scaffolding in the domain of science education. *Journal of Computer Assisted Learning*, 28(6), 557-573.
- Dewey, J. (1916). *Democracy and Education*. New York: The Free Press.
- Dodge, J. (2009). *25 Quick Formative Assessments for a Differentiated Classroom: Easy, Low-prep Assessments That Help you Pinpoint Students' Needs and Reach All Learners*. New York, NY: Scholastic Teaching Resources.
- Evans, K., Gordon, K., Senior, T., & Speed, B. (2002). *Maths Frameworking: Year 7 Teacher's Pack 2 and Pack 3*. London, England: Harper Collins Publishers Limited.
- Evans, N. (2013, January 30). *2011 Census: The main 20 languages spoken in the UK*. Retrieved October 2, 2014, from Mirror: <http://www.mirror.co.uk/news/uk-news/2011-census-top-20-languages-1563629>
- Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York, NY: Basic Books.
- Geography of Florida*. (n.d.). Retrieved April 30, 2014, from Maps of World: <http://www.mapsofworld.com/usa/states/florida/geography.html>

- Gordon, K., Evans, K., & Speed, B. (2002). *Maths Frameworking: Year 7 Teachers' Pack 2*. London, England: Harper Collins Publishers Limited.
- Gurian, M. (2010). *Boys and Girls Learn Differently! A Guide for Teachers and Parents* (10 ed.). San Francisco, CA: Jossey-Bass.
- Hall, T. (2002). *Differentiated instruction*. From National Center on Accessing the General Curriculum:
http://www.principals.in/uploads/pdf/Instructional_Strategie/DI_Marching.pdf
- Henningfeld, D. (2012). *Global Viewpoints- Education*. Farmington Hills, MI: Greenhaven Press.
- Jitendra, A. K., & Star, J. R. (2011, January). Meeting the needs of students with learning disabilities in inclusive mathematics classrooms: The role of schema-based instruction on mathematical problem-solving. *Theory Into Practice*, 50(1), 12-19.
- Johnson, L. (2011). *Teaching Outside the Box*. San Francisco, CA: Jossey-Bass.
- Koestler, C., Felton, M. D., Bieda, K. N., & Otten, S. (2013). *Connecting the NCTM Process Standards and the CCSSM Practices*. Reston, Virginia: The National Council of Teachers of Mathematics, Inc.
- Krathwohl, D. R. (2002). A revision of bloom's taxonomy: An overview. *Theory into Practice*, 41(4), 212-264. Retrieved October 20, 2014, from
http://www.unco.edu/cetl/sir/stating_outcome/documents/Krathwohl.pdf
- McBain, R. (2011). How high can students think? A study of students cognitive levels using blooms taxonomy in social studies. *ERIC*, 1-10.
- Millet, J. (2000). *Cultural savvy is smart business*. From Cultural Savvy:
http://www.culturalsavvy.com/understanding_american_culture.htm
- National Bureau for Students with Disabilities. (n.d.). *Staying in education or training until you are 18*. Retrieved July 31, 2014, from Skill:
<http://www.skill.org.uk/youth/page.aspx?c=309&p=430>
- National Governors Association. (2010). *Common Core State Standards for Mathematics*. Washington: National Governors Association Center for Best Practices, Council of Chief State School Officers. From Common Core State Standards Initiative:
<http://www.corestandards.org/Math/Content/7/introduction/>

- NCTM. (2000). *Principles and Standards for School Mathematics*. Reston. Retrieved from NCTM.
- Neel, K. S. (2005, September). Addressing diversity in the mathematics classroom with cultural artifacts. *Mathematics Teaching in the Middle School*, 11(2), 54-61. Retrieved September 22, 2014, from <http://www.jstor.org/stable/41182853>
- Office for National Statistics. (2012, December 11). *Ethnicity and National Identity in England and Wales 2011*. Retrieved October 2, 2014, from Office for National Statistics: http://www.ons.gov.uk/ons/dcp171776_290558.pdf
- Piaget, J. (1952). *The Origins of Intelligence in Children*. New York, NY: W W Norton & Co.
- Polya, G. (1945). *How to Solve it: A new Aspect of Mathematical Method*. Princeton and Oxford: Princeton University Press.
- Riskowski, J. L. (2010). Student views of diversity: A multicultural mathematics activity: Viewing transformation during the middle school years. *Multicultural Education*, 17(1), 1-12.
- Scholastic. (2001, February). Pioneers in our field: Jean Piaget- Champion of children's ideas. *Early Childhood Today*, 15(5), 43.
- Smith, M. S., & Stein, M. K. (1998). Selecting and creating mathematical tasks: From research to practice. *Mathematics Teaching in the Middle School*, 3(5), 344-350.
- Smith, M. S., & Stein, M. K. (2011). *5 Practices for Orchestrating Productive Mathematics Discussions*. Reston: The National Council of Teachers of Mathematics, Inc. .
- Tomlinson, C. (1999). *The Differentiated Classroom: Responding to the Needs of All Learners* (1 ed.). Alexandria, VA: Association for Supervision & Curriculum Development.
- U.S. Census Bureau. (2010). *2010 Census Interactive Population Search*. Retrieved April 30, 2014, from United States Census 2010: <https://www.census.gov/2010census/popmap/ipmtext.php?fl=12>
- Ultanir, E. (2012). An epistemological glance at the constructivist approach: Constructivist learning in Dewey, Piaget, and Montessori. *International Journal of Instruction*, 5(2), 195-212.