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A Quantitative Content Analysis of the Common Core State Standards Compared to Missouri's Grade-Level Expectations using the Revised Bloom's Taxonomy Framework

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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Abstract

With the pressure in education to develop a 21st century learner with higher-level thinking skills, many educators connected previous state curriculum to the Common Core State Standards (CCSS). Missouri's Department of Education experts paired the previous state's curriculum known as the Missouri Grade Level Expectations (MO GLEs) with a corresponding CCSS based on Webb's depth-of-knowledge model in a document commonly referred to as the Missouri Crosswalk. This quantitative content analysis study compared the MO GLEs and CCSS by quantifying the language using an adapted and revised Bloom's taxonomy framework. This study tested for a cognitive difference in means and for a possible relationship between the two documents using the Missouri Crosswalk in each grade level from 1-5 in the areas of English Language Arts (ELA) and Mathematics (MA). This study revealed no overall difference in means between the MO GLEs and the CCSS within the content areas of ELA and MA, grades 1-5. Although the results seemed as though CCSS did not offer more higher-level thinking opportunities than the MO GLEs, the researcher noticed a trend in the amount of objectives assigned in each cognitive category. In a further analysis that divided the objectives into higher-level and lower-level thinking, the results showed CCSS generally had more higher-level thinking opportunities than the MO GLEs. The contradicting results showed the importance of closely analyzing the two documents in order to adjust instruction.

This study also revealed no cognitive relationship between the paired CCSS and MO GLEs aligned in the Missouri Crosswalk for all grades in both ELA and MA with the exception of fifth grade ELA. The structural difference in the ELA and MA crosswalk prompted an investigation of the objectives labeled "direct alignment" found only in the

ELA crosswalk. The result showed no relationship between the higher-level thinking skills in the ELA GLE and the “direct” paired CCSS in all grade levels except fourth grade. Generally speaking, when adjusting instruction based on the objectives labeled “direct”, only grade 4 ELA teachers may find the Missouri Crosswalk helpful since it was the only grade level to show a cognitive relationship.

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List of Abbreviations

NCLB - No Child Left Behind

CCSS - Common Core State Standards

MO DESE - Missouri Department of Elementary and Secondary Education

MO GLEs - Missouri Grade-Level Expectations

ELA - English Language Arts

MA - Mathematics

National Board for Professional Teaching Standards (NBTS)

Elementary and Secondary Education Act (ESEA)

Race to the Top (RTT)

Chapter One: Introduction

Background of Study

Teaching higher-level thinking skills in schools is not a new concept (Carr, 1988); yet, it is an important one (Daggett, n.d.; Grischow, n.d.; National Board for Professional Teaching Standards [NBTS], 2002). As the United States' (U.S.) economy has changed so has the focus for the country's education (Brandt, 2010; Daggett, n.d.; Teach for America, 2011). When the U.S. was an agriculture-centered society in the 1900s, vocational schools that focused on agriculture proliferated (Ballanca, 2010), and as factory work became a prevalent way of life for most U.S. citizens, education focused on teaching how to follow directions (Teach for America, 2001); however, with the advancement of technology, the emphasis on teaching higher-level thinking skills became more prominent for students to be successful in the workplace (Brandt, 2010; Teach For America, 2011; The Partnership for 21st Century Skills, 2008). "In 1900, the ten largest American companies were either agrarian or tied to an industrial base. In 1998, the ten largest companies were industrial, retail, or based in information technology" (Daggett, n.d., p. 2). For a country to succeed in an informational society, members of that society must possess the required skills to perform high-level cognitive tasks (Hanushek, Jamison, Jamison, & Woessmann, 2008; Partnership for 21st Century Skills, 2008).

Although U.S. education has changed over the years (Brandt, 2010; Daggett, n.d.; Teach for America, 2011), some would argue the change in education is not enough to enable students to meet the demands of society (Daggett, n.d; Kay, 2010; Lieberman, 1993; The White House, Office of the Press Secretary, 2011). Graduates from schools will no longer compete against neighbors down the street, but people from other countries

(Finn et al., 2006; The White House, Office of the Press Secretary, 2011; Wente, 2011); students need additional focus on higher-level thinking skills to become global competitors (National Education Association (NEA), 2008; The Partnership for 21st Century Skills, 2008; Prabhu, 2011).

For educators, developing 21st century skills in students means to analyze the very “heart” (The Partnership for 21st Century Skills, 2007a, p. 5) of education: the curriculum (The Partnership for 21st Century Skills, 2007a). Research has shown that curriculum influences students’ academic success (Fletcher, 2009; McReal, 2001; Schmidt et al., 2001; U.S. Department of Education (U.S. DOE), Institute of Education Sciences, 2010). In the study *Achievement Effects of Four Early Elementary School Math Curricula Findings for First and Second Graders* (U.S. DOE, Institute of Education Sciences, 2010), multiple MA curricula were compared. The results of this study revealed that “in terms of student math achievement, the curriculum used by the study schools mattered” (U.S. DOE, Institute of Education Sciences, 2010, p. xxiv). With the knowledge that curriculum is a significance component in students’ academic achievement (Schmidt et al., 2001), many political officials have throughout the years, taken an interest in influencing states’ educational content used by educators to teach students (Barton, 2009; Guthrie, Hart, Ray, Candoli, & Hack, 2008; New York State Library, 2009; Russo, 2009; U.S. DOE, 2004; U.S Department of Education, 2010c; U.S. DOE, 2012; U.S. DOE Office of Planning, Evaluation and Policy Development, 2010; U.S. General Accounting Office [GAO], 1998; Wong & Nicotera, 2007; Zhao, 2009); the political officials’ interest has translated into educational reform policy such as Goals 2000 (U.S. GAO, 1998), No Child Left Behind (NCLB) (U.S. DOE, 2004; 2007; 2008), and more recently Common Core State Standards (CCSS) (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010e).

Although involvement of federal government has made the CCSS a well-debated topic (Cruise, 2011; McCluskey, N., 2010), the state of Missouri has lead in the CCSS mission as a governing state (Missouri Department of Elementary and Secondary Education [MO DESE], 2010a). The mission of the CCSS was to develop a consensus of the content and skills that students need to learn in order to be prepared to compete in the global economy (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010e). After the adoption of the CCSS in June 2010 (MO DESE, 2010a), the MO DESE set the expectation that Missouri educational leaders would begin to engage in professional learning opportunities concerning the "differences" (MO DESE, 2010a, p. 1) between the two documents in preparation for 2014 assessments (MO DESE, 2010a); with this set expectation, there is interest from the researcher and MO DESE officials (Hoge, 2011; MO DESE, 2011b) in comparing the two documents.

This quantitative content analysis study has measured a difference in means between the Missouri Grade-Level Expectations (MO GLEs) and the CCSS and investigated a possible relationship between the cognitive skills within the content areas of English Language Arts (ELA) (once called Communication Arts) and Mathematics (MA), grades 1-5. This research was conducted by comparing the cognitive language established by the Revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68). This study could possibly demonstrate the level of cognitive process the curricula offers to students and give insight into the cognitive levels of both the MO GLEs and

CCSS curricula in ELA and MA. This study may also provide insight into the cognitive differences in the MO GLEs and CCSS to help curriculum builders and educational leaders make informed decisions.

During an extensive literature review, the researcher found studies (Carmichael et al., 2010; MO DESE, 2011b; Porter, A., McMaken, J., Hwang, J., & Yang, R., 2011) that investigated state curricula compared to the CCSS; however, the studies did not use the same cognitive model. Porter, McMaken, Hwang, and Yang (2011) examined the cognitive demand in both the CCSS and state curricula, but the study did not identify Missouri; however, the Porter's et al. (2011) study validated the importance for educators to analyze the change from state curriculum to CCSS. Porter et al. (2011) stated that "given the interest in common standards and the incentives to adopt them, one question we should be asking is just how much change the Common Core State Standards represent in comparison with current practice among U.S. states" (Porter, A., McMaken, J., Hwang, J., & Yang, R., 2011, p. 104). Other studies (Carmichael et al., 2010; MO DESE, 2011b) examined how a state curriculum aligned with the CCSS, but the studies (Carmichael et al., 2010; MO DESE, 2011b) did not complete an in-depth analysis in the cognitive processes using revised Bloom's framework. The MO DESE constructed a document called the *CCSS and GLEs/CLEs Crosswalk Alignment Analysis* or for the purposes of this study, the Missouri Crosswalk, that compared each CCSS per grade level with a corresponding MO GLE(s) (MO DESE, 2011b). This process aligned using a different cognitive model than the Revised Bloom's Taxonomy (Hoge, 2011). The researcher believes this study fills the gap of knowledge from previous studies (Carmichael et al., 2010; MO DESE, 2011b; Porter et al., 2011) by including a Missouri curriculum document (MO DESE, 2003) as an additional analysis using the Revised Bloom's Taxonomy framework on cognitive processes (Anderson & Krathwohl, 2001, pp. 67-68) compared to the CCSS.

The researcher also asserts that this study will offer to school leaders, educators, parents, and government officials in the state of Missouri a greater understanding of the possible opportunities offered in both the current MO GLEs and the CCSS for students to develop higher-order thinking skills that are "the lifeblood of the most essential workplace skills" (Chartrand, Ishikawa, & Flander, 2009, p. 8). Research confirms that curriculum, as a statement of what society believes to be valued (Williamson & Payton, 2009), is an important component in student achievement (Fletcher, 2009) and that higher-level thinking skills are important in society (Daggett, n.d.; Grischow, n.d.; NBTS, 2002). The researcher believes that analyzing the CCSS, the MO GLEs, and the Missouri Crosswalk using revised Bloom's taxonomy will enlighten educators of the possible curriculum opportunities students have to be prepared to compete in a society that demands higher-level thinking skills.

Purpose of Study

The purpose of this quantitative content analysis on the MO GLEs and the CCSS in the academic content areas of ELA and MA, grades 1-5, was to determine the difference in the level of cognitive language defined by the revised Bloom's theoretical construct (Anderson & Krathwohl, 2001, pp. 67-68). Another purpose of this study was to investigate the relationship between the cognitive levels of MO GLEs and CCSS using the corresponding MO GLEs to the CCSS as documented in the Missouri Crosswalk (MO DESE, 2011b), in the academic content areas of ELA and MA, grades 1-5. The researcher conducted an extensive literature review and found no studies conducted on comparing the two curricula with the language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68). With curriculum influencing students' academic success (Fletcher, 2009; Schmidt et al., 2001; U.S. DOE, Institute of Education Sciences, 2010) and jobs for the 21st century demanding higher-level skills (Brandt, 2010; The Partnership for 21st Century Skills, 2008; Teach For America, 2011), it is important to examine both state curriculum (in the form of Missouri Grade-Level expectation) and the CCSS for differences in cognitive processes (Hoge, 2011; Porter et al., 2011).

It was hypothesized by the researcher that there is a measurable difference in the overall cognitive skills found within the MO GLEs and the corresponding CCSS in the content areas of ELA and MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) adapted by the researcher as illustrated in Appendix A and Appendix B. It was also hypothesized by the researcher that a possible relationship exists between cognitive skill levels of the MO GLEs and the corresponding CCSS as listed in the Missouri Crosswalk in the content areas of ELA and MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) adapted by the researcher as illustrated in Appendix A and Appendix B.

The researcher believes that this study has the possibility of increasing the knowledge level of educational leaders such as teacher leaders, administrators, and the MO DESE state officials on the possible cognitive differences in language found within the current MO GLEs and the newly adopted CCSS (Missouri DESE, 2010a). The importance of curriculum on student achievement (Schmidt et al., 2001) encourages educators to investigate the language used in educational documents in light of the taxonomy (Bloom, 1956). As Bloom (1956) explained, the "use of the taxonomy can also help [educators] gain a perspective on the emphasis given to certain behaviors by a particular set of educational plans" (p. 2). This research intends to illustrate the difference and relationship of the higher-level thinking opportunities presented in both documents. Higher-level thinking skills are important for the types of jobs that students will be applying for in the 21st century (North Central Regional Educational Laboratory and Metiri Group, 2003; Prabhu, 2011; The Partnership for 21st Century Skills, 2008; Zhao, 2009).

The researcher completed a content analysis of the MO GLEs (MO DESE, 2010b), the CCSS (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f), and the Missouri Crosswalk (MO DESE, 2011b) in 1-5 grade in the areas of ELA and MA. The researcher also used an adapted version of the cognitive process language found within Anderson & Krathwohl's (2001, pp. 67-68) Revised Bloom's taxonomy. The words and phrases chosen consisted of using an evaluation process for all verbs to be placed into a cognitive category on the adapted *Cognitive Process Dimension* table (Anderson & Krathwohl 2001, pp. 67-68) listed as Appendix A.

The researcher has taught for over ten years with experience in both first and fourth grade in a suburban school district located in Missouri and has obtained certification in educational administration. The researcher's interest in this topic began when a colleague commented that higher-level thinking skills should not be taught to lower-level elementary students. In the researcher's experience, first graders not only showed that they were capable of higher-order thinking, but they also showed high achievement when exposed to higher-order thinking activities. The researcher was passionately disheartened to learn that other professionals did not value higher-order thinking skills for all children and began searching for avenues to educate teachers, educational leaders, and state leaders on the importance of these skills and uncover how these higher order thinking skills where incorporated into the elementary setting. In the researcher's experience, the curriculum is what a teacher is held accountable for and the most logical place to begin. Upon notification that Missouri had adopted the CCSS (MO DESE, 2010a), the researcher began to wonder how many opportunities for higher-level thinking skills were available and if there were greater or fewer opportunities than the current grade-level expectations. Other studies have shown an interest in the difference between state curriculums and the CCSS (Carmichael et al., 2010; MO DESE, 2011b; Porter et al., 2011) with one study focused on cognitive demand (Porter et al., 2011); yet, the researcher could not find a study that focused on the state of Missouri with an in-depth analysis of the cognitive processes using Revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) compared to the CCSS.

Hypotheses

The following hypotheses was developed and then investigated in this study:

Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs and the CCSS in the content areas of ELA and

MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Hypothesis: There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA and MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy

Limitations of Study

By using only the MO GLEs, the results of this study can be generalized to those school districts with curriculum aligned to the MO GLEs or the CCSS. At the time of this writing, the state of Missouri consisted of 522 public school districts (MO DESE, 2012c). There are other educational models of higher order thinking that are in use in the education world (Forehand, 2005) and it may be a limitation to this study to base the research on the use of what is known as the revised version of Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68).

Definition of Terms

Bloom's Taxonomy: "A multi-tiered model of classifying thinking according to six cognitive levels of complexity" (Forehand, 2005, para. 9).

Cognitive: "of, relating to, being, or involving conscious intellectual activity (as thinking, reasoning, or remembering)" (Cognitive, 2011, para.1).

Cognitive Process: The "framework includes six categories of processes-one most closely related to retention (Remember) and the other five increasingly related to transfer (Understand, Apply, Analyze, Evaluate, and Create)" (Anderson & Krathwohl, 2001, p. 66).

Common Core State Standards: “The content of the intended curriculum” (Porter et al., 2011, p. 103) that will provide “clear and consistent goals for learning that will prepare our [United States’] children for success in college and work” (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a, para. 1).

Critical Thinking: “Higher order thinking skills include critical, logical, reflective, metacognitive, and creative thinking” (King, n.d., p.1) the terms critical thinking and higher order/level thinking will be used interchangeably for the purpose of this research. See also “Higher Order Thinking”.

Curriculum: A “vision” (Williamson & Payton, 2009, p. 3) for “what students are expected to know and be able to do” (Levin, 2008, p. 8) dependent on what type of society is needed (Williamson & Payton, 2009).

Grade-Level Expectations: Learning objectives divided by grade level and content area that serve as the “model state curriculum” (MO DESE, 2003, Grade-Level Expectations, para. 2).

Handbook: For the purpose of this study the book *Taxonomy of Educational Objectives: The Classification of Educational Goals: Book 1 Cognitive Domain* (Bloom et al., 1956) will interchangeably be used with *Handbook*.

Higher Level Thinking: “The highest three levels [of Bloom’s taxonomy] are: analysis, synthesis, and evaluation” (Forehand, 2005, para. 8).

Higher Order Thinking: “Higher order thinking skills include critical, logical, reflective, metacognitive, and creative thinking” (King, n.d., p. 1) the terms critical thinking and higher order/level thinking will be used interchangeably for the purpose of this research. See also “Critical Thinking”.

Language: “The vocabulary and phraseology belonging to an art or a department of knowledge” (Language, 2011, para. 4).

Missouri Crosswalk: CCSS and GLEs/CLEs Crosswalk Alignment Analysis document

Show-Me Standards: “The standards serve as a blueprint from which local school districts may write challenging curriculum to help all students achieve their maximum potential” (MO DESE, 2010c, para 4).

Subsets: For the purposes of this study, the detailed description under a CCSS will be referred as a subset of that standard.

Summary

Chapter One discussed the importance of teaching higher-level thinking skills by providing opportunities in the curriculum as well as establishing the need for students to have higher-level thinking skills to compete for jobs in the 21st century. This chapter also illustrated interest in examining the CCSS document, the MO GLEs document, and the Missouri Crosswalk. The researcher stated the background of the researcher, the research statement, the limitations of the study, and definitions of terms. The purpose of the study was to add to the knowledge of educational research regarding the overall cognitive difference in means between the Missouri’s Grade-Level Expectations and the CCSS in the area of ELA and MA in grades 1-5 when compared using the cognitive language defined by Anderson & Krathwohl (2001, pp. 67-68). Another purpose of this study was to examine the cognitive relationship between the corresponding MO GLEs and CCSS as stated in the Missouri Crosswalk. This study intends to offer educators, educational leaders, state officials, and the reader information on the cognitive language that can give insight to the number of higher-level thinking opportunities the curricula offers to students.

Chapter Two will discuss the current literature concerning Bloom's taxonomy and other models of higher-level thinking, the importance of higher-level thinking in the 21st century, the federal government's role and CCSS, the influence of curriculum on instruction, and a comparison of the CCSS and Missouri's Grade-Level Expectations. Chapter Three will present the data collection and analysis process, the design of the research, and details of the methodology used in this study. Chapter Four will focus on the results and analysis of the data. Chapter Five will focus on the synthesis of data and involve a discussion of the possible implications and recommendations that drawn from the results.

Chapter Two-Review of Related Literature

Overview

Chapter two provides a historical and current review of literature to offer the reader background knowledge related to this study. The foundation of this analysis originated from what has commonly been referred to as “Bloom’s taxonomy” (Marzano & Kendall, 2007, p. 1). Exploring the history, purpose, and use of the original framework is important in understanding the changes made in the Revised Bloom’s Taxonomy (Anderson & Krathwohl, 2001) and may aid the reader in understanding the relationship of Webb’s depth-of-knowledge, that is currently used as a cognitive framework by the MO DESE (Taylor, et al., 2010; Venet, 2009).

After the cognitive frameworks are explored, the next section, 21st Century Skills and Higher-Level Thinking, addressed the need for higher-level thinking in relation to 21st century skills and how studies (Chow, 2011; Fox, 2011; Saunders, 2011) revealed the U.S. education system lacking in teaching these skills to students. The Federal and State Government’s Role in CCSS section discussed the federal government’s influence in education through policies and funding, and two current debates concerning CCSS’s as national standards. The section Curriculum: Definition, History, and Influence, investigated how curriculum has evolved from memorization of text to the standards movement as well as the importance of curriculum in student achievement. Since both the MO GLEs and the CCSS are examined for a relationship, it is important that a reader is familiar with both documents and their relationship to each other. The section Comparisons of CCSS and MO GLEs provides the reader with opportunity for comparison of both documents. The Assessment section notes the connection of cognition and the development of the assessment of the CCSS.

History and Purpose of Bloom's Taxonomy

Forehand (2005) explained that the public was not aware of how to classify thinking until 1956 when Benjamin Bloom and his colleagues conceived what many educators know as Bloom's taxonomy; even though it was "truly a group product" (Bloom, Engelhart, Furst, Walker, & Krathwohl, 1956, p. 9), the taxonomy continued to be accredited to the publication's editor, Benjamin Bloom (Forehand, 2005; Marzano & Kendall, 2007). The beginnings of the taxonomy of cognitive thinking orginated from the lack of clear communication about learning between educators (Bloom et al., 1956); this lack of communication was discussed at an "informal meeting of college examiners attending the 1948 American Psychological Association Convention in Boston" (Bloom et al., 1956, p. 4). After many discussions, a taxonomy was agreed upon as the communication tool because of its useful endevors in the science field (Bloom et al., 1956). Known for promoting the taxonomy (Forehand 2005), Benjamin Bloom explained that "biologists have found their taxonomy markedly helpful as a means of insuring accuracy of communication about science and as a means of understanding the organization and interrelation of the various parts of the animal and plant world" (Bloom et al., 1956, p. 1). After a long deliberation, a "preliminary edition of 1000 copies" (Bloom et al., 1956, p. 8) was distributed to procure feedback from the educational community. After many revisions, the book *Taxonomy of Educational Objectives: The Classification of Educational Goals: Book 1 Cognitive Domain* was finally released (Bloom et al., 1956).

Although the intention was to publish three categorial domains (Anderson & Krathwohl, 2001; Anderson & Sosniak, 1994), the affective domain was published in 1964 and the psychomotor domain framework was developed later (Anderson & Krathwohl, 2001). Neither the affective nor the psychomotor domains were developed by all of the members of the original collaborative group nor did it follow the same extensive collaborative process as the cognitive domain (Anderson & Krathwohl, 2001). The framework not only developed a common language (Bloom et al., 1956), but also “develop[ed] a codification system whereby educators could design learning objectives that have a hierachial organization” (Marzano & Kendall, 2007, p. 1). The hierarchical classification system is described by Forehand (2005) as a system dividing into two portions. One portion is considered the lower-level thinking skills and the other part is the “higher level thinking” (Forehand, 2005, “What is Bloom’s Taxonomy,” para. 1; King, Goodson, & Rohani, n.d.).

Although the epistemological purpose was to clarify language to assist college professors (Bloom et al., 1956), many other intentions for the use of the taxonomy developed throughout the process. These included developing assesments, educators’ use in designing curriculum and lesson plans, and designing a systematic approach to categorize learning objectives (Anderson & Krathwohl, 2001; Anderson & Sosniak, 1994; Bloom, 1956; Marzano & Kendall, 2007). An unintended occurance after the publication was that Bloom’s taxononmy contributed to not only a common language within the U.S. colligical realm, but a world-wide use (Anderson & Sosniak, 1994; Chapman, n.d.; Forehand, 2005) even across disciplines (Anderson & Krathwohl, 2001; Chapman, n.d.; Forehand, 2005).

The Use of Bloom's Taxonomy

Since the release of *Taxonomy of Educational Objectives: The Classification of Educational Goals: Book 1 Cognitive Domain* (Bloom et al., 1956), the taxonomy has been widely used (Anderson & Sosniak, 1994; Chapman, n.d.; Forehand, 2005). In the book *Bloom's Taxonomy: A Forty-Year Retrospective* (Anderson & Sosniak, 1994), Bloom writes that after he presented the Taxonomy in China, a "million" (Anderson & Sosniak, 1994, p. 6) copies were translated and given to educators (Anderson & Sosniak, 1994). Professors from Israel, Hungary, Germany, and the President of Haliym University in Korea all agreed that the Taxonomy was relevant in their own educational realm and served as a major influence in education around the world (Anderson & Sosniak, 1994). Since its publication, it has been translated into many languages (National Art Education Association, 2012); a professor from Israel and a professor from Hungary wrote that "the Taxonomy is one American idea that was welcomed and used intensively by educators and educational researchers in continental Europe, the Mediterranean, and the Middle East for test construction, curriculum development, lesson planning, and teacher training" (Anderson & Sosniak, 1994, p. 146).

The use of the taxonomy was also documented across disciplines (Chapman, n.d.; Forehand, 2005) and in a wide variety as Forehand (2005) expounded, "current [Internet search] results include a broad spectrum of applications represented by articles and websites describing everything from corrosion training to medical preparation" (Forehand, 2005, "How can Bloom's Taxonomy be used?", para. 1) for the use of the taxonomy. The world-wide use of Bloom's Taxonomy (Anderson & Sosniak, 1994; Chapman, n.d.; Forehand, 2005) as well as its documented uses across disciplines

(Chapman, n.d.; Forehand, 2005) was an unforeseeable outcome of the published work (Anderson & Krathwohl, 2001); however, developing assesments, educators' use in designing curriculum and lesson plans, and designing a systematic approach to categorize learning objectives has also been documented (Anderson & Krathwohl, 2001; Anderson & Sosniak, 1994; Bloom, 1956; Marzano & Kendall, 2007).

The use of Bloom's taxonomy in developing assessments and curriculum reaches back to the 1950s before it was common to use objectives in planning instruction and developing assessments (Anderson & Sosniak, 1994; Marzano & Kendall, 2007). Although near "panic", (Guillemette, 2011, para. 11) illustrated by the passing of the National Defense Education Act, gripped the U.S. after the launching of the Russian satellite, Sputnik, (Guillemette, 2011) the integral piece of instruction and assessment design was not immediately influenced by the publication of the *Handbook (*Anderson & Sosniak, 1994); however, the sentiment that students can learn began to grasp the education world and less emphasis was placed in "sorting individuals" (Anderson & Sosniak, 1994, p. 86). The implementation of the Elementary and Secondary Education Act (ESEA) of 1965 (Anderson & Sosniak, 1994; Marzano & Kendall, 2007) revolutionized education by placing accountability on schools based on the students' outcomes to evaluate the success of the Title I program implemented in the ESEA (Anderson & Sosniak, 1994; Marzano & Kendall, 2007). One of the purposes of the *Handbook* was to use the taxonomy as "a classification of the student behaviors which represent the intended outcomes of the educational process" (Bloom, 1956, p. 12) and it proved to be a useful tool in the monitoring of the ESEA (Marzano & Kendall, 2007). As states began developing their own state assessments in the 1970s (Marzano & Kendall, 2007), “it [was] no surprise that the first large-scale use of Bloom's taxonomy was [used] as a template for assessment design” (Marzano & Kendall, 2007, p. 123).

Bloom’s taxonomy served not only as an essential part of evaluation in education, but also in curriculum development (Anderson & Sosniak, 1994; Bloom, 1956; Marzano & Kendall, 2007). When creating a curriculum, Bloom (1956) challenged educators to categorize their current curriculum based on cognitive demands to reveal missing pieces; he instructed that by “comparing the goals of their present curriculum with the range of possible outcomes [this comparison] may suggest additional goals they may wish to include” (Bloom, 1956, p. 2). The ability to construct curriculum goals as instructed by Bloom (1956) was not practiced before the release of the *Handbook*, as Marzano & Kendall (2007) explained “it allowed for a level of detail in stating goals that had not previously been readily attained” (Marzano & Kendall, 2007, p. 2). The *Handbook* not only changed the way goals were described, but also “bec[a]me [a] part of the language of curriculum theory and practice. [The taxonomy] is referenced in virtually every textbook on curriculum” (Anderson & Sosniak, 1994, p. 103). With the emphasis on higher-level thinking taking root in 1980s and a shift to standards-based curriculum, the need for analyzing the Taxonomy started to emerge (Anderson & Krathwohl, 2001; Anderson & Sosniak, 1994; Marzano & Kendall, 2007).

The Revised Bloom’s Taxonomy in Relationship to the Original Taxonomy and Webb’s Depth-of-Knowledge

The design of the taxonomy written in an objective-based instead of a standards-based language began losing its usefulness as a new understanding in thinking emerged and concerns among experts regarding the limitations of Bloom's taxonomy occurred (Anderson & Krathwohl, 2001; Anderson & Sosniak, 1994; Marzano & Kendall, 2007).

Other issues such as the lack of attention on content (Marzano & Kendall, 2007) and questionable user-friendly format for today's educators were considered limitations of the taxonomy as well (Anderson & Krathwohl, 2001).

The two main reasons that a revision was created were to "refocus educators' attention on the value of the original Handbook" (Anderson & Krathwohl, 2001, p. xxi) since the "ideas . . . are valuable to today's educators" (Anderson & Krathwohl, 2001, p. xxi) and to "incorporate new knowledge and thought into the framework" (Anderson & Krathwohl, 2001, xxii). Anderson and Krathwohl (2001), noted changes in emphasis, terminology, and structure in efforts to update the original taxonomy. Marzano and Kendall (2007) argued that the revised taxonomy did not fully address the limitations of the original taxonomy. Hess, Jones, Carlock, and Walkup (2009) proposed that Webb's Depth-of-Knowledge better addressed the limitations of the structure of the verb-noun relationship that the revised taxonomy used.

The authors, Anderson and Krathwohl (2001), noted changes in emphasis, audience, and structure in Appendix A. The emphasis on the revised taxonomy was on "planning curriculum, instruction, assessment, and the alignment of all three" (Anderson and Krathwohl, 2001, p. 305). The purpose was also to appeal to all grade level teachers as an intended patron and clarify meaning with sample assessments and subcategories (Anderson & Krathwohl, 2001). Four significant changes took place. These included changes in terminology from noun forms such as *application* to the verb forms such as *apply,* the presence of metacognition appeared, comprehension was named "understand" (Anderson & Krathwohl, 2001, p. 306) and synthesis was named "create" (Anderson & Krathwohl, 2001, p. 306). Changes in structure included addressing the confusion over knowledge, including a two-dimensional cognitive structure, addressing the evidence from empirical data in overlapping of categories in higher-levels, and the reversal of the top two cognitive levels (Anderson & Krathwohl, 2001).

Although it was the intent of the authors of the original taxonomy to address the affective and psychomotor domains (Anderson & Krathwohl, 2001; Anderson & Sosniak, 1994; Marzano & Kendall, 2007), both domains are excluded in the widely used "Bloom's taxonomy" (Marzano & Kendall, 2007, p. 1). All three domains are noted to be of importance in understanding student thinking (Anderson & Krathwohl, 2001; Anderson & Sosniak, 1994; Marzano & Kendall, 2007); the author's of the revised taxonomy argued that "nearly every cognitive objective has an affective component" (Anderson & Krathwohl, 2001, p. 300) and should not be separated (Anderson & Krathwohl, 2001). Because the widely used taxonomy (Marzano & Kendall, 2007) focused on only the cognitive domain (Bloom, 1956), the authors of the revised version felt it was necessary to address this limitation. Anderson and Krathwohl (2001) believed that the revised taxonomy "bridge[ed] the cognitive and affective domains" (Anderson & Krathwohl, 2001, p. 301). The authors did not address specific distinctions between the three domains (Marzano & Kendall, 2007); however the revised framework's lack of complexity was noted (Anderson & Krathwohl, 2001). The intention of the authors was for the revised framework to be used as a "user-friendly framework to educators" (Anderson & Krathwohl, 2001, p. 302). The structure of the framework was argued by both Anderson and Krathwohl (2001) and Marzano and Kendall (2007) as a limitation in the original framework. As where Anderson and Krathwohl (2001) contended that the nature of frameworks did not fully portray reality because the function of frameworks are to interpret reality in a manageable method, Marzano and Kendall (2007) argued that the hierarchical nature of a framework does not account for complex tasks to require little thought due to routine experiences. An example of driving a car at first is categorized as a complex task involving higher-level thinking, but as experiences continued the task then requires little thought (Marzano & Kendall, 2007). In a study conducted by Norman Webb (1999) it was also noted that student experiences and access to material also played a role in determining what the study defined as depth-of-knowledge; both Bloom's taxonomy and Webb's depth-of-knowledge have "natural ties to the complexity of thought" (Hess, Jones, Carlock, & Walkup, 2009, p. 4).

The revised Bloom's taxonomy language is structured in a "verb-noun relationship" (Anderson & Krathwohl, 2001, p. 307) based on the way educational objectives are written (Anderson & Krathwohl, 2001). In Webb's study (1999) a group of experts gathered, and through an exploration of defining and redefining a process of categorizing four anonymous states' curriculum goals, objectives, and standards based on four criteria outlined by Webb (1999), judged the alignment of the each states' assessments to the respective states' curriculum (Webb, 1999). One of the criteria given was depth-of-knowledge consistency defined as "what is elicited from students on the assessment is as demanding cognitively as what students are expected to know and do as stated in the standards" (Webb, 1999, pp. 7-8); the category was further broken into numerical value with descriptors describing each value (Webb, 1999). The values ranged with the lowest cognitive demand described as "Recall" (Webb, 1999, p. 3) to a value of 4 labeled "Extended Thinking [that] requires an investigation" (Webb, 1999, p. 3). In Webb's (1999) study, experts first calibrated the depth-of-knowledge value assigned to each reviewed piece by coding a few together, and then coded without interacting using “a sample of items” (p. 5) to “compare their results” (p. 5) after full coding of an assessment piece. The experts, after reflecting on their initial analysis, described the dilemma of categorizing students’ cognitive demand based on verbs and described some cases where “verbs could be interpreted in different ways” (Webb, 1999, p. 23); the study noted that the experts “interpreted very broadly” (Webb, 1999, p. 21) Level 2 and whereas “Level 1 (Recall) was frequently interpreted very narrowly” (Webb, 1999, p. 21). Hess, Jones, Carlock, and Walkup (2009) argued that “by superposing two widely accepted models” (p. 1) educators “can enhance learning opportunities for all students and across all subject areas and grade levels” (p. 7). The authors further explained that Bloom’s model rests on what the brain processes when introduced to a new task whereas Webb’s (1999) model evaluates how much and how deep of content knowledge is needed to “complete the task from inception to finale” (Hess, Jones, Carlock, & Walkup, 2009, p. 4).

From the beginning of the original taxonomy, discussions, revisions, and feedback were a part of its development (Bloom, 1956). Its use in curriculum construction and assessments (Anderson & Krathwohl, 2001; Anderson & Sosniak, 1994; Bloom, 1956; Marzano & Kendall, 2007) proved useful worldwide (Anderson & Sosniak, 1994; Chapman, n.d.; Forehand, 2005) and across disciplines (Chapman, n.d.; Forehand, 2005). Because of the worldwide use and valued ideas, the revised taxonomy author’s hoped to update the taxonomy while still maintaining its familiarity with educators (Anderson & Krathwohl, 2001). Although there were concerns regarding lack of distinctions between the three cognitive domains (Marzano & Kendall, 2007), the hierarchical nature of the revised framework did not account for student experiences (Marzano & Kendall, 2007; Webb, 1999). Confusion was evident when classifying cognitive demands based on verb usage (Webb, 1999); yet, the revised taxonomy "added significantly to Bloom's original work" (Marzano & Kendall, 2007, p. 10). The revised taxonomy updated the original work in emphasis, terminology, and structure (Anderson & Krathwohl, 2001). The framework combined with Webb's depth-of knowledge has been combined to provide educators a more in depth analysis of cognition in student tasks (Hess, Jones, Carlock, & Walkup, 2009).

21st Century Skills and Higher-Level Thinking

The responsibility for preparing the U.S. society to be competitive in the future rests in its education (The White House, Office of the Press Secretary, 2011; U.S. DOE, 2004; U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010; Zhao, 2009). When developing the CCSS, 21st century skills were considered (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010b); the CCSS document included 21st century skills as the authors stated, "the standards have incorporated 21st century skills where possible. They are not inclusive of all the skills students need for success in the 21st Century, but many of these skills will be required across disciplines" (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010b, p. 2). Although there are multiple definitions established in current literature defining the skills needed for the 21st century, an underlying theme of students needing higher-level thinking skills to meet the workforce demand is common (Carr, 1988; Jerald, 2009; King, Goodson, & Rohani, n.d.; Larson & Miller, 2011; North Central Regional Educational Laboratory & Metiri Group, 2003; The Partnership for 21st Century Skills, 2008).

Even though there is an agreement that higher-level thinking skills are needed for the future (Day & Koorland, 1997; Jerald, 2009; King, Goodson, & Rohani, n.d.; Larson & Miller, 2011; North Central Regional Educational Laboratory & Metiri Group, 2003; The Partnership for 21st Century Skills, 2008), some sources debated on how much emphasis should be placed on knowledge (Common Core, 2009; Day & Koorland, 1997; Jerald, 2009; Larson & Miller, 2011; Rotherham, 2008; Yeo & Zhu, 2005). With a changing world, 21st century skills are needed to stay competitive in the world market (Finn et al., 2006; Friedman, 2012; The White House, Office of the Press Secretary, 2011; Wente, 2011). Studies revealed that although many U.S. educators are looking to incorporate higher-level thinking skills into education to prepare students for the future, they are unsure and unsuccessful in accomplishing this task and leaving students unprepared (Chow, 2011; Fox, 2011; Saunders, 2011).

The need for higher-level thinking appears in the multiple definitions of 21st century skills (Larson & Miller, 2011; Jerald, 2009; North Central Regional Educational Laboratory & Metiri Group, 2003; The Partnership for 21st Century Skills, 2004). Larson and Miller (2011) argued that most students are working on the lowest levels of thinking and warned teachers that to prepare students with 21st century skills that “it is vital that teachers encourage students to apply knowledge, analyze that knowledge (in multiple ways), synthesize or create new knowledge, and continuously evaluate” (Larson & Miller, 2011, p. 123). While authors such as Larson and Miller (2011) defined 21st century skills with recommendations of progressing through Bloom’s Taxonomy, Jerald

(2009), discussed how the changing world has forced students to "*apply* what they have learned in school to deal with real world challenges" (Jerald, 2009, p. 34) if they are to succeed in the 21st century. Both Larson and Miller (2011) and Jerald (2009) viewed higher-level thinking as a needed skill for the 21st century. Other authors have developed visual cues that include higher-level thinking skills to define 21st century skills (North Central Regional Educational Laboratory & Metiri Group, 2003; The Partnership for 21st Century Skills, 2004). Developed by The Partnership for 21st Century Skills (2004) the Framework for 21st Century Learning listed "Creativity . . . Critical Thinking and Problem Solving" (The Partnership for 21st Century Skills, 2004, para. 6) as needed skills for the 21st century; King, Goodson, and Rohani (n.d.) associate these terms with higher-level thinking. Other skills listed under this framework included "make judgments and decisions" (The Partnership for 21st Century Skills, 2007b, para. 8) and "synthesize and make connections between information and arguments" (The Partnership for 21st Century Skills, 2007b, para. 8). The enGauge 21st Century Skills model (North Central Regional Educational Laboratory & Metiri Group, 2003) reported "higher order thinking and sound reasoning" (p. 5) as well as "creativity" (p. 5), and the ability to create "relevant, high-quality products" (p. 64) are needed to expand the "intellectual capital" (p. 38) of the United States. In Table 1, an adapted version comparing parts and definitions of the two models is listed (The Partnership for 21st Century Skills, 2007b; North Central Regional Educational Laboratory & Metiri Group, 2003).

Table 1

Cognitive Language Compared in Two 21st Century Skill Models

enGage21st Century Skills	**The Partnership for 21st Century Skills**
Inventive Thinking	**Creativity & Innovation**
Adaptability, Managing Complexity, and Self-Direction	*Reason Effectively* Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation
Curiosity, Creativity, and Risk Taking	*Use Systems Thinking* Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems
Higher-Order Thinking and Sound Reasoning	*Make Judgments and Decisions* Effectively analyze and evaluate evidence, arguments, claims and beliefs Analyze and evaluate major alternative points of view Synthesize and make connections between information and arguments Interpret information and draw conclusions based on the best analysis Reflect critically on learning experiences and processes *Solve Problems* Solve different kinds of non-familiar problems in both conventional and innovative ways Identify and ask significance questions that clarify various points of view and lead to better solutions

Both The Partnership for 21st Century Skills (2007b) and the North Central Regional Educational Laboratory and Metiri Group (2003) provided a visual model that highlighted the need for higher-level thinking. Although higher-level thinking competencies are needed to meet 21st century skills (Jerald, 2009; Larson & Miller, 2011; North Central Regional Educational Laboratory and Metiri Group, 2003; The Partnership for 21st Century Skills, 2004; 2008), a debate on how much time in education should be devoted to teaching these skills is evident in literature (Common Core, 2009; Jerald, 2009; Larson & Miller, 2011; Rotherham, 2008; Yeo & Zhu, 2005; Zhao, 2009).

While what should be taught in schools has been long debated in the history of education (Barton, 2009; Daggett, n.d; Levin, 2008), a current focus is on how much time should be dedicated to teaching higher-level thinking skills verses time spent on learning knowledge to prepare students for the 21st century (Common Core, 2009; Jerald, 2009; Larson & Miller, 2011; Zhao, 2009). Many experts agree it is necessary to have both knowledge and higher-level thinking skills taught in schools (Jerald, 2009; Larson & Miller, 2011; Rotherham, 2008) where there is a divergence in thinking lies on how much time should be dedicated to one in sacrifice of the other (Common Core, 2009; Jerald, 2009; Rotherham, 2008; Yeo & Zhu, 2005). There are educators that warned of the dangers of placing too much focus on higher-level thinking skills and not enough focus on knowledge (Common Core, 2009; Jerald, 2009). Jerald (2009) claimed that 21st century skills must consist of both factual knowledge as well as critical thinking, problem solving, and higher-level thinking skills; schools need to consider both for students to be successful in the future workplace (Jerald, 2009). In the report *Why We're Behind: What Top Nations Teach Their Students But We Don't* by the Common Core (2009), the

Executive Director proposed that vast content knowledge was needed for 21st century skills; the report also revealed through a content analysis that countries that outperformed the U.S. on the "international test" (Common Core, 2009, p. iii) called the Programme for International Student Assessment (PISA) used a "content-rich" (Common Core, 2009, p. iv) curriculum. Common Core (2009) listed Singapore as one of the countries that was included in their report.

In contrast to Common Core's (2009) study, the *Higher-Order Thinking in Singapore Mathematics Classrooms* (Yeo & Zhu, 2005) study included not only a content study of math lessons in "36" (Yeo & Zhu, 2005, p. 2) schools in Singapore, but also observation (Yeo & Zhu, 2005). The assertion that a content rich curriculum exists in high performing countries was strengthened as Yeo and Zhu's (2005) study revealed that despite an effort to increase higher-level thinking into Singapore's classroom teaching, content is mostly taught in a "teacher-directed" (p. 6) setting; the authors contend this type of setting is not conducive to producing higher-level thinking (Yeo & Zhu, 2005). North Central Regional Educational Laboratory and Metiri Group (2003), The Partnership for 21st Century (2004), and Zhao (2009) agreed higher-level thinking skills are important for the 21st century. Day and Koorland (1997) noted in their content analysis study, which reviewed multiple sources throughout different publication types, higher-level thinking skills are preferred to move students into the 21st century workforce.

It is important for U.S. students to develop higher-level thinking skills for competing in a world economy (North Central Regional Educational Laboratory & Metiri Group, 2003; The Partnership for 21st Century, 2004; The Partnership for 21st Century, 2008; Zhao, 2009). Zhao (2009) commented on the change in education in recognizing that “problem solving and critical thinking [skills] are more important than memorization of knowledge” (p. 151); educators recognizing this shift has led to an increased value of higher-level thinking skills in deciding the content taught in schools (Zhao, 2009). While a fear of replacing knowledge with higher-level thinking skills is evident (Common Core, 2009; Jerald, 2009), most experts agree that a balanced approach is best suited to prepare students for the future (Larson & Miller, 2011; NBTS, 2002; OECD, 2011; Rotherham, 2008; Williamson & Payton, 2009).

Larson and Miller (2011) carefully balanced both knowledge and higher-level thinking through application when they defined 21st century skills as what “students can *do* with knowledge and how they *apply* what they learn in authentic contexts” (Larson & Miller, 2011, p. 121). Rotherham (2008) stated that teaching higher-level thinking skills is not new and dates back to Plato’s time; the difference is that these skills are not held by the elite and should not take the place of knowledge since “content undergirds” (Rotherham, 2008, para. 7) the higher-level thinking skills needed for the 21st century. Brandt (2010) acknowledged those that argued for more knowledge based learning and reputed the idea that one should exist without the other; he believed that education must include both higher-level thinking skills and knowledge to prepare students for the future.

In many countries, including the U.S., there is evidence of a mixture of both knowledge and higher order thinking skills (NBTS, 2002; OECD, 2011; Williamson & Payton, 2009). The National Board for Professional Teaching Standards (NBPTS) (2002) published a policy of what U.S. teachers should know and be able to do; this policy asserted that the “hallmark of accomplished teaching” (p. 10) is to help students develop higher-level thinking (NBTS, 2002). Content knowledge is also stressed by the NBTS (2002). The Forum on Educational Accountability (FEA) (2008) agreed with NBTS (2002) in supporting the claim that higher-order thinking must be taught to U.S. students; FEA (2008) suggested that U.S. students need higher-level thinking skills to be competitive in the workplace. The U.S. is not alone in setting the goal of balancing knowledge and teaching higher-level thinking skills (OECD, 2011; Williamson & Payton, 2009). According to the report *Strong Performers and Successful Reformers in Education Lessons from PISA for the United States*, Hong Kong's education reforms are mixing a balanced approached in viewing learning as an "active construction of knowledge" (OECD, 2011, p. 102) and "develop[ing] high-order or critical thinking" (OECD, 2011, p. 103) by analyzing information to construct new theories and schemas in the students' understanding. Williamson and Payton (2009) argued that knowledge has its place, but should be "streamlined" (p. 4) while also focusing on teaching complex thinking skills to prepare students for the 21st century. By teaching higher-level thinking skills in education, the U.S. and other countries work to prepare students for the 21st century skills to be successful (NBTS, 2002; OECD, 2011; Williamson & Payton, 2009) in a competitive market (Finn et al., 2006; Friedman, 2012; The White House, Office of the Press Secretary, 2011; Wente, 2011).

Many experts agree that the U.S. workforce changed with the information age into a highly competitive market (Finn et al., 2006; Friedman, 2012; The White House, Office of the Press Secretary, 2011; Wente, 2011) and to strive in that marketplace higher-level thinking skills are needed (North Central Regional Educational Laboratory & Metiri Group, 2003; The Partnership for 21st Century, 2004; The Partnership for 21st Century, 2008; Zhao, 2009). Friedman (2012) discussed the competiveness of the market in terms of jobs being automated and the cheap manufacturing cost in other countries; he warned that the “best jobs will require workers to have more and better education to make themselves above average” (Friedman, 2012, para. 8). When addressing globalization, Finn et al. (2006) illustrated that students must realize they are competing for jobs against people that may live across an ocean from them; he contended, “the United States faces unprecedented competition from nations around the planet. If all of our young people are to succeed in the ‘flat’ global economy of the 21st century, they will need to achieve to world-class standards” (Finn et al., 2006, p. 10). The researcher believes there is an evident enigma in education; experts are in agreement that it is essential in preparing students for 21st century skills (North Central Regional Educational Laboratory & Metiri Group, 2003; The Partnership for 21st Century, 2004; The Partnership for 21st Century, 2008; Zhao, 2009), yet studies are revealing a true lack in U.S. education accomplishing this task (Chow, 2011; Fox, 2011; Saunders, 2011).

Although some experts agree that 21st century skills are needed in the global market (North Central Regional Educational Laboratory & Metiri Group, 2003; The Partnership for 21st Century, 2004; The Partnership for 21st Century, 2008; Zhao, 2009), the problem that exists in the U. S. is that the education system is not preparing students with these skills (Chow, 2011; Fox, 2011; Saunders, 2011). Fox (2011) conducted a mixed method action research study within a high school setting; the author’s findings revealed a lack of teacher knowledge on how to implement a high level of cognitive demand that will be sought in the 21st century workforce, administrators feeling as though moving students to a high level is beyond their control, and students believing that grades are the ultimate goal of school instead of skills for workforce preparation (Fox, 2011). Although this study does have a limitation of broad application beyond the high school setting involved in the study, Fox (2011) stated "some of Jefferson's High School's administrators take solace in the understanding that Jefferson High School's lack of implementation of 21st [*sic*] century skills is no different from many other traditional high schools" (Fox, 2011, p. 172). Teachers and administrators have limited knowledge on 21st century skills and how to implement them in the classroom (Fox, 2011).

As where Fox's (2011) case study focused on the teachers, students, and administrators within one particular high school, Sauders' (2011) qualitative case study examined the involvement of the community. Sauder (2011) concluded that although the involvement of the community improved skills in urban students participating in the study, there still was a gap in skills needed for the workforce. Sauders' (2011) study used a collection of artifacts and conducted interviews and observations to evaluate urban students' opportunities for employment matched the 21st century job opportunities available. Results revealed a students' lack of skills for success in entering the job market or college (Sauders, 2011); the author admitted "the truth is that many urban school students are not prepared to enter the competitive job market or college upon graduation from high school" (Sauders, 2011, p. 188). A more global perspective of how the U.S. has not prepared students for the 21st century demands was addressed in Chow's (2011) study, which compared international test data, minimum graduation requirements, and enrollment in various STEM majors in higher education. Chow (2011) not only concluded that the U.S. is behind in producing 21st century workers, but also contested that students were "underprepared or even under-qualified to apply for the college of their choice" (p. 122). Researchers such as Fox (2011), Sauders (2011), and Chow (2011) discussed a need for 21st century skills and, at the same time, demonstrated that the U.S. education system is not producing students that can authenticate these skills.

When defining 21st century skills, it is evident that higher-level thinking skills are skills that must be taught to students (Jerald, 2009; Larson & Miller, 2011; North Central Regional Educational Laboratory & Metiri Group, 2003; The Partnership for 21st Century Skills, 2004; The Partnership for 21st Century, 2008). Although there is a debate on how much focus should be spent in education on higher-level thinking skills in place of knowledge (Day & Koorland, 1997; Jerald, 2009; Larson & Miller, 2011; North Central Regional Educational Laboratory & Metiri Group, 2003; The Partnership for 21st Century Skills, 2008), most agree they both should be taught (Day & Koorland, 1997; Jerald, 2009; Larson & Miller, 2011; Rotherham, 2008; Yeo & Zhu, 2005). The world has changed making it a highly competitive market where 21st century skills are needed to succeed (Finn et al., 2006; Friedman, 2012; The White House, Office of the Press Secretary, 2011; Wente, 2011). Although 21st century skills are needed, studies revealed that the U.S. is unsuccessful in teaching these skills to students (Chow, 2011; Fox, 2011; Saunders, 2011).

Federal and State Government's Role in Common Core State Standards

The federal government has influenced education through many policies and publications since the creation of the U.S. DOE (Barton, 2009; Guthrie, Hart, Ray, Candoli, & Hack, 2008; New York State Library, 2009; Russo, 2009; U.S. DOE, 2004; U.S Department of Education, 2010c; U.S. DOE, 2012; U.S. DOE Office of Planning, Evaluation and Policy Development, 2010; U. S. General Accounting Office [GAO], 1998; Wong & Nicotera, 2007; Zhao, 2009). There are two current debates in education pertaining to Common Core with one debate questioning if CCSS are national standards (Cook, 2011; Cruise, 2011; Estrada & Palazzo, 2010; Lewin, 2010; McCluskey, N., 2010; Quay, 2010) and the other debate is concerned if U.S. education should have national standards (Barton, 2009; Burke & Marshall, 2010; Finn et al., 2006; Mathis, 2011; Organisation for Economic Co-operation and Development (OECD), 2011; Williamson & Payton, 2009; Zhao, 2009). The ability to influence systemic educational reform from the federal government comes from leveraging funding (Burke & Marshall, 2010; Cavanagh, Sawchuk, & Sparks, 2010; New America Foundation, n.d.; U.S. DOE, 2010c; Watt, 2009).

The U.S. DOE was established in "1867" (U.S. DOE, 2012, para. 4) and since its creation, the U.S. DOE has influenced the nation's educational landscape through implementation of many policies and reports (Guthrie, Hart, Ray, Candoli, & Hack, 2008; U.S. DOE, 2012). Education in the U.S., under the protection of the Tenth Amendment, rests mostly on the state's shoulders (Russo, 2009; U.S. DOE, 2012) using the federal U.S. DOE to function "as a kind of 'emergency response system,' a means of filling gaps in State and local support for education when critical national needs arise" (U.S. DOE, 2012, para. 3). The federal involvement metamorphosis took place through policies such as the ESEA in 1965 (New York State Library, 2009), the 1983 *A Nation At Risk: The Imperative for Educational Reform* publication (Gurthie, Hart, Ray, Candoli, & Hack, 2008; Wong & Nicotera, 2007; Zhao, 2009), Goals 2000 (Gurthie et al., 2008; U.S. GAO, 1998), NCLB Act in 2001 (U.S. DOE, 2004), and currently the Race to the

Top (RTT) reform (U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010).

Although the ESEA in 1965 began the federal government's financial role in public education for the purpose of improving education (New York State Library, 2009), it was the report *A Nation At Risk: The Imperative for Educational Reform* in "1983" (Zhao, 2009, p. 26) that not only fearfully tied education to national security creating in the public's view education as a national concern (Zhao, 2009), but also marked the beginning of the federal government's role in standards-based reform (Wong & Nicotera, 2007). Although the report did little in the legislative branch, the community embraced the message that there was a decline in public education and thus the report was able to spur on other future federal education policy (Gurthie et al., 2008; Zhao, 2009). The federal policy Goals 2000 gave monetary advantage that would leverage a change in education (Gurthie et al., 2008; U. S. General Accounting Office [GAO], 1998). Under President George H. W. Bush and then persevered through President Bill Clinton, Goals 2000 utilized federal money as an incentive to schools that adopted standards and created assessments (Gurthie et al., 2008; U. S. General Accounting Office [GAO], 1998).

Although there is a federal influence on states to develop common standards (U.S. DOE, 2010b), attention for the development of national standards was first gained outside of the U.S. DOE and instead by the National Council of Teachers of Mathematics (NCTM) when analyzing the MA curriculum in 1989 (Barton, 2009); this analysis lead to the creation of content standards in MA (Barton, 2009). Although a set of common standards started to appear in the education realm (Barton, 2009), federal policy required accountability of standards without the requirement that the standards had to be common

(Barton, 2009, U.S. DOE, 2004). The NCLB Act in 2001 mandated all states to set standards and produce results showing progress towards reaching achievement (U.S. DOE, 2004); however, NCLB results were measured differently among states and therefore, created diverse expectations from state-to-state (Barton, 2009). In an address at the National Press Club, Secretary of Education, Arne Duncan, stated that NCLB lowered standards in education and that educational reform is “underway” (U.S Department of Education, 2010c, para. 4). The President along with the U.S. DOE Office of Planning, Evaluation and Policy Development (2010) initiated a plan called the *Blueprint for Reform: The Reauthorization of the Elementary and Secondary Education Act* to encourage a systemic change in the U.S. educational system to improve students’ ability to meet “college- and career-ready standards” (p. 3); this plan called for all states to “develop and adopt common, state-developed standards” (U.S. DOE Office of Planning, Evaluation and Policy Development, 2010, p. 3). The federal government through publications and mandates had shaped the educational landscape (U.S. DOE, 2004; U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010) by fostering a movement of creating standards (Gurthie et al., 2008; U.S. DOE Office of Planning, Evaluation and Policy Development, 2010; U. S. General Accounting Office [GAO], 1998; Wong & Nicotera, 2007).

There is a debate that CCSS are national standards (Cook, 2011; Cruise, 2011; Estrada & Palazzo, 2010; McCluskey, N., 2010). The CCSS effort was mobilized by a national group of governors called the National Governors Association Center for Best Practices and a group that consisted of mainly leaders of each states’ department of education called the Council of Chief State School Officers (National Governors

Association Center for Best Practices & Council of Chief State School Officers, 2010a). The National Governors Association Center for Best Practices and the Council of Chief State School Officers wrote that the CCSS are a “state-led effort” (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a, para. 1) and that state adoption is voluntary (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010d); however, Lewin, (2010) contended that federal funding was granted to schools for the “quick adoption” (Lewin, 2010, para. 3) of the CCSS as outlined in the Race to Top (RTT) plan. The American Recovery and Reinvestment Act of 2009 (ARRA) funded the RTT program (U.S. DOE, 2009b); the executive summary of the plan states:

> Race to the Top Fund, a competitive grant program designed to encourage and reward States that are creating the conditions for education innovation and reform; achieving significance improvement in student outcomes, including making substantial gains in student achievement, closing achievement gaps, improving high school graduation rates, and ensuring student preparation for success in college and careers; and implementing ambitious plans in four core education reform areas: Adopting standards and assessments that prepare students to succeed in college and the workplace and to compete in the global economy; building data systems that measure student growth and success, and inform teachers and principals about how they can improve instruction; recruiting, developing, rewarding, and retaining effective teachers and principals, especially where they are needed most; turning around our lowest-achieving schools. (U.S. DOE, 2009b, p. 2)

The RTT plan outlined funding in the form of a grant and promoted standards, yet the plan did not direct states' in a step-by-step approach on how to accomplish this task (U.S. DOE, 2009b).

Cook (2011) further explained that opponents believe CCSS are an "unconstitutional power grab by the federal government and will lower standards in high-performing states, reduce democratic participation, and accountability in education matters" (Cook, 2011, para. 3). In contrast, Quay (2010) pointed out that the current structure of states devising their own standards had many problems such as being "too numerous" (p. 2), "confusing and inconsistent" (p. 3), "often hold students to low expectations" (p. 4), and did not prepare students for the future; Common Core will address these issues (Quay, 2010). Presenting both sides of the debate, Cruise (2011), a writer for the Voice of America (VOA), an organization that is known as a broadcasting company to help people learn English and the American way of life (Voice of America (VOA), 2012), interviewed a school board member that believed "the goal [of CCSS] is national control of education" (Cruise, 2011, para. 5) and a teacher that stated, "Not everything has to be a state issue. There could be a benefit from some more federal involvement in our education system, that we could address a lot of the inequalities that we have" (Cruise, 2011, para. 12). However McCluskey (2010) contends that CCSS has more than enough federal involvement when he stated "but make no mistake: The move to national standards is anything but truly voluntary and state led. It is very much a federal campaign" (McCluskey, 2010, para. 8). In agreement with McClusky (2010), Estrada and Palazzo (2010) wrote how CCSS would bring "more centralized, federal involvement into educational decisions" (para. 1) and described the CCSS as "national education standards" (para. 1). Not only is there a debate on CCSS as national standards (Cook, 2011; Cruise, 2011; Estrada & Palazzo, 2010; McCluskey, N., 2010), but there is also a debate on constituting national standards.

The establishment of national education standards is also a well-debated, current topic in education (Barton, 2009; Burke & Marshall, 2010). Some researchers have asserted such uniform national standards are essential if students are to develop skills necessary for the 21st century (Barton, 2009; OECD, 2011; Williamson & Payton, 2009); however, other researchers argued enforcing national standards would limit U.S. students' higher-level thinking ability (Barton, 2009; Burke and Marshall, 2010; Mathis, 2011; Zhao, 2009). In the report authored by the OECD (2011), it was noted the Singapore's reform efforts were successful largely because the government gave its people a "national mission" (p. 233) to successfully develop high standards in schools. Huang (2004) highlighted a major educational reform effort made in China in 1996; a committee of experts diagnosed a lack of clear direction in China's education system and initiated a process to identify clear objectives and ways to reach the objectives (Hunag, 2004). Finland, one of the top scoring countries on the PISA assessment, had many divisions among its political parties after World War II that united under the mission to improve its education (OECD, 2011); this unity in political parties aided in bringing a cohesive focus on education among its people (OECD, 2011). Because of globalization, the advanced countries are moving towards a common set of standards to be more competitive (Finn et al., 2006).

Although national standards are established in countries with high international test scores, there are also many countries with national standards that have performed lower than the U.S. on international tests (Burke & Marshall, 2010). Mathis (2011) claimed international test scores have little to do with economic competitiveness; he also claimed the U.S. competitiveness is decreasing due to other factors in the U.S. and not a lack of national standards (Mathis, 2011). Barton (2009) discussed the risks and rewards of establishing national standards in a country such as the U.S. that claims its educational roots began, and are still functioning, in the hands of local control. What works in countries with a history of federal control of education may not work in the U.S. that until recently has had very limited federal involvement (Barton, 2009). When creating the federally managed U.S. DOE, Congress placed limitations on its ability to override the states' authority in the areas of creating and implementing curriculum and instruction (U.S. Department of Education, 2009a; 2012); however, how federal grant funding for resources in these areas which can be given or taken away from state government is not mentioned in these limitation laws (U.S. Department of Education, 2009a). Although Finn et al. (2006), Huang (2004), the OECD (2011), and Williamson and Payton (2009), claimed national standards can provide a common vision to enable a nation to be successful in the global market, Barton (2009), Burke and Marshall (2010), Mathis (2011), and Zhao (2009) illustrated national standards do not guarantee international success of a country.

Within the U.S. there is evidence of federal government influence on the creation of standards in education (Gurthie et al., 2008; U.S. DOE 2009b; U.S. DOE 2010c; U.S. General Accounting Office [GAO], 1998; Wong & Nicotera, 2007) while maintaining true to the U.S. educational history of the local control bearing much of the responsibility (Barton, 2009; Russo, 2009; U.S. DOE, 2009a, 2012). Although there is disagreement in the benefits of establishing national standards (Barton, 2009; Burke and Marshall, 2010; Mathis, 2011; OECD, 2011; Williamson & Payton, 2009; Zhao, 2009), the federal governments' influence in education is not only felt through federal policies (Barton, 2009; Guthrie, Hart, Ray, Candoli, & Hack, 2008; New York State Library, 2009; U.S. DOE, 2010c; U.S. DOE, 2012; Zhao, 2009), but also through federal funding (Burke & Marshall, 2010; New America Foundation, n.d.; Watt, 2009).

Leveraging its authority to allocate funds, the federal government can persuade states to accept the national reform efforts (Burke & Marshall, 2010; Cavanagh, Sawchuk, & Sparks, 2010; New America Foundation, n.d.; Watt, 2009). Federal policies such as Goals 2000, NCLB, and RTT use federal money to influence education reform (Burke & Marshall, 2010; Cavanagh, Sawchuk, & Sparks, 2010; Gurthie et al., 2008; New America Foundation, n.d.; U.S. DOE, 2010c; U.S. General Accounting Office [GAO], 1998; Watt, 2009). The Goals 2000 federal policy awarded grant money to states that met the federal requirements for developing statewide assessments and standards (Burke & Marshall, 2010; Watt, 2009). Guthrie, Hart, Ray, Candoli, and Hack (2008) discussed how the federal funding of NCLB changed the federal governments role from requiring school to simply account for "*how* federal funds were used" (Gurthie et al., 2008, p. 200) to now requiring schools to produce "*whether* [the] use of funds resulted in elevated student academic achievement" (Gurthie et al., 2008, p. 200). Because NCLB is a voluntary program for states, the courts decided the law was not challengeable (New America Foundation, n.d.) and if a state does not participate in the NCLB program, it does not receive any funding from the federal government (Burke & Marshall, 2010; New America Foundation, n.d.). The authorization funds of NCLB had a maximum dollar amount set for funding the federal requirements; however, the authorization funds were not enough to cover the expenses of testing and were then left up to the states to fund on their own (Burke & Marshall, 2010; New America Foundation, n.d.).

In the year when NCLB first passed, states received full funding (New America Foundation, n.d.); however, the funding amount has remained the same despite increased expenses (New America Foundation, n.d.). The *Blueprint for Reform: The Reauthorization of the Elementary and Secondary Education Act* (2010) also offered federal money to states that met the federal requirements (U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010); this act allowed the federal government to penalize states by denying Title I funding when states do not accept federal educational initiatives such as efforts to create national standards and national testing (Burke & Marshall, 2010). This publication also outlined the future funding on schools by warning states that "beginning in 2015, formula funds will be available only to states that are implementing assessments based on college- and career-ready standards that are common to a significance number of states" (U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010, pp. 11-12). In contrast, Watt (2009) explained that it was the National Governors Association Center for Best Practices & Council of Chief State School Officers that elicited funding from the federal government to help implement standards; it was "the coordinating organisations [*sic*] [that] approached the federal government to provide financial support for the CCSS Initiative through the Race to the Top Fund" (Watt, 2009, p. 25). Although funding is awarded through RTT, Cavanagh, Sawchuk, and Sparks (2010) described how many states were struggling to meet demands set by the RTT; the article discussed that states that did not meet the requirements, did not receive federal money, and the judging may have been subjective (Cavanagh, Sawchuk, & Sparks, 2010). There is a strong debate surrounding the federal government's influence through funding on implementing the use of standards (Burke & Marshall, 2010; Cavanagh, Sawchuk, & Sparks, 2010; Gurthie et al., 2008; New America Foundation, n.d.; U.S. DOE, 2010c; U. S. General Accounting Office [GAO], 1998; Watt, 2009).

The CCSS were designed to prepare students for the global workforce and to provide "consistent standards . . . for all students" (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a, para. 3). With the role of the federal government changing through polices (Barton, 2009; Guthrie, Hart, Ray, Candoli, & Hack, 2008; New York State Library, 2009; U.S Department of Education, 2010c; U.S. DOE, 2012; Zhao, 2009) and the federal governments' funding involvement (Burke & Marshall, 2010; New America Foundation, n.d.; Watt, 2009), Common Core has been the center of recent debates such as associating the standards as national standards (Cook, 2011; Cruise, 2011; Estrada & Palazzo, 2010; McCluskey, 2010) and debating the consequences of establishing national standards in U.S. education (Barton, 2009; Burke & Marshall, 2010; Organisation for Economic Co-operation and Development (OECD), 2011; Williamson & Payton, 2009). While many experts differ on defining what curriculum is (Crawford, 2012; Jacobs, 2010; Pinar, 2012; Schmidt et al., 2001; Solomon, 2003, Williamson & Payton, 2009), the history of curriculum has changed in the U.S. (Kliebard, 2002; Solomon, 2003; Wright, 2006); yet curriculum is valuable (Schmidt et al., 2001) and tied to student achievement (Fletcher, 2009; Lauer, et al., 2005; Schmidt et al., 2001; U.S. DOE, Institute of Education Sciences, 2010; U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010).

Curriculum: Definition, History, and Influence

Many curriculum experts differ on the definition of curriculum (Crawford, 2012; Jacobs, 2010; Pinar, 2012; Schmidt et al., 2001; Solomon, 2003, Williamson & Payton, 2009). While curriculum development in schools has changed since the beginning of formal education in the U.S. (Kliebard, 2002; Solomon, 2003; Wright, 2006) to the development of the standards movement (Langa & Yost, 2007; U.S. DOE, 2004), some argue that more change is needed (Darling-Hammond (as cited in Ballanca, 2010); Finn et al., 2006; OECD, 2011; Schmidt (as cited by Trends in International Mathematics and Science Study [TIMSS] United States, 1998); Willamson & Payton, 2009). Many reports have concluded that curriculum effects student achievement (Fletcher, 2009; Lauer, et al., 2005; Schmidt et al., 2001; U.S. DOE, Institute of Education Sciences, 2010; U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010).

Definition. Many educational experts define curriculum differently (Crawford, 2012; Jacobs, 2010; Pinar, 2012; Schmidt et al., 2001; Solomon, 2003, Williamson & Payton, 2009). The importance of recognizing what was taught in the past and what needs to be taught for students to succeed in the future is noted by both Jacobs (2010) and Pinar (2012) when defining curriculum. Jacobs (2010) argued that if curriculum is not updated and students believe that the curriculum reflects a past world they do not recognize, then the motivation to learn the curriculum is lowered; Jacobs (2010) stated "and if the path is going to 1973 and they know it, then their will and desire to engage are diminished" (p. 2). Pinar (2012) asserted that curriculum is a "complicated conversation" (p. 193) that is not only held by those who reside within the classroom walls but all those who participate; Pinar (2012) further explained that the conversation transcends over time when he stated, “the curriculum is . . . [a] complicated conversation between teachers and students over the past and its meaning for the present” (p. 2). Both Pinar (2012) and Jacobs (2010) not only identified the students’ role in curriculum, but also recognized the value of a curriculum connecting past generations to future generations.

Some experts assert that curriculum should be defined by what is written (Crawford, 2012; Schmidt et al., 2001). Both Crawford (2012) and Schmidt et al. (2001) grappled with the idea of how curriculum is an intangible concept that can invoke many definitions from a variety of people (Crawford, 2012) and is such an enormous category that any analysis of curriculum is only going to address a portion of it (Schmidt et al., 2001) and, therefore, makes it important to look at tangible evidence (Crawford, 2012; Schmidt et al., 2001). Crawford (2012) stated “a curriculum is defined as a document, readily available to and understandable by the entire educational community, that clearly outlines standards-based learning expectations for the year and for the academic terms within that year” (p. 34). When defining curriculum, Schmidt et al., (2001) directed the focus on materials when the authors stated, “we can see the artifacts and effects of curriculum, but not the curriculum itself” (p. 2). Both Crawford (2012) and Schmidt et al. (2001) agreed that looking at concrete evidence defines the curriculum.

Another perspective on defining curriculum is that curriculum is not just what is written, but also includes what is presented in the classroom (Jacobs, 2010; Solomon, 2003). Solomon (2003) explained the “written curriculum” (Solomon, 2003, p. viii), formed by many people, is the curriculum that is written down; however, “the planned and unplanned decisions made, and the actions taken by teachers in classrooms (with the written curriculum and other things in mind) are referred to as the *enacted curriculum*, which is, in essence, classroom practice" (Solomon, 2003, p. viii). Jacobs (2010) stated that when looking to change curriculum, educators should "attend to three major decisions: (1) what should be taught-*goals and outcomes*; (2) how to organize and teach toward those goals-*instruction*; and (3) how we might know if those goals are being achieved using these instructional strategies-*assessment*" (p. 223). Both Jacobs (2010) and Solomon (2003) recognized that curriculum is more than what is written.

Not only did Jacobs (2010) define curriculum as more than what is written, the author along with Williamson and Payton (2009) also addressed a global view on curriculum connecting curriculum to our world society. Although both authors concluded that students need a curriculum to help them perform in that world society, the authors differ in focus on obtaining the desired results. Williamson and Payton (2009) defined curriculum as a "vision" (p. 3) of the society that people want to have and discussed the influence of society in developing curriculum. Jacobs (2010) began her book with a series of questions that asked the reader to assess if the curriculum they are using is preparing students for the 21st century. The questions inquired about topics such as using technology, teaching how to communicate and share information, and teaching different languages (Jacobs, 2010); it also challenged readers to question if the implemented curriculum is focused on outdated materials that teach to the state test (Jacobs, 2010). The questioning concluded with "it is no wonder that we are behind other nations in international comparisons of academic achievement" (Jacobs, 2010, p. 1). Although Jacobs (2010) focused on the academic aspect as where Williamson and

Payton (2009) focused on the role of society, both agree that the curriculum has an effect beyond the school. Although there is diversity among experts on defining curriculum (Crawford, 2012; Jacobs, 2010; Pinar, 2012; Schmidt et al., 2001; Solomon, 2003, Williamson & Payton, 2009), there is agreement that curriculum and curriculum development has transformed from its early conception in the United States (Kliebard, 2002; Solomon, 2003; Wright, 2006).

History. Curriculum and curriculum development has changed in the United States (Kliebard, 2002; Solomon, 2003; Wright, 2006). Wright (2006) described education in its earliest form was meant for upper class and even though today the idea that education should be available for everyone, to the point of mandatory attendance to a certain age, education was not easily accessible in the early stages of education during the Colonial period of America. Many schools were one-room schoolhouses with the textbook as the curriculum and learning included mostly memorization instead of analysis of text (Kliebard, 2002). Kilebard (2002) explained, "by and large, when country teachers taught, it took the form of making assignments from a textbook for each student and then listening to the student recite that lesson as time permitted" (p. 10). Education looked different in the late 1800s than in earlier years because of the influx of students attending school due to the advancement of the industrial revolution (Jacobs, 2010). In 1892, a group of college professors noticed the wide variety of high school curriculum students were receiving, and began to seek conformity in the curriculum by forming the Committee of Ten (Jacobs, 2010; Wright, 2006).

The Committee of Ten not only sought to standardize the curriculum, but also promoted the idea that school was for everyone and that schools should provide rigorous academics in order to prepare students for college (Jacobs, 2010; Wright, 2006). The focus of preparing students with skills needed for college was later widened by the Commission on the Reorganization of Secondary Education in 1918 (Jacobs, 2010; Wright, 2006). The 1918 committee proposed the idea that high schools should prepare students for life that may not have a college future, and emphasized the "use of intelligence and tracking tests designed to discover what fields students were best sited for in life after high school" (Wright, 2006, p. 71). Graham (2005) explained yet another movement in widening the curriculum began with the release of the Eight Year Study, a study that tracked the success of students from both public and private high schools in the 1930s; the study had a profound affect on education and led to the belief that "curriculum does not make a difference" (Graham, 2005, p. 87). Although discussions about the study's validity continued in the education realm, the Great Depression and World War II took precedence in national conversation (Graham, 2005). The country began to accept a curriculum that was all-inclusive and promoted a mediocrity culture, so much so that the "shopping mall" (Powell, Farrar, & Cohen, 1985, p. 7) concept where nearly anything was available was coined (Kliebard, 2002; Powell et al., 1985).

Although many shifts in curriculum have occurred, changes in curriculum have been influenced by both forces inside and outside the educational realm (Graham, 2005; Solomon, 2003; Williamson & Payton, 2009; Wright, 2006). Education policy has also influenced curriculum (Langa & Yost, 2007; U.S. DOE, 2008; Zhao, 2009). The standards-based movement began shortly after the release of *A Nation at Risk: The Imperative for Educational Reform* report was released (Langa, & Yost, 2007) which tied education to U.S. success (Zhao, 2009). The curriculum again changed to include standards with the passage of NCLB (U.S. DOE, 2004); however, the standards themselves varied greatly across the nation (Barton, 2009; Jacobs, 2010). This difference in curricula from state-to-state sparked the movement of developing common standards in effort to minimize the varied curriculums throughout the U.S. (Barton, 2009).

Some experts argued that changing the curriculum is needed (Darling-Hammond (as cited in Bellanca, 2010); Finn et al., 2006; OECD, 2011; Schmidt (as cited by TIMSS United States, 1998; Willamson & Payton, 2009). The OECD (2011) suggested that common standards are not only the “first step” (p. 228) in developing a successful education program, but is also what other high-performing countries have done. The United Kingdom made recent changes to its overloaded National Curriculum as determined by the House of Commons (Willamson & Payton, 2009). Finn et al. (2006) asserted national standards give a much-needed alignment of skills for students to obtain success in college, in their careers, and to advance the U.S. democratic society. In an interview with a professor of education at Stanford University, Linda Darling-Hammond (as cited in Ballanca, 2010) claimed for a deep understanding of the material, a “lean, not overly prescribed, curriculum” (p. 42) must occur; she also suggested the alignment of the curriculum is an overwhelming task which should not be expected of teachers (Ballanca, 2010). Although CCSS refocused the debate of national standards (Common Core, 2009), development of national standards first took place when analyzing the MA curriculum by the National Council of Teachers of Mathematics (NCTM) in 1989 (Barton, 2009); this analysis lead to the creation of content standards in MA (Barton, 2009). Schmidt (as cited by TIMSS United States, 1998) stated after an extensive review, the science and MA curricula was a “mile wide and an inch deep” (para. 7); this "inch deep" (para. 7) curriculum meant teachers covered too many topics and students did not understand topics in depth. Although many believe that changing curriculum in the U.S. will allow for a more in-depth learning to take place (Darling-Hammond (as cited in Bellanca, 2010; Finn et al., 2006; OECD, 2011; Schmidt (as cited by TIMSS United States, 1998; Willamson & Payton, 2009); some studies revealed that curriculum is not the only link to student success, but also acknowledged other factors that may influence student achievement (Fletcher, 2009; Lauer, et al., 2005; Schmidt et al., 2001; U.S. DOE, Institute of Education Sciences, 2010).

Influence. Some studies revealed a link between curriculum and student achievement (Fletcher, 2009; Schmidt et al., 2001; U.S. DOE, Institute of Education Sciences, 2010); as well a meta-analysis and a government report (Lauer, et al., 2005; U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010). Fletcher's (2009) study examined student success as defined by earnings and degrees achieved based on four different high-school curriculum tracks such as college preparatory track, Career and technology education (CTE) track, dual track, and general track. A sample size, drawn from a national data set, consisting of "7,065" (Fletcher, 2009, p. 65) students with an age range of "22 and 26" (Fletcher, 2009, p. 65) chose to participate in the study (Fletcher, 2009). After comparing the types of curriculum each category received, Fletcher (2009) concluded "in terms of high school curriculum tracking, college preparatory, CTE, and dual, tracked students all have higher earnings compared to general tracked students" (p. 97). Although Fletcher's (2009) study showed a connection between high school curriculum and student achievement, the author concluded that other factors such as “students’ connectedness to their schools, parents, and teachers” may also influence student achievement (p. 102).

Whereas Fletcher (2009) examined high school, the U.S. DOE, Institute of Education Sciences (2010) conducted a study at the elementary level. A sample size of “110 elementary schools” (U.S. DOE, Institute of Education Sciences, 2010, p. xxv) that were considered to have a higher percentage of low-income families and varied in location was used to determine if curriculum made a difference in student achievement (U.S. DOE, Institute of Education Sciences, 2010). The study compared four types of MA curriculum in the first year of implementing the programs and determined student achievement based on a nationally normed pre- and post-test (U.S. DOE, Institute of Education Sciences, 2010). The study not only concluded based on the test scores that the curriculum the students received “mattered” (U.S. DOE, Institute of Education Sciences, 2010, p. xxiv), but also acknowledged the role of the teacher and the publisher of each curriculum. The study noted that the delivery of the curriculum was “ultimately depend on how teachers implemented their curriculum, and actual implementation reflects what publishers and teachers achieved” (p. xxviii).

Although Fletcher (2009) and the U.S. DOE, Institute of Education Sciences (2010) both looked at the national level, Schmidt et al. (2001) analyzed data on an international level. Schmidt et al., (2001) utilized curriculum documents and textbooks as well as the “Third International Mathematics and Science Study” (TIMSS) (Schmidt et al., 2001, p. xix) data from all countries that participated in the international test as a sample size. Schmidt et al., (2001) concluded based on the curriculum documents and TIMSS data, student achievement is affected by the curriculum, but the authors did not discount other factors. The authors explained that they believe "the TIMSS data clearly show[s] that [the] curriculum affects learning" (Schmidt et al., 2001, p. I), as well as, acknowledging "there is a close relationship between curriculum, learning, and culture" (Schmidt et al., 2001, p. 7). The authors concluded "nonetheless, in case after case, some significance relationship was found between achievement gains and curriculum" (Schmidt et al., 2001, p. 355). Studies were not the only accounts of curriculum affecting student achievement (Lauer et al., 2005; U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010).

A meta-analysis as well as a government report also tied curriculum to student achievement while acknowledging there may also be other contributing factors (Lauer et al., 2005; U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010). In the meta-analysis a sample size of "one hundred and thirteen studies" (Lauer et al., 2005, p. vi) were analyzed and the authors concluded that the "standards-based curricula found predominantly positive influences on student achievement, including that of at-risk students" (Lauer et al., 2005, p. vi.). The study also discussed that length of exposure to a standard-based curriculum as well as teacher variation in instruction may have also had an effect on student achievement (Lauer et al., 2005).

In the government report, the U.S. DOE, Office of Planning, Evaluation and Policy Development (2010) acknowledged the role of curriculum on student achievement in terms of availability to a better opportunity; the authors reported "access to a challenging high school curriculum has a greater impact on whether a student will earn a four year college degree than his or her high school test scores, class rank, or grades" (U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010, p. 6). The document also discussed the importance of the role of the teacher when it stated “we know that from the moment students enter a school, the most important factor in their success is not the color of their skin or the income of their parents – it is the teacher standing at the front of the classroom” (U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010, p. 1). Educational studies, a meta-analysis, and a government document all noted that curriculum influenced student achievement while also validated that other factors may also play a role (Fletcher, 2009; Lauer et al., 2005; Schmidt et al., 2001; U.S. DOE, Institute of Education Sciences, 2010; U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010).

Although experts differ on defining curriculum (Crawford, 2012; Jacobs, 2010; Pinar, 2012; Schmidt et al., 2001; Solomon, 2003, Williamson & Payton, 2009), curriculum development in schools has changed since the beginning of formal education in the U.S. (Kliebard, 2002; Solomon, 2003; Wright, 2006). The curriculum shift has changed from the widening of the curriculum in the past (Kliebard, 2002; Powell et al., 1985; Schmidt (as cited by TIMSS United States, 1998) to what some experts argue as a more unified and focused curriculum (Darling-Hammond (as cited in Bellanca, 2010); Finn et al., 2006; OECD, 2011; Schmidt (as cited by TIMSS United States, 1998; Willamson & Payton, 2009). Although the standards movement changed curriculum (Langa & Yost, 2007; U.S. DOE, 2008), reports have not only validated curriculum is important (Schmidt et al., 2001; U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010), but also concluded that curriculum effects student achievement (Fletcher, 2009; Lauer et al., 2005; Schmidt et al., 2001; U.S. DOE, Institute of Education

Sciences, 2010; U.S. DOE, Office of Planning, Evaluation and Policy Development, 2010).

Comparisons of Common Core and the Grade-Level Expectations

The history of how the MO GLEs and the CCSS were developed and the purpose of each document (Carr, 2012; MO DESE, 2003; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a; Practical Parenting Partnerships, 2008) have some similarities and differences (Carr, 2012; MO DESE, 2003; MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010g; Practical Parenting Partnerships, 2008). Studies claim that it is important to look at past state curriculums and compare them to the CCSS (Carmichael et al., 2010; Porter et al., 2011). With the adoption of CCSS (MO DESE, 2010a), Missouri Department of Education has taken steps in reviewing the previous curriculum to the CCSS in an effort to help school districts update curriculum (MO DESE, 2011b).

Both the CCSS and the MO GLEs were developed with input from a variety of sources (MO DESE, 2003; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a). Although they were developed for different reasons, both documents avoid detailed instructions on how implementation should occur within each school district (Carr, 2012; MO DESE, 2003; National Governors Association Center for Best Practices & Council of Chief State School

Officers, 2010a; Practical Parenting Partnerships, 2008). The CCSS were created with the consultation of educators, experts, and the general public, and was "coordinated by the National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO)" (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a, para. 1). The National Governors Association (NGA) was first created in 1908 and is comprised of all U.S. governors (National Governors Association, 2011); the Council of Chief State School Officers (CCSSO) "is a nonpartisan, nationwide, nonprofit organization of public officials who head departments of elementary and secondary education in the states, the District of Columbia, the Department of Defense Education Activity, and five U.S. extra-state jurisdictions" (Council of Chief State School Officers [CCSSO], 2012, para. 1). The state of Missouri CCSSO is elected by the State Board of Education (CCSSO, 2012; MO DESE, 2009).

Although the NGA and the CCSSO helped organized the process, the standards themselves were created by the input of others (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a). On the CCSS Initiative website, the National Governors Association Center for Best Practices & Council of Chief State School Officers (2010a) state that "the standards were developed in collaboration with teachers, school administrators, and experts" (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a, para. 1). The MO GLEs were also developed with input from a variety of people (MO DESE, 2003). When the GLEs were first developed, the MO DESE (2003) explained that not only did they have "writers and reviewers from all regions of the state" (MO

DESE, 2003, p. 7) and “representatives from teacher and administrator professional organizations” (MO DESE, 2003, p. 7), but also stated a request when developing the document for “as many voices as possible” (MO DESE, 2003, p. 7). Although both the CCSS and the MO GLEs were created with the input of many people, the purpose for the creation of both documents differed (MO DESE, 2003; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a).

The purpose of the CCSS was “to provide a clear and consistent framework to prepare our children for college and the workforce” (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a, para. 1). The standards are considered “benchmarks” (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a, para. 3) that give “states a common platform for goals and measures, but do not dictate the curriculum districts must use or teachers’ instructional methods” (Carr, 2012, p. 38). The purpose of developing the MO GLEs was in response to the NCLB Act of 2001 and to “provide support and specificity for local curriculum development” (MO DESE, 2003, p. 5). The MO GLEs are meant as a “guide [for] district curriculum and teachers’ lesson planning” (Practical Parenting Partnerships, 2008, p. 7) and gives control to the each school district within the state to develop its own curriculum (Practical Parenting Partnerships, 2008). The CCSS and MO GLEs documents refrained from directing school districts or teachers in an elicit methodology of the implementation of the content of each document (Carr, 2012; MO DESE, 2003; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a; Practical Parenting Partnerships, 2008). Although the development of both the CCSS and the MO GLEs allowed input from a variety of people (MO DESE, 2003; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a), the creation of each document originated for different reasons, but still share an opportunity for local school districts and teachers to have discretion on the implementation of the content of the documents (Carr, 2012; MO DESE, 2003; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a; Practical Parenting Partnerships, 2008).

Studies suggested that it is important to analyze past state curriculum and compare them to the CCSS (Carmichael et al., 2010; MO DESE, 2011b; Porter et al., 2011). Two studies compared the CCSS to multiple state standards, but differed in methodology and sample (Carmichael et al., 2010; Porter et al., 2011). Both studies indicate a difference from state standards and the CCSS (Carmichael et al., 2010; Porter et al., 2011). The MO DESE (2011b) released a document that compared the CCSS to the state's GLEs.

The Porter et al.'s (2011) study was designed to compare both CCSS and state standards to uncover how the documents "are alike and how they are different and, in so doing, to characterize the amount of change that lies ahead for states adopting the Common Core" (Porter et al., 2011, p. 105). Although Porter, McMaken, Hwang, and Yang (2011) analyzed the curriculum from multiple states, drawn from the Wisconsin Center for Education Research database, and compared to the state curricula to the CCSS for cognitive demand, Missouri was not an identified state. Porter et al. (2011) used the Surveys of Enacted Curriculum content analysis to evaluate both the topics covered and cognitive demand of the content. The Porter et al. (2011) study also compared CCSS to the National Council of Teachers of Mathematics content standards, to state assessments, and "benchmark[ed] the Common Core to standards and assessments from selected other countries, just as the developers of the Common Core did" (Porter et al., 2011, p. 104). The sample included all CCSS from kindergarten through twelfth grade, 14 states in MA standards grades 3-8, and 13 states in ELA standards in grades 3-8 (Porter, et al., 2011). Unlike Revised Bloom's Taxonomy that listed six cognitive demands (Anderson & Krathwohl, 2001, pp. 67-68) and Webb's (1999) study that identified four categories, Porter et al.'s (2011) study divided cognitive demand into five categories. In Webb's (1999) study, the categories were recall, skill/concept, strategic thinking, and extended thinking; Porter et al.'s (2011) categories were memorize, perform procedures, demonstrate understanding, conjecture, generalize, prove, and solve routine problems. The study revealed that there is a "greater emphasis on higher cognitive demand" (Porter et al., 2011, p. 115) in CCSS than in state curricula as a whole (Porter, et al., 2011). The Common Core compared to the states' curricula offers a "modest" (Porter et al., 2011, p. 106) change in higher cognitive intensity in MA, but with a much higher cognitive emphasis in ELAR relative to mathematics (Porter et al., 2011). The authors cautioned the reader to note each state's standards varied on the cognitive demand and the change may be more for some states than for others (Porter et al., 2011). This study also compared the CCSS to "top-achieving countries" (Porter et al., 2011, p. 115) and noted a paradox; the other countries' standards included in the study placed emphasis on performing procedures which is something that the U.S. does not consider higher-level thinking, yet these countries are outperforming the U.S. on international testing (Porter et al., 2011).

The purpose of Carmichael et al.'s (2010) study was to "analyze each state's most recently adopted standards and compare them to the Common Core" (Carmichael et al., 2010, p. 12). In this study, Missouri was included, along with all other 50 states and the District of Columbia, but was not evaluated for cognitive demand but for "Content and Rigor and Clarity and Specificity" (Carmichael et al., 2010, p. 13). The state standards were gathered from the each state's education department website and contact was made with an expert from each state to verify the documents gathered were the most up-to-date version in use (Carmichael et al., 2010). An evaluative tool, labeled as a grading metric was used along with a list of criteria assigned to a numerical value that further defined the grading metric (Carmichael et al., 2010). Experts involved in the study must use the words "expectations are slightly too high or too low" (Carmichael et al., 2010, p. 358) or "students are expected to learn the content and skills in a sensible order and an appropriately increasing level of difficulty" (Carmichael et al., 2010, p. 357) to judge for rigor in a standard. The study deemed the Common Core as a "significance improvement" (p. 21) of many states' standards (Carmichael et al., 2010). Whereas both Porter et al. (2011) and Carmichael et al., (2010) analyzed multi-state curricula to the Common Core to reveal a difference, the MO DESE compared the Missouri GLEs to the Common Core (MO DESE, 2011b).

After the MO DESE adopted the CCSS, the department published the Missouri Crosswalk for each grade level (MO DESE, 2011b). These grade level documents detailed the alignment of the MO GLEs to the CCSS and were constructed by experts knowledgeable in both the "alignment processes conducted by psychometrists [*sic*] as well as depth of knowledge alignment with Dr. Norman Webb" (Hoge, 2011, para. 2). A difference that the MO DESE assistant commissioner, Sharon Hoge (2011), noted was the MO GLEs were written in assessment language to fulfill NCLB sanctions whereas the CCSS are written in “much more instructional language” (Hoge, 2011, para. 5). The website also listed documents are helpful for districts to “begin . . . the implementation of the CCSS” (MO DESE, 2011b, para. 6). Although the crosswalk only analyzed Missouri’s GLEs to the Common Core, there were differences in the alignment (MO DESE, 2011b). Three studies (Carmichael et al., 2010; MO DESE, 2011b; Porter et al., 2011) suggested the importance of analyzing CCSS to past curriculum and note differences, as well as illustrated different approaches in analyzing CCSS.

Both the CCSS and the MO GLEs were developed with input from many educational experts (Carr, 2012; MO DESE, 2003; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a; Practical Parenting Partnerships, 2008). Studies examined multi-state curriculums compared to the CCSS and noted that there were differences (Carmichael et al., 2010; Porter et al., 2011). The Missouri Crosswalk document published by MO DESE (2011b) compared the CCSS to the GLEs in effort to help school districts update curriculum (MO DESE, 2011b).

Assessment

After the CCSS were composed, two consortiums were awarded RTT funds in order to assess the standards (Smarter Balanced Assessment Consortium, 2012b; U.S. DOE (U.S. DOE) 2010d; Willhoft, 2010). Missouri joined one of the awarded consortiums and has provided feedback as well as direct involvement as a member of one of the workgroups (MO DESE, 2011b; SBAC, 2012c; SBAC, 2012e; U.S. DOE, 2010a;

Willhoft, 2010). The development of the assessments includes analyzing cognitive demands (SBAC, 2012a; Riddile, 2012).

As part of the RTT funding, two consortiums were awarded grant money to develop assessments (U.S. DOE, 2010d). The Partnership for Assessment of Readiness for College and Careers (PARCC) consortium consists of "26 states" (U.S. DOE, 2010d, para. 4) and is focused on developing multiple tests, including projects and presentations, that are averaged, as where the Smarter Balanced Assessment Consortium (SBAC) consortium is focused on using a more weighted one-time test given near the end of the school year with a few optional formative assessments given to check students' progress toward meeting the end goal (U.S. DOE, 2010d). Both consortiums have an "absolute priority" (U.S. DOE, 2010b, p. 3) to develop "comprehensive assessment systems measuring student achievement against common college- and career-ready standards" (U.S. DOE, 2010b, p. 3) as well as a "competitive preference priority" (U.S. DOE, 2010b, p. 3) to demonstrate "collaboration and alignment with higher education" (U.S. DOE, 2010b, p. 3).

The path of Missouri's participation in the SBAC began in fall of 2009 (Willhoft, 2010). Missouri was a part of the MOSAIC consortium consisting of mostly mid-western states, which then merged with the Summative Multi-state Assessment Resources for Teachers and Educational Researchers (SMARTER) consortium that consisted of mostly north-western states and adopted the SMARTER name (Willhoft, 2010). This new SMARTER consortium joined the Balanced Assessment System that comprised of many states and combined the name (Willhoft, 2010). Missouri is considered to be a governing state, a state with decision making abilities, in the

SMARTER Balanced Assessment Consortium (SBAC) with Washington State being the leader of the consortium (MO DESE, 2011b; U.S. DOE, 2010a; Willhoft, 2010). Representatives from the MO DESE organization had involvement in the SBAC assessment process (MO DESE, 2011a; SBAC, 2012e). The MO DESE Science Education Consultant, Shaun Bates, (MO DESE, 2011a) was listed on the SBAC website as a co-chair for the assessment design for the test administration workgroup (SBAC, 2012e). The SBAC website also listed K-12 leads for each state with the MO DESE Coordinator of Assessment, Michael Muenks, listed as the lead for Missouri (SBAC, 2012c).

In an effort to promote transparency, the SMARTER Balanced assessment consortium published a document describing the process in developing the assessments (SBAC, 2012a). One of the steps in developing the assessment was prioritizing the standards, sorting parts of the standard that are conducive to testing, and evaluating the selected part of the standard for cognitive level and to ensure that the part tested relates to the college and career ready goal (SBAC, 2012a). A “policy coordinator at SMARTER Balanced Assessment Consortium” (Riddile, 2012, p. 39) further explained the process in evaluating the cognitive level of an assessment in an interview; the SBAC is “using a cognitive rigor matrix that was developed in 2009” (Riddile, 2012, p. 40). The matrix that the policy coordinator referred to “uses Bloom’s taxonomy and Norman Webb’s depth of knowledge to define what students need to be able to demonstrate to show that they’ve achieved proficiency” (Riddile, 2012, p. 40). The state of Missouri was listed as a contributor of feedback in the SMARTER Balanced document that detailed the process of developing assessments (SBAC, 2012a). According to the timeline posted on the

SBAC website (2012d), the assessments will be piloted in the 2012-2013 school year. In the year 2014, Missouri school districts will participate in full implementation of the CCSS assessment (MO DESE, 2012a).

Summary of Research Findings

Chapter two provided insight to the reader from a historical and current perspective concerning literature related to this study. With Bloom's taxonomy establishing a common language (Bloom et al., 1956) in defining a hierarchical cognitive levels (Forehand, 2005), educators were challenged to evaluate the cognitive demands of curriculum and assessment (Bloom, 1956). Although changes to the original Bloom's taxonomy has occurred (Anderson & Krathwohl, 2001), the Revised Bloom's taxonomy as well as Webb's (1999) depth-of-knowledge study provided evaluative tools to examine thinking. Although many experts agreed that higher-level thinking is needed in the workforce for the 21st century (Carr, 1988; Jerald, 2009; King, Goodson, & Rohani, n.d.; Larson & Miller, 2011; North Central Regional Educational Laboratory & Metiri Group, 2003; The Partnership for 21st Century Skills, 2008), recent studies (Chow, 2011; Fox, 2011; Saunders, 2011) revealed a lack in students mastering these skills. Both government policy (Gurthie et al., 2008; U.S. DOE, 2008; U. S. General Accounting Office [GAO], 1998; Wong & Nicotera, 2007) and curriculum development (Barton, 2009; Crawford, 2012; Langa, & Yost, 2007; U.S. DOE, 2008) progressed through history towards a standards movement. The CCSS was developed to "prepare our children for college and the workforce" (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a, para. 1). Studies (Carmichael et al., 2010; Porter et al., 2011) have validated the importance of analyzing the change from state curricula to the CCSS. Many states have developed documents (Curriculum 21, 2011), including Missouri (MO DESE, 2011b) that compares their own state documents to the CCSS (Curriculum 21, 2011). The established connection of cognition to the development of the CCSS assessment validates the need for higher-level thinking (SBAC, 2012a; Riddile, 2012). After reflection of the literature review, the researcher wondered if educators can define higher-level thinking skills by using evaluative tools such as revised Bloom's taxonomy and Webb's (1999) depth-of-knowledge and educators recognize that these skills are valuable and needed for success in the workplace, then will CCSS be the "how" that will ensure the mastery of developing higher-level thinking skills in students in order to achieve 21st century success.

Chapter Three will present the data collection and analysis process, the design of the research, and details of the methodology used in this study.

Chapter Three: Methodology

Introduction

The methodology of this study is a quantitative content analysis. The U.S. General Accounting Office's (GAO), an "independent, nonpartisan agency that works for Congress" (U.S. General Accounting Office (GAO), 2011, para. 1) to aid "congressional decision makers in their deliberations by furnishing them with analytical information" (U.S. GAO, 1996, p. 2), described content analysis as "a methodology for structuring and analyzing written material" (U.S. GAO, 1996, p. 1). Within this study, the Missouri Grade Level Expectations (GLEs), the Missouri Crosswalk, and CCSS were analyzed. The researcher believes since all documents in the study were in written form, that content analysis "fits" within the U.S. GAO's (1996) definition. Rourke and Anderson (2004) summarized the content analysis method as "a process that includes segmenting communication content into units, assigning each unit to a category, and providing tallies for each category" (Rourke & Anderson, 2004, p. 5). The researcher believes Rourke and Anderson's (2004) definition aids in describing the research design of this study; the researcher "segment[ed]" (Rourke & Anderson, 2004. p. 5) words from the Missouri GLEs and the CCSS, "assigned. . . a category" (Rourke & Anderson, 2004, p. 5) based on the revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68), and measured for a difference in means of each grade level in the areas of ELA and MA. The researcher also analyzed corresponding CCSS and MO GLEs for each grade level in the areas of ELA and MA to determine the strength of the overall relationship between each cognitive level per grade level of both documents with a Pearson product moment correlation coefficient (PPMC). One advantage to a content analysis study includes being easily duplicated by other researchers for “repeated analysis” (Frankel & Wallen, 2010, p. 483); the advantage that other researchers could readily repeat the study and validate or reject its findings appealed to the researcher. After investigating numerous methodologies the researcher believes a content analysis was a “best fit” to address the hypotheses.

Data Collection and Analysis

The researcher examined three documents, the Missouri GLEs (MO GLEs), the CCSS, and the Missouri Crosswalk. This section will identify each document, its purpose, and why it was chosen for this study. In this section the researcher compares the structures of the MO GLEs and the CCSS document (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010fc; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010g).

The GLEs are defined as a set of learning objectives divided by grade level and content area that served as the “model state curriculum” (MO DESE, 2003, Grade-Level Expectations, para. 2). In 2008, the Practical Parenting Partnerships outlined the development and the relationship of the GLEs to other state curriculum documents. The GLEs are a “detailed” (Practical Parenting Partnerships, 2008, p. 7) “guide” (Practical Parenting Partnerships, 2008, p. 7) that “expand[s] on the Show-Me Content and Process Standards and the Missouri Frameworks for Curriculum Development” (Practical Parenting Partnerships, 2008, p. 3). Although the report discussed that the Show-Me Content and Process Standards, the Missouri Frameworks, and the Missouri GLEs all have the goal of defining what students should be able to do (Practical Parenting Partnerships, 2008, p. 3), the GLEs are to be used “to guide district curriculum and teachers’ lesson planning” (Practical Parenting Partnerships, 2008, p. 7). The GLEs were also used to develop the state assessment (Practical Parenting Partnerships, 2008) and are designed for state testing purposes. The researcher chose the MO GLEs for the purpose of this study because it was the critical document school districts were encouraged to use to write curriculum and assessment (Practical Parenting Partnerships, 2008).

The CCSS document is “the content of the intended curriculum” (Porter, McMaken, Hwang, & Yang, 2011, p. 103) that provide “clear and consistent goals for learning that will prepare [United States’] children for success in college and work” (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a, para. 1). The researcher chose the CCSS document for the following reasons: it is a currently debated topic in education (Cruise, 2011; McCluskey, 2010), it is used for testing purposes (MO DESE, 2010a, 2012a), written to describe what students are to be able to do at each grade level (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f), and the MO DESE plans to assess the standards starting in “2014” (MO DESE, 2012a, p. 26) the CCSS will replace the GLEs in Missouri from which school districts are to build their curriculum (Common Core Standards, 2011). The researcher asserted that although there is a difference in purpose, with the GLEs designed to give more detail to state standards (Practical Parenting Partnerships, 2008) and the Common Core developed to prepare students on a national level, the documents have the following similarities: they are both written for testing purposes (MO DESE, 2010a; Practical Parenting Partnerships, 2008), designed to describe what students are to be able to do per grade level (MO DESE, 2003; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f; Practical Parenting Partnerships, 2008, p. 3), and what school districts use in the state of Missouri to build their curriculum (Common Core Standards, 2011); the researcher believes that all of these reasons call for a comparison of the two documents. The MO DESE (MO DESE) also compared the documents and published an analysis in the Missouri Crosswalk (MO DESE, 2011b).

The Missouri Crosswalk document was designed to assist a school district in "identifying content to be addressed in each grade or course in updating curriculum and preparing students for assessments aligned to the CCSS" (MO DESE, 2012a, p. 5). The document provided the alignment (MO DESE, 2011c) of the CCSS to the Missouri GLEs (MO DESE, 2011b). MO DESE was compelled to help school districts align the GLEs to the Common Core instead of a school district completing this task on their own (Hoge, 2011). The process included gathering a team of people familiar with the alignment process (Hoge, 2011) and then rated the alignment as either "no alignment" (MO DESE, 2011c, p. 2), "partial alignment" (MO DESE, 2011c, p. 1), "aligns to multiple GLEs" (MO DESE, 2011c, p. 1) or "direct alignment" (MO DESE, 2011c, p. 1); this alignment process was taught and practiced by teacher participants at the DESE workshop (MO DESE, 2011b). Other states, although different in approaches, also compared their state curriculum to the CCSS and published the similarities and differences (Curriculum 21, 2011). Since many states, including Missouri, have created an evaluation tool similar to the Missouri Crosswalk (Curriculum 21, 2011; MO DESE, 2011b), the researcher is compelled to acknowledge and utilize the Missouri Crosswalk as an important component in evaluating a relationship and the differences between the state curriculum and the CCSS.

The structure of the CCSS and the MO GLEs vary with some similarities (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010g). The researcher reasoned that it is important to examine the structure of each document, which is the foundation of how the verbs are grouped, since the highest cognitive level is used. For example, if an objective contained a verb that has a 3.2 value and was grouped with another 2.1 verb, the 3.2 value was assigned to the objective; however, if the same 3.2 verb is grouped with a 4.2 verb, the objective was assigned a 4.2 value.

The CCSS consists of ELA and MA standards since "these two subjects are skills, upon which students build skill sets in other subject areas" (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010d, para. 26). The CCSS also has supporting documents concerning English Language Learners, students with special needs, and appendixes (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f) with "two content area—specific sections for grades 6–12, one for ELA and one for history/social studies, science, and technical subjects" (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010g, para. 1). In ELA grades 1-5, there are 10 Reading Literature and Informational strands as well as foundational skills; some strands contain many parts that may include skills that are numbered or have a designated letter that vary in amount depending on grade level (National Governors

Association Center for Best Practices & Council of Chief State School Officers, 2010f). For the purpose of this study, the researcher referred to these skills as subsets. There are also 10 writing standards that include writing subsets (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). There are a greater number of foundational skills and foundational subsets in lower-level elementary as compared to upper-level elementary; however, there is a greater number of writing subsets in upper-level elementary compared to lower-level elementary. Grade 5 has the highest number of writing objectives compared to other grade levels (see Table 2). The number of standards in each category is summarized in Table 2.

Table 2

Number of Objectives for ELA grades 1-5 CCSS

Grade	Reading literature	Reading: Informational text	Foundational skills	Found-ational skills numbered subsets	Writing	Writing num-bered subsets
grade 1	10	10	4	15	10	0
grade 2	10	10	2	9	10	0
grade 3	10	10	2	7	10	12
grade 4	10	10	2	4	10	15
grade 5	10	10	2	4	10	16

In ELA, there are also six Speaking and Listening standards in 1-5 grade with various subsets according to grade level (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). There are also six Language standards in grades second through fifth with five standards in first grade (National

Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f); there are various subsets in the language area across grade levels (National Governors Association Center For Best Practices & Council Of Chief State School Officers, 2010f). Both grade 2 and grade 5 have the lowest total number of combined speaking, listening, and language skills. Grade 5 also has the lowest number of language subset skills compared to other grade levels. According to the National Governors Association Center for Best Practices & Council of Chief State School Officers (2010) website, all together these ELA standards create a “vision of what it means to be a literate person in the twenty-first century” (para. 6).

In MA, the standards are divided into Operations and Algebraic Thinking, Number and Operations in Base Ten, Measurement and Data, and Geometry (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010h). The Number and Operations in Base Ten and the Measurement and Data groups had subsets (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010h). Grade 3 holds the most objectives in the areas of Operations and Algebraic Thinking with grade 5 containing the least number. When combining Number and Operations in Base Ten with the Number and Operations in Base Ten subsets, grade 2 has more in these two combined area than other grades and grade 3 contains the least number. When combining Measurement and Data with the Measurement and Data subsets, grade 3 has more objectives in these two areas than other grades with grade 1 containing the least number. Grade 5 CCSS MA holds more objectives in geometry than other grades while grade 3 contains the least number of objectives (see Table 3). The number of objectives in each category is summarized in Table 3.

Table 3

Number of Objectives for MA grades 1-5 CCSS

Grade	Operations and Algebraic Thinking	Number and Operations in Base Ten	Number and Operations in Base Ten subset	Measure-ment and Data	Measurement and Data subset	Geometry
grade 1	8	6	3	4	0	3
grade 2	4	9	2	10	0	3
grade 3	9	3	0	8	6	2
grade 4	5	6	0	7	2	3
grade 5	3	7	2	5	5	4

The MA Standards also included Number and Operations-Fractions that started in third grade and this group also had subsets listed in grades third through fifth (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010h). The organizational structure of the CCSS differs from the MO GLEs in both ELA and MA (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010g; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010h).

The MO GLEs are "are arranged by Strand, Big Idea, Concept, and Grade Level" (Practical Parenting Partnerships, 2008, p. 9) in both the ELA (formerly referred to as

Communication Arts) and MA area (Practical Parenting Partnerships, 2008). The Reading, Information Literacy, Writing, and Listening and Speaking strands all have various numbers of objectives listed for each grade level (MO DESE, 2010b). Grade 2 has the least number of reading objectives with grade 5 having the most. Grades 3 and 4 have more information literacy than other grades including grade 5. Grades 4 and 5 have more listening and speaking objectives than other grades. Grade 4 has fewer reading objectives than grade 3 (see Table 4). The number of objectives in each category is summarized in Table 4.

Table 4

Number of Objectives for Communication Arts grades 1-5 MO GLEs

Grade	Reading	Information Literacy	Writing	Listening and Speaking
grade 1	45	3	20	5
grade 2	41	4	20	7
grade 3	55	7	21	7
grade 4	53	7	22	8
grade 5	58	5	25	8

In the MO GLEs MA, the Algebraic Relationships, Data and Probability, Geometric and Spatial relationships, measurement, and numbers and operations strands all have various numbers of objectives listed within each grade level (MO DESE, 2010b). There are six Algebraic Relationships objectives in grade second through sixth with first grade having only five objectives (MO DESE, 2010b). When combining Algebraic Relationships with Numbers and Operations, grades third through fifth contain 16 objectives with first and second containing 13 and 15 respectively. When combining Data and Probability with Measurement, grade 4 has more than any other grade level with grade 1 and 2 with the least number. In MA GLEs, grade 4 has more total objectives than other grade levels while grade 1 has the least number. There is an increase in the number of objectives from grade level to grade level starting in first and increasing until fourth; however, fifth grade total number of objective is two less than fourth grade (see Table 5). The number of objectives in each category is summarized in Table 5.

Table 5

Number of Objectives for MA grades 1-5 MO GLEs: MA grades 1-5 MO GLEs Count

Grade	Algebraic Relationships	Numbers and Operations	Data and Probability	Measurement	Geometric and Spatial Relationships
grade 1	5	8	3	4	5
grade 2	6	9	3	4	4
grade 3	6	10	4	5	5
grade 4	6	10	4	7	6
grade 5	6	10	5	4	6

The ELA CCSS and the MO CA GLEs both have categorized standards or objectives into the areas of reading, writing, and speaking and listening/listening and speaking (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). The ELA CCSS further divided the reading standards into two areas listed as literature and informational text as where the MO CA GLEs did not (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). Another difference is that the MO CA GLEs do not contain identified language objectives, foundational skills, or subsets (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f); however it does contain identified objectives as information literacy (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). The MA CCSS and the MO MA GLEs share common language such as algebra, numbers and operations, measurement, and geometry (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f); however, there are differences between documents (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). Although algebra is used in both documents, the MO MA GLEs emphasized relationships as where the MA CCSS identified operations and thinking (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). The two MA documents differed in how numbers and operations were categorized (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f); the MO MA GLEs do not specify a base 10 or fractions section whereas the MA CCSS identifies these two specific parts (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). Another difference is the placement of data (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f); the MO MA GLEs created a specific category of data and probability whereas the MA CCSS document listed data with measurement (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). Although the MA CCSS and the MO MA GLEs both identify a geometry category, the MO MA GLEs specified spatial relationships whereas the MA CCSS did not (MO DESE, 2010b; National

Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). The MO MA GLEs did not contain subsets whereas the MA CCSS did (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). The structure of the MA CCSS and the MO MA GLEs have similarities and differences in terms of structure (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f, 2010g, 2010h).

The differences in in analyzing state documents compared to the CCSS are important (Carmichael et al., 2010; MO DESE, 2011b; Porter et al., 2011). The structure of each document (MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010g; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010h) contain both reading, writing, and math, but differ in how each area is divided (Carr, 2012; MO DESE, 2003; MO DESE, 2010b; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010a; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010g; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010h; Practical Parenting Partnerships, 2008).

Research Design

The first step in the study was to establish a data code (Colorado State University (CSU), 2011). The researcher coded for exact verbs listed in Appendix A and Synonyms' List in Appendix B, created based on the revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68), for each objective in the MO GLEs (MO DESE, 2010b) and then for the CCSS grades 1-5 in ELA and MA (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). The researcher then used the Missouri Crosswalk (MO DESE, 2011b) to check for a difference in corresponding MO GLEs to CCSS listed within the Missouri Crosswalk for grades 1-5 in ELA and MA. The researcher closely adhered to the words located in the cognitive categories used in the revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) to maintain integrity of the framework. Thus, altering the categories or varying the "verbs" significantly would, in the researcher's view, risk the integrity of the framework. Holsti (1969) stated that "because the nature of the data is usually beyond the investigators' control, opportunities for enhancing reliability are generally limited to improving coders, categories, or both" (p. 135); the researcher considered that to improve the categories, it was logical to extend the framework for the best possible reliability (for ways that the researcher improved coder reliability, see section "Validity and Reliability"). In an effort to improve the categories while still maintaining the integrity of the framework, an extensive list of synonyms was created. Each word listed in the framework was researched using Merriam-Webster's online dictionary (Merriam-Webster Incorporated, 2011). The verbs selected from the list of synonyms were added to Appendix B. The researcher placed objectives that do not contain any words or phrases listed in Appendix A or Appendix B into the "Non-identified Revised Bloom's Language" (NRBL) category and designated the objective with a value of 0. By developing an extensive synonyms list, the researcher attempted to avoid objectives being placed in the NRBL category.

When the researcher created the Synonyms' List for Appendix B, it was noted that a word could appear in both a low-level cognitive process and a higher-level cognitive process. This is logical since the framework is hierarchical; a "thinker" would need to be able to have low-level cognitive ability to achieve high-level cognitive ability. For example, looking at the word "conclude" the researcher noticed it is listed as a synonym for both "inferring" (lower-level) and "judging" (higher-level). The researcher realized that if all lower-level thinking words were placed in the high-level section, the framework integrity would not be maintained. The higher-order thinking words do encompass low-level thinking words (see Figure 1); yet to maintain the integrity of the framework, the researcher determined that a word used in a lower level cannot be used again in any higher-level. The researcher developed the language from 1.0 and progressed to 6.3 to prevent this oversight.

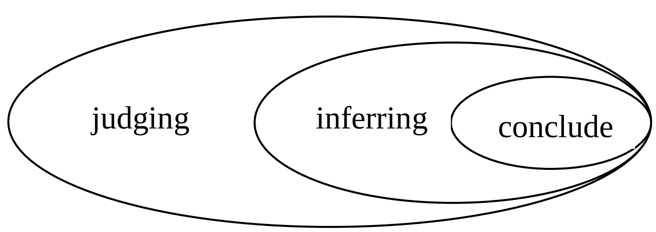

Figure 1. Lower-level thinking included in higher-level thinking

The researcher created other safeguards when developing the Synonyms' List for Appendix B. When searching for synonyms of a verb listed in Appendix A, the researcher discovered that more than one definition of verb use of the searched word was given. The researcher reviewed all definitions and synonyms; the synonyms that were chosen were based on the researcher's past curriculum writing experience, current literature on curriculum writing, and application to the study. Because Appendix A is based on the revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68), Appendix A took priority over Appendix B.

The words in each objective from the CCSS and the MO GLEs were coded an assigned value from 1.1 to 6.3 based on Appendix A and Appendix B. All words were assigned to 7 categories: Remember, Understand, Apply, Analyze, Evaluate, Create, and NRBL. All words coded with a 1.1-1.2 were categorized for the "remember" cognitive process concept. All words coded with a 2.1-2.7 were categorized for the "understand" cognitive process concept. All words coded with a 3.1-3.2 were categorized for the "apply" cognitive process concept. All words coded with a 4.1-4.3 were categorized for the "analyze" cognitive process concept. All words coded with a 5.1-5.2 were categorized for the "evaluate" cognitive process concept. All words coded with a 6.1-6.3 were categorized for the "create" cognitive process concept. The "cognitive process" categories are assigned as follows: 1.0 for remember, 2.0 for understand, 3.0 for apply, 4.0 for analyze, 5.0 for evaluate, 6.0 for create. Any word or phrase not coded 1.0 to 6.3, were assigned into the "Non-identified Revised Bloom's Language" (NRBL) category with a value of zero. One portion of the taxonomy is considered the lower-level thinking skills "knowledge, comprehension, and application" (Forehand, 2005, para. 8) and the "highest three levels are: analysis, synthesis, and evaluation" (Forehand, 2005, para. 8).

Instrumentation and Hypotheses

Checking for the difference. Using the Excel format of the MO GLE for each grade level in both ELA and MA (MO DESE, 2010b) and the CCSS Excel format (Illinois State Board of Education, 2012) for each grade level in both ELA and MA, the researcher verified if there was a statistical difference in average values assigned to each objective from Table l and Appendix B in ELA and MA by grade-level using a T-test for difference in means.

> **Hypothesis:** There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs and the CCSS in the content areas of ELA and MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Checking for the relationship. Bluman (2010) stated that "statisticians use a measure called the *correlation coefficient* to determine the strength of the linear relationship between two variables" (p. 533); to determine the strength of the overall relationship between each set of CCSS and its aligned MO GLE, based on cognitive level, per grade level of both documents, a PPMC was calculated. The researcher selected the same values assigned to each objective from Table l and Appendix B in ELA and MA when calculating the PPMC to obtain an r value (one number that is within the range on -1 to 1). The closer the r value is to 1, the greater the relationship is between both documents in comparison to the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68). The researcher surmised that because the PPMC measures the relationship of two variables, it is the "best fit" for this study.

> **Hypothesis:** There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA and MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Validity and Reliability

The next step was to check for reliability and existence of coding (CSU, 2011). For an inter-rater reliability check, the same original sample from each document that the researcher previously rated was distributed without the researcher's results revealed to the five experts in the educational field. The raters also received Appendix A and Appendix B for assignment of values based on Bloom's hierarchy of cognitive process. The researcher held a training session for the individuals to also help improve reliability. After the experts rated the samples by assigning values from the rubric, the five-scored samples from the MO GLEs and the five-scored samples from the CCSS were compared against the researcher's sample with a chi-square goodness-of-fit test to check for inter-rater consistency. Bluman (2010) defined the chi-square goodness-of-fit test as "a frequency distribution [that] fits a specific pattern" (p. 573). The inter-raters' scores were compared for a "fit" of the expected pattern of the researcher's score. Bluman (2010) stated

> The observed frequencies will almost always differ from the expected frequencies due to sampling error; that is, the values differ from sample to sample. But the question is: are these differences significance (a preference exists), or are they due to chance? The chi-square goodness-of-fit test will enable the researcher to determine the answer. (Bluman, 2010, p. 573)

In this study, the researcher was responsible for assigning all objectives the cognitive level and therefore, the researcher believed that it was important to check the reliability of the results against the researcher's scores as the expected outcome. The researcher believed that this statistical test would reveal if there existed a significance difference between other analysts using the same tools to evaluate the cognitive levels. This was important information to the researchers since a team of evaluators were not available for conducting this study; in essence, the researcher used this test to verify that if a team was assigning cognitive values to each objective within the study, no statistical difference from the researcher's results would be found. By measuring the frequencies of all raters, the researcher believed that this test validated the reliability of the tools. If results proved reliable, the researcher continued coding the remaining objectives of both documents; if the results proved inconsistent, the researcher made adjustments accordingly.

After a check for inter-rater reliability, this study evaluated all objectives in both documents (CCSS and MO GLEs) and placed them into the appropriate levels of the cognitive framework (higher and lower) based on the procedures distributed during the inter-rater training session; by doing this the researcher was able to examine a cognitive relationship and differences between the two documents. Due to the demand of higher-level thinking skills for the 21st century skills (Brandt, 2010; The Partnership for 21st Century Skills, 2008; Teach For America, 2011), the researcher was particularly interested in the number of higher-level thinking skills that are presented in the documents.

Inter-rater reliability test. The chosen experts for the inter-rater reliability test were familiar with educational "jargon" to improve reliability; Redman (2010) noted that many states placed “competencies online” (Redman, 2010, para. 1) and argued that competencies are “often written in educational jargon that isn't easy to understand” (Redman, 2010, para. 1). The researcher believed that choosing individuals within the educational realm as a profession may improve the reliability. Holsti (1969) stated that “reliability is a function of coders’ skill, insight, and experience” (p. 135). Each of the five experts selected for the study had similar backgrounds as certified gifted education teachers who maintained an interest in and expert knowledge of Bloom’s taxonomy. These experts also expressed interest in cognitive levels of curriculum. Due to scheduling conflicts, on the first training session three experts were trained together, then the two other experts were trained separately at a different time. The second training session included four experts that were trained together and one expert trained separately.

> **Hypothesis:** There is *no* difference in the expected cognitive values and the cognitive values chosen by the five experts when comparing the sample of the MO GLEs and the sample CCSS in the content areas of ELA and MA in fourth grade as measured by a numerically-scaled comparison to the language defined by the adapted version of the revised Bloom’s taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms’ List in Appendix B.

A sample of four GLE’s and four CCSS with two of the four from each subject area was presented to five experts in the educational field, along with the rubric based on Bloom’s hierarchy of cognitive process and the synonym list for assignment of values. Each standard of the Common Core (See Appendix 3), the MO GLEs for ELA (see Appendix 1), and MO GLEs for MA (See Appendix 2) was assigned a number. One sample from the CCSS and one sample from the MO GLEs in both subject areas were randomly selected using a randomizer generator (Haahr, 2011) for use by the experts; first by grade and then by objective.

Once an objective from the CCSS or the Missouri GLEs was placed into a cognitive process concept, it was not placed into any other cognitive category. The researcher coded verbs in each objective for the highest level of cognitive concept. For example, "Students will *identify* (1.1) and *explain* (2.7) . . . " was coded with a value of 2.7 because it contained the word *explain* that is a higher cognitive level than the word *identify*. Although the word *identify* was present, the highest level was assigned to an objective even if a lower level word or phrase was present. The same rule applied to synonyms; the objective was categorized on the highest-level language present. The creation of directions and the rules for assigning a value to an objective or a standard is summarized in Table 6 (see Table 6).

Table 6

Summary of Directions and Rules

Directions	Rules
The cognitive process listed in Appendix A (left column area) should also have numbers since there are verbs listed in this area that are not listed in the category of the “possible verb used” area. The researcher added numbers to correct this oversight.	Label objectives or standards that do not contain any words or phrases listed in Appendix A or Appendix B as NRBL. NRLB is an acronym for “Non-identified Revised Bloom’s Language”.
The original Appendix B was created as an Excel document. It was converted to a Word document for consistency for raters and more user-friendly word search capabilities.	If a word is found in multiple levels, the value is given at the lowest level it first appears.
The original directions stated that all words should be searched; however, considering that “the verb generally describes the intended *cognitive process*” (Anderson & Krathwohl, 2001, p. 12) the researcher decided to search for verbs only.	Appendix A will always take priority over Appendix B.
When the researcher completed the directions, a trial run on the presentation of the directions was conducted on a non-educator. The trial run revealed that the visuals were helpful, the rule to search for all tenses of the verb should be emphasized during training session to experts, and a demonstration of two examples was helpful.	If multiple words in an objective or standard are found in Appendix A or Appendix B, the highest value of the words found will be assigned. Search for all tenses of the word.
The researcher also coded the CCSS “subsets” with a number.	Any objective that is categorized as NRLB will be given the value of zero.

After rating the samples with the assigned values from the rubric, the five-scored samples from the MO GLEs and the five-scored samples from the CCSS were compared with a chi-square goodness-of-fit test to check for a difference between the researcher's ratings and the experts' ratings. Bluman (2010) commented that a chi-square goodness-of-fit test is used "to see whether a frequency distribution fits a specific pattern" (Bluman, 2010, p. 11-3). The researcher created the "theoretical" (Bluman, 2010, p. 11-2) result and then sought to compare with the experts' results for a difference; with all data expected to match the researcher's results the data was not normally distributed. The researcher considered the chi-square goodness of fit test a "best fit" for comparing the five-scored examples' means against the researcher's expected results. The researcher first compared the Missouri GLEs (see Table 7). The results for the MO GLEs inter-rater sample are summarized in Table 7.

Table 7

MO GLEs Inter-Rater Results

GLE assigned number	RA (expected)	RB	RC	RD	RE	RF
380	2.3	2.3	2.3	2.3	2.3	2.3
311	1	1.1	1.1	1.1	1.1	1.1
106	6	2.1	6	6	6	6
110	2.3	2.1	2.3	2	2	2.3

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the Missouri Grade Level Expectations analysis was 2.68. The critical value was determined by taking the number of categories and subtracting 1. There are 6 categories possible; the degree of freedom was 5. Using Bluman's (2010) Table G, the critical value was 11.071, not rejecting the null hypothesis. There was evidence to support that there was no difference in the expected cognitive values and the cognitive values chosen by the five experts when comparing the sample of the MO GLEs in the content areas of ELA and MA in fourth grade as measured by a numerically-scaled comparison to the language defined by the adapted version of the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B. This result confirmed for the researcher that the training session as well as the process and procedure used was valid for the MO GLEs objectives. Since the sample contained both ELA and MA content areas, this confirmed for the researcher that the training session as well as the process and procedures used was reliable for the MO GLEs in those areas. The researcher then calculated the CCSS from the experts' sample containing both ELA and MA (see Table 8). The results for the first CCSS inter-rater sample are summarized in Table 8.

Table 8

CCSS Inter-rater Result 1

CC assigned number	RA (expected)	RB	RC	RD	RE	RF
CC23	2.5	2.1	2.5	2.5	2.5	2.5
CC61	4.2	2.6	4.2	2.6	2.1	2.6
CC13	2.6	6	2.6	6	2.6	2.6
CC21	3	3	3	3	2	2

The alpha level of .05 was used giving the results a significance level of 95% and the test value for the CCSS analyst was 12.50. The critical value was determined by taking the number of categories and subtracting 1 with 6 categories possible and a degree of freedom of 5. Using Bluman's (2010) Table G, the critical value was 11.071 leaving the researcher to reject the null hypothesis. There is evidence to support that there is a difference in the expected cognitive values and the cognitive values chosen by the experts when comparing the sample of the CCSS in the content areas of ELA and MA in fourth grade as measured by a numerically-scaled comparison to the language defined by the adapted version of the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B. Figure 2 illustrates that the MO GLEs showed no difference between in the expected cognitive value represented as RA for rater A and the cognitive values of the experts; however, Figure 2 also shows that in CCSS Result 1 there is a difference in the expected cognitive value and the experts' chosen cognitive value.

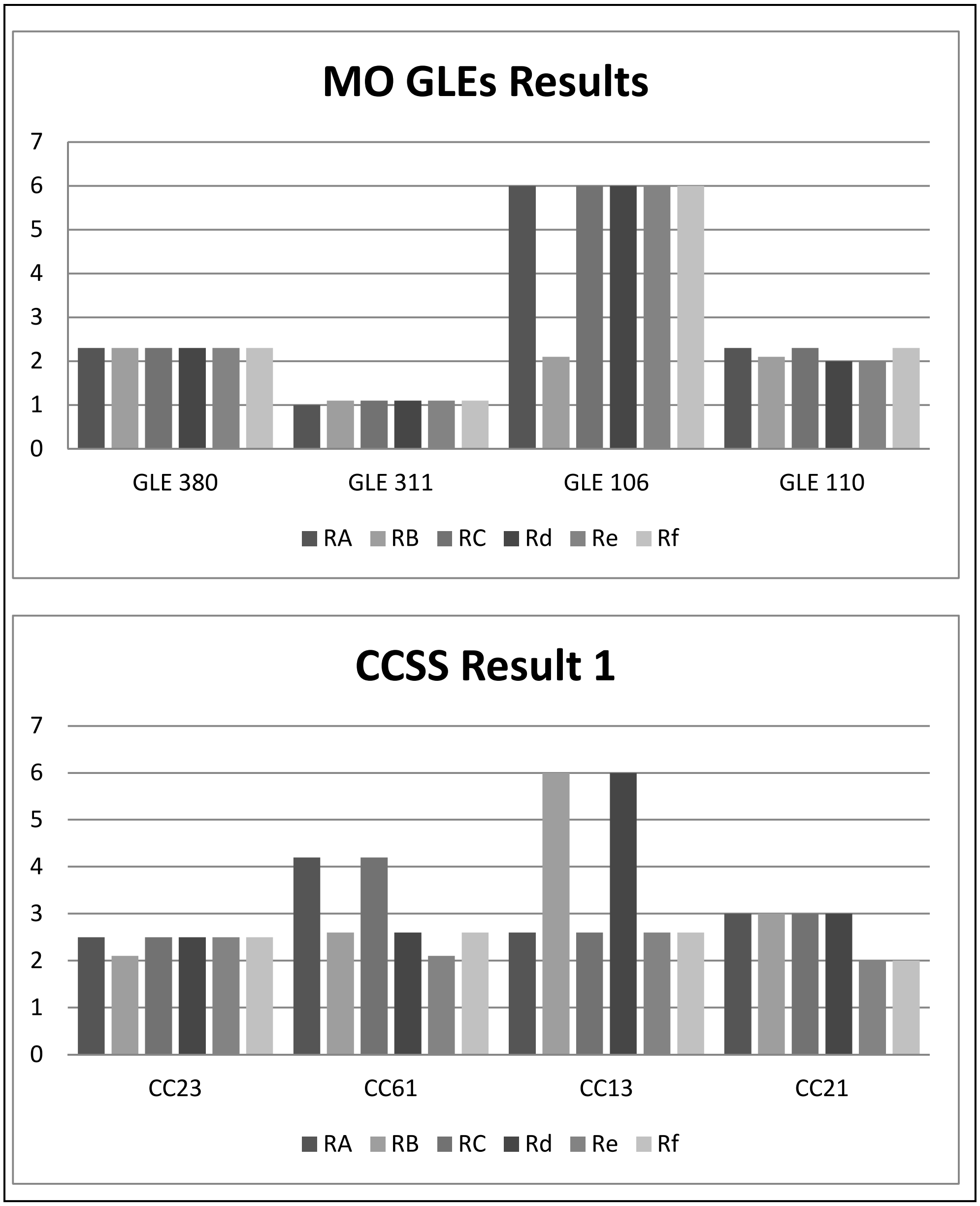

Figure 2. Results for inter-rater MO GLEs and CCSS

The researcher believed there would be no difference in the expected cognitive values and the cognitive values chosen by the five experts when comparing the sample of the CCSS. After reviewing the response of expert "RD", the researcher discovered that the expert was including the examples stated in the standard. The researcher did not address what to do with examples during the training even though the expert ignored examples that were given inside the CCSS when evaluating the sample data. The researcher believed that the examples given were similar to the appendix, meaning they were used for clarification purposes and not as the standard itself. For the purpose of this study, the researcher was only interested in the standard. This unconscious decision was the researcher's oversight in the training session and the researcher suspected the oversight skewed the results. The samples were changed, the second training session was held with the clarification of avoiding the examples given, and the results were compared a second time. The results are shown in Table 9.

Table 9

CCSS Inter-rater Result 2

CCSS assigned number	RA (expected)	RB	RC	RD	RE	RF
CC23	2.6	2.6	2.6	2.6	2	2.6
CC61	2.3	2.1	2.3	2.3	4	4
CC13	3	3.2	3	3.2	4.2	3
CC21	2.3	2.1	2.1	3.2	2.1	2

The alpha level of .05 was used giving the results a significance level of 95% and the test value for the second training session of the CCSS analysis was 3.62. The critical value was determined by taking the number of categories and subtracting 1 with 6 categories possible and a degree of freedom of 5. Using Bluman's (2010) Table G, the critical value was 11.071. There is enough evidence to support that the coding is reliable with a 95% significance level. Figure 3 illustrates that there is no difference between in the expected cognitive value represented as RA for Rater A and the cognitive values of the experts; this result confirmed for the researcher that addressing how to handle the examples listed in the CCSS with the raters was an oversight in the training session. The result also confirmed for the researcher that the tools and process were valid and the researcher began to proceed assigning cognitive values for all objectives in the study.

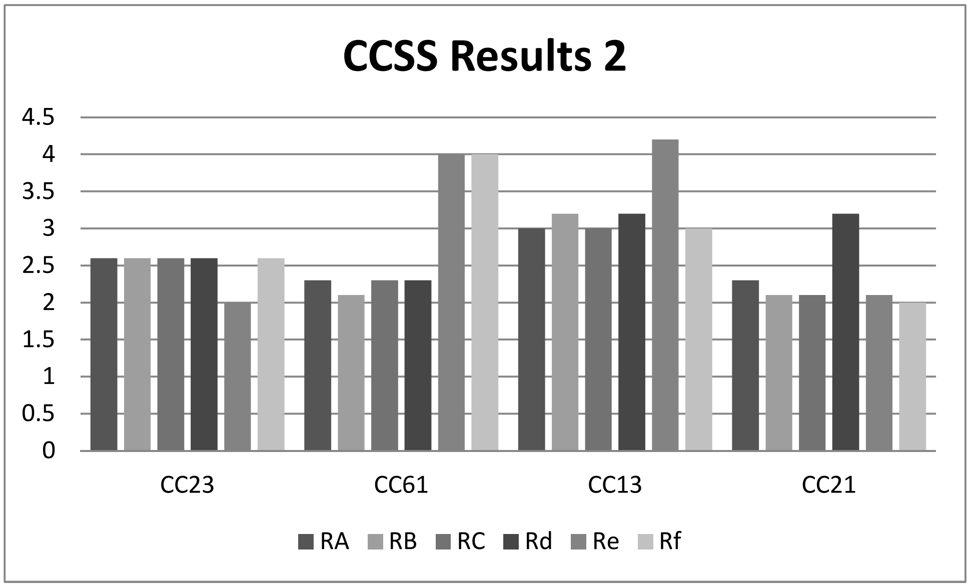

Figure 3. CCSS inter-rater result 2

Following the same procedures and rules given during the second training session for the inter-rater reliability test, the researcher coded all MO GLEs ELA (formerly called Communication Arts) objectives grades 1-5 and then the MO GLEs in MA to a cognitive value concept. The researcher then assigned all CCSS in ELA grades 1-5 starting with first grade and then progressing to fifth grade. After the ELA was completed, the researcher then completed the CCSS MA standards in the same manner. The researcher adapted the Excel format of the MO GLE (MO DESE, 2010b) for each grade level (by including the categories of “Word-Table-Value” to describe the word evaluated, the table used, and the cognitive value assigned by the researcher. For the purposes of coding for investigating a difference in cognitive skills, the researcher also assigned a number to each objective as shown in Table 10 in the “GLE CA objective”. After following the procedures from the inter-rater reliability test, the value was assigned to each objective listed in the “assigned GLE cognitive value”. An example of the coding table used for MO GLEs is listed in the sample excerpt in Table 10.

Table 10

Excerpt of Coding Table for MO GLEs

GLE Description	Word-table-value	GLE CA objective	Assigned GLE cognitive value
Demonstrate ability to use phonemes to construct words: replace beginning and ending sounds to form new words	Demonstrate-t2-2.1; use-t1-3.0; construct-t1-6.3; replace-t2-2.1; form-t1-6.0	81	6.3
Develop and apply decoding strategies to "problem-solve" unknown words when reading grade level instructional text	Develop-t2-2.1; apply-t1-3.0; solve-t2-2.1; read-t2-2.5	82	3
Read grade-level instructional text by developing automaticity of an increasing core of high-frequency words	Read-t2-2.5; develop-t2-2.1	83	2.5

The researcher used the MO DESE crosswalk (MO DESE, 2011b) to extract which GLEs MO DESE matched the CCSS. The researcher executed a T-test to analyze if there was a statistical difference in means in the overall cognitive values between the MO GLEs and CCSS in each grade level. According to Bluman (2010), “using samples saves time and money and in some cases enables the researcher to get more detailed information about a particular subject” (Bluman, 2010, p. 10). For these purposes, the researcher took a random sample of 20 objectives from each grade level that contained more than 40 objectives using a computer generated randomizer (Haahr, 2011); for both ELA and MA in all grade levels the same random numbers were used. For data sets that are less than 40 sets, the whole population was used.

The researcher used the same cognitive values assigned to each objective when calculating the corresponding MO GLE and CCSS according to MO DESE crosswalk by grade level using a PPMC calculation to obtain an r value (one number that is within the range of -1 to 1). The closer the r value is to 1, the greater the positive relationship is between both documents in comparison to the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68). The data were categorized by content area and grade level before executing both the T-test for difference in means and the PPMC to compare the relationship between the MO GLEs to the CCSS per grade level. Although the T-test used all objectives in both documents, the PPMC test used the paired objectives based on Missouri Crosswalk. Table 11 illustrates how data were categorized. It is important to note that many GLEs may have the same Common Core State Standard as the excerpt example illustrates in Table 12; the MO GLE A1A5 and MO GLE A1B5 both have a partial match to CCSS 5.0A3.

Table 11

Excerpt Sample of Grade 5 Analyzed Crosswalk

CCSS MA Grade 5	CCSS MA Grade 5 Value	Crosswalk MO GLE	Crosswalk MO GLE Value	Alignment
5.0A1	5	A2B5	3	Partial
5.0A2	2.1	A2A5	3	Partial
5.OA3	6.1	A1A5	5	Partial
5.OA3	6.1	A1B5	4	Partial

Similar to the T-test for difference in means, a computer generated random sample (Haahr, 2011) was used to calculate the PPMC. Unlike the random sample for the T-test for difference in means, the data set was with the corresponding pair according to the Missouri Crosswalk; since the data for both ELA and MA for each grade level were approximately 40 paired sets, each grade level for both ELA and MA were randomized using the same random numbers. When setting the randomizer, the researcher allowed for the range to be based on the highest number of cognitive paired objectives in each subject area with each item unique. The range was extended because each strand (ELA) or domain (MA) had an equal chance of being chosen. The MO Crosswalk grouped the overall standard with the subsets as noted in Table 12 on the top left line of the excerpt of the MO Crosswalk (MO DESE, 2011b, grade 3, p. 9); the researcher used the Excel formatted CCSS document for CCSS ELA and CCSS MA (Illinois State Board of Education, 2012) (see Figure 4). The procedure for how the researcher paired the CCSS and the MO GLEs based on the MO Crosswalk is summarized in Figure 4.

RF.3.4.a-c Read with sufficient accuracy and fluency to support comprehension.	
a. Read on-level text with purpose and understanding.	R1D.3.b Read grade-level instructional text b. adjusting reading rate to difficulty and type of text R1F.3.d Apply pre-reading strategies d. set a purpose for reading
b. Read on-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings.	R1D.3.a Read grade-level instructional text a. with fluency, accuracy and expression
c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.	R1G.3.b During reading, utilize strategies to b. self-monitor comprehension

Figure 4. Adapted excerpt of MO Crosswalk Grade 3 ELA (MO DESE, 2010a, grade 3, p. 10)

To stay true to the crosswalk, the researcher paired the overall CCSS with each of the GLE objectives listed. The excerpt sample of the tested data set illustrates how the RF.3.4 was paired with each GLE (R1D.3.b, R1F.3.d, R1D.3.a, and R1G.3.b) within the assigned section much like a matrix (see also Table 12). Objectives were kept in the study if they were previously covered in grades lower than the one being analyzed. For example in all MO GLE objectives from Figure 4 were from grade 3 and were kept in the study; however, if one of the MO GLEs were listed as a grade 4 GLE, then it would have been dropped from the study. Other objectives that were dropped from the study were objectives that referenced grade levels that were not involved in the study such as kindergarten and any grade level above sixth grade. The MO Crosswalk also referenced objectives from the *Information and Communications Technology Literacy Grade-Level Expectations* (MO DESE, 2012b) that were also dropped from the study, since the document was not a part of the study. The Missouri Crosswalk listed in the type of alignment (direct, partial, and aligns to multiple GLEs) that occurred between the CCSS and the paired GLE; this information was later used in an extended analysis of the data (see chapter 5).

Table 12

Excerpt Sample of Tested Data

RF.3.4	2.5	R1D.3.b	2.5	aligns
RF.3.4	2.5	R1F.3.d	3	aligns
RF.3.4	2.5	R1D.3.a	2.5	partial
RF.3.4	2.5	R1G.3.b	5	direct
RF.3.4.a	2.5	R1D.3.b	2.5	aligns
RF.3.4.a	2.5	R1F.3.d	3	aligns
RF.3.4.b	2.5	R1D.3.a	2.5	partial
RF.3.4.c	3	R1G.3.b	5	direct

Although the excerpt sample of the tested data set illustrates a matrix design, not all overall standards followed this format in the MO Crosswalk. The researcher did not cross-categorize the overall CCSS with all grouped GLEs when the MO Crosswalk document specified a particular GLE to the overall GLE. The researcher intended this decision would help to reflect the significance pairing in the MO Crosswalk.

Summary

This chapter discussed the type of methodology used in this study, the selected pieces of data and the researcher's reasoning for choosing each data piece. This chapter also explained the research design including the development of Appendix A and Appendix B. The cognitive language in Appendix A was derived from a revised Bloom's taxonomy chart (Anderson & Krathwohl, 2001, pp. 67-68). Appendix B Synonyms' List was developed using safeguards to protect the integrity of Appendix A. The instrumentation reviewed the two hypotheses and the use of a T-test and PPMC. The inter-rater reliability test validated the reliability of the tools and process in assigning cognitive levels to an objective. A sample from each document was presented to five experts in the educational field, along with the rubric for assignment of values based on Bloom's hierarchy of cognitive process. After rating the samples by assigning values from the rubric, the five scored samples from the MO GLEs and the five scored samples from the CCSS were compared using a chi-square goodness-of-fit test for difference in means to check for rater consistency. The same procedures used in the inter-rater reliability test were applied by the researcher to all objectives in the MO GLEs and the CCSS grades 1-5 in area of ELA and MA. Once each objective was assigned a cognitive value, the objectives were compared by grade level in both the MO GLEs and the CCSS using a paired T-test for difference in means. To determine the strength of the overall relationship between each cognitive level per grade level of both documents, a PPMC was calculated. Chapter 4 will discuss the results.

Chapter Four: Results

Introduction

This quantitative content analysis study was conducted to determine the difference between the cognitive language as defined by the revised Bloom's theoretical construct (Anderson & Krathwohl, 2001, pp. 67-68) in the MO GLEs and CCSS in the academic content areas of ELA and MA, grades 1-5. The study also investigated the relationship between the cognitive levels of MO GLEs and CCSS using the corresponding CCSS to the MO GLEs as documented in the Missouri Crosswalk (MO DESE, 2011b), in the academic content areas of ELA and MA, grades 1-5.

Treatment of the data

This study compared the MO GLEs grades 1-5 (MO DESE, 2010b) and the CCSS grades 1-5 (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010f). The researcher also used the Missouri Crosswalk (MO DESE, 2011b) in the analysis (MO DESE, 2011b). As discussed in detail in chapter three, to quantify revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68), the researcher created Appendix A and a Synonyms' List referred to as Appendix B. The researcher created instructions for the inter-rater reliability test and then reconstructed the instructions after discovering an oversight in interrupting the examples listed in the CCSS. The analysis for a measurable *difference* in the cognitive thinking skills required of the MO GLEs and the CCSS in the content areas of ELA and MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy was calculated using a T-test. The analysis for a *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS as listed in the Missouri Crosswalk in the content areas of ELA and MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy was calculated using PPMC.

Results and Analysis

Null Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs and the CCSS in the content areas of ELA and MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

The researcher first checked for a measurable difference in cognitive thinking skills required of the MO GLEs and the CCSS in the content areas of ELA and MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. The results are displayed starting with the content area of ELA beginning with first grade and then progressing to fifth grade followed by the display of results in the content area of MA starting with first grade and then progressing to fifth grade. Each analysis begins with the hypothesis statement, the result of the calculated test, and the summary. As described in chapter 3, the researcher used the Excel format of the MO GLE (MO DESE, 2010b) and the CCSS Excel format (Illinois State Board of Education, 2012) for each grade level in both ELA and MA. The researcher verified that there was a statistical difference in values assigned to each objective from Table l and Appendix B in ELA and MA by grade-level using a T-test for difference in means. First grade in the content area of ELA was calculated (see Table 13).

Null Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs in the content area of ELA in first grade and the CCSS in the content area of ELA in first grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 13

T-Test: Two-Sample Assuming Equal Variances Grade 1 ELA

Point Estimate	MO CA GRADE 1 Value	CCSS ELA GRADE 1 Value
Mean	2.622857143	2.342857143
Variance	1.447109244	1.482521008
Observations	35	35
Pooled Variance	1.464815126	
Hypothesized Mean Difference	0	
df	68	
t Stat	0.967800067	
t Critical two-tail	1.995468907	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the difference in means in first grade ELA analysis was 0.9678. The critical value was 1.995. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a measurable difference in the overall cognitive thinking skills required of the MO GLEs in the content area of ELA in first grade and the CCSS in the content area of ELA in first grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B. Next, second grade was calculated (see Table 14).

Null Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs in the content area of ELA in second grade and the CCSS in the content area of ELA in second grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 14

T-Test: Two-Sample Assuming Equal Variances Grade 2 ELA

Point Estimate	CCSS ELA GRADE 2 Value	MO CA GRADE 2 Value
Mean	2.820588235	2.438235294
Variance	3.370775401	0.829099822
Observations	34	34
Pooled Variance	2.099937611	
Hypothesized Mean Difference	0	
df	66	
t Stat	1.087891792	
t Critical two-tail	1.996564396	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the difference in means in second grade ELA analysis was 1.0879. The critical value was 1.997. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a measurable difference in the overall cognitive thinking skills required of the MO GLEs in the content area of ELA in second grade and the CCSS in the content area of ELA in second grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B. Next, third grade was calculated (see Table 15).

Null Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs in the content area of ELA in third grade and the CCSS in the content area of ELA in third grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 15

T-Test: Two-Sample Assuming Equal Variances Grade 3 ELA

Point Estimate	CCSS ELA GRADE 3	MO CA GRADE 3 Value
Mean	2.885	2.82
Variance	3.417205128	0.451897436
Observations	40	40
Pooled Variance	1.934551282	
Hypothesized Mean Difference	0	
df	78	
t Stat	0.208996124	
t Critical two-tail	1.990847036	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the difference in means in third grade ELA analysis was 0.2090. The critical value was 1.991. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a measurable difference in the overall cognitive thinking skills required of the MO GLEs in the content area of ELA in third grade and the CCSS in the content area of ELA in third grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B. Next, fourth grade was calculated (see Table 16).

Null Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs in the content area of ELA in fourth grade and the CCSS in the content area of ELA in fourth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 16

T-Test: Two-Sample Assuming Equal Variances Grade 4 ELA

Point Estimate	CCSS ELA GRADE 4 Value	MO CA GRADE 4 Value
Mean	2.9875	2.8775
Variance	2.587275641	0.619737179
Observations	40	40
Pooled Variance	1.60350641	
Hypothesized Mean Difference	0	
df	78	
t Stat	0.388483281	
t Critical two-tail	1.990847036	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the difference in means in fourth grade ELA analysis was 0.3884. The critical value was 1.991. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a measurable difference in the overall cognitive thinking skills required of the MO GLEs in the content area of ELA in fourth grade and the CCSS in the content area of ELA in fourth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B. Next, fifth grade was calculated (see Table 17).

Null Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs in the content area of ELA in fifth grade and the CCSS in the content area of ELA in fifth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 17

T-Test: Two-Sample Assuming Equal Variances Grade 5 ELA

Point Estimate	MO CA GRADE 5 Value	CCSS ELA GRADE 5 Value
Mean	3.0075	2.9825
Variance	0.81250641	2.259429487
Observations	40	40
Pooled Variance	1.535967949	
Hypothesized Mean Difference	0	
df	78	
t Stat	0.090211921	
t Critical two-tail	1.990847036	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the difference in means in fifth grade ELA analysis was 0.0902. The critical value was 1.991. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a measurable difference in the overall cognitive thinking skills required of the MO GLEs in the content area of ELA in fifth grade and the CCSS in the content area of ELA in fifth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B. Next, first grade in the content area of MA was calculated (see Table 18).

Null Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs in the content area of MA in first grade and the CCSS in the content area of MA in first grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 18

T-Test: Two-Sample Assuming Equal Variances Grade 1 MA

Point Estimate	CCSS MA GRADE 1 Value	MO MA GRADE 1 Value
Mean	3.057142857	2.372
Variance	1.799571429	1.167933333
Observations	21	25
Pooled Variance	1.455041558	
Hypothesized Mean Difference	0	
df	44	
t Stat	1.918863895	
t Critical two-tail	2.015367547	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the difference in means in first grade MA analysis was 1.9189. The critical value was 2.0154. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a measurable difference in the overall cognitive thinking skills required of the MO GLEs in the content area of MA in first grade and the CCSS in the content area of MA in first grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B. Next, second grade was calculated (see Table 19).

Null Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs in the content area of MA in second grade and the CCSS in the content area of MA in second grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 19

T-Test: Two-Sample Assuming Equal Variances Grade 2 MA

Point Estimate	CCSS MA GRADE 2 Value	MO MA GRADE 2 Value
Mean	2.996153846	2.592307692
Variance	0.865184615	1.581538462
Observations	26	26
Pooled Variance	1.223361538	
Hypothesized Mean Difference	0	
df	50	
t Stat	1.316467724	
t Critical two-tail	2.008559072	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the difference in means in second grade MA analysis was 1.3165. The critical value was 2.009. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a measurable difference in the overall cognitive thinking skills required of the MO GLEs in the content area of MA in second grade and the CCSS in the content area of MA in second grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B. Next, third grade was calculated (see Table 20).

Null Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs in the content area of MA in third grade and the CCSS in the content area of MA in third grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 20

T-Test: Two-Sample Assuming Equal Variances Grade 3 MA

Point Estimate	CCSS MA GRADE 3 Value	MO MA GRADE 3 Value
Mean	2.885714286	2.746666667
Variance	1.090084034	1.852229885
Observations	35	30
Pooled Variance	1.440913076	
Hypothesized Mean Difference	0	
df	63	
t Stat	0.465567479	
t Critical two-tail	1.998340522	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the difference in means in third grade MA analysis was 0.4656. The critical value was 1.9983. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a measurable difference in the overall cognitive thinking skills required of the MO GLEs in the content area of MA in third grade and the CCSS in the content area of MA in third grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B. Next, fourth grade was calculated (see Table 21).

Null Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs in the content area of MA in fourth grade and the CCSS in the content area of MA in fourth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 21

T-Test: Two-Sample Assuming Equal Variances Grade 4 MA

Point Estimate	CCSS MA GRADE 4 Value	MO MA GRADE 4 Value
Mean	3.002857143	2.951515152
Variance	1.377344538	2.176325758
Observations	35	33
Pooled Variance	1.764729372	
Hypothesized Mean Difference	0	
df	66	
t Stat	0.159283279	
t Critical two-tail	1.996564396	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the difference in means in fourth grade MA analysis was 0.1593. The critical value was 1.9966. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a measurable difference in the overall cognitive thinking skills required of the MO GLEs in the content area of MA in fourth grade and the CCSS in the content area of MA in fourth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B. Next, fifth grade was calculated (see Table 22).

Null Hypothesis: There is no measurable *difference* in the overall cognitive thinking skills required of the MO GLEs in the content area of MA in fifth grade and the CCSS in the content area of MA in fifth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 22

T-Test: Two-Sample Assuming Equal Variances Grade 5 MA

Point Estimate	CCSS MA GRADE 5 Value	MO MA GRADE 5 Value
Mean	3.152777778	2.993548387
Variance	1.117992063	1.827290323
Observations	36	31
Pooled Variance	1.445360491	
Hypothesized Mean Difference	0	
df	65	
t Stat	0.540542492	
t Critical two-tail	1.997137887	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the difference in means in fifth grade MA analysis was 0.5405. The critical value was 1.9971. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a measurable difference in the overall cognitive thinking skills required of the MO GLEs in the content area of MA in fifth grade and the CCSS in the content area of MA in fifth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) in Appendix A and the Synonyms' List in Appendix B.

The researcher next checked for a relationship in overall cognitive thinking skills required of the MO GLEs and the CCSS in the content areas of ELA and MA in grades 1-

5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. The results are displayed starting with the content area of ELA beginning with first grade and then progressing to fifth grade followed by the display of test results in the content area of MA starting with first grade and then progressing to fifth grade. Each analysis begins with the hypothesis statement, the result of the calculated test, and the summary. As stated in chapter three, the MO DESE crosswalk (MO DESE, 2011b) was used to obtain the GLEs MO DESE matched with the CCSS. The cognitive value assigned using Appendix A and Appendix B for each pair was then analyzed. The researcher verified if there was a statistical relationship in overall paired cognitive values assigned to each objective from Table l and Appendix B in ELA and MA by grade-level using a calculated using PPMC. First grade in the content area of ELA was calculated (see Table 23).

Null Hypothesis: There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA first grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 23

PPMC Grade 1 ELA

Document	MO GLEs	CCSS
MO GLEs	1	
CCSS	-0.31029	1
df	18	
critical value	± 0.444	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the first grade analysis was -0.31029. The critical value was ± 0.444. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA first grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. Next, second grade was calculated (see Table 24).

Null Hypothesis: There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA second grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 24

PPMC Grade 2 ELA

Document	CCSS	MO GLEs
CCSS	1	
MO GLEs	0.35944	1
df	19	
critical value	± 0.433	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the second grade analysis was 0.35944. The critical value was ± 0.433. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA second grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. Next, third grade was calculated (see Table 25).

Null Hypothesis: There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA third grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 25

PPMC Grade 3 ELA

Document	CCSS	MO GLEs
CCSS	1	
MO GLEs	0.285085	1
df	29	
critical value	0.349	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the third grade analysis was 0.2851. The critical value was ± 0.349. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA third grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. Next, fourth grade was calculated (see Table 26).

Null Hypothesis: There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA fourth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 26

PPMC Grade 4 ELA

Document	CCSS	MO GLEs
CCSS	1	
MO GLEs	-0.28159	1
df	36	
critical value	±0.325	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the fourth grade analysis was -0.28159. The critical value was ±0.325. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA fourth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. Next, fifth grade was calculated (see Table 27).

> Null Hypothesis: There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA fifth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 27

PPMC Grade 5 ELA

Document	CCSS	MO GLEs
CCSS	1	
MO GLEs	-0.34813771	1
df	38	
critical value	±0.304	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the fifth grade analysis was -0.3481. The critical value was ±0.304. The null hypothesis was rejected. There is *sufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA fifth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. Next, first grade in the content area of MA was calculated (see Table 28).

> Null Hypothesis: There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of MA first grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 28

PPMC Grade 1 MA

Document	CCSS	MO GLEs
CCSS	1	
MO GLEs	0.081697	1
df	19	
critical value	0.433	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the first grade analysis was 0.0817. The critical value was ±0.433. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of MA first grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. Next, second grade was calculated (see Table 29).

Null Hypothesis: There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of MA second grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 29

PPMC Grade 2 MA

Column	CCSS	MO GLEs
CCSS	1	
MO GLE	0.328106	1
df	22	
critical value	±0.423	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the second grade analysis was 0.3281. The critical value was ±0.423. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of MA second grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. Next, third grade was calculated (see Table 30).

Null Hypothesis: There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of MA third grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 30

PPMC Grade 3 MA

Document	CCSS	MO GLEs
CCSS	1	
MO GLEs	-0.33365	1
df	22	
critical value	± 0.423	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the third grade analysis was -0.3337. The critical value was ±0.423. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of MA third grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. Next, fourth grade was calculated (see Table 31).

> Null Hypothesis: There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of MA fourth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 31

PPMC Grade 4 MA

Document	*CCSS*	*MO GLEs*
CCSS	1	
MO GLEs	-0.1679	1
df	31	
critical value	± 0.349	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the fourth grade analysis was -0.1679. The critical value was ± 0.349. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of MA fourth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. Next, fifth grade was calculated (see Table 32).

Null Hypothesis: There is no *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of MA fifth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Table 32

PPMC Grade 5 MA

Document	CCSS	MO GLEs
CCSS	1	
MO GLEs	0.00302	1
df	38	
critical value	±0.304	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the fifth grade analysis was 0.0030. The critical value was ± 0.304. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of MA fifth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy.

Summary

This chapter discussed the type of study investigated and the documents used for analysis. Two hypotheses were stated, tested, and analyzed. The results were displayed beginning with first grade and progressing to fifth grade in the content areas of first ELA and then MA for both hypothesis statements. When checking for a measurable *difference* in the overall cognitive thinking skills required of the MO GLEs and the CCSS in the content areas of ELA and MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy, the test results illustrated that there is no difference in means in grades 1-5 in both ELA and MA. When checking for a *relationship* between the overall cognitive thinking skills required of the MO GLEs and the corresponding CCSS in the content areas of ELA and MA in grades 1-5 as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy, only fifth grade ELA showed evidence of a cognitive relationship between the paired CCSS and GLEs as stated in the Missouri Crosswalk (MO DESE, 2011b). Chapter 5 will discuss reflections of the study and recommendations.

Chapter Five: Discussion

This quantitative content analysis study has measured the difference in the overall cognitive means between the MO GLEs and the CCSS within the content areas of ELA and MA, grades 1-5. This study has also checked for a relationship in cognitive skills within the content areas of ELA and MA, grades 1-5 between the paired CCSS and MO GLEs based on the Missouri Crosswalk. Both analyses were conducted comparing the cognitive language established by the Revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) and adapted by the researcher illustrated in Appendix A and Appendix B. The results of this study showed there was no statistical difference in average values between the MO GLEs and the CCSS within the content areas of ELA and MA, grades 1-5. The results also showed that there was no cognitive relationship between the paired CCSS and MO GLEs based on the Missouri Crosswalk for all grades in both ELA and MA with the exception of fifth grade ELA. This study demonstrated the level of cognitive process the curricula offers to students based on the Revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) adapted by the researcher illustrated in Appendix A and Appendix B and gave insight into the paired cognitive levels of both the CCSS and MO GLEs in the content areas of ELA and MA. Chapter 5 includes two extended analyses. The first extended analysis investigated a pattern in the assigned cognitive values of objectives conducted in the initial study. An interpretation of the results of this extended study with recommendations is given after the reporting of the results per grade level. The second extended analysis investigated the cognitive relationship between objectives labeled "direct" in the ELA Missouri Crosswalk. Interpretations and recommendations are given after the reporting of all grade levels.

Topics related to the study and the extended studies are divided into reflections and recommendations for teachers, curriculum builders and district leaders, state education leaders, and national education leaders followed by a conclusion.

Extended Studies

The result of the initial study showed no measurable difference in overall cognitive thinking skills between the MO GLEs and the CCSS. At the surface level, this test would contradict Carmichael et al.'s, (2010) and Porter et al.'s (2011) studies that generally viewed CCSS as a step-up from state curriculum. However, after reflecting on the analysis, the researcher noticed when assigning cognitive values, many GLE's were falling in the "3" range. The researcher decided to further investigate how the cognitive values are distributed within each cognitive range based on revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68). The following extended analysis on the frequencies of higher-level thinking objectives explained a short synopsis of methodology, results, and summary of the test. The researcher then reflected and interpreted the results in relation to the study's difference of the overall cognitive means results and made recommendations.

Frequency of higher-level objectives extended study. The researcher used a histogram frequency chart to display the cognitive values for each grade level. The researcher, reflecting on the division of lower and higher-level thinking skills according to Forehand (2005), decided to investigate how many objectives were in the highest three levels. The researcher applied Forehand's (2005) division of lower-level and higher-level thinking skills to Appendix A and decided that any objective value from 1.0-3.2 is considered lower-level thinking and any objective rated 4.0 or higher is considered higher-level thinking. After creating a frequency chart, the researcher tallied the number of objectives that were placed in the cognitive range that contained a "3" as the last number before the decimal point, commonly known as the "ones" place. For the purposes of this extended study, the researcher decided that any range that held a three in the ones place was evaluated as the "analysis" cognitive level. The researcher viewed the cut-off point as an estimate since the next range may include an objective that is rated with a cognitive value with a 3.1-3.2. A line placed in each table will indicate the cutoff point used for each analysis. In previous chapters, the researcher organized the results by content; however, in order for educators to have another perspective on the cognitive differences between the two documents, the researcher first displayed the results by grade level with ELA on the left and MA on the right. Due to the differences in the number of objectives per grade level, different amounts and bins may vary across grade levels; however, the size of the bin *within* the content area and grade level is the same for both the CCSS and the MO GLE for comparing purposes. The results for grade 1 ELA and MA are displayed in Table 33.

Table 33

Frequency of Higher-level Objectives Grade 1

ELA				MA			
CCSS		MO GLEs		CCSS		MO GLEs	
Bin	Frequency	Bin	Frequency	Bin	Frequency	Bin	Frequency
0	3	0	2	0	1	0	3
1.26	6	1.26	5	1.5	0	1.5	2
2.52	10	2.52	4	3	14	3	19
3.78	14	3.78	22	4.5	4	4.5	1
5.04	1	5.04	0	More	2	More	0
More	1	More	2		6		1
	2		2				

Table 33 illustrates that there is the same number of higher-level thinking objectives in grade 1 ELA and there are 5 more higher-level thinking objectives in CCSS MA than in MO GLEs. It is worth noting that there are more opportunities in the “analysis” range in the Missouri GLE’s in both MA and ELA than in the CCSS; however, it is also important to note that there are more GLE's then CCSS. When comparing the organizational structure in grade 1 in the GLEs to CCSS, it is important to note that the CCSS MA included fewer objectives on data and measurement and more objectives in operations, algebraic thinking, and numbers than compared to MO GLEs; MO GLEs included probability in the same category as data (see chapter 3 for details).

Grade 1 recommendations. As a grade 1 instructor, this information may be helpful in recognizing more change in higher-level thinking objectives in MA and a shift in a particular area of MA content focusing more on number, operations, and algebra when adjusting instruction and gathering resources. It may also be helpful to a grade 1 instructor to recognize that the CCSS ELA content area will have the same number of higher-level thinking opportunities as the past curriculum and may not require as much adjustment in instruction or resources from past curriculum. The results for grade 2 ELA and MA is displayed in Table 34.

Table 34

Frequency of Higher-level Objectives Grade 2

ELA				MA			
CCSS		MO GLEs		CCSS		MO GLEs	
Bin	Frequency	Bin	Frequency	Bin	Frequency	Bin	Frequency
0	4	0	2	1.1	1	1.1	4
1.26	4	1.26	4	2.1	3	2.1	1
2.52	8	2.52	9	3.1	17	3.1	18
3.78	10	3.78	18	4.1	4	4.1	1
5.04	2	5.04	1	5.1	0	5.1	1
More	6	More	0	More	1	More	1
	8		1		5		3

Table 34 illustrates that there are more higher-level thinking objectives in grade 2 ELA and MA in the CCSS than MO GLEs with 7 more objectives in CCSS ELA and 2 more in CCSS MA. When exploring the organizational structure of the MO GLEs, grade 2 holds the least number of reading objectives compared to other MO GLEs grade levels in the study and this may account for the relative greater difference in the number of higher-level thinking opportunities compared to the CCSS (see chapter 3 for details) than in grade 1. The organizational structure in grade 2 in the GLEs also reveals that compared to CCSS, the CCSS MA included more objectives on data and measurement and the same number of objectives in number, operations, and algebra than compared to MO GLEs (see chapter 3 for details); the difference between the number of higher-level thinking opportunities MA CCSS and MA GLEs is fewer in grade 2 than grade 1. In both content areas, MO GLE's have more objectives listed in the "analysis" cognitive level.

Grade 2 recommendations. Since the difference in number of higher-level thinking opportunities is greater in ELA, the researcher believes that a greater change in instruction and resources may be needed in the ELA content area for a second grade teacher than in grade 2 MA. The results for grade 3 ELA and MA is displayed in Table 35.

Table 35

Frequency of Higher-level Objectives Grade 3

ELA				MA			
CCSS		MO GLEs		CCSS		MO GLEs	
Bin	Frequency	Bin	Frequency	Bin	Frequency	Bin	Frequency
0	6	0	1	1.1	1	1.1	3
1.05	0	1.05	0	2.1	9	2.1	3
2.1	3	2.1	1	3.1	19	3.1	19
3.15	22	3.15	35	4.1	4	4.1	1
4.2	1	4.2	2	5.1	0	5.1	2
5.25	2	5.25	1	More	2	More	2
More	6	More	0		6		5
	9		3				

Table 35 illustrates that there are more higher-level thinking objectives in grade 3 ELA and MA in the CCSS with 6 more objectives in CCSS ELA and 1 more in CCSS MA. Overall, in both CA and MA, the MO GLEs have more objectives in grade 3 than in the previous grades with the exception of Listening and Speaking and algebra. There are more numbers, operations, and algebra objectives combined in the CCSS MA than in the MO GLEs MA when including the objectives in the category of Number & Operations-Fractions that begins in grade 3 and continues through grade 5. There are also fewer objectives in measurement and data combined categories in the MO GLEs MA than in the CCSS MA. The difference of higher-level thinking opportunities in MA GLEs compared to CCSS was greater than grade 1 than in grade 2 with grade 1 offering fewer objectives in the number, algebra, and operations combined areas than CCSS and grade 2 offering the same number of objectives as CCSS MA in number, algebra, and operations.

In grade 3, MA GLEs offered fewer number, algebra, and operation objectives than the CCSS, yet continued the pattern of narrowing the difference in higher-level thinking opportunities than in previous grades. MO GLE's have more objectives listed in the "analysis" cognitive level in ELA when compared to the CCSS, but the same number in the MA.

Grade 3 recommendations. A MO third grade instructor may see more objectives in the content areas of number, operations, and algebra area when including the objectives in the category of Number & Operations-Fractions and may need to adjust resources. A MO third grade instructor may also see more MA objectives that are of higher cognitive levels being offered than in the past and may need to adjust instruction to meet the demand. The results for grade 4 ELA and MA are displayed in Table 36.

Table 36

Frequency of Higher-level Objectives Grade 4

ELA				MA			
CCSS		MO GLEs		CCSS		MO GLEs	
Bin	Frequency	Bin	Frequency	Bin	Frequency	Bin	Frequency
0	3	0	0	1.1	1	1.1	4
1.05	0	1.05	0	2.1	6	2.1	2
2.1	6	2.1	4	3.1	23	3.1	19
3.15	22	3.15	32	4.1	0	4.1	3
4.2	2	4.2	2	5.1	2	5.1	1
5.25	2	5.25	1	More	3	More	4
More	5	More	1		5		8
	9		4				

Table 36 illustrates that there are 5 more higher-level thinking objectives in the CCSS in ELA than the GLEs. In MA, there are 3 more higher-level thinking objectives in the GLEs than in the CCSS. MO GLEs have more objectives listed in the "analysis" cognitive level in ELA, but fewer in the MA compared to the CCSS. The pattern established in grade 1 through grade 3 of increased higher-level thinking objective in CCSS than MO GLEs correlating with the increasing focus in of number, algebra, and operations objectives does not fit in grade 4 since there are more higher-level thinking opportunities offered in the MO GLEs and the MO GLEs has an increased focused on measurement and data. There is a greater difference between CCSS and MO GLEs ELA in grade 3 than in grade 4.

Grade 4 recommendations. Although grade 4 MA GLEs had the same number of objectives in number, algebra, and operations as grade 3 and grade 5 MA GLEs, it does contain more measurement and data objectives than any other grade (see chapter 3) and teachers may need to adjust resources. Grade 4 MA teachers may not experience the pressure to dramatically shift instruction to meet an increased amount of higher cognitive levels compared to other grade level teachers since is the only grade level to have more higher-level objectives than CCSS. CCSS MA grade 4 contains the least number of number, algebra, and operations objectives compared to other CCSS MA grades; however, there are still more number, algebra, and operations in CCSS MA than in MO GLEs MA therefore resources may need to be adjusted. The results for grade 5 ELA and MA are displayed in Table 37.

Table 37

Frequency of Higher-level Objectives Grade 5

ELA				MA			
CCSS		MO GLEs		CCSS		MO GLEs	
Bin	Frequency	Bin	Frequency	Bin	Frequency	Bin	Frequency
0	3	0	1	2	1	2	4
1.05	0	1.05	0	2.72	10	2.72	13
2.1	6	2.1	1	3.43	17	3.43	6
3.15	22	3.15	31	4.15	4	4.15	2
4.2	2	4.2	3	4.87	0	4.87	1
5.25	3	5.25	4	5.58	2	5.58	3
More	4	More	0	More	2	More	2
	9		7		8		8

Table 37 illustrates that there are 2 more higher-level thinking objectives in the CCSS in grade 5 ELA than the GLEs. In MA, there is the same number of higher-level thinking objectives in the GLEs as in the CCSS. MO GLEs have more objectives listed in the "analysis" cognitive level in ELA, but fewer in the MA compared to the CCSS. MO GLEs in grade 5 offered more writing and reading objectives than any other MO GLEs grade level, while CCSS grade 5 offered the same number in all ELA areas as grade 4 except for one additional writing subset and two fewer language subsets (see chapter 3).

Grade 5 recommendations. Since the gap between the differences in number of higher-level thinking objectives narrowed more in grade 5 than in grade 4 when comparing the ELA CCSS and MO GLEs, then adjustment for resources and instruction may be less for a grade 5 teacher than a grade 4 teacher. A grade 5 MA teacher may have less adjustment than any other grade level since the MO GLEs offered the same amount of higher-level thinking opportunities as the CCSS. A summary in Table 38 displayed the number of higher-level thinking objectives for each grade level (see Table 38).

Table 38

Numbers of Higher-level Objectivesby Grade

ELA			MA		
Grade	CCSS	GLE	Grade	CCSS	GLE
Grade 1	2	2	Grade 1	6	1
Grade 2	8	1	Grade 2	5	3
Grade 3	9	3	Grade 3	6	5
Grade 4	9	4	Grade 4	5	8
Grade 5	9	7	Grade 5	8	8

The researcher noticed in Table 38 an increased number of higher-level thinking objectives in the MO GLEs with the exception of grade 1 ELA and Grade 5 MA (grade 5 is the same number as grade 4). The researcher did not find a similar increasing pattern in the number of higher-level thinking objectives in the CCSS. Instead, the researcher noticed that most grades in ELA are in the range of 8-9 with the exception of grade 1 and in MA most grades are in the range of 5-6 with the exception of grade 5. A possible reason for this is that curriculum language has changed from revised Bloom's taxonomy more so in MA than in ELA or MA may rely more heavily on examples that were excluded from this study to convey higher-level cognitive demand than the standard itself. Another possibility is ELA offers more higher-level thinking objectives. Although there is an increase from grade 1 CCSS ELA of two higher-level thinking objectives to grade 5 with nine higher-level thinking objectives, the increase from grade level to grade level is not present. In the CCSS MA, there is a pattern of a decreased number of higher-level thinking objectives followed by an increase; the researcher expected an increase in higher-level thinking opportunities in CCSS MA in the higher elementary levels since the structure of the CCSS document included Number & Operations-Fractions category starting in grade 3. The researcher noticed a correlation between the increased number of higher-level thinking objectives and an increased focus on number, algebra, and operations objectives, in CCSS in lower level elementary. The researcher began the frequency of higher-level objectives extended analysis due to an observation of assigning many objectives within the analysis range for the Missouri GLE's and caused the researcher to wonder how many objectives were in the higher-level thinking categories. By consequence, this extended analysis not only confirmed the observation that the researcher made during this study with the exception of grade 3-5 MA, but also revealed that of all the grade levels in both ELA and MA included in this study 70% showed CCSS as having more higher-level thinking objectives than the MO GLE's. This confirms Carmichael et al. (2010) and Porter et al. (2011) studies that generally viewed CCSS as an improvement from state curriculum.

ELA direct relationship extended study. During the analysis of the initial study, the researcher noticed a difference between the two content areas for the Missouri Crosswalk used in the study. The MA crosswalk paired every CCSS with corresponding MO GLEs with only a partial alignment or no alignment, whereas the ELA crosswalk paired the corresponding MO GLEs with one of the following: a partial, a direct, aligns-with-multiple-GLEs, or no alignment. The MO ELA crosswalk also listed a reason for the alignment whereas the MA crosswalk did not. The MA crosswalk did bold and italicized print font to show differences between GLEs and CCSS. Upon reflecting on the results of the study’s overall cognitive relationship between the CCSS and MO GLEs, the researcher wondered if the corresponding ELA GLEs and CCSS labeled “direct” alignment would show any relationship. In order to test the hypothesis, the researcher sorted original data and calculated a PPMC using the whole population labeled “direct” alignment from grades 1-5 in the ELA content area starting with grade 1 (see Table 39).

Table 39

Grade 1 ELA Direct Alignment

	Column 1	Column 2
Column 1	1	
Column 2	0.224941	1
d.f.	60	
critical value	0.25	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the first grade analysis was 0.224941. The critical value was 0.25. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the “direct” corresponding CCSS in the content areas of ELA first grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom’s taxonomy. The researcher believes that the result of finding no relationship between the MO GLEs and the “direct” corresponding CCSS in the content areas of ELA first grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom’s taxonomy strengthens the result that no relationship was found between the overall cognitive thinking skills required of the MO GLEs and the CCSS in the content areas of ELA in first grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom’s taxonomy. Next, grade 2 was calculated (see Table 40).

Table 40

Grade 2 ELA Direct Alignment

	Column 1	Column 2
Column 1	1	
Column 2	0.14870895	1
d.f.	62	
critical value	0.25	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the second grade analysis was 0.14870895. The critical value was 0.25. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the “direct” corresponding CCSS in the content areas of ELA second grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom’s taxonomy. The researcher believes that the result of finding no relationship between the MO GLEs and the “direct” corresponding CCSS in the content areas of ELA second grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom’s taxonomy strengthens the result that no relationship was found between the overall cognitive thinking skills required of the MO GLEs and the CCSS in the content areas of ELA in second grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom’s taxonomy. Next, grade 3 was calculated (see Table 41).

Table 41

Grade 3 ELA Direct Alignment

	Column 1	*Column 2*
Column 1	1	
Column 2	0.24138688	1
d.f.	50	
critical value	0.273	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the third grade analysis was 0.24138688. The critical value was 0.273. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the "direct" corresponding CCSS in the content areas of ELA third grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. The researcher believes that the result of finding no relationship between the MO GLEs and the "direct" corresponding CCSS in the content areas of ELA third grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy strengthens the result that no relationship was found between the overall cognitive thinking skills required of the MO GLEs and the CCSS in the content areas of ELA in third grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom's taxonomy. Next, grade 4 was calculated (see Table 42).

Table 42

Grade 4 ELA Direct Alignment

	Column 1	Column 2
Column 1	1	
Column 2	0.343092	1
d.f.	58	58
critical value	0.25	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the fourth grade analysis was 0.343092. The critical value was 0.25. The null hypothesis was rejected. There is *sufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the “direct” corresponding CCSS in the content areas of ELA fourth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom’s taxonomy. The researcher believes that the result of finding evidence of a relationship between the MO GLEs and the “direct” corresponding CCSS in the content areas of ELA fourth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom’s taxonomy do not strengthen the result that no relationship was found between the overall cognitive thinking skills required of the MO GLEs and the CCSS in the content areas of ELA in fourth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom’s taxonomy. Next, grade 5 was calculated (see Table 43).

Table 43

Grade 5 ELA Direct Alignment

	Column 1	Column 2
Column 1	1	
Column 2	0.5101337	1
d.f.	87	
critical value	0.205	

The alpha level of .05 was used and resulted in a significance level of 95%. The test value for the third grade analysis was 0.5101337. The critical value was 0.205. The null hypothesis was not rejected. There is *insufficient* evidence to support the claim that there is a relationship between the overall cognitive thinking skills required of the MO GLEs and the “direct” corresponding CCSS in the content areas of ELA fifth grade as measured by a numerically-scaled comparison to the language defined by the revised Bloom’s taxonomy. When checking for a relationship between the overall cognitive skill level required of the CCSS grade 1-5 ELA and the overall cognitive skill level required of the "direct" corresponding MO GLEs grades 1-5 ELA, only fourth grade had sufficient evidence of a relationship. The researcher cannot offer a reason why the “direct” alignment in grade 4 showed a relationship while other grades did not, but would recommend further analysis of this result. Perhaps, the reason why grade 4 appeared to show a relationship in the extended study and grade 5 showed a relationship in the initial study, depended on how MO DESE categorized the relationship of the CCSS with the paired MO GLEs. Future studies may investigate if a portion of the objectives that were not labeled as “direct” had more of a direct relationship than the “direct” labeled objectives since the sample size from the extended study differed from the whole population of the initial study. With only 20% of the “direct” alignment showing a cognitive relationship, the researcher confirms that the "direct" alignment test results overall strengthens the results of initial study.

Reflections and Recommendations

When reflecting on the extended analysis of frequencies of higher-level thinking objectives results in relation to the overall cognitive difference in means results, the researcher believes that the appearance of contradictory results when comparing both test results show a paradox. The paradox is that at first glance the CCSS and MO GLEs may look very similar as indicated by the overall cognitive level showing no difference in means; however, the extended analysis of cognitive frequencies revealed that generally there are more higher-level thinking objectives in the CCSS than the MO GLEs. The researcher, as part of a district curriculum writing team, experienced this paradox. When writing curriculum, the researcher, at first glance, reviewed a grade 1 ELA standard that required students to describe (2.3 cognitive value) characters and confirmed that the stated objective was exactly how the researcher instructed current students that followed the MO GLEs; however, after a more careful analysis the researcher realized that the MO GLEs only required identification (1.1 cognitive value) of characters. Although the researcher was disheartened that the difference was not noted in the researcher's initial observation, it was that experience that not only revealed how easily it is for an educator to believe the documents are the same, but it also revealed how important it is for educators to spend time discovering the differences. Although the initial study showed only a cognitive relationship in the Missouri Crosswalk in grade 5 ELA, the document did note the differences between the two grade 1 ELA objectives (MO DESE, 2011c). The extended studies as well as the researcher's own experience revealed the paradox of educators believing that CCSS and MO GLEs are the same at first glance, yet a closer analysis is beneficial in discovering the differences.

Teachers, curriculum builders, and district leaders. The extended study of the frequencies of higher-level thinking objectives illustrated that CCSS, in general, contains more higher-level thinking objectives that educators must convey to students. By offering more opportunities for higher-level thinking in CCSS, the researcher believes instruction must also change to prepare students with 21st century skills; as stated in Chapter 2, Fox's (2011) study shows that not all educators are confident in teaching 21st century skills such as higher-level thinking. For this reason, the researcher recommends to all educators to carefully examine both documents for the differences to adjust instruction.

For educators and curriculum builders, CCSS may be a shift in curriculum thinking that each grade level should increase in the number of higher-level thinking objectives. In the CCSS ELA, a second grader is offered nearly the same number of higher-level thinking objectives as a fifth grader. In the CCSS MA, a first grader is offered a greater number of higher-level thinking objectives than a fourth grader. A fourth-grade teacher, knowing that fewer higher-level thinking objectives are offered in CCSS MA as compared to the MO GLEs, may choose to supplement in this content area in order to reach the same number of higher-level thinking opportunities of the past.

It is the researcher's hope that by educators knowing the differences between past and present curricula, each educator can adjust instruction to provide more higher-level thinking opportunities for students. Since the written curriculum is not the only piece in providing higher-level thinking opportunities for students, it is important for administrators and educational leaders to provide ample amount of time and professional development for teachers and learning how to instruct higher-level thinking objectives.

State education leaders. Although both the initial study and the ELA direct relationship extended study suggested no cognitive relationship between the CCSS and the corresponding MO GLE according to the Missouri Crosswalk (with the exception of grade 4 “direct”); the document would be strengthened with a few changes. As stated in chapter 2, the Missouri Crosswalk was created based on Webb’s study (Hoge, 2011), yet the document does not list the DOK level of both the MO GLEs and the corresponding CCSS. In Webb’s (1999) study, in essence the experts first gave a DOK level for each of the standards in each document examined and for each of the assessment items for that particular standard to measure the alignment to each other. It is recommended that the DOK levels for both the Missouri GLE's and the CCSS are listed in the Missouri Crosswalk. This would give teachers more information on understanding the cognitive differences between the paired MO GLEs to the CCSS. By listing the DOK level, perhaps educators can better deduce if the paired objectives were matched with more emphasis on the content, cognitive level, or both evenly. This information may help teachers in forming lessons, adjusting instruction, and gathering resources.

Although MA bolds and italicizes the words in the MO GLE that corresponded with the CCSS, the ELA Missouri Crosswalk lists the reason for the stated alignment to define the connection between the two documents. For example, in the ELA Missouri Crosswalk grade 1, one “partial alignment” (MO DESE, 2011b, p. 6) pairing explained that the CCSS “requires a description of key ideas” (MO DESE, 2011b, p. 6), while the GLE requires only “identification” (MO DESE, 2011b, p. 6). In an example of the MA

Missouri Crosswalk grade 1, “compose or decompose whole numbers up to 20 using multiple strategies” (MO DESE, 2011b, p. 2) a portion of a MO GLE is bold and italicized to indicate that only this part of the whole GLE corresponds to the “relate counting to addition and subtraction” CCSS (MO DESE, 2011b, p. 2). The MO MA Crosswalk lists nearly all of the GLEs as a partial alignment or no alignment; because no direct alignment was found, or perhaps was not stated, the MA Crosswalk data was not investigated for a “direct” corresponding relationship. Although it is understood by the researcher that the content areas differ in nature, it is recommended that the two content area Crosswalks match in the structure of reporting. For an elementary teacher responsible for teaching both ELA and MA, using the same reporting structure for both documents may improve understanding and time efficiency. In reflecting on the researcher’s experience in curriculum writing, the grade 1 ELA MO Crosswalk listed the difference between “identify” and “describe” in the explanation column that helped the researcher better understand the difference between the two curricula (MO DESE, 2011b, p. 1). Although the structures in reporting the details of the alignment differ in content areas, the researcher believes that explanations in the MO Crosswalk can be valuable information to curriculum builders and teachers in understanding the connections between the corresponding objectives.

National education leaders. The researcher began the extended frequency study due to a pattern in how the values were gathering around the mid-range level for MO GLEs but not necessarily in the CCSS; yet, paradoxically both documents had no difference in averages. If within the CCSS document, more objectives fell within the higher-level thinking range and fewer within the lower-level thinking, then the results may have proven to show a cognitive difference in means between the CCSS and the MO GLEs. After reflecting on this paradox, the researcher questioned why CCSS has an average in the cognitive mid-range when higher-level thinking in important in developing a 21st century learner. Perhaps, the authors of the CCSS believed that by offering lower-level thinking objectives students are exposed to an array of situations that better prepare them or possibly that lower-level skills are needed to obtain higher-level skills. Future studies may investigate if the mid-range average of CCSS is effective in preparing students with the higher-level skills needed for the 21st century.

Although this study was limited to the MO GLEs, other states may use this analysis as an example in order to evaluate the differences between their previous state curriculum and the CCSS in order to adjust instruction. When reflecting on the methodology used in this study, the researcher believes that it would be beneficial to extend Appendix B to include other synonyms taken from a variety of resources instead of one online source. Although much effort was given in avoiding the NRBL category, perhaps by using even more sources the category can be eliminated altogether. Another suggestion is to use a team of raters instead of one person to save time; if a team of raters is gathered in future studies, then the chi-square goodness of fit test may not be as applicable. The researcher recommends extending the study to include K-12, other states, and possibly other CCSS content areas if developed, to confirm or offer more insight into the cognitive differences between the CCSS and MO GLEs. Unlike Porter et al.'s (2011) study, this study did not examine the content of the objective thoroughly; however, with a noticeable pattern established in organizational structure in lower level elementary, the researcher recommends future studies conducting an in-depth analysis.

The paradox of the initial study showing no difference in means between the CCSS and the MO GLEs and the extended frequency study showing more higher-level thinking opportunities in CCSS than in the MO GLES may illustrate the complicated nature of curriculum language that the revised Bloom's Taxonomy (Anderson & Krathwohl, 2001) tried to capture. It was Anderson and Krathwohl (2001) who argued that by taking a difficult concept and putting it into a framework or structure, there can be disconnection since it is essentially taking something very abstract and making it concrete.Because this study was based on the researcher's adapted Revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) and this study used the Missouri Crosswalk that was created based on Webb's (1999) depth of knowledge (Hoge, 2011), it is important to discuss these frameworks in relation to Hess et al.'s (2009) study. As stated in Chapter 2, Hess et al.'s (2009) study blended both Bloom's and Webb's model. Because content, cognition, and processing time are accounted for in Webb's (1999) model, using the adapted revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) may deepen the level of educators' understanding in the area of cognition in both the CCSS and MO GLEs. This study categorized only the verb. The researcher's adapted and revised Bloom's Taxonomy does not take into account the content of an objective since in the Revised Bloom's Taxonomy the content of an objective is reflected in the noun (Anderson & Krathwohl, 2001). The researcher believes that by using the adapted revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) to evaluate the MO Crosswalk that was based on Webb's (1999) DOK, this study may bring another perspective to integrating the two models that Hess et al.'s study only began. As mentioned in chapter 2, the SMARTER Balanced policy coordinator referred to using both models when constructing assessments (Riddile, 2012); understanding the implications of blending the two cognitive models could be further explored in future educational research. Future studies may involve using Hess et al.'s (2009) model or include the noun in the analysis.

When reflecting on the process of how the SMARTER balance consortium is constructing the assessment piece, it is worth noting that because standards contain so many parts, not all parts are considered by experts as testable (SBAC, 2012a). The researcher wonders that if after sorting the testable part from the standard, the test developers will examine the cognitive ability of the testable part compared to the whole standard in effort to avoid disconnect. The researcher reasons that it would be erroneous to assume that if children master the lower level cognitive piece, then they have also mastered the higher cognitive level standard from which that the piece originated. The researcher recommends careful cognitive analysis of the assessments. Although having two consortiums developing different ways to assess the CCSS may bring different perspectives in developing CCSS assessments, the researcher hopes that this will not cause a divide in education. The researcher fears that after time, effort, and money are invested in developing two ways, neither consortium will want to abandon their respective practice. The research recommends all educators learn about both consortiums' processes to be better prepared to engage in the ensuing discord.

As stated in the researcher's background section of chapter 1, a colleague of the researcher mentioned that higher-level thinking opportunities should not be presented in lower-level elementary school curriculum. This study suggests that CCSS may increase the exposure to high cognition learning experiences among lower-level elementary grades. Although the researcher found it surprising that the CCSS did not offer even more higher-level thinking objectives, the benefit of the CCSS is that for the first time in U.S. history, educators are beginning to have conversations across states about curriculum in ways that did not exist in the past. In the researcher's own experience, a colleague explained that the lesson plans she used to implement a standard had been developed by a teacher in another state. Although the researcher does not view the CCSS as a "cure all" to the U.S. education, the researcher is excited at the potential national conversations in which educators will now be able to participate.

Conclusion

This quantitative content analysis study measured the difference in the overall cognitive means within the content areas of ELA and MA, grades 1-5 between the MO GLEs and the CCSS and found there was no measurable difference between the cognitive averages in both content areas in all grade levels included in this study. This study also investigated a relationship between cognitive skills within the content areas of ELA and MA, grades 1-5 between the paired CCSS and MO GLEs based on the Missouri Crosswalk and found no cognitive relationship between the paired CCSS and MO GLEs for all grades in both ELA and MA with the exception of fifth grade ELA. Both analyses were conducted comparing the cognitive language established by the Revised Bloom's Taxonomy (Anderson & Krathwohl, 2001, pp. 67-68) adapted by the researcher and illustrated in Appendix A and Appendix B. With curriculum influencing students' academic success (Fletcher, 2009; Schmidt et al., 2001; U.S. DOE, Institute of Education Sciences, 2010) and jobs for the 21st century demanding higher-level skills (Brandt, 2010; The Partnership for 21st Century Skills, 2008; Teach For America, 2011), it is important to examine both state curriculum (in the form of Missouri Grade-Level expectation) and the CCSS for differences in cognitive processes (Hoge, 2011; Porter et al., 2011). After an exhaustive literature review, the researcher found no studies conducted on comparing the two curricula with the cognitive language defined by the revised Bloom's taxonomy (Anderson & Krathwohl, 2001, pp. 67-68). The researcher believes that this study informed educational leaders that there is no difference in the cognitive *averages* between the MO GLEs and the CCSS per grade level and therefore can easily give the illusion, if not for the frequency of higher-level thinking extended study, that there is no difference in higher-level thinking opportunities presented.

This study also gave insight into MO Crosswalk paired CCSS and MO GLEs showing only a cognitive relationship in grade 5. This result included all paired objectives. By labeling the objectives as a "partial" alignment without giving cognitive descriptors, teachers are unaware if the partial alignment was given more based on content rather than cognitive levels and may be confusing in planning adjustments in instruction. This study's result showed that the majority of grade levels in the Missouri Crosswalk are not paired cognitively using the adapted and revised Bloom's taxonomy. In essence, when adjusting instruction based on the paired objectives, only grade 5 ELA teachers may find the Missouri Crosswalk helpful since it was the only grade level to show a cognitive relationship. Teachers might use this study as an example of how to evaluate the cognitive values of each objective to better understand the differences in each paired objective when using the Missouri Crosswalk.

The study also included two extended studies. The frequency of higher-level thinking language extended study showed a contraction of the initial study by illustrating that CCSS have more higher-level thinking opportunities when analyzing all higher-level thinking objectives in both the CCSS and the MO GLEs. The ELA direct relationship extended study revealed that only one grade level in the “direct” group of the ELA content area of the MO Crosswalk showed evidence of a relationship. In other words, when adjusting instruction based on the objectives labeled “direct”, only grade 4 ELA teachers may find the Missouri Crosswalk helpful since it was the only grade level to show a cognitive relationship. Both the initial study and the extended studies illustrated the complicated paradox that educators face in moving towards CCSS implementation. The results of the study begin to close the gap in knowledge on the topic by revealing this paradox and offering insight into the differences between the MO GLEs and the CCSS.

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Appendix A
Cognitive Categories and Language

Cognitive Process	Possible Verbs Used
1.0 Remember- retrieve relevant knowledge from long-term memory	1.1 recognize- identify, locate 1.2 recall- retrieve
2.0 Understand- construct meaning from instructional messages, including oral, written, and graphic communication	2.1 interpret- clarify, paraphrase, represent, translate, change 2.2 exemplify- illustrate, instantiate, find or give examples of 2.3 classify-categorize, subsume, determine something belongs to a category, classify, describe category 2.4 summarize-abstracting a general theme or major points, generalizing 2.5 inferring- concluding, extrapolating, interpolating, predicting, drawing a logical conclusion 2.6 comparing- contrasting, mapping, matching, detecting correspondences between two ideas, compare 2.7 explain- constructing models such as cause-and-effect
3.0 Apply- carry out or use a procedure in a given situation	3.1 execute-carry out a procedure, applying a procedure 3.2 implement- using (in context of implementing a procedure in an unfamiliar task)
4.0 Analyze- break materials into parts and determine how the parts relate	4.1. differentiate- discriminate, distinguish, focus, select 4.2 organize-finding coherence, integrate, outline, parsing, structure, determine how elements fit or function within a structure 4.3 attribute-deconstruct, determining point of view, bias, values, or intent underlying presented material
5.0 Evaluate - make judgments based on criteria and standards	5.1 check -coordinate, detect, monitor, test, detect inconsistencies or fallacies within a process or product, determine whether a process or product has internal consistency, determine the effectiveness of a procedure as it is implemented, determine if a scientist's conclusions follow from observed data 5.2 critique-judging, detect inconsistencies between a product and external criteria, determine whether a product has external consistency, determine the appropriateness of a procedure for a given problem
6.0 Create -put elements together to form a coherent or functional whole; we organize elements into a new pattern or structure	6.1 generate-hypothesize, coming up with alternative hypothesis based on criteria 6.2 plan-design, devise a procedure for accomplishing some task 6.3 produce-construct, invent a product

Adapted from Anderson & Krathwohl (2001, pp. 67-68) revised Bloom's taxonomy

Appendix B
Synonyms' List

Code	Word or phrase	Synonyms
Remember		
1.1	recognize	assimilate, catch, catch onto, cognize, conceive, decipher, decode, discern, get, grasp, know, make, make out, perceive, recognize, see, seize, sense, absorb, take in, realize, to have a clear idea of
	identify	to find out, establish the identity of, distinguish, pinpoint, single out, diagnose, determine, find, locate, pick out, place, spot, check, examine, inspect, investigate, notice, observe, scrutinize, disclose, discover, reveal, to think of in combination, connect, correlate, identify, link, relate, compare, equate, liken; group, join, lump together, tie together, tie
	locate	to come upon after searching, study, effort, ascertain, descry, detect, hit on, hit upon, hunt down, hunt up, learn, run down, scout, track down, turn up, sight, look for, search for, search out, seek
1.2	recall	recalling, remembered, recall, recollection, reminder, association, calling, to bring back to mind, recollect, reproduce, think of, recapture, recur, educe, elicit, evoke, extract, raise, remind, relive
	retrieve	to get again, get back, reacquire, reclaim, recoup, regain, repossess, retake, retrieve, recruit, replenish, redeem
Understand		
2.1	interpret	to make plain, make understandable, clarify, clear, clear up, construe, demonstrate, explicate, expound, get across, illuminate, illustrate, interpret, simplify, spell out, unriddle, analyze, break down, undo, unravel, unscramble, resolve, solve; define, specify, annotate, commentate, present a portrayal, present a performance, interpret, perform, play, portray, depict, dramatize, render, represent; act out, enact, pantomime, playact, role-play, take on, imitate
	clarify	filter, process, rectify, refine, screen, sieve, sift, demystify
	paraphrase	express in different words, rephrase, restatement, restate, reword, translate, translation, rehash, abstract, recap, recapitulate, reiteration, summary, reiterate, boil down, summarize, sum up
	represent	to point out the chief quality, character, describe, categorize, classify, indicate, name, individualize, mark, particularize, to present a picture of, image, delineate, describe, document, outline, sketch, show, diagram, epitomize, materialize, objectify, personalize, personify, exemplify
	translate	restate, reword, beget, bring, bring about, bring on, catalyze, cause, create, do, draw on, effectuate, generate, induce, invoke, produce, prompt, result in, translate, translate into, work, yield, conduce to, contribute to, decide, begin, establish, found, inaugurate, initiate, innovate, institute, introduce, launch, pioneer, set, set up, start, advance, cultivate, develop, encourage, forward, foster, further, nurture, promote, turn out
	change	the act of making different, process of making different, making different, alteration, difference, modification, redo, remake, remodel, revamp, review, revise, revision, rework, variation, correction, rectification, reform, conversion, deformation, distortion, metamorphosis, mutation, transfiguration, transformation; fluctuation, shift, displacement, replace, substitute, adjustment, modulation, regulation, redesign, change, to make different, alter, make over, modify, recast, vary, deform, metamorphose, mutate, regenerate, revolutionize, transfigure, transform, convert, exchange, retool, fluctuate, switch, trade, interchange; displace, replace, supersede; cede, surrender, reciprocate

Appendix B
Synonyms' List (continued)

2.2	exemplify	make clear by using examples, instance, adduce, cite, mention, quote, explain, edify, elucidate, enlighten, detail, enumerate, list
	illustrate	pictorialize, picture, visualize
	instantiate	to represent in visible form, express, externalize, incarnate, incorporate, instantiate, substantiate, actualize, concretize, symbolize, typify
2.3	classify	arrange, assign according to type, assort, codify, compartment, compartmentalize, distribute, grade, range, rank, relegate, separate, sort, types, array, dispose, draw up, order, organize, systematize, alphabetize, catalog, file, index, refer, clump, cluster, colligate, recategorize, reclassify, regroup, subcategorize, put into a particular arrangement, arrange, array, dispose, draw up, lay out, range, make up, align, line, line up, file, hierarchize, prioritize, sequence; emplace, set; display, map out, map, set out
	categorize	
	subsume	to have as part of a whole, comprehend, encompass, comprise, compose, constitute, form, integrate
	determine something belongs to a category	Phrases are not searchable in thesaurus
	describe a category	Phrases are not searchable in thesaurus
2.4	summarize	to make into a short statement of the main points, report, brief, digest, encapsulate, reprise, synopsize, wrap up, abridge, condense, curtail, cut back, shorten; downsize, shrink; concentrate, consolidate; decoct, essentialize, streamline
	abstract	expressing an idea, to draw the attention to, detract, divert, amuse, beguile, entertain; stray, wander, main points
2.5	inferring	form an opinion, reach a conclusion through reasoning and information, conclude, deduce, derive, extrapolate, gather, judge, reason, understand, assume, suppose, conjecture, guess, speculate, surmise, read; contemplate, rationalize, think, to convey an idea indirectly, allude, imply, infer, insinuate, intimate, suggest, advert, point, signal, signalize, signify
	concluding	concluding, ensuing, conclusive, decisive
	extrapolating	
	predicting	tell beforehand, describe beforehand, forecast, predict, anticipate, foresee; announce, declare
2.6	comparing	betray, make note of, look at, note, remark, pick up, attend to, heed, watch, scan, survey, to arrange according to type
	contrasting	contrast, deviance, divergence; differentiability, discriminate, conflict, to be unlike, to not be the same, deviate, diverge, divide
	mapping (map)	plan, plot, to work out the details in advance, arrange, blueprint, budget, calculate, chart, choreograph, design, frame, prepare, project, scheme out, scheme, shape, strategize about, strategize, conspire, contrive, devise, intrigue, put up; concert, get up; draft, figure, have on, intend, mean; meditate, premeditate

Appendix B
Synonyms' List (continued)

	matching	placing qualities in common together, analogous, cognate, comparable, connate, correspondent, corresponding, like, matching, resemblant, resembling, similar, proportionate, relatable, related, approximating, close, conforming, consistent, consonant, duplicate, equivalent, identical, indistinguishable, interchangeable, redundant, same, substitutable, synonymous, entire, homogeneous, homogenous, unchanging, uniform, to be the exact counterpart, correspond, correspond to, equal, blend with, conform to, conform, coordinate with, coordinate, go with, harmonize with, complement, supplement; counterbalance, counterpoise; echo, mirror, repeat; add up to, amount to, approach, come to, near; measure up, partake of, rival, to produce equal to, meet, beat, better, eclipse, excel, outdistance, outdo, outshine, outstrip, overtop, surpass, top, transcend; touch; approximate, keep up, measure up to, rival, stack up against, stack up with
2.7	explain	to give the reason for or cause of, account for, attribute, explain away
Apply		
3.1	execute	to carry out effectively, administer, apply, execute, implement, to carry through as a process, carry through as a process to completion, accomplish, achieve, bring off, carry off, carry out, commit, compass, follow through, fulfill, negotiate, perpetrate, prosecute, pull off, put through, dispatch, execute, claim, eliminate
3.2	implementing	effect, discharge, legislate; honor, uphold; promulgate, the doing of an action, administration, direction, handling, management; application, operation, practice
	using	the act of employing something for a particular purpose, employment, exercise, usage, exertion, reuse, the capacity for being useful for, usefulness, assistance, help; applicability, appropriateness, relevance, value, preference, use, bias, prejudice, to put into action, employ, exercise, exploit, harness, operate, utilize, handle, manipulate, wield; run, recycle, reuse, to behave toward, act toward, be to, deal with, serve, use, consider, esteem, rate, regard, view; engage with, react to, respond to, to take unfair advantage of, abuse, capitalize on, cash in on, impose on, leverage, play on, manipulate
Analyze		
4.1	differentiate	point out the difference in, differentiate, contradistinguish, part, mark off, set off
	discriminate	
	distinguish	betray, make note of, look at, note, remark, pick up, attend to, heed
	focus	is of greatest importance to an interest, a guiding purpose, cynosure, focus, lodestar, polestar, benchmark, criterion, measure, par, standard, touchstone, yardstick, aim, ambition, aspiration, goal, intention, object, objective, purpose, target, train, aim, direct, attend, refocus
	select	to decide to accept from a group of possibilities, elect, name, opt for, pick, prefer, select, single out, tag, take, preselect; appoint, designate, fix, mark, nominate, tab, tap; accept, adopt, embrace, espouse; settle, settle on

Appendix B
Synonyms' List (continued)

4.2	organize	cue
	integrate	to make a part of, co-opt, amalgamate, blend, combine, commingle, fuse, intermingle, merge, mingle; acculturate, accustom, condition, enculturate, habituate, naturalize, commix, composite, concrete, conflate, fuse, homogenize, immingle, immix, interfuse, intermix, meld, mix, add, admix, cut in, fold, stir, coalesce, compound, emulsify; conjoin, knit, unite; intertwine, interweave, weave
	outline	silhouette, trace, bound, fringe, margin, skirt; edge, hem, rim, trim; circle, encircle, girdle, girth, loop, ring, round, surround; draw, moutline
	structure	put together by arranging, arranging, connecting an array of parts, connecting, structure, arrangement, assembly; configuration, framework, shell, skeleton, configuration, edifice, framing, infrastructure, network; contour, profile, chassis
4.3	attribute	to explain as the result of, accredit, ascribe, chalk up, impute, lay, put down, blame, charge, impute to, pin on; assign, attach, account, condone, excuse, forgive, justify, absolve, acquit, exculpate, exonerate, vindicate
	deconstruct	to examine the basic elements or parts of, discover interrelationships, anatomize, assay, cut, deconstruct, dissect, assess, evaluate, schematize, tabulate; reduce, segment, subdivide
Evaluate		
5.1	check	to be in agreement, accord, agree, cohere, coincide, comport, fit, tally, to look over closely, judging quality, audit, check out, overlook, oversee, peruse, pore over; parse; delve into, explore, plumb, probe, research, pick over; reinspect, rereview, resurvey
	coordinate	accommodate, attune, conciliate, reconcile, adapt, tune; match, orchestrate, pair, square, suit, synchronize, synthesize, unify, balance, equalize, even, proportion, regularize, standardize, to form a pleasing relationship, chime, chime in, consort, parallel
	detect	
	monitor	to pay continued close attention for a particular purpose, surveil;
	test	to put to a test, sample, test, experiment, experiment with, resample, retest, to subject to often excessive stress, stretch, tax, demand, exact, importune
5.2	critique	an essay evaluating, an essay analyzing, critique, commentary, editorial, appraisal, assessment, evaluation; analysis, examination, opinion
	judging	to give an opinion, adjudge, adjudicate, arbitrate, rule on, rule, deem, deliberate, ponder, size up; mediate, moderate, redetermine, rejudge, gauge, to form an opinion, philosophize, hold, imagine
Create		
6.1	generate	to be the cause of, breed, engender, occasion
	hypothesize	take as a fact without actual proof, hypothecate, hypothesize, postulate, premise, presume, presuppose, suspect, conceive, perceive, preconceive; theorize; affirm, allege, assert, aver, avouch, avow, contend, insist, maintain, profess
6.2	plan	to have in mind as a purpose, propose, purport, purpose, debate
	design	
	devise	to create by use of the imagination, think of by clever use of the imagination, concoct, construct, excogitate, fabricate, manufacture, think up, coin, envisage, envision, vision, ad-lib, extemporize, improvise

Appendix B
Synonyms' List (continued)

6.3	produce	assemble, build, prefabricate; invent, mint, originate; refashion, remanufacture, disport, exhibit, unveil, uncover
	construct	confect, piece, forge, reassemble, rebuild, reconstruct, redevelop
	invent	

Note. Some words are left blank intentionally because the definition was used in a previous word. Adapted from source: http://www.merriam-webster.com/thesaurus.

Vitae

Toni Gallia has obtained her B.A. in Elementary Education, M.A.in Education Administration, and Ed.D. in Education Administration from Lindenwood University in 2001, 2009, and 2012 respectfully. Her professional experiences includes teaching grades first and fourth, ELA curriculum writing and building coordinator, and an adjunct professorship at Lindenwood University. Toni Gallia obtained a K-8th Initial elementary principal certification and a 1-6 grade career CPC teaching certification. Please contact the author to obtain a copy of the raw data used in this study at tgallia@lindenwood.edu