TEACHERS' PERCEPTIONS AND PRACTICES OF DIFFERENTIATED INSTRUCTION AT

AN INNOVATIVE MIDDLE SCHOOL FOR GIFTED AND TALENTED STUDENTS

by

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(Under the Direction of Bonnie Cramond)

ABSTRACT

The Michelangelo Academy (MA), a public middle school program of choice located in Jinx County, Georgia, has been described as "a timely response to rising interest in alternative educational models and a need to be more economically efficient" (Hall County Public Schools, n.d.-a). MA was designed for students with a passion for technology, science and/or the arts, and emphasizes creative productivity and challenging academic standards. It represents one school district's creative effort to provide cost-effective, high-end learning opportunities for bright, motivated students. As these programs evolve, there is a need for research to support their effectiveness. School districts must design and implement procedures to evaluate these innovative new programs to determine the extent to which such programs meet stated goals. The purpose of this study was to examine a cornerstone of the MA program—the quality of instructional delivery. To do so teachers' perceptions and practices of differentiated instruction (DI) were examined. A mixed methods research design was used. Data were collected from teacher observations and interviews, and a student survey that was developed and validated for the purposes of this study.

The results of this study indicate that MA teachers are generally effective at differentiating instruction for students. Teachers' perceptions of DI are consistent with the descriptions of DI found in the research literature. MA teachers further reported a high level of satisfaction with their jobs and perceived positive student response to the program. Teachers' perceptions and practices of DI converged in a number of notable ways.

This study adds to the existing body of research on DI, and suggests that effective differentiation can contribute to gifted students' responsiveness to curriculum and instruction. This research also suggests that there may be a link between teachers' ability to fully differentiate instruction and their job satisfaction. Lastly, this study indicates that school districts, administrators, and other education leaders could possibly encourage increased differentiation by adopting some of the characteristics of a program like MA. These include a de-emphasis on explicit standards-based instruction, a smaller faculty and student body, and grouping of bright, motivated students.

INDEX WORDS: Gifted and talented students, Differentiated instruction, Middle school, Mixed methods design

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A Dissertation Submitted to the Graduate Faculty of The University of Georgia in Partial

Fulfillment of the Requirements for the Degree

DOCTOR OF PHILOSOPHY

ATHENS, GEORGIA

2011

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DEDICATION

For Clay

ACKNOWLEDGMENTS

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CHAPTER 1

INTRODUCTION

Welcome to the Michelangelo Academy

To enter the parking lot for the Michelangelo Academy (MA) one must first drive under a

rusted metal archway bearing the name of Renaissance Middle School (RMS), a previous

occupant of the building. This archway was a gift from the RMS class of 1965, and judging

from the rust and chipped paint, appears to not have been touched since it was first installed

roughly 30 years ago. However, this entranceway is quite in keeping with the building itself—a

plain, single story brick building with dated siding. At a glance the building is unremarkable; the

standardized architecture brings to mind some forgotten school from the 1950s, when RMS was

built. One might drive by such a site and never even really notice it. This is a somewhat

surprising first impression for what is quickly becoming a crown jewel in the Jinx County School

District: an innovative middle school program for bright, motivated students with a passion for

technology, science, and the arts.

On closer inspection a few small details begin to hint at what is housed inside, adding color

to the building's otherwise drab palette. "State School of Distinction" is spelled out in 10-inch

blue letters on a wall by the building's entrance.   To the right of the entrance is a two foot-high

cylindrical yellow alien sculpture—something apparently hand crafted from some sort of metal

drum previously used for another purpose—bearing a sign for "The Outer Limits", the current

exhibit in MA's Museum of Inspired Learning. The alien is flanked by colorful, freshly planted

pansies. Tulips, irises, and daffodils are beginning to push up through the ground in a circular

garden space to the left of the entrance, with an inviting bench tucked amidst the flowers. A

peek through the front doors reveals a foyer lined with lush green potted plants. Two school

buses pull up in front and let out elementary students from neighboring counties who have come

to visit the school's museum.

As you enter the building the true character of MA immediately begins to appear. One

wall of the foyer is covered in a large Renaissance-styled painted mural, bearing the seven Da

Vincian principles (in Italian) that the school hopes to instill in its students: Curiosita (an

insatiably curious approach to life and continued learning); Dimostrazione (a commitment to test

knowledge through experience, persistence, and a willingness to learn from mistakes);

Sensazione (the continual refinement of the senses to enliven experience); Sfumato (a

willingness to embrace ambiguity, paradox, and uncertainty); Arte/Scienza (the development of

the balance between science and art, logic and imagination); Corporalita (the cultivation of

grace, ambidexterity, fitness, and poise); and Connessione (a recognition of and appreciation for

the interconnectedness of all things and phenomena). On the opposite wall are several posters

announcing MA students who recently won awards at the county, regional, and state-level Social

Studies and History Fairs. Another poster is a re-creation of an article from a local newspaper

featuring MA students presenting before lawmakers and other educators at Technology Day at

the state capitol. In the background, music filters down the hall from the cafeteria. Due to its

small size, MA does not have a full-time music teacher; however, the orchestra teacher from the

local high school comes each day so the school's musically inclined students can pursue an

instrument.

The building is rather small in size for a middle school—two wings joined by a hallway

and flanked by a small cafeteria space. Many of the classrooms don't resemble what one would

expect to find in a typical middle school, with rows of individual desks in neat lines facing the front board. Instead chairs are often arranged around tables, facilitating discussion amongst students. Technology is pervasive throughout the school. Students can be seen working on personal laptops in almost any classroom. A peek in the technology room finds the advanced computer programming class hard at work using geographic information system (GIS) technology to plot collected data under the direction of a professor from a local college. A visit to another classroom finds students pouring over a New York Times editorial, engaged in a lively discussion about current uprisings in the Middle East. The conversation pulls in details covered in Social Studies and Science, and it takes a few minutes to realize this is actually a Language Arts class engaged in a lesson on persuasive writing.

At the very center of the building is MA's Museum of Inspired Learning, what one faculty member described as the heart of the school. Today it is filled with elementary students from around the county who have come to view the current installation, "Outer Limits", created by the MA's sixth grade class. MA students act as docents, leading people on a tour of the 35 exhibits, which explore everything from astronomy and space travel to early navigation and the search for new lands. Over the last six weeks the sixth grade has engaged in an interdisciplinary unit around the theme of travel and exploration. This unit culminated in the proposal and creation of the different exhibits on display in the museum. Faculty, parents, and community members contributed time and materials to help the exhibits come to fruition; however, the teachers emphasize that each project is very much a product of the inspiration, research, and hard work of the participating students. Five elementary students gather around a robotics exhibit featuring a simulated Mars Lunar Rover bumping along a dusty simulation of the moon's surface. In another corner students are examining a re-creation of the prow of Columbus's ship and learning

about his travels. Other exhibits include: a constellation station, where various constellations are recreated in light; a journey through black holes and galaxies; a piece on the space race; and an exhibit about the Apollo mission, complete with astronaut cuisine and an anti-gravity simulation. The MA teacher behind the idea for the museum recognized the value of museum collections to education, yet observed how young people are often disinterested in visiting museums due to their inability to touch or interact with exhibits. The Museum of Inspired Learning was designed to remedy this, allowing young visitors to actually participate in exhibits through hands-on activities and involvement. In short, visitors to MA's museum learn by doing.

This idea of artifacts and projects tied to learning and instruction can be found throughout the school. Sixth grade is wrapping up a Social Studies unit on World War II, and a local college donated an exhibit of artifacts from the time period that is currently on display in glass cases at the start of the sixth grade hall. Another classroom, the "Research Room", is devoted to use for exploratory and enrichment activities throughout the school year. South American artifacts— donated by parents and the local college—line tables at the side of the room, along with an impressive aquarium, glass cases of preserved butterflies, moths, and insects, skeletons of various animals, and an incubator filled with newly hatched chicks. Student projects are also on display, showcasing final products from research completed during enrichment or other classes. Together they form a second, smaller museum of student work.

Examples of student work can be found everywhere as you proceed through MA. The bathrooms were designed and painted with murals by students. Painted canvases, each representing a different time period, form a visual time line from 10,000 B.C. to modern times. Mixed media, including photos, drawings, collages, and paintings, illustrate the school's adopted seven principles. One hundred hand-painted paper mache masks are hung on another wall,

creating a scaled representation of the earth's population by race, religion, and language, a schoolwide project from the beginning of the year. All of these artifacts serve to reinforce the student-centered nature of the school, and provide students with an authentic audience for their work.

A bell rings and the halls fill with students chattering animatedly as they make their way to the next class. Another school bus pulls up in front, bringing more visitors to the museum. As with any day one spends visiting MA, it's difficult to pull yourself away, to exit back to the parking lot and leave the energy and excitement unfolding throughout the building. However, you do not leave empty handed, but with a hopeful vision of the power and possibility of innovative education.

Study Context

The current focus on school reform mandates, most notably the No Child Left Behind (NCLB) Act of 2001 (U.S. Department of Education, 2001), and the economic crisis in the United States have compelled many school districts across the country to adopt innovative ways to address the needs of gifted students in the context of shrinking school budgets and increased accountability. Foremost among the goals of NCLB is that low performing students achieve on grade-level in basic skills like reading (U.S. Department of Education, 2001). Such goals are of clear value to many students, but the focus on remediating skill deficits is of limited value to students whose achievement is already above the level deemed "adequate". Furthermore, NCLB contains no explicit provisions for holding schools accountable for helping gifted students to reach their full potential. With critical funds tied to compliance with NCLB, many schools have placed the needs of gifted students low on the list of priorities. Despite these challenges, some schools have found ways to comply with accountability mandates and simultaneously innovate

programs that support the success of all students, struggling and gifted alike.

Thomas Downs, Superintendent of Jinx County Schools, Georgia, has contended that some aspects of recent school reform mandates may undermine rather than support students' achieving their full potential (Hall County Public Schools, n.d.-b). Specifically, he has indicated that the notion of adequacy, emphasized by measurement of schools' Adequate Yearly Progress (AYP), is problematic. When applied to student performance, adequacy often means meeting a state-identified minimum criterion. Downs has argued that by setting minimum performance as the outcome goal, we are holding students to relatively low standards. In today's increasingly complex society and competitive global economy, passable educational performance is unlikely to equip students with the skills and knowledge needed to succeed (Hall County Public Schools, n.d.-b; Hall County Public Schools, 2008).

Downs identified another significant problem that arises when schools emphasize adequacy: Districts are often forced to narrow their focus to remediation of the most fragile students when threatened with repercussions for failure to meet AYP. Though such a response to accountability measures is understandable, an unintended consequence of a singular focus on students at risk for failure is that students who are highly able, and who are likely meeting the criterion of adequacy already, are not provided with the kinds of learning opportunities needed to express their talents fully (Hall County Public Schools, n.d.-b; Hall County Public Schools, 2008). In response to these concerns, Downs has reshaped the mission of Jinx County to focus on *excellence* for all students.

The Michelangelo Academy (MA), a public middle school program of choice located in Jinx County, Georgia, has been described as "a timely response to rising interest in alternative educational models and a need to be more economically efficient" (Hall County Public Schools,

n.d.-a). MA was designed for students with a passion for technology, science and/or the arts, and emphasizes creative productivity and challenging academic standards. It represents one school district's creative effort to provide cost-effective, high-end learning opportunities for bright, motivated students.

Statement of Problem

Educators and administrators in Jinx County have said that they practice what the field of gifted education preaches. They used creative problem solving to address an identified problem: meeting the needs of gifted students despite a number of seeming obstacles in the NCLB climate of school reform. If this effort is successful, one may predict that more school districts will apply aspects of existing gifted models in new ways as they seek to meet the needs of gifted students. As these programs evolve, there is a need for research to support their effectiveness. The problem is that schools may rely solely on existing research as justification for new programming. *School districts must design and implement procedures to evaluate these innovative new programs to determine the extent to which such programs meet stated goals.*

Purpose of the Study

In response to the problem introduced above, the purpose of this study was to examine a cornerstone of the MA program—the quality of instructional delivery. Research findings could be used to determine the extent to which MA is meeting program goals, and to possibly support the effectiveness of the program for gifted students.

The Jinx County Schools Rigor Specialist, Deborah Jones, has stated that the mission of the program "is to instill lifelong intellectual curiosity and commitment to learning by building an extraordinary educational foundation on students' strengths and interests" (Jordan, 2009, August 8). To achieve these broadly stated outcomes for gifted students, research reveals that

key elements must be in place. First, instruction must be based on a high-quality curriculum that is carefully designed and built around meaningful and relevant ideas. Second, teachers must deliver the curriculum in ways that are responsive, compelling, and flexible—all characteristics associated with differentiated instruction (DI) (Tomlinson & McTighe, 2006). Thus, it is important to examine the degree to which teachers at MA exhibit behaviors associated with DI. Investigating teachers' differentiation practices also: 1) allows stakeholders to determine the extent to which differentiation is actually occurring at the school, and 2) is important data for use when considering causal relationships between MA's programming and students' academic performance and creative productivity, areas that also warrant future evaluation.

This study further involved studying MA teachers' perceptions of differentiation. Understanding these is important when examining teachers' use of DI, as perceptions often influence practice. Insight into teachers' perceptions of DI may also prove useful when planning for future staff development for teachers at MA or, by extension, other schools eager to implement similar programs of choice.

Need for the Study

This study is necessary to address needs identified at both a program (MA) and discipline (gifted education) level. First, there is a need to examine the extent to which MA meets its stated goals as discussed above. MA is a new program, and research findings can support future decision-making as the program continues to grow and evolve. Research is further needed to support such a program in the context of current school budget crises. Regardless of whether or not MA operates at a reduced cost compared to traditional middle schools, it still requires funding. There is a risk that the school district will not continue to pay for the program if it is not reaching desired outcomes.

This study also addresses gaps identified in the research on gifted education programs. Much of the current research on differentiated instruction for gifted learners has been undertaken in heterogeneous classrooms of students representing a great range of achievement levels (Moon, Brighton, & Callahan, 2003; Moon, Brighton, Jarvis, & Hall, 2007; Reis et al., 1993; Westberg, Archambault, Dobyns, & Salvin, 1993). MA provides a unique opportunity to study DI in the context of a program with a more homogeneous population of high-ability students.

Research Questions

Tomlinson (1999) has proposed an equilateral triangle as a model of learning and teaching; one side represents the teacher, a second the students, and the third the content, or what is taught and learned in the classroom (see Figure 1).
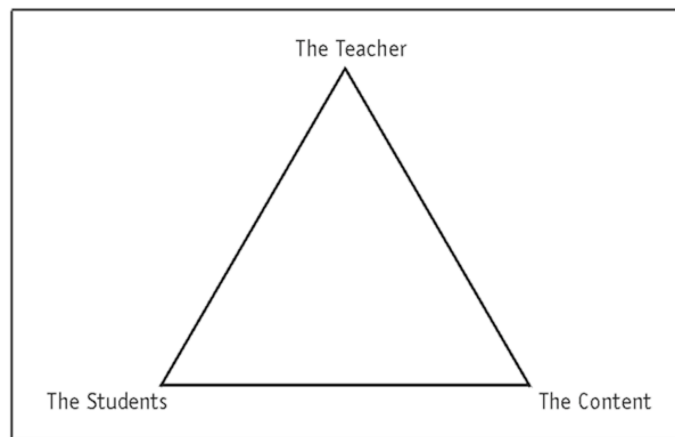
Figure 1. Tomlinson's model of teaching and learning. From C. A. Tomlinson, 1999, *The differentiated classroom: Responding to the needs of all learners*, p. 27.

Each part of the triangle is essential to supporting the whole and to helping create a learning environment that supports DI. This equilateral triangle was used to guide both the formation of research questions related to key components of DI and the selection of methods to

answer these questions. Specifically, this model drew attention to three areas that warranted investigation when considering teachers' perceptions and practices of DI; MA teachers, students, and content were considered when designing research questions and methods to investigate each question. This study examined the following research questions in order to address the stated purpose of and need for the research:

Question 1. How effectively are Michelangelo Academy teachers differentiating instruction for students?

Question 2. What are Michelangelo Academy teachers' perceptions of differentiated instruction?

Question 3. What is the relationship between Michelangelo Academy teachers' perceptions and practices of differentiated instruction?

Definition of Terms

MA has adopted a broadened conception of giftedness similar to that suggested by Renzulli's *Three-Ring Conception of Giftedness*. Students who are passionate about the arts, science, and technology are selected to participate in the program based on high levels of ability, creativity, and motivation as demonstrated in student products and performance. Instead of relying on cutoff scores to identify gifted students, MA focuses on identifying gifted behaviors. Given program eligibility requirements, MA students may also be described as *high ability* or *high achieving.* These three terms—gifted, high ability, and high achieving—are therefore used interchangeably in the context of this study as they all describe the population under examination.

CHAPTER 2

LITERATURE REVIEW

Introduction

This literature review has two objectives. First, it will establish the philosophical framework underlying the purpose of this research and the need for this study. Second, this review will summarize the relevant research literature regarding the Michelangelo Academy (MA). To achieve the program's stated outcomes, research reveals that key elements must be in place. As discussed in the Introduction, instruction must be based on a high-quality curriculum and teachers must deliver the curriculum in ways that are responsive, compelling, and flexible— all characteristics associated with differentiated instruction (DI) (Tomlinson & McTighe, 2006). The first section of this review examines DI, including a rationale for this practice and findings from previous studies. Implications of the current school reform movement on gifted students will also be discussed, as this provided some of the impetus for the creation of MA. Lastly, MA will be described in detail. This section will include a discussion of the conceptualization of the program, as well as a review of the curriculum and instruction. Possible student and teacher outcomes from MA methods will also be discussed.

Philosophical Framework

This research is influenced by the philosophical paradigm of pragmatism. Teddlie and Tashakkori (2003) suggested that pragmatism is well suited for mixed methods for a number of reasons, including the philosophy's support for use of multiple research methods (qualitative and quantitative) and emphasis on the utility of results. John Dewey is recognized as one of the

founding fathers of pragmatism, a uniquely American school of thought that arose in the late 19th century. Throughout his career, Dewey applied the principles of pragmatism to the development of educational practices and philosophy. There is no one single expression of pragmatism, but many, which can make a discussion of the key stances of this philosophy a challenge (Greene, 2007). However, there are some consistent philosophical beliefs that unite the various branches and hold relevance for the schooling of young adolescents. When regarding the significance of Dewey's particular contribution to pragmatism, Biesta and Burbules (2003) noted:

> Dewey's approach is different in that he deals with questions of knowledge and the acquisition of knowledge within the framework of a philosophy of *action,* in fact, a philosophy that takes action as its *most basic* category. This connection between knowledge and action is especially relevant for those who approach questions about knowledge primarily from a practical angle – such as educators and educational researchers. (p. 9)

Teddlie and Tashakkori (2003) similarly highlighted pragmatism's emphasis on the utility of research results as one of its defining characteristics. In other words, there is an expectation that research should result in knowledge that is useful in guiding decisions in educators' daily practice. Dewey stressed that teachers need knowledge that can inform their activities and action. In this way, it could be said that education research is more about research *for* education than research *about* education (Biesta & Burbules, 2003). Dewey and the other founders of pragmatism shared an overarching concern in practical consequences and empirical findings to help further philosophical understanding and guide decisions in the context of the real world (Johnson & Onwuegbuzie, 2004).

Onwuegbuzie and Johnson (2006) stated, "By pragmatism we mean to search for workable solutions through the practice of research…to help answer questions that we value and to provide workable improvements in our world" (p. 54). As noted in the Introduction, MA is a workable solution to address the relative lack of learning opportunities needed for high ability students to fully express their talents in the context of the current school reform movement that focuses on adequacy versus excellence. Pragmatists are also concerned with designing needs-based evaluations around identified questions for the purpose of guiding future action; the evaluation questions dictate the selection of methods and procedures (Johnson & Onwuegbuzie, 2004). In the case of MA, there is a specific need to research such innovative new programs to determine the extent to which they meet their stated goals. MA has the inherent potential to be a viable program for replication due to its cost-effectiveness and the relatively minimal resources required. Most importantly, it can provide other school districts with a much-needed model for offering high-end learning opportunities for gifted students in the current age of school reform. Allotment of resources, support, and funding to programs like MA necessitate research data to support their effectiveness.

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Rationale for Differentiated Instruction

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Gifted Students' Needs

Gifted students are often distinguished from their peers by their ability to learn content more quickly and link the new knowledge to previously mastered skills and knowledge; advanced performance in one or more areas; aptitude for dealing with complexity and abstraction; and deeper concentration on or commitment to multiple activities (Feldhusen, 1989; Rakow, 1989; Rogers, 2007). They typically have high self-efficacy and can easily achieve at levels beyond their chronological peers (Moon, 2009). Based on these characteristics, and the social emotional

characteristics discussed above, there is a need to provide affective education for gifted students and to move gifted students ahead in some way when their learning surpasses the curriculum offered in school (Hébert, 1993; Rogers, 2007; Sicola, 1990). Students with high-ability need an educational environment that is appropriately challenging with quality, fast-paced instruction at a high conceptual level (Feldhusen, 1989; Moon, 2009). Feldhusen (1989) further suggested that gifted students benefit from being grouped with other highly able students for the subjects in which they excel. Research by Kulik and Kulik (1987) revealed that such grouping can lead to superior learning for gifted students.

According to Cooper (2009), appropriately rigorous and challenging curriculum for gifted students "should focus on and be organized to include more elaborate, complex, and in-depth study of major ideas, problems, and themes that integrate knowledge within and across systems of thought" (p. 278). Cooper further stated that gifted students need to specifically learn *how* to think versus *what* to think. First hand experience in solving authentic problems with no single known answer is one way to foster this. Betts (2004) proposed that a major goal of gifted education is to develop students into self-directed, independent, life-long learners.

Risks Facing Gifted Students

When reviewing the literature on gifted education, the following findings repeatedly emerge: Gifted students face great risk when schools fail to meet their unique educational needs. Gifted underachievement is of particular concern, and it is estimated that as many as 15%-40% of gifted students are "at risk" of failure or performing below their full potential (Rayneri, Gerber, & Wiley, 2006). As discussed above, gifted underachievement may occur if students become bored, frustrated, and unmotivated in learning environments that are not appropriately stimulating (Rayneri et al., 2006; Renzulli & Reis, 1991; Tomlinson et al., 2003). A false belief

that gifted students will "make it on their own", that they have the ability to succeed without additional school services or supports, pervades our educational system. Research shows that this is not always the case. For example, studies have revealed that gifted students are represented in the pool of school dropouts. Estimates of gifted dropouts differ, largely due to state-by-state variations in both the definition of giftedness and dropout. As a result, estimates of gifted dropouts have ranged from as high as 18%-25% of the population of students who drop out (Robertson, 1991; Solorzano, 1983) to as low as 1% (Matthews, 2006). Kaskaloglu (2007) completed a metanalysis of 16 studies, including 1,025 subjects, and found that at least 10% had a sufficiently high IQ to be classified as high ability.

In the last two decades, several reports have highlighted the risks facing gifted students. The 1983 report *A Nation at Risk: The Imperative For Educational Reform* (National Commission on Excellence in Education) estimated that over half of the gifted population does not demonstrate school achievement commensurate with their tested ability. *National Excellence: A Case for Developing America's Talent,* a report by the U.S. Department of Education (1993), drew attention to the "quiet crisis" in American schools, namely the looming failure of our education system to provide for the needs of gifted and talented students. According to this report, the U.S. is squandering many of its students' gifts and talents, one of the country's most valuable resources, evidenced by U.S. students' poor performance when compared with top students from other countries. The U.S. depends on its top performing students to provide leadership in many areas, including business, the sciences, writing, politics, and the arts. The report contends that too many of our gifted and talented students spend their days in schools that do not provide special attention to their needs, with teachers making few to no provisions for them.

Two additional facts revealed in the *National Excellence* report demonstrate the seriousness of gifted students' needs for an appropriately challenging curriculum. The first is that gifted students in elementary school have already mastered 35%-50% of their current grade-level curriculum before the beginning of the school year. Also, up to 40% of the top 5% of students graduating from high school will not graduate from college, a statistic that speaks to the specific problem of gifted underachievement.

In *A Nation Deceived: How Schools Hold Back America's Brightest Students* (2004), Colangelo, Assouline, and Gross reported that America ignores excellence, holding bright students back by failing to challenge them in the regular classroom and requiring them to learn at the same pace as their grade-level peers. The authors referred to this "national scandal" whereby thousands of the country's students are forced to lower their expectations (p. 2). "We are deceiving ourselves when it comes to encouraging excellence…[and in the process] we undermine the motivation of bright students and hurt ourselves" (Colangelo et al., 2004, p. 2). The authors noted that gifted students are afforded little legal protection, while federal law protects their disabled peers' rights to an appropriate education responsive to their relative needs. In contrast, most states do not have laws mandating the similar provision of appropriate interventions and services for gifted students.

Educational environments are a primary influence on the extent to which gifted students will experience challenges and problems related to motivation and academic achievement. High-ability students placed in unchallenging environments (e.g., classrooms that are adapted to serve low- to average-ability students) are at greater risk to experience boredom, frustration, decreased motivation, and underachievement. In contrast, an appropriately challenging environment allows

gifted students to fully develop their talents and reduce the likelihood of the problems and obstacles they face in classrooms that do not meet their needs (Moon, 2009).

At the heart of the problem facing gifted students is what Tomlinson et al. (2003) described as "patterns of inattention to student variance" (p. 125) evident in the literature on students with learning exceptionalities, including gifted individuals. According to Tomlinson et al., these patterns found in the literature suggest that problems are rooted in understandings and beliefs related to how students learn and how they should be taught, or "how we do school" (p. 125). Research reveals that tens of thousands of gifted students across the country have their needs unmet and abilities unrecognized in their classrooms. They must wait for their peers to master the skills they have learned several years earlier before moving on in school (Archambault et al., 1993; Feldhusen, 1989; Gentry, 2006; Moon et al., 2003; Moon et al., 2007; Reis et al., 1993; Westberg et al., 1993).

Differentiated Instruction Defined

One way to attend to the needs of gifted students is through differentiated instruction (DI). "Differentiation is not a recipe for teaching. It is not an instructional strategy. It is not what a teacher does when he or she has time. It is a way of thinking about teaching and learning. It is a philosophy" (Tomlinson, 2000, p. 6). DI is focused on modifying the content (what is taught), the process (how it is taught), and the product (the outcome of instruction). These modifications are made according to students' readiness, interests, and preferred mode of learning (Tomlinson, 1999). Central to differentiation is a belief that the job of the school is to allow each child to reach his or her full potential by maximizing individual students' learning opportunities (Cooper, 2009; Tomlinson, 2000). DI takes into account the fact that learning is

what Cooper (2009) described as, "a highly personal process that each student experiences alone" (p. 284).

Impact of School Reform on Gifted Students

Guiding Principles of Equity and Excellence

Since the early 1980s, educational reform in the United States has been driven by the competing and often contradictory values of equity and excellence (Colangelo & Davis, 2003). Equity represents zeal for helping below-average students, a group most often represented by economically disadvantaged and minority students, achieve minimum academic standards (Davis & Rimm, 2004; Gallagher, 2003). Many of those who stress equity perceive attempts to offer gifted students special services as elitist. Doda (2005) expanded on this idea, suggesting that the advancement of equity in education is a recognition of schools' role in the development of a democratic society.

In theory, the policy of excellence involves creating conditions that allow students to reach their full potential (Gallagher, 2003). Experts in the field of gifted education have focused the idea of excellence more specifically as providing appropriate instruction and opportunities to allow highly able students to fully express their talents (Gallagher, 2004). However, many researchers argue that the concept of excellence has come to mean improving students' performance on mandated state assessments (Renzulli & Reis, 1991). Advocates for gifted students stress that failure to help high-ability students build their capabilities and harness their potential contributions to the future is a damaging outcome of the concept of excellence expressed in current education reform (Davis & Rimm, 2004).

Some critics have cautioned that the emphasis on equality and social egalitarianism has been at the expense of academic rigor for young adolescents. Yecke (2003) differentiated

between the importance of equal opportunities versus equal outcomes, with the latter leading to a potential leveling of academic achievement. Such a level playing field for all students has created "a culture of disdain and contempt for high academic achievement. This is nothing less than a declaration of war against academic excellence" (Yecke 2003, p. xx). Renzulli and Reis (1991) referred to the practice of "dumbing down" curriculum as an example of the fervor for leveling the academic playing field, citing that in the last 10 to 15 years the difficulty of school textbooks has dropped two grade levels (p. 30). "By dragging the nation's entire achievement level down so low that group differences are minimized, it will appear as if at-risk students are closing the gap with their higher scoring peers" (Renzulli & Reis, 1991, p. 30).

Another consequence of the reform movement's quest for equity in schools has been efforts to abolish ability grouping. The result has been a movement away from homogeneous ability grouping toward heterogeneous ability grouping, with an accompanying cry to eliminate separate classes based on achievement and/or ability at all levels of schooling (Kulik, 2003; Sicola, 1990). This move towards inclusion has been one of the most influential trends in education reform in the last decade, with clear roots in the commitment to equity. The term inclusion is borrowed from special education and originally described the integration of students with disabilities in the regular classroom setting versus in resource rooms (educational settings outside of the regular classroom). Education policy makers and school administrators have extended this trend to gifted students, with a push to eliminate resource services for this population in favor of education in the regular classroom. Inclusion is seen as one way to respond to underrepresentation of minorities in separate programs for gifted students (Gallagher, 2003). Individuals committed to ridding U.S. schools of ability grouping view these practices as types of segregation; elimination of grouping or tracking is therefore one way to achieve equality

in education. Opponents of the detracking movement fear that schools with a "single track" can never meet the needs of a diverse student population or aspire to excellence for all (Kulik, 2003).

The belief in the power of DI to attend to the diverse needs of students in a heterogeneous classroom has been one factor in many school districts' decision to cut back or eliminate traditional gifted programs (e.g., pull-out or resource classrooms) in favor of inclusion in the regular classroom. Supporters of inclusion believe this practice has the added benefit of addressing several of the issues that have beleaguered gifted education for decades: concern over underrepresentation of ethnic minority students in gifted programs, debate over how to identify gifted students, costs to maintain separate gifted programs, and the belief that pull-out programs are a part-time solution to a full-time problem (how to better serve gifted students throughout the entire school day). In theory, these concerns will evaporate if teachers are attending to their students' individual needs in the context of the regular classroom; separate identification procedures and gifted programs will no longer be necessary if regular classroom teachers differentiate instruction to attend to the affective and academic needs of their students with gifts and talents (Hertberg-Davis, 2009). Thus, DI offers a way to address the seemingly opposing viewpoints of equity and excellence presented in the research. Ideally, allowing teachers to address learner variance in mixed ability classrooms can result in the attainment of academic excellence *and* equity. Unfortunately, "the reality is that the way we 'do school' does not make it easy for classrooms to be places where individual student needs, rather than pressure to pass a standardized test, ultimately shape the curriculum" (Hertberg-Davis, 2009, p 252). Research studies have found that teachers do not regularly differentiate instruction in response to all students' needs (Archambault et al., 1993; Callahan, Tomlinson, Reis, & Kaplan, 2000; Reis et al., 1993; Westberg et al., 1993). For example, a study from the National Research Center on the

Gifted and Talented (Reis et al., 1993) found that gifted students in the regular classroom received no differentiation in 84% of the learning activities in which they participated.

No Child Left Behind

Introduction to the Legislation

As Gallagher (2004) observed, "There has been no piece of education legislation in the past decade that has stirred so much comment and controversy as the No Child Left Behind Act" (p. 121). No Child Left Behind (NCLB) is a comprehensive federal law introduced by the United States Congress in 2001. The stated goal of the legislation is:

> To ensure that all children have a fair, equal, and significant opportunity to obtain a high-quality education and reach, at a minimum, proficiency on challenging state academic achievement standards and state academic assessments. (U.S. Department of Education, 2001, Sec. 1001)

> To accomplish this goal, NCLB is particularly focused on the needs of struggling

learners, namely low-achieving children from poverty, students with limited English proficiency, students with disabilities, students from migrant families, Native American students, and young children requiring extra reading assistance. NCLB aims to close the achievement gap between low- and high-performing students, "especially the achievement gaps between minority and nonminority students, and between disadvantaged children and their more advantaged peers", by attending to the specific needs of these groups (U.S. Department of Education, 2001, Sec. 1001).

NCLB requires school systems to implement state content area standards, broad statements of intended year-end student outcomes, in reading and math. States are also mandated to administer annual assessments corresponding to the standards across content areas for students in third through eighth grade, with results used to determine if students and teachers

are meeting acceptable standards. Test scores are also used to determine whether schools are demonstrating Adequate Yearly Progress (AYP), or annual increases in the numbers of students performing in the proficient range on state tests. Failure to meet AYP results in various sanctions, including dismissal of administrators and teachers and restructuring of schools; schools that fail to meet AYP for five years may be subject to reconstitution (U.S. Department of Education, 2001).

NCLB's intended goals and outcomes reflect the school reform movement's quest for equity, specifically as it relates to providing additional attention and resources to students with disadvantages. As a result, the law has been highly criticized by advocates for the gifted for being antithetical to their valued principle of excellence, and for unintentionally diminishing concern for talented students (Gallagher, 2004; Robinson, 2009). Specifically, these advocates argue that NCLB impedes gifted students' ability to grow. Gentry (2006) stated that, "in the wake of NCLB (2001), [bright] students across the country in countless districts and classrooms experience the same quiet marginalization of their prior knowledge and consequently of their future potential."

Deficit-Based Approach to Education

NCLB has shifted the mindset in education to a focus on student deficits and remediating weaknesses. According to Gentry (2006), this approach favors remedial programs at the expense of advanced classes, gifted programs, and enrichment programs. Fear of sanctions should students not demonstrate AYP coupled with limited school budgets have led schools to reallocate funding for gifted services, which are currently not mandated under federal law, to provide for remediation for students at risk of not passing state mandated assessments (Gentry, 2006). The inherent prominence in NCLB given to fixing weaknesses has come at the expense of equal

attention to the development of talent. Instead, the desired outcome of our educational system is focused on basic proficiency, with minimum competency the final goal versus the starting point of a child's education (Gentry, 2006; Renzulli & Reis, 1991).

Focus on State Standardized Assessments

NCLB explicitly links students' test performance with school accountability, federal funding, and possible sanctions (Adams, 2009; Moon, 2009). This pressure for schools to demonstrate AYP has led educators to focus increasingly on the content covered by these tests at the expense of other material, a practice known as curricular reduction or narrowing of the curriculum (Adams, 2009; Burke-Adams, 2007; Gentry, 2006; Moon, 2009; Moon et al., 2007; Sisk, 2009).

In their review of the literature on the effects of state standardized testing programs on schools, Moon at al. (2003) found that teachers repeatedly reported that they adjusted the curriculum based on what was included on state tests (teach to the test). This included adopting instructional approaches that resemble testing methods and formats and deemphasizing or eliminating subjects not covered by the tests. Teachers also spend more time on test-preparation activities, resulting in detrimental effects including decreased graduation rates and scores on other national and international tests of learning, reduced student motivation to learn, and classroom lessons centered on decontextualized basic skills (Adams, 2009; Burke-Adams, 2007; Gentry, 2006; Moon, 2009).

When education is focused on what is being assessed on state mandated tests, instruction becomes increasingly standardized; attention to individual student needs diminishes in favor of "one-size-fits-all" instruction (Gentry, 2006; Moon et al., 2003). In a study of the effects of state standardized testing programs on teachers and students, Moon et al. (2007) found that teachers

feel much pressure and frustration with standardized curriculum that affords them little time to respond to student diversity. Moon et al. (2003) further found that teachers reported hesitance to use innovative teaching strategies in favor of more traditional methods (e.g., skill-and-drill), believing these would leave students better prepared to pass state assessments. Burke-Adams (2007) stated that schools that veer from standards-based teaching may face punishing penalties if they fail to meet state and federal mandated requirements. As a result, it becomes much safer for schools to continue to adhere to traditional methods geared towards maximizing testing success than to implement new ideas in instruction.

Impact of NCLB on Gifted Students

"Recent research indicates that the high-stakes associated with No Child Left Behind has rendered the regular classroom even less hospitable to gifted learning than it was previously" (Herbert-Davis, 2009, p. 252). The National Association for Gifted Children (NAGC, 2009) has criticized the U.S. for neglecting its approximate three million gifted and talented students, all of whom require a challenging and responsive education in order to meet their full potential. According to the State of the States Executive Summary (NAGC, 2009), America has "a markedly insufficient national commitment to gifted and talented children, which, if left unchecked, will ultimately leave our nation ill-prepared to field the next generation of innovators and to compete in the global economy" (p. 1).

Perhaps one of the most ominous consequences of NCLB for high-ability students is the ceiling effect it has on student learning (Moon, 2009; Moon et al., 2003). NCLB is guided by the assumption that all students can achieve the same learning outcomes. Given what we know about the reality of differences in students' abilities, if all students can meet the same standards, they are likely too low for our most capable learners. Many states have adopted the practice of

lowering their standards so their students are able to meet the levels of proficiency mandated by

NCLB. As a result, academic challenge is eroded for bright students (Gentry, 2006).

Ward (2005) agreed that NCLB's focus on raising all students to proficiency is at the

expense of developing the full potential of individuals. According to Ward, NCLB effectively

says, "Until every child has achieved a threshold of proficiency, the goal of achieving this

threshold shall take priority over other educational goals, such as the development of all children

to their individual potential" (p. 59). The standardized curricula resulting from NCLB fail to

provide gifted and talented students with either the challenging advanced curriculum they

require, or the opportunities to problem solve, experience freedom in learning, and work with

high-level concepts they are well suited for (Betts, 2004; Burke-Adams, 2007). The unbalanced

emphasis on equity over excellence that pervades NCLB ultimately hurts gifted students, leaving

them educationally underserved (Gentry, 2006). Adams (2009) explained that a main criticism

from the field of gifted education is that although gifted students often demonstrate mastery of

basic skills, they must wait for their peers to catch up rather than receive appropriately

challenging curriculum. In her often-quoted statement, Reis has argued that gifted students don't

learn anything new until January (Reis et al., 1993).

Unchallenging classrooms create a number of otherwise avoidable problems for gifted

students. For example, gifted students may seem to be fine, warranting no special attention

because their performance is above grade level. However, in such an environment, these

students risk developing unhealthy beliefs about motivation that will damage their resilience

when they are confronted with challenging work in the future (Moon, 2009). Classrooms do not

foster skills and abilities required by gifted students to be successful in rigorous programs if

expectations for student performance are low and if the focus is on low-level tasks (Moon et al.,

2003). A study by Moon et al. (2003) revealed that elementary gifted students experienced boredom and disengagement in classrooms that emphasize test preparation. Surveyed students responded that they were just learning for the state test when asked by the researchers if their studies were connected to their lives outside the classroom. Students also expressed anger and frustration with pressure from teachers to comply with mandated, prescribed steps for certain tasks, like solving math problems, instead of being afforded the freedom to problem solve in alternative ways.

Gifted students have additionally expressed resentment and frustration with their inability to learn new things or study content in greater depth due to curricular reduction. The actions of teachers included in this study (Moon et al., 2003) were greatly shaped by perceived pressure to prepare students for state mandated assessments. In particular, teachers were less willing to differentiate for gifted learners. Moon et al. (2003) summarized that the resulting implications for bright students are significant, including the possible underdevelopment of these students' potential.

Tomlinson (2000) has suggested that there is no inherent contradiction between standards-based instruction and differentiation, offering hope that the two may be reconciled. According to the author, "the problem is not a contradiction between standards and appropriately responsive instruction. The problem lies in an ill-conceived interpretation and use of standards that erode the underpinning of effective teaching and learning" (Tomlinson, 2000, p. 8). In other words, standards-based instruction becomes detrimental to student learning when the standards are used as a curriculum instead of guiding the development of a curriculum. A curriculum tells us *what* to teach while the practice of differentiation tells us *how* to teach.

Conceptualization of Michelangelo Academy

MA is not a magnet school, nor is it restricted to students identified as gifted according to state guidelines. The faculty and administration that participated in the creation of MA selected the language "program of choice" in part to emphasize that MA is not limited to gifted identified students. However, a large number of gifted students are drawn to MA because of the challenging curriculum it advertises.

Instead of strictly adhering to the state gifted eligibility requirements, MA is based on a broadened conception of giftedness, similar to that suggested by Renzulli's *Three-Ring Conception of Giftedness*. In Renzulli's model, giftedness results from the interaction between above average ability, high levels of creativity, and task commitment. Instead of relying on a single IQ cutoff score to identify gifted *students,* Renzulli's model focuses on identifying gifted *behaviors*, a practice MA has also adopted (Gibson & Efinger, 2001; Renzulli & Reis, n.d.; Renzulli & Reis, 2003). Any student in the county with a strong interest in technology, science, and/or the arts may apply for MA. The program description states that, "students who are curious and who learn best in a creative educational setting are prime candidates for this program. Intrinsic motivation, resourcefulness, and a problem-solving disposition are characteristics the applicant should possess" (Hall County Public Schools, n.d.-c, p. 2).

Interested students complete an application packet consisting of a variety of information, including student essays, teacher recommendations, standardized test scores, grades, attendance, and discipline records. Although gifted eligibility is not a prerequisite for admission, gifted program records are also reviewed if available (Hall County Public Schools, 2009). A committee including the Jinx County Schools Rigor Specialist and MA teachers reviews each application. There are no cutoff scores (e.g., minimum achievement or IQ test scores)

considered during the review process. Instead, the committee selects students based on "(a) interest and advanced ability in the arts and/or sciences, (b) creativity, (c) motivation, and (d) ability to work well independently and in small group settings" (Hall County Public Schools, n.d.-c, p. 2). On the basis of these criteria, MA students should be highly able and represent a variety of strengths and talents.

Since its inception in August of 2009, MA has become home to approximately 200 sixth, seventh, and eighth grade students from across Jinx County. MA operates as an extension of Renaissance Middle School (RMS), and all MA students have access to extracurricular activities at this neighboring facility. Demographic data by ethnicity for RMS, MA, and Jinx County are presented in Table 1.

Table 1

Percent of RMS, MA, and Jinx County Student Population by Ethnic Group

	No Race Identified[a]	American Indian or Alaskan Native	Asian or Pacific Islander	Black, not Hispanic	Hispanic	Multi-Racial	White, not Hispanic
MA		1	2	2	.9	6	79
RMS	.08	1	3	5	50	3	38
Jinx County	.23	.26	2	5	35	3	55

Note. Percents greater than one were rounded to the next whole number.
[a]Demographic data from student registration records. Parents had the option to not identify their child's race.

In addition to its innovative curriculum, one of the distinguishing features of MA is that it operates at a reduced cost when compared to traditional middle school models. For the 2009 school year Jinx County schools functioned on a budget that is ten million dollars less than in 2008 (Jordan, 2009, April 5). The average cost per student at MA is estimated to be 30-40% less than the average cost per middle school student at other schools (Jordan, 2009, August 8).

Costs are kept low in several ways. First, personnel costs are minimized: The school maintains a small staff of eight to ten teachers and one secretary, and there are no cafeteria workers, custodians, nurses, special education or English-language learning services. All families are required to provide their children with lunch, and families outside of the RMS zone must transport their children to and from school. Parents of enrolled students also commit to 20 hours of volunteer work each school year, and the students themselves take responsibility for helping keep the facilities clean. Laptops replace many expensive textbooks, and a costly media center is replaced with the Museum of Inspired Learning, which displays student work and exhibits on loan from local archeologists and visual artists (Jordan, 2009, August 8; Hall County Public Schools, 2009, October).

Michelangelo Academy's Efforts to Meet the Needs of High-Ability Students

The idea for MA came from three Jinx County teachers enrolled in a gifted endorsement class who were asked to conceptualize their dream school (Jordan, 2009, April 5). An integral part of this dream school was the broadened conception of giftedness inherent in the eligibility criteria. Based on program documentation, MA appears to incorporate many of the best practices for gifted and talented students identified in the research in order to achieve this mission (Hall County Public Schools n.d.-a; Hall County Public Schools, n.d.-b; Hall County Public Schools, n.d.-c; Jordan, 2009, April 5; Jordan, 2009, August 8). Rogers (2007)

highlighted five such best practices based on a synthesis of the research on educational practices for gifted and talented students. These five practices repeatedly encountered in the literature are:

1. Gifted and talented students need daily challenge in their areas of specific talent;

2. Gifted and talented students need regular opportunities to be unique and work independently in their areas of talent and passion;

3. Teachers must provide various forms of grade-based and subject-based acceleration to meet the educational needs of gifted and talented students;

4. Gifted and talented students need opportunities to learn and socialize with like-ability peers; and

5. Instructional delivery must be differentiated in pace and content presentation for specific curriculum areas.

Program descriptions have suggested that the curriculum and instruction at MA appear to reflect these best practices. In this regard, the program aims to be responsive to the educational and social-emotional needs of the high-ability students the program serves. This study examined MA's curriculum and instruction to determine the extent to which some of these practices are in place.

Curriculum and Instruction

Teacher characteristics. The NAGC State of the State Report (2009) said that most regular education teachers have little to no training in the education of the gifted. A mere five states require teachers to have pre-service training in gifted education, and general education teachers in 36 states are not required to have any training on the needs and nature of gifted students at any time in their teaching careers. In *A Nation Deceived* (2004), Colangelo et al. reported that many teacher preparation programs do not require course work on gifted students,

resulting in practicing teachers who are not prepared to teach highly capable students. In contrast, all of the teachers at MA are required to either have, or be working toward, the Georgia gifted endorsement. Teachers earn this add-on to their regular teaching certificate after demonstrating certain competencies related to the education of gifted students. This is typically accomplished through the completion of four courses related to gifted education, including characteristics of the gifted, methods and materials for teaching the gifted, curriculum and programming for gifted students, and assessment of the gifted.

MA teachers were carefully selected based on individuals' fit with the school's mission and curriculum and programming. Following Board of Education approval of the new program, the Jinx County Central Office sent out an internal web announcement to county employees. Deborah Jones, Jinx County Rigor Specialist, explained that the application process for MA was somewhat different from the typical hiring process in the county. For example, all interested teachers had to submit a written statement about why they wanted to work in an environment like MA, and also had to provide an example of a unit they'd taught that was interdisciplinary and fostered creativity. Jones and other program administrators wanted to ensure that hired teachers had a degree of experience with this type of curriculum, as there would be no time to train teachers in advance of the start of the school year. In general, administrators believed there were certain characteristics teachers must possess in order to be a good fit for the program and help reach the stated mission. MA administrators directly approached several teachers who had distinguished themselves at RMS and a second local middle school and encouraged them to apply. For example, one teacher had used the museum model with other students and was interested in developing this further. Two others were teachers of the gifted who stood out for their work with their students. The three teachers who came up with the original idea for MA as

part of their "dream school" project were also invited to apply, but declined for various reasons. Throughout the hiring process MA administrators were very transparent about the expectations of the program and its teachers. In advance of MA's second year several teaching positions were added and one teacher was replaced. Interested applicants were invited to walk through and observe MA classes, and the RMS principal and MA Museum Coordinator also observed applicants teaching in their own classrooms. Efforts like these helped ensure that hired teachers would be well suited to work in MA's unique environment.

Curriculum description. According to descriptions of the program, an integrated curriculum and interdisciplinary instruction emphasizing technology, world languages, and international education are at the heart of MA (Hall County Public Schools, 2009). Core subjects are taught using thematic units that pull in from multiple content areas, reinforcing how material connects across the traditional academic disciplines (Hall County Public Schools, n.d.-c). Thematic units are centered on issues of particular importance to middle school students, such as "my place in the global economy, resolving conflict in the 21st century, [and] environmental stewardship" (Hall County Public Schools, n.d.-c, p. 1). The Georgia Performance Standards (GPS) are integrated throughout each unit. Foreign languages offered include Mandarin Chinese and Spanish (Hall County Public Schools, n.d.-c; Jordan, 2009, April 5). All students are also able to earn high school credit in their areas of interest and strength (Hall County Public Schools, 2009).

Emphasis on discovery and exploration. Documentation on the program stated that the MA curriculum emphasizes discovery learning and collaborative exploration (Hall County Public Schools n.d.-a; Hall County Public Schools, n.d.-b; Hall County Public Schools, n.d.-c; Jordan, 2009, April 5; Jordan, 2009, August 8). Community resources are utilized regularly in

the form of collaboration with professional scientists, artists, and others who work with students individually or in small groups to explore areas of student interest (Hall County Public Schools, 2009). According to the documentation on the program (Hall County Public Schools n.d.-a; Hall County Public Schools, n.d.-b; Hall County Public Schools, n.d.-c), throughout their years at MA students are encouraged to become active participants in the construction of knowledge instead of passive recipients of information. This is accomplished by encouraging students to function as practitioners, researchers, creators, and problem solvers through applied learning experiences. Students are also regularly encouraged to assume the role of firsthand inquirer in authentic, inquiry-based learning. MA teachers further foster active student participation by allowing students to explore areas of identified interest in depth.

   Museum of Inspired Learning. Instead of a media center, MA features a Museum of Inspired Learning. Students research and create projects related to personal interests within an identified field of study to display in the museum, developing expertise in their field of study (Hall County Public Schools, 2009). Community members and local middle and elementary schools are invited to view the museum, with MA students acting as docents. As a result, MA students have an authentic audience to share their discoveries with (Hall County Public Schools, n.d.-c; Jordan, 2009, August 8). One MA teacher described the Museum as "the heart of the school". Finally, sophisticated use of technology pervades the MA curriculum. All students have access to laptop computers and wireless technology that can be used at school or at home (Hall County Public Schools, n.d.-c).

   Opportunities for challenge and acceleration. Program documentation further stated that a hallmark of the MA curriculum is systematic differentiation of challenge level of required material through processes like curriculum compacting; content intensification procedures by

which students test out of content that they already know and replace it with more in-depth learning experiences; and enrichment activities based on identified student interests. MA also offers middle school students numerous opportunities for accelerated learning, including high school classes. MA administrators are also currently in the process of accrediting college level courses for students. Additional special services for MA students include counseling and the arrangement of mentorships or internships for students as needed (Hall County Public Schools n.d.-a; Hall County Public Schools, n.d.-b; Hall County Public Schools, n.d.-c.; Jordan, 2009, April 5; Jordan, 2009, August 8).

Student Performance on State-Mandated Achievement Tests

Elementary and middle school students in the state of Georgia are required to take the Criterion Referenced Competency Test (CRCT), a standardized multiple choice test that measures student acquisition of the skills and knowledge outlined in the Georgia Performance Standards (GPS) (Georgia Department of Education, n.d.-b). This assessment provides information on academic achievement at the student, class, school, system, and state levels, and is part of Georgia's efforts to comply with NCLB. Information from the CRCT is used to identify student strengths and weaknesses related to the instruction of the GPS. All Georgia public school students in grades two through eight are required to take the English/Language Arts, Reading, and Mathematics subtests. Students in grades three through eight are additionally required to take the Science and Social Studies subtests. Students must meet a minimum grade level score on the Reading subtest in grade three and the Reading and Mathematics subtests in grade five in order to be promoted to the next grade level (Georgia Department of Education, n.d.-b). Georgia also uses the CRCT as part of the assessment component of federally mandated reporting of AYP. Schools and identified student groups (e.g., students with disabilities and

economically disadvantaged students) must meet or exceed Georgia's Annual Measurable Objectives (AMO) regarding the percentage of students scoring proficient or advanced on the Reading, English/Language Arts and Mathematics CRCT subtests (Georgia Department of Education, n.d.-a).

The threat of sanctions tied to student performance on tests like the CRCT has lead many educators to narrow their instruction, focusing on the content covered by these state tests. This practice is often at the expense of providing appropriately challenging and rigorous curriculum and instruction for gifted students. Descriptions of MA have suggested the school is committed to providing differentiated instruction that draws on the best practices in gifted education. Georgia state education standards are embedded in this instruction versus serving as the singular focus of teaching and learning at MA. Research has revealed a perceived concern amongst educators that students may not master grade-level standards if instruction is not specifically tailored to state assessments. An examination of MA students' performance on the CRCT can address this concern. Regardless of how one feels about such tests, they cannot be ignored as long as they are linked with school accountability, federal funding, and possible sanctions for poor results. The onus is on a new school program to demonstrate that students perform adequately on such mandated measures if the program hopes to remain viable; these are the high stakes in high-stake assessments. If MA students do demonstrate adequate progress on state tests, it can offer support for reconciling the program's emphasis on DI and standards based instruction.

MA's county of residence maintains a database of all enrolled students' CRCT scores from year to year. The 2010 CRCT scores for the current seventh and eighth grade students who were enrolled at MA during the proceeding year ($N = 107$) were investigated. Reading,

English/Language Arts, Mathematics, Science, and Social Studies scores were examined for the

percentage of students who met or exceeded the minimum grade-level score set by the state of

Georgia. These scores are presented in Table 2.

Table 2

Percent of MA Students who Met or Exceeded Minimum State Criteria on the 2010 CRCT

		CRCT Content Domains			
	Reading	ELA[a]	Math	Science	SS[b]
% Met or exceeded criteria	100	100	96	100	97
N Met or exceeded criteria	107	107	103	107	104

[a]English/Language Arts. [b]Social Studies.

These data from the program's first year suggest that MA students are performing satisfactorily

on the state-mandated assessments, a necessary concern in the current climate of school reform.

Possible Outcomes from the Michelangelo Academy Methods

Rogers (2007) suggested that the most important lesson to be learned from research in

gifted education is that there are many different ways schools can offer these opportunities to

their most able students. Schools can select methods that best align with existing philosophy,

staff, and community features (Rogers, 2007).

Student Outcomes

Based on the negative effects experienced by high-ability students

in heterogeneous, "one-size-fits-all" classrooms across the country, a number of positive student

outcomes can be predicted from participation in MA. As Hertberg-Davis (2009) suggested,

"who wouldn't agree that students learn more efficiently and effectively when learning tasks are geared towards their individual needs?" (p. 251) Increased student engagement, achievement, problem-solving abilities, creativity, motivation, positive feelings about school and self, and self-efficacy are just a few of the benefits high-ability students can reap from curriculum and instruction tailored to their aptitudes, characteristics, and preferences (Dobyns et al., 1993; Kulik & Kulik, 1987; Moon, 2009; Reis et al., 1993; Tomlinson, 1999; Tomlinson, 2000; Tomlinson, 2003). MA students may also experience a decrease in the boredom, frustration, and resentment at the slow pace of learning experienced by high-ability students in classrooms where differentiation is not practiced in favor of preparation for the mandated state assessments. The achievement ceiling is removed for MA students through practices like curriculum compacting, opportunities to take high school courses, and attention to student interests. As Tomlinson (2000) recommended, state standards are incorporated *into* the MA curriculum, as opposed to *becoming* the curriculum. Possible observable MA student outcomes include positive attitudes toward the program's curriculum and instruction, and mastery of grade level state standards as measured by mandated state achievement test.

Teacher Outcomes

Research on the effects of state standardized testing programs on teachers reveals several consistent themes. First, teachers feel frustration and pressure to focus instruction on preparing students for state-mandated tests due to the seemingly prescribed mandate from administration to do so (Moon et al., 2003; Moon et al., 2007). Teachers interviewed reported that they gear their instruction toward the lower end of students' academic levels. Teachers' practice is greatly influenced by their perception of tests and standards. In particular, schools' emphasis on state standardized assessments can lessen teachers' willingness to try innovative or creative teaching

strategies or to differentiate for the diverse learning needs of students (Moon et al., 2003; Moon et al., 2007).

MA emphasizes the goal of instilling students with a life-long love of learning and intellectual curiosity by implementing a responsive curriculum for high-ability learners. This is in opposition to the prevailing and arguably more limited goal of demonstrating high student scores on standardized tests. As a result, one possible outcome of MA is an improved attitude towards teaching on the part of its instructors. Furthermore, with the goal of preparing students to be strong thinkers versus strong test takers, teachers gain the opportunity to be creative and try innovative teaching strategies. In general, MA teachers may have more positive perceptions of differentiation and be more willing to practice differentiated instruction in the classroom.

Summary

The Michelangelo Academy is a middle school program of choice designed for students with a passion for technology, science, and the arts, with an emphasis on creative productivity and challenging academic standards. The program was created to provide high-end learning opportunities for bright, motivated students in the context of seeming obstacles including the standards based reform movement and shrinking school budgets. The program's designers have applied existing aspects of gifted models and best practices from the field in a new way to meet the needs of gifted students in the context of their county. As this program evolves, so does the potential for replication in other settings. The purpose of this research was to examine a cornerstone of the MA program the quality of: instructional delivery. Specifically, this study examined teachers' practices and perceptions of differentiated instruction, (DI), an instructional practice that allows teachers to deliver curriculum that is responsive, compelling, and flexible as a means to reach stated goals for gifted students.

CHAPTER 3

METHODS

Research Design

A sequential mixed methods case study design (Greene, 2007; Teddlie & Tashakkori, 2003) was used, in which the research methods were given equal status. The case under study was Michelangelo Academy (MA). Both quantitative and qualitative research methods were used to answer research questions. This design was sequential because quantitative data (observations and surveys) were collected first. The decision to use mixed methods rested on the belief that engaging multiple approaches to social inquiry can provide a fuller picture of the subject under investigation than the use of a single approach (Greene, 2007). Greene (2007) noted that a mixed methods study has the advantages of improving validity and credibility, broadening and deepening understandings, and involving multiple, possibly incongruous perspectives.

I decided to begin with quantitative data collection so as not to affect the qualitative data; I did not want to influence teachers' behavior as a result of the interview questions related to differentiated instruction (DI). There was a risk that, based on these questions, teachers may believe I was specifically examining their classroom differentiation practices and alter what they did accordingly. This could have influenced whether or not teachers' typical classroom instruction was captured. Therefore the process of gathering qualitative data from teacher interviews was begun after the completion of classroom observations and student surveys.

Mixing occurred at the level of research questions, methods, and data interpretation; data

were analyzed independently (Greene, 2007). Quantitative data were of importance when examining actual teacher practices of differentiation, a guiding principle of MA; qualitative data were essential for understanding teacher perceptions of DI. Both quantitative and qualitative data were then compared for triangulation and complementarity. Figure 2 provides a graphical representation of the design used in the study.
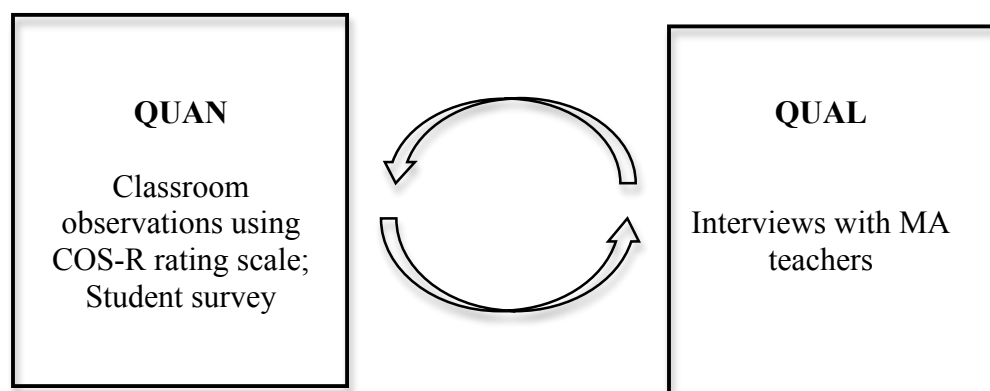
Figure 2. Graphical representation of mixed method design showing sources for quantitative and qualitative data as well as the order of the data collection and analysis.

Mixed Method Purpose

I decided to mix quantitative and qualitative approaches to allow for *between methods triangulation* and *complementarity*. Jick (1983) defined between methods triangulation as, "the use of multiple methods to examine the same dimension of a research problem" (p. 136). The use of triangulation in this context refers to the combination and comparison of data across different research methods. Greene (2007), described complementarity as seeking "broader, deeper, and more comprehensive social understandings by using methods that tap into different

facets or dimensions of the *same complex phenomenon*" (p. 101). First, this study focused on the effectiveness of teachers' differentiation practices, which was examined through the use of rating scales from classroom observations and student surveys. Second, this study explored teachers' perceptions of differentiation. Interviews were conducted to elicit teachers' definition of differentiation and their perceptions of the value of DI for gifted students. Once all data were collected they were analyzed to see if teachers' perceptions of differentiation converge with their actual implementation of differentiation in the classroom. Finally, I also wanted to capture a more holistic portrayal of the context under study. In this regard, the use of triangulation could potentially uncover differences in teacher perceptions and actions, which was useful information for school stakeholders.

As noted above, I investigated teachers' perceptions *and* practices of DI. The different methods used (e.g., interviews, observations, and surveys) helped elaborate and enhance the research findings on teachers' perceptions and practices of DI by including multiple stakeholders and variables. I sought to broaden research findings, allowing an emphasis on implications for other school programs and teacher practices.

Participants

Observations and Interviews

Six MA teachers across grade levels and content areas, including English/Language Arts, Science, Social Studies, and Technology, consented to participate in classroom observations and interviews. An additional three gifted education teachers were also observed at Renaissance Middle School (RMS), the neighboring middle school under which MA operates. The purpose of these observations at RMS was to ensure the observation rubric used in the study captured variability in teachers' practices of DI, and will be discussed in greater depth in a subsequent

section. The teachers at RMS were selected after MA teacher consent was attained; teachers at RMS were targeted because they taught the same grade level and/or content area as a participating MA teacher.

Surveys

As part of the process of survey validation, a draft survey was administered to 88 MA students (approximately half of the total student body) and 85 RMS students enrolled in gifted and/or advanced content area classes across sixth through eighth grades ($N = 173$). Rationale for the selection of draft survey participants is discussed in greater detail in a subsequent section. A final student survey was administered to the remaining 89 MA students who did not take the draft survey. These students all had at least one class with one of the MA teachers who participated in this study.

<div align="center">

Description of Measures

</div>

Observations

The first guiding research question dealt specifically with how effectively teachers were differentiating in the classroom. I identified a tool to use to measure teachers' differentiation practices: The Classroom Observation Scale-Revised (COS-R; VanTassel-Baska et al., 2003; see Appendix A). This structured rubric was developed to assess teaching practices against expectations from regular education and gifted education best practices (VanTassel-Baska, Feng, Brown et al., 2008). The scale includes 25 targeted teaching behaviors subsumed under six different subscales: curriculum planning and development (CPD), accommodation for individual differences (AID), problem solving strategies (PS), critical thinking strategies (CRI), creative thinking strategies (CRE), and research strategies (RS). Each of the targeted behaviors is

measured using a 3-point Likert scale. A rating of 1 means "not effective", 2 means "somewhat effective", and 3 means "effective" (VanTassel-Baska, Feng, Brown et al., 2008).

Reliability data for the COS-R was provided from two observation periods involving 23 pairs of observers visiting 73 classrooms on two different occasions The COS-R has high overall internal consistency reliability (Alpha .91 and .93), and relatively high coefficients for the sub-categories (average Alpha .7). The inter-rater reliability was established at .87 and .89 based on two observation periods. Content validity was established at .98. The instrument developers used the intra-class coefficient Alpha to examine four raters' agreement on the clarity of the items included in the COS-R. The agreement for the clarity of items was .99, providing evidence that the items are clearly written (VanTassel-Baska, Quek, & Fang, 2005).

The COS-R User's Manual recommends that observations of teachers' lessons last 30 to 50 minutes. Scorers are encouraged to write a narrative report of the instructional behaviors observed during the observation period, including a description of teachers' questions and actions, student responses, duration of and transitions between activities (VanTassel-Baska et al., 2005). The observer then scores the 25 items on the COS-R immediately after the observation using the narrative recording as a reference. There are also comment boxes under each subscale on the rating scale where observers can add additional notes or questions related to the observation. What results is a rubric with clearly interpretable scores for items and subscales, as well as rich narrative data that can be used to clarify and substantiate ratings. This combination facilitates the ease with which researchers, teachers, and other stakeholders can interpret scores. This scale is of even greater use to a program like MA because it specifically includes behaviors associated with differentiated instruction that can ultimately lead to the program's desire for a curriculum that emphasizes creative productivity and challenging academic standards.

I elected to observe three gifted education teachers at RMS prior to beginning observations of MA teachers. MA is an extension of RMS, and all MA students are officially enrolled there. The purposes of these observations at RMS were two-fold: (a) to practice using the COS-R in advance of actual study data collection, identify any questions or concerns about using the rubric, and become more familiar with targeted behaviors included in the instrument; and (b) to confirm that the COS-R captured variability in teachers' differentiation practices. I hypothesized that if the COS-R did indeed capture variability in DI behaviors, the ratings for gifted teachers at RMS would be different from those for teachers at MA, with MA teachers demonstrating greater levels of DI based on the school's mission statement, student body, and expected teacher characteristics. Specifically, I hypothesized that MA teachers would demonstrate more of the behaviors included in the COS-R and earn higher ratings when compared with RMS teachers. I contacted RMS's principal and arranged to observe RMS teachers in gifted and/or advanced classes representing content areas, students, and grade levels similar to those taught by MA participants. RMS teachers were matched with participating MA teachers to help control for other factors that may influence teachers' level of differentiation. Each RMS teacher was observed two times to ensure a more representative sample of his or her teaching practice. A review of other studies in which the COS-R was used further revealed that researchers conducted two observations as part of data collection using the rubric (VanTassel-Baska, Feng, Brown, et al., 2008; VanTassel-Baska, Feng, & MacFarlane, 2008). The percent of time teachers used behaviors in each subscale was calculated by dividing the total number of possible occurrences for all the behaviors included in the subscale by the observed number of occurrences. The average teacher rating for each subscale was also calculated. These findings

are presented in Table 3, and demonstrated that the COS-R did capture variability in teachers'

use of DI.

Table 3

Comparison of MA and RMS COS-R Subscale Means and Percent of Time Used

	MA Teachers			RMS Teachers		
	N	*M (SD)*	%[a]	*N*	*M (SD)*	%[a]
CPD	6	2.67 (.51)	80	3	2.35 (.67)	67
AID	6	2.88 (.16)	81	3	2.25 (.66)	71
PS	6	2.78 (.50)	33	3	[b]	0
CRI	6	2.71 (.35)	55	3	2.33 (.00)	25
CRE	6	2.76 (.49)	50	3	1.75 (.00)	33
RS	6	2.50 (.60)	13	3	3.00 (.00)[c]	3

Note. CPD = curriculum planning and delivery; AID = accommodations for individual differences; PS = problem solving; CRI = critical thinking strategies; CRE = creative thinking strategies; RS = research strategies;
[a]Percent of time subscale behaviors used across observations. [b]Behavior not observed. [c]Only one observation of one behavior across teachers.

The COS-R developers intended for observers to visit targeted classrooms in pairs to

ensure inter-rater reliability in the context of any new research or evaluation. Inter-rater

reliability refers to different scorers' consistency in rating students (Nitko & Brookhart, 2007).

A second rater accompanied me on the first four of the 22 observations at MA, observing four

different participating teachers one time each. Inter-rater reliability was examined at the start of

the study to support the validity of subsequent findings. The second observer had a

demonstrated understanding of differentiated instruction for gifted and talented students,

ensuring his ability to identify behaviors within the construct of interest. I contacted the COS-R

developers prior to beginning the study to try and get the video and other materials that were

used to train observers for the pilot study, but was unable to secure these. Instead the second

observer and I reviewed the COS-R manual and rubric several times to ensure familiarity with

the items and directions. The observations at RMS further prepared me to use the rating scale.

I compared my ratings with the second observer's after the first two observations,

discussing why behaviors were recorded as occurring or not observed, and any assigned ratings.

The mean percent of agreement between my ratings and the second observer's four ratings was

calculated to be 88%, an acceptable level of inter-rater agreement. The percent agreement for

each of the four observations is presented in Table 4. An analysis of these ratings revealed two

types of disagreement: differences in whether or not a behavior was recorded as observed and

different ratings for an observed behavior.

Table 4

Percent Inter-rater Agreement Across Observations

		Observations			
	1	2	3	4	*M*
% agreement	88	88	92	84	88

In addition to the steps outlined above, methods were used to specifically examine the

decision accuracy of the COS-R. Crocker and Algina (1986) explained that, "in many cases a

test user wants to draw inferences from test scores to examinee behavior on some performance

criteria that cannot be directly measured by a test" (p. 224). However, before one can

confidently make such decisions there must be some evidence of a relationship between the test

score and the criterion performance. This evidence was obtained for the present study by

criterion-related validation (Crocker & Algina, 1986). An MA administrator who was an expert

in DI and had worked closely with the participating teachers was asked to rank each teacher as

"novice", "proficient", or "advanced" based on her observation of their differentiation practices.

These three categories were identified at the suggestion of the MA administrator. She

hypothesized that there may be some variability in the level of differentiation practiced by MA

teachers. For example, some teachers are in the process of completing their gifted endorsement

coursework, while others currently have it, which may affect their skill with DI. The MA

administrator assigned these ratings concurrent with the researcher's observations, resulting

specifically in *concurrent criterion-related validation*.

If my ratings on the COS-R were accurate, I predicted that individuals who were rated by

the MA administrator as "expert" would receive very high ratings on the COS-R, while the

scores of individuals ranked as "proficient" or "novice" would be somewhat lower. Given that

there were an uneven number of observations for the teachers, each participating teacher's total

COS-R score for the first three observations was examined. The MA administrator rated three

teachers as "experts" and three as "proficient". These ratings corresponded with the total COS-R

scores for the first three observations; the three teachers with the highest total COS-R scores

were those rated as "expert" by the administrator and the three with the lowest scores had been

rated "proficient".

Survey

Another important consideration when evaluating the effectiveness of teachers'

differentiation practices is the extent to which students feel they are appropriately challenged and engaged, two intended outcomes of differentiated instruction. In classrooms where differentiation for high-ability learners is emphasized, factors including boredom, lack of motivation, and frustration with environments that ignore their talents and interests can ideally be reduced or eliminated entirely. In turn, schools can become inviting places that foster a love of learning. Several studies have collected student survey data to examine students' views of their schooling (Gallagher, Harradine, & Coleman, 1996; Reis et al., 1993). I was unable to identify any existing instruments in the literature that could be used to measure students' perceptions of the level of curricular differentiation. I therefore decided to develop a student survey for this purpose.

Tomlinson (2003) noted that student needs are the impetus for differentiation. Furthermore, teachers can differentiate more effectively as they better their understanding of how these needs manifest in class and are met by classroom experiences (Tomlinson, 2003). This work formed the theoretical basis for the survey I created. Tomlinson (2003) identified five specific needs learners seek to meet in school: affirmation, contribution, power, purpose, and challenge. Affirmation refers to self-esteem issues, including students' need to feel accepted and acknowledged; contribution is related to self-efficacy, or students' need to feel they make a difference; power refers to students' need for some control over their learning, and that learning in turn gives them increased power in their world; purpose refers to students' need to understand why they should learn what is taught; and challenge refers to students' need to be stretched and strengthened by classroom work. Students whose needs are met will continually invest in school (Tomlinson, 2003).

I created a draft survey to administer to 173 students at RMS and MA for the purposes of

survey validation. Experts in the field of research and measurement agree that there must be

evidence to support an instrument's validity (American Educational Research Association,

American Psychological Association, & National Council on Measurement in Education, 1999;

Benson & Clark, 1982; Kane, 1992; Messick, 1995); instrument developers must present a

comprehensive argument that interpretations made from data collected with a given instrument

are correct. Kane (1992) explained:

> Validity is associated with the interpretation assigned to a test scores rather than with the
>
> test scores or the test. The interpretation involves an argument leading from the scores to
>
> score-based statements or decisions, and the validity of the interpretation depends on the
>
> plausibility of the interpretive argument. (p. 527)

I addressed this need for support through the process of survey validation in advance of data

collection.

     Theoretical base. I completed an extensive review of the existing literature on DI prior to

creating the scale, paying particular attention to the theoretical base for DI, teacher practices, and

gifted students' responses in the presence or absence of DI. An important consideration when

evaluating the effectiveness of teachers' differentiation practices is the extent to which students

feel they are appropriately challenged and engaged, two intended outcomes of DI. Tomlinson

(2003), recognized as an expert on DI, noted that students' needs are the impetus for DI.

Accordingly, appropriately differentiated instruction should ensure that students' needs are met.

This theory of the relationship between students' needs and DI led me to adopt three of the needs

proposed by Tomlinson as the basis for a survey measuring the effectiveness of teachers'

practices of DI.   I wanted to have a sufficient number of survey items to conduct a principal axis

factor analysis (PAF) and to adhere to the recommended three to five items per construct

(MacCallum, Widaman, Zhang, & Hong, 1999). However, including too many items could possibly overwhelm the middle school participants, affecting the accuracy of their results. I elected to focus on three of Tomlinson's needs identified as being critical indicators of DI. These three needs (power, purpose, and challenge) particularly seemed to be addressed by the vision of the MA program, which seeks to offer challenging, rigorous curriculum that fosters student empowerment and engagement.

Content validity. Content validity describes the degree to which assessment items are representative of a larger domain of performance (Nitko & Brookhart, 2007). I began the process of survey validation by constructing a Likert survey with a 7-point scale. Tomlinson (2003) provided examples of statements associated with the need for power, purpose, and challenge, and I adopted 15 of these statements for the draft survey (five items represented each of the three needs). I then wrote three additional statements representing each need, resulting in 24 statements in all (eight predicted to represent each of the three needs). I selected this number of items so that in the event items were eliminated after the pilot survey, a recommended minimum of three to five items per construct would remain (MacCallum et al., 1999) and a desirable Alpha coefficient could be attained (Pett, Lackey, & Sullivan, 2003). I compiled these 24 statements in random order in a table and sent this to six experts in the field of gifted education for the purpose of establishing content validity. Five of these six individuals have a doctorate in Gifted and Creative Education and are currently teaching gifted courses at the university level. The sixth expert teaches gifted students in a public elementary school and has completed all of her coursework toward her doctorate in gifted education. I directed each of the six reviewers to examine the 24 items and identify the need - power, purpose, or challenge - they thought each item addressed. The reviewers were further provided with the following definition

of each need to reference when reviewing items:

1. *Power***:** Students have a need for power in school; they need to feel some control/power in school, that their interests and needs are acknowledged;

2. *Purpose:* Students have a need for purpose in school; they want to understand why they are doing what they do, and how it relates to their lives (relevance);

3. *Challenge:* Students have a need for challenge in school; they perceive their work is within their zone of proximal development, not too easy. Students want to feel stretched by their schoolwork.

I examined each reviewer's responses to determine whether or not he or she assigned a statement to the same need I predicted. I retained 15 items where at least five of the six reviewers assigned the same need predicted by the researcher. In two instances six out of six reviewers assigned an item the same need, although this was a different need from what I predicted. In both cases I retained the item and reassigned it to the need agreed upon by all of the reviewers. For example, the item "What I learn in school is useful to me now" was originally predicted to represent the need for power. However, all six of the reviewers responded that this statement represented the need for purpose, and I reassigned the statement accordingly.

I rewrote the remaining six items that did not reach consensus among at least five of the six experts surveyed during the initial review so as to make them more representative of their assigned need. For example, the statement "I know what quality looks like at my school and how to achieve it" was predicted to represent the need for power. However, only four out of the six reviewers assigned it to this need. I changed the statement to, "I know what I must do in order to succeed at my school" in an effort to better capture the need for power. These six rewritten items were sent to same six experts for a second review, following the same directions

as the first review procedure. A consensus of at least five out of six experts assigned each of these revised items to the need I predicted, at which point all items were retained. All 24 items were then compiled into a student survey for the purposes of validation.

Pilot survey administration. The 24-item pilot survey was administered to 85 students at RMS and 88 students at MA ($N = 173$). This sample size met Comrey and Lee's (1992) criteria of "fair" for the number of cases needed for factor analysis, and Gorsuch's (1993) recommended five participants per variable. The RMS students were in classes taught by the gifted teachers included in pre-study observations. I went to each RMS and MA class to administer the survey. Students were informed that the survey was anonymous and that they did not need to write their name or any other identifying information on the survey. In some instances students had questions about survey language (e.g., what did the word "absorbs" mean in Item 9) and I attempted to clarify meaning through rephrasing.

Internal consistency reliability. Pilot survey results were entered into SPSS (Version 18) and a reliability analysis was performed, resulting in a correlation matrix used to analyze the relationship between items.   There were moderate correlations between some items, suggesting some items were related. The correlation matrix is included in Appendix C. This finding was expected based on the underlying theory and the grouping of items according to the needs of power, purpose, and challenge. I also examined each item's score distribution using scatter plots and measures of skewness and kurtosis. Score distributions indicate whether or not the underlying assumption of normality can be upheld. A critical value of $|2|$ was used to test for both skewness and kurtosis (Crocker & Algina, 1986). Survey Items 4 and 18 had measures of skewness and kurtosis above this recommended value, and scatter plots that violated normality. Both of these items were included under the construct of power, and were transformed using

their R^2 values. The "Cronbach's Alpha if item deleted" feature was used in order to identify items that did not significantly contribute to the scale's reliability. The deletion of Items 4 and 18 raised Cronbach's Alpha internal consistency coefficient from .75 to .88. I decided to eliminate these items based on this increase in Alpha and the fact that both of these items had scatter plots and measures of skewness and kurtosis that violated normality.

A reliability analysis was also run within each of the three identified constructs (power, purpose, and challenge). Acceptable internal consistency coefficients were obtained for all three constructs and are presented in Table 5. Alpha was somewhat lower for the construct of power, which may be attributed to the smaller number of items ($n = 6$) for this construct after the deletion of Items 4 and 18.

Table 5

Cronbach's Alpha Internal Consistency Reliability Coefficients by Survey Construct

Construct	Alpha Coefficient
Purpose (8)[a]	.854
Challenge (8)	.775
Power (6)	.636

[a]Number of items comprising the subscale

This examination of reliability coefficients raised the additional question of how high coefficients should be to demonstrate adequate reliability. Rudner and Schafer (2001) indicated that the consequences of the use of the test are an important consideration when making this determination. If the consequences are high, as with tests used to place students in special education programming or for professional certification, then the internal consistency reliability

needs to be correspondingly high: preferably above .90. Large-scale tests typically report

reliability coefficients that exceed .80. The intended use of this survey is to provide me with an

indication of the extent to which MA teachers are differentiating instruction; consequences

resulting from this sharing of information are not considered high as in the scenarios above. As a

result, the reliability coefficients reported may be used as indicators of the overall internal

consistency of the items included on the survey.

Construct validity. An exploratory factor analysis on the remaining 22 survey items was

conducted in SPSS (Version 18) using principal axis factoring (PAF). PAF was selected because

the purpose of this analysis was to determine the underlying constructs, or factor structure, of the

survey. The number of factors to be included in the solution was not restricted for the first

analysis. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (.853) and Bartlett's

Test of Sphericity ($p <.000$) both suggested that the data were factorable. The resulting scree

plot, Eigenvalues, and percent of total variance explained were then examined. The scree plot

suggested a three-factor solution, while the number of factors with an Eigenvalue greater than

one suggested a six-factor solution and accounted for 64% of the total variance explained. The

data were subjected to a Direct Oblimin rotation, using the number of factors obtained from the

PAF, to maximize the variance of the loadings on each factor. I used an oblique rotational

technique because the underlying factors were assumed to be correlated based on the theoretical

foundations of the survey. The scree plot for the rotated solution again suggested a three-factor

solution, while the factor loadings and percent of total variance explained suggested a six-factor

solution. An examination of the factor loadings revealed that some of the related survey items

were loading under the same factors, as anticipated. For example, eight of the survey items that

loaded highest on factor one were the items associated with purpose, and four of the six items

that loaded on factor two were the challenge items. Based on this observation, the rotated scree

plot, and the underlying theory, the analysis was then repeated with a forced three-component

solution and subjected to Oblimin rotation. The scree plot (see Figure 3) once again suggested a

possible three-factor solution.
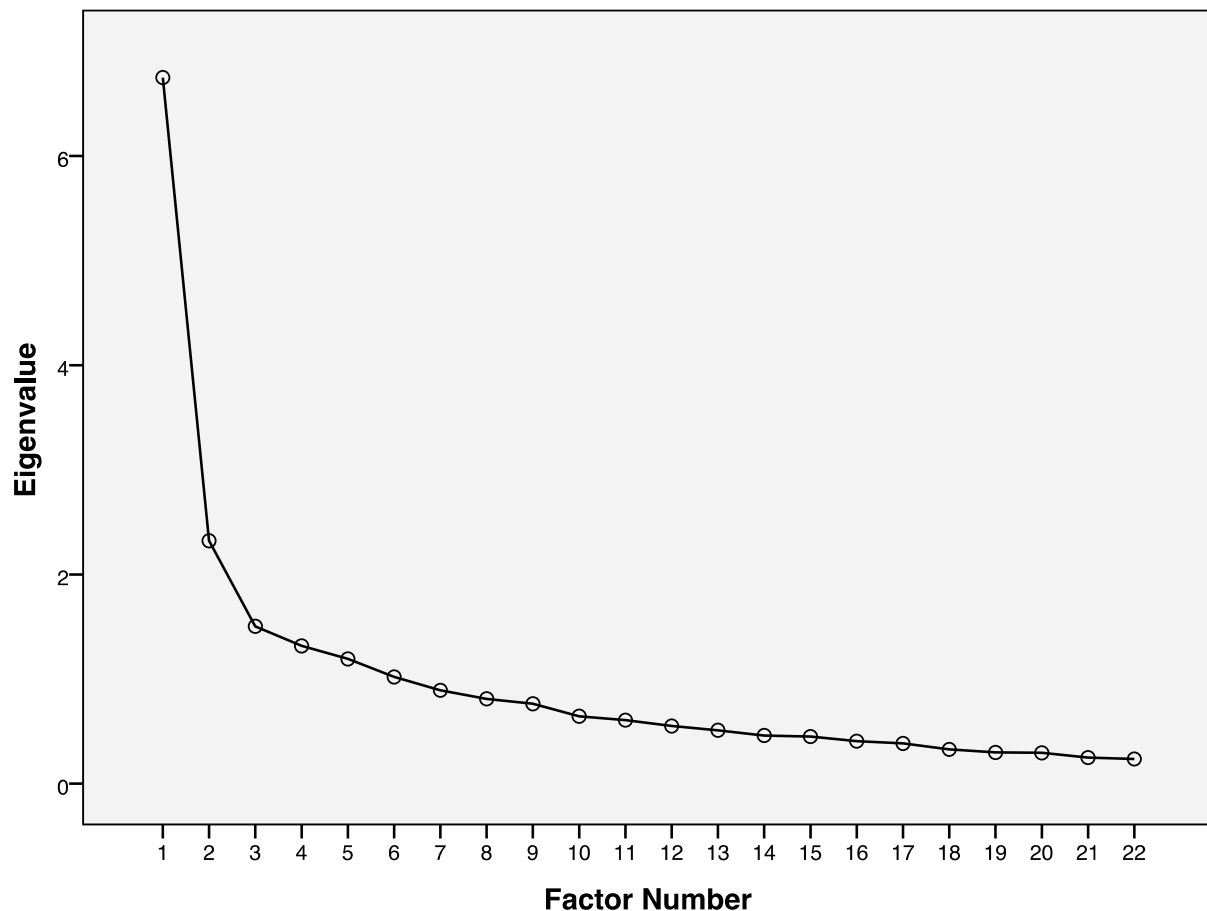
Figure 3, Scree plot from forced three-factor solution with Oblimin rotation

An examination of the factor loadings (see Table 6) also provided some support for a three-

factor solution. Factor loadings of .30 or higher were retained. All eight of the purpose items

loaded on factor one, four of the eight challenge items loaded on factor two, and three of the six

power items loaded on factor three.

Table 6

Pilot Survey Factor Loadings for Forced Thre- Factor Solution With Oblimin Rotation

	Factor		
Item	1[a]	2[b]	3[c]
1	**.573**		
2	.483		
3			**.895**
4	.580		
5	**.445**		
6	**.788**		
7	.768		
8	**.671**		
9	.679		
10	**.483**		.302
11	.377	**.376**	
12		**.612**	
13	.390	.451	
14		**.555**	
15	**.631**		
16	.612	.392	
17	.575	.490	.326

18	.430		**.428**	
19		**.745**		
20	**.634**			
21		**.640**		
22			**.409**	

Note. Boldfaced = loadings for items related to the factor. Loadings <.30 were suppressed.
[a]Purpose. [b]Challenge. [c]Power.

This three-factor solution accounted for 48% of the total variance explained (see Table 7). Social desirability, unfamiliarity with certain vocabulary, and a smaller *n* for purpose items, as previously discussed, are several considerations that may help explain this. While these data do not offer optimal support for a three-factor model, taken together they do lend support for a three-factor solution for the purposes of this study; the factor loadings alone suggested that survey items are clustered around factors as predicted. I elected to proceed with the assumption that the student survey measured three distinct student needs (power, purpose, and challenge) addressed by differentiated instruction. However, findings from the PAF indicated that caution be exercised when interpreting final survey results and making inferences from these data.

Table 7

Total Variance Explained for Forced Three-Factor Solution

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance
1	6.749	30.677	30.677	6.184	28.108
2	2.322	10.556	41.233	1.765	8.023
3	1.504	6.838	48.071	1.075	4.887
4	1.317	5.987	54.058		
5	1.193	5.422	59.480		
6	1.021	4.640	64.120		

7	.893	4.059	68.178
8	.811	3.686	71.864
9	.764	3.472	75.337
10	.645	2.931	78.267
11	.607	2.761	81.028
12	.552	2.508	83.536
13	.511	2.322	85.858
14	.461	2.095	87.953
15	.451	2.049	90.001
16	.407	1.848	91.849
17	.385	1.750	93.600
18	.328	1.491	95.091
19	.299	1.359	96.450
20	.295	1.340	97.790
21	.250	1.136	98.926
22	.236	1.074	100.00

The process of survey validation resulted in a final 22-item Likert survey with a 7-point scale. A rating of '7' meant complete agreement with a statement, and a rating of '1' meant complete disagreement. The final survey included eight items representing the need for purpose and challenge, and six items representing the need for power (see Appendix B). Based on the relationship between the statements included in the survey and teacher differentiation, as discussed above, survey scores were used as evidence to answer the question regarding the effectiveness of teachers' practices of differentiated instruction.

Teacher Interviews

Tomlinson (1999) stated that the teacher must be atop the learning triangle (see Figure 1) as the leader who controls the climate in an effective classroom. "Leadership can and should be shared with the learners, but responsibility for the leadership resides with the adult who is charged by professionalism, tradition, and law with that task" (Tomlinson, 1999, p. 28). The second guiding question of this study addressed teachers' perceptions of DI. Researchers have

used semi-structured interviews with teachers to gain valuable insight into beliefs about and perceptions of differentiation (Moon et al., 2003; Moon et al., 2007; Westberg et al., 1993). Research studies have also found that teachers' beliefs about differentiation influence teaching practices (Moon et al., 2003; Moon et al., 2007). Semi-structured interviews with MA teachers were used to provide important information and insight when examining teachers' beliefs about and practices of DI, and factors that may influence these.

Focus group questions were written to encourage teachers' discussion of their perceptions of DI. All teachers were asked the following three questions: How do you define differentiated instruction? What are your beliefs about differentiated instruction? What are factors that may help or hinder differentiated instruction? A summary of the data sources used to answer each guiding research question is presented in Table 8.

Table 8

Methods Associated with Research Questions

Research Question	Quantitative Data Source	Qualitative Data Source
1) How effectively are MA teachers differentiating instruction for students?	Classroom observations and student surveys	
2) What are MA teachers' perceptions of DI?		Interviews with participating teachers
3) What is the relationship between MA teachers' perceptions and practices of DI?	Classroom observations and student surveys	Interviews with participating teachers

Procedures

Observations

Prior to beginning the study I made arrangements with an MA administrator to explain the study, including expectations and rights of participants, and review the participant consent form with the teachers during a regularly scheduled faculty meeting. I then distributed consent forms to all twelve teachers and asked individuals who were willing to participate to return signed forms to an assigned MA administrator. Seven teachers across grade levels and content areas returned signed forms. One consenting teacher had a student teacher who would be teaching throughout much of the period of data collection, so she was not included.

Formal observations of teachers at MA began immediately after the completion of observations at neighboring Renaissance Middle School (RMS). At the start of the study, I intended to observe each teacher three times, for a total of 18 observations. I elected to complete multiple observations per teacher because not all lessons provided an opportunity to observe all of the DI behaviors included in the scale; conducting a minimum of three observations per teacher allowed for a representative sample of teachers' instruction. A review of other studies also indicated that researchers using the COS-R to study DI completed at least two observations, as discussed above. However, I was able to observe four of the six teachers four times each. Due to research time constraints and the beginning of CRCT testing at MA, a fourth observation was not completed for two of the six teachers; these two teachers were observed for the minimum three times each. This resulted in a total of 22 teacher observations in all.

I contacted teachers in advance of observations to determine if there were any tests, guest speakers, field trips, or other activities that would interrupt a typical class period of instruction during a school week. Teachers were alerted to the possibility of an observation a day in

advance. This served as a second check to ensure that observable teacher instruction would be occurring during a given class period. Observations occurred over a seven-week period, and I observed teachers during different class periods when possible.

All observations lasted for 50 minutes (one class period), a duration recommended in the COS-R user's manual. I took detailed anecdotal notes including descriptions of: types of activities, duration of activities, teacher directions and instruction, teacher and student questions and comments, and student responses to instructions and activities. These notes were then used to complete the COS-R ratings immediately after each observation, procedures also recommended in the user's manual. Notes supported ratings with specific examples of teacher behavior.

Surveys

Student perceptions are an important consideration when evaluating the effectiveness of teachers' differentiation practices, as discussed above. The finalized 22-item survey (see Appendix B) was administered to the remaining 89 MA students who had not taken the pilot version. Administration procedures were identical to those used for the pilot survey. Surveys were administered during the first period class, when the students were in the classes of five of the six participating teachers (the sixth teacher had planning first period). I explained the directions to the students and was available to answer any questions while students completed survey items. Several students asked for clarification about vocabulary included in the survey, and I reviewed the meaning of a word as needed.

Teacher Interviews

Semi-structured interviews were conducted with participating teachers after all observations were completed. I originally intended to conduct two separate group interviews,

each with three teachers. The decision to conduct group interviews rested on the assumption that group dynamics would enhance the conversation as teachers elaborated on and responded to one another's comments. MA is distinguished by a small faculty of only 12 teachers who have shared in the evolution of the program. There was an observable level of familiarity and comfort among faculty members, further influencing the decision to conduct group interviews.

I worked with faculty members to find mutually convenient times to conduct group interviews. Due to scheduling conflicts one teacher was interviewed independently, while the remaining five were interviewed in groups of two and three. The two group interviews lasted approximately 45 minutes, while the individual interview lasted 25 minutes. All interviews were audio recorded with the consent of participants and transcribed verbatim. I took field notes during the interviews, including notes about emergent themes within and across interviews. Follow up questions were asked to get participants to clarify or expand on responses, or to encourage participants to respond to one another's statements. In several instances I also asked follow up questions related to the classroom observations, specifically activities, statements, or teacher actions that appeared to pertain to teachers' perceptions and practices of differentiated instruction.

Analysis

Observations

Quantitative data from the COS-R was analyzed using SPSS (Version 18). Two different dimensions of the COS-R data were examined. First, ratings across participants were examined. Descriptive statistics were generated for all items, including measures of central tendency. Ratings within participants were then examined, including rating patterns in the subscales for individual teachers. These results were used to answer Question 1: How effectively are

Michelangelo Academy teachers differentiating instruction for students?

Observation data were also compared with survey and interview data as part of the intended research purpose of data triangulation and complementarity. During data comparison I investigated relationship patterns, including themes, stories, or variable clusters that seem to go together (Greene, 2007). More specifically, teachers' perceptions of differentiation, their classroom practices, and students' perceptions of MA curriculum and instruction were compared. Data comparison led to the discussion related to Question 3: What is the relationship between Michelangelo Academy teachers' perceptions and practices of differentiated instruction?

Surveys

Quantitative data from the student surveys were loaded into SPSS (Version 18) and reduced to descriptive statistics (means, medians, modes, and standard deviations) for each of the three constructs represented in the survey (power, purpose, and challenge). Individual items were also reduced to descriptive statistics and examined for patterns of responses. These results were used to answer Question 1. As discussed above, survey data were also compared with observation and focus group data to answer Question 3.

Focus Group Interviews

Focus group data were first analyzed using open coding, where the data were repeatedly reviewed to identify major categories of information. This was followed with a synthesis of observed codes into relevant themes (Creswell, 2007), which are summarized in the results section. These results were used to answer Question 2: What are Michelangelo Academy teachers' perceptions of differentiated instruction? As discussed above, focus group data was then compared with observation and survey data to answer Question 3.

CHAPTER 4

RESULTS

Observation Results

Results from the COS-R observation scale were analyzed using SPSS (Version 18). Data were first examined across participants and observations. Descriptive statistics for each of the 25 COS-R items across all 22 teacher observations are presented in Table 9.

Table 9

COS-R Item Number of Observed Occurrences, Percent of Possible Occurrences, Mean Ratings, and Standard Deviations Across Teachers and Observations

Teacher Behavior[a]	N[b]	%[c]	M (SD)
1	22	100	2.68 (.568)
2	21	95	2.81 (.402)
3	18	82	2.72 (.461)
4	17	77	2.76 (.437)
5	10	45	2.70 (.675)
6	22	100	2.86 (.468)
7	17	77	2.88 (.332)
8	12	55	2.83 (.389)
9	20	91	2.80 (.410)
10	12	55	2.75 (.452)
11	5	23	3.00 (.000)
12	5	23	2.60 (.548)
13	15	68	2.67 (.488)
14	6	27	2.67 (.516)
15	11	50	3.00 (.000)
16	16	73	2.81 (.403)
17	16	73	2.44 (.629)
18	7	32	2.86 (.378)
19	3	14	3.00 (.000)
20	18	82	2.72 (.461)
21	3	14	2.33 (.577)

22	3	14	2.33 (.577)
23	3	14	2.67 (.577)
24	2	9	2.50 (.707)
25	3	14	2.67 (.577)

[a]Item numbers may be cross referenced with observed teacher behaviors in Appendix A.
[b]Number of observed behavior occurrences across 22 observations. [c]Percent of time behavior occurred across 22 observations.

The mean ratings, standard deviations, and percent of time teachers used behaviors across teacher observations were also calculated for each of the six COS-R subscales, and are presented in Table 10. The percent of time teachers used behaviors in each subscale was calculated by dividing the total number of possible occurrences for all the behaviors included in the subscale by the observed number of occurrences. Differences were noted in the frequency of behaviors used across the subscales. Teachers employed behaviors in curriculum planning and delivery (CPD) and accommodations for individual differences (AID) for the majority of the observations. Behaviors included in critical thinking strategies (CRI) and creative thinking strategies (CRE) were used in at least half of the observations. Behaviors included in problem solving (PS) and research strategies (RS) were observed the least frequently. Mean ratings for each of the subscales fell between 2 and 3, with all means closer to 3, suggesting teachers are generally effective in their use of subscale behaviors. Teachers consistently used a majority of the behaviors included in the COS-R, evidenced careful planning and flexibility when implementing behaviors, and typically elicited many appropriate student responses.

Table 10

COS-R Subscale Means and Percent of Time Used Across Participant Observations

	N	*M (SD)*	%[a]
CPD	6	2.67 (.51)	80
AID	6	2.88 (.16)	81
PS	6	2.78 (.50)	33
CRI	6	2.71 (.35)	55
CRE	6	2.76 (.49)	50
RS	6	2.50 (.60)	13

Note. CPD = curriculum planning and delivery; AID = accommodations for individual differences; PS = problem solving; CRI = critical thinking strategies; CRE = creative thinking strategies; RS = research strategies. Subscales may be cross referenced with item numbers in Appendix A.
[a]Percent of time subscale behaviors used across 22 observations.

Individual teacher ratings across observations were then examined for occurrences of the 25 behaviors targeted on the COS-R. Specifically, I examined whether or not each participating teacher demonstrated a behavior at least one time across all observations. These data are presented in Table 11. Differences were noted in the total number of behaviors used by participating teachers, with participants 4, 5, and 6 using fewer of the identified behaviors than participants 1, 2, and 3. Differences were also noted in teachers' use of behaviors identified within the six subscales. All teachers demonstrated all behaviors associated with curriculum planning and delivery (CPD) and accommodations for individual differences (AID). All teachers also demonstrated a pattern of fewer occurrences of behaviors associated with research strategies (RS) when compared to other subscales. Participants 2, 4, and 5 further demonstrated fewer behaviors associated with problem solving (PS) when compared to their other subscales and

participants. Participants 5 and 6 demonstrated fewer behaviors associated with creative thinking strategies (CRE) when compared to their other subscales and participants.

Table 11

Occurrence/Non-occurrence of COS-R Behaviors for Participants Across Observations

Behaviors[a]	Participants					
	1	2	3	4	5	6
CPD						
1	+	+	+	+	+	+
2	+	+	+	+	+	+
3	+	+	+	+	+	+
4	+	+	+	+	+	+
5	+	+	+	+	+	+
AID						
6	+	+	+	+	+	+
7	+	+	+	+	+	+
8	+	+	+	+	+	+
9	+	+	+	+	+	+
PS						
10	+	+	+	+	+	+
11	+	0	+	0	0	+
12	+	0	+	0	0	+
CRI						
13	+	+	+	+	+	+
14	+	+	+	0	+	+
15	+	+	+	+	+	0
16	+	+	+	+	+	+
CRE						
17	+	+	+	+	+	+
18	+	+	+	+	0	0
19	0	+	0	+	0	0
20	+	+	+	+	+	+
RS						
21	+	+	0	0	0	0
22	0	0	+	+	+	0
23	+	+	+	0	0	0
24	0	+	0	+	0	0
25	+	+	+	0	0	0

Note. + denotes occurrence of behavior at least once across all observations. 0 denotes non-occurrence of behavior. CPD = curriculum planning and delivery; AID = accommodations for individual differences; PS = problem solving; CRI = critical thinking strategies; CRE = creative thinking strategies; RS = research strategies.
[a]Item numbers may be cross referenced with teacher behaviors in Appendix A.

Survey Results

Five of the 22 survey items were negatively worded, and therefore were directionally

recoded to allow for higher scores to always indicate stronger student agreement about a need

being met. Item numbers can be cross-referenced with item statements in Appendix B. Items

were rated using a 7-point agreement response choice Likert scale (1 = completely disagree to 7

= completely agree). Total survey item means ranged from a low of 3.09 (*SD* = 1.55) for Item

18 (*I can choose what I learn about in my classes)* to a high of 6.28 (*SD* = .93) for Item 14 (*I*

have the chance to do work at school that is challenging to me).

Descriptive statistics were examined for each of the three identified needs (power,

purpose, and challenge), including means and standard deviations, and these are presented in

Table 12. Construct means showed that students generally agreed with items included under

purpose and challenge. The mean for power was somewhat lower, suggesting a lower level of

agreement with items included under this construct.

Table 12

Item Means and Standard Deviations for Identified Survey Constructs

Item Numbers per Construct Domain[a]	*N*	*M*	*SD*
Purpose			
1	89	5.66	1.148
5	89	6.09	.913
6	88	5.92	1.064
7	89	5.53	1.341
8	89	5.25	1.408
10[b]	89	5.58	1.565
15[b]	89	5.38	1.696
20	89	6.18	1.154
Construct Average		**5.70**	
Challenge			
9	88	4.91	1.210
11	88	5.01	1.489

12	89	5.97	1.247
14	88	6.28	.934
16	89	5.78	1.053
17	89	5.61	1.403
19[b]	89	6.13	1.150
21[b]	89	4.48	1.431
Construct Average		**5.52**	
Power			
2	89	6.10	.892
3[b]	89	4.11	1.728
4	89	6.06	1.200
13	88	5.75	1.350
18	89	3.09	1.549
22[b]	88	4.00	1.709
Construct Average		**4.85**	

[a]Item numbers may be cross referenced with survey statements in Appendix B. [b]Reverse scored item.

Interview Results

Data analysis yielded four themes that described MA teachers' perceptions of DI. A fifth theme related more specifically to teachers' perceptions of the MA program also emerged during data analysis. These themes are presented in Table 113.

Table 13

Thematic Findings from Participant Interviews

Theme 1	Differentiated instruction is student centered.
Theme 2	Quality differentiated instruction is a lot of work; it requires much time and planning.
Theme 3	Differentiated instruction is an imperative, not a choice.
Theme 4	Characteristics of Michelangelo Academy enable teachers to engage in a high level of differentiation.
Theme 5	Michelangelo Academy teachers reported a high level of teacher satisfaction and positive student response to the program.

Theme 1: Differentiated Instruction is Student Centered

That DI is student-centered was evidenced in a number of ways in teachers' interview comments. Four of the six teachers discussed how DI involved individualizing instruction for each student. As one teacher commented, "To me it [differentiated instruction] is knowing where your kids are, knowing their needs, knowing the level of knowledge in various areas, so that then you can tailor the curriculum to meet each child's need." Another teacher expanded on this idea of individualizing instruction:

> It's almost an individual thing. Because I have my kids who are gifted in writing fiction. I have kids who are gifted in writing persuasive type pieces. I have kids who are just, you know, various readers who are gifted even in another way. I have my kids who are gifted in drama within the Language Arts classroom. And so I didn't really realize when I was at the traditional middle school how important it was to really evaluate the strengths of students and not just do it by groups sometimes, but almost an individual type thing.

In keeping with this, teachers seemed to really know their students as individuals, frequently referring to specific examples of students to illustrate points about the need to individualize instruction to meet student needs. One teacher spoke of a student who was "bored to death" in a class, and how the teacher had therefore sought alternatives to challenge and engage this student. A second teacher exemplified her knowledge of individual students in her discussion of one of her classes:

> I mean, you have kids who are gifted writers who are working on novels. And then you have your scientists who their writing is much different. They know how to bullet. But as far as writing a cohesive paragraph they still struggle and they are in the same class with kids who will be published authors.

Having personal knowledge of their students allowed teachers to make instructional decisions specifically in response to student readiness and interest, something discussed by four of the six teachers. As one teacher explained:

> Well, you can differentiate in different ways. You can differentiate for ability level, but you can also differentiate the product that they have to create, which I know we do that in...[my class]. Or also you could differentiate based on interest, and so maybe we're not always differentiating for ability level though we do have to. But we hit it in a bunch of different ways I guess is what I'm trying to say.

Three of the six teachers also discussed how placing students at the center of instructional decision making means teachers must be flexible; the teacher takes on the role of *facilitator of learning* versus the leader, as in a traditional classroom. One teacher described her job as "guiding [my students] towards their dreams". Another explained, "We truly are facilitating a lot of what's happening and not teaching." A third teacher described how it could be uncomfortable at times to relinquish some of the traditional control teachers hold over instruction in order to respond to students needs, but added, "You have to learn to embrace ambiguity....That is [MA]. That really is what it is."

Keeping with the theme of student centeredness, three of the six teachers also discussed how allowing for *student choice*—giving students some control over their learning—was an important part of DI. Specifically, teachers talked about how giving students choices resulted in increased engagement and creativity, and fewer behavior problems. It also required flexibility on the part of the teacher. A teacher explained:

> The more choice you give them, the more engaged they are going to stay. I would never start into a research paper with a group of children and assign a topic. I

want them to pick the topic. Sometimes that presents a challenge when you are trying to integrate curriculum. So you have to have a social studies and a science teacher who will present engaging topics in the course of a week so that everybody will hear something that he or she is engaged in....So you have to be very flexible. You can't dig your heels in and say you're not researching rock music or whatever. You have to because if you're going to keep them engaged I believe...it has to be something they are passionate about, something that they care about or you will lose them.

Whether individualizing instruction in response to student characteristics, adapting to the role of facilitator versus leader, or providing students with choices, MA teachers clearly perceived DI as first and foremost student centered.

Theme 2: Quality Differentiated Instruction is a Lot of Work; It Requires Much Time and Planning

In their discussion of DI, four of the six teachers referred to the fact that it takes a lot of work to effectively differentiate for students. One teacher commented, "You have to plan for it. It's not something that you can just throw together at the last minute. If you want to differentiate you've got to have some well laid plans." Teachers also perceived differentiation as something that can be difficult to do, especially on your own. This is evidenced by the following response from a teacher:

I have always thought, you know, I see the point [of differentiation]. I get it. And I do it. But I think it's really hard to do extremely well. And if they really mean it people need to see it being done. You can't just be told how it works.…I think that a lot of people when they are learning it, they are feeling overwhelmed....They are all just like, "Yeah, this all sounds good but I don't really get it".

This particular individual described how she had sought out opportunities to observe other teachers on her own time in order to increase her understanding of how to differentiate effectively. In keeping with this, two of the teachers repeatedly acknowledged the importance of collaboration with peers when planning and implementing DI. One teacher was new to teaching gifted students when she came to MA, and reported that other MA teachers were extremely helpful as she planned for differentiation. She explained:

> The good thing is I had the support of my colleagues and they had the experience with gifted kids. And so that was wonderful. And the fact that...at any moment I could just say, okay is this kind of like what it should look like? And they were very helpful.

A second teacher discussed writing differentiated interdisciplinary units of instruction at the beginning of the first school year as a collaborative process, one undertaken with grade-level colleagues who taught different content areas.

All six of the teachers spoke about how lack of common planning time could hinder efforts to differentiate, reinforcing the importance of collaboration when planning for DI. As one teacher noted, "Having such a small faculty makes it very difficult [to collaborate]. That's one of the challenges here." Another teacher elaborated:

> I think more planning would help us to make it even a better situation as far as the differentiation because we could actually maybe meet together and spend time talking about Chad, Jake and Emory who are our little scientists and their particular needs. And that does not really happen too much.

Three of the six teachers further discussed how differentiated instruction must be comprehensive and ongoing; DI is not simply something you do one time for one lesson. This was evidenced in teachers' explanations of the planning involved in creating differentiated units,

and specific discussion about plans for the future. For example, one teacher explained the process of developing interdisciplinary curriculum units as follows:

> We separated it all out [between teachers] when we built these units and I think last year we got that first unit going pretty well. This year we really ironed out the second unit pretty well. And now we're working through the third and fourth units and it's our goal even over the summer is to meet as a [grade level] team. And then next year we have a plan on how to get them to the next level.

A second teacher talked about work underway to develop a three-year plan for the Museum of Inspired Learning, which she hoped faculty could work on over the summer. Her colleague added, "That's kind of the long term thinking you have to have so you can take these units to that next level." These two also discussed how common planning next year may allow grade-level teachers to split students up in hopes of differentiating more across the school day. As all of these examples illustrate, MA teachers perceived DI as something that requires a lot of time and work, specifically in the form of on-going planning and collaboration.

Theme 3: Differentiated Instruction is an Imperative, Not a Choice

When discussing their personal beliefs about DI, four of the six teachers interviewed expressed strong opinions on the topic. Specifically, they made statements suggesting that differentiation is something teachers *must* do, not something you choose to do. One teacher explained, "The big thing is I think you have to do it. I think you have to if you're going to meet the…stage [each student is at]. You have to. Everybody can't be the same." Another teacher explained her beliefs about her responsibility to differentiate instruction as follows: "You have to be careful that your number one job is challenging these learners that we've been given the

privilege to teach, that that doesn't get pushed down on your priority list." Others echoed these sentiments, emphasizing that it was not a choice to differentiate, but a requirement of their job.

Theme 4: Characteristics of Michelangelo Academy enable teachers to engage in a high level of differentiation. Discussions about DI in the literature are usually focused on curriculum and instruction at the classroom level. However, teacher interview data suggested that differentiation goes beyond the classroom at MA. School characteristics, including the eligibility requirements, facilitate an even higher level of differentiation experienced across the entire spectrum of the program. All six of the teachers interviewed had experience teaching in a different middle school setting, and repeatedly spoke of MA as being a special place in comparison, one that more naturally facilitated differentiation in the classroom. In particular, teachers referenced the students as one characteristic of MA that made consistent, program-wide differentiation possible. The program's eligibility requirements dictate that accepted students are highly motivated and high achieving. Teachers perceived this as something that positively influenced DI. For example, having high ability students allowed teachers to frequently compact curriculum, making time for acceleration and differentiation in response to student interest. As one teacher explained it:

> I think being at this school gives you more freedom because of the type students that we
> have, freedom to compact and go ahead and do more with the interests they have.
> Whereas at a regular middle school you have to follow whatever is in the standards and
> because some of them are not at the level that you want them to be you have to start
> teaching all this background knowledge that they don't have. Here these students...have a
> lot of background information. So we can just compact it. Okay, let's go further, or let's

go somewhere [based on student] interest. Where at a regular middle school it's hard to do.

In comparison, greater diversity in student ability made differentiation a challenge in other middle school settings. Another teacher recalled:

We had heterogeneous grouping. I taught math at…and it was so difficult to differentiate math instruction. I had a special education co-taught class, so in one class I had special education students...all the way up to kids that exceeded the standards and it was, I mean it was quite honestly next to impossible [to differentiate] and continue to teach 22 sixth grade math standards. But it does take a lot more work in that situation as a teacher than it does here.

Three teachers discussed how in their experience other middle schools more narrowly defined differentiation in response to *ability*. A teacher noted:

Well, I know at the middle school that I came from we did a lot of differentiation because we were a needs improvement school. So that was part of our plan [to improve]. And so we did a lot of that last year. But it was definitely ability based....So it was more of what I think you would think of when you think of differentiation, where as this [MA] is just completely different.

In summary, the presence of students with high motivation and achievement, and absence of the more extreme heterogeneity found in other middle school classes, allowed MA teachers to more readily engage in DI. Teachers felt this further enabled them to use DI in response to student interest, where at other schools it was more narrowly used in response to ability.

Theme 5: Michelangelo Academy Teachers Reported a High Level of Teacher Satisfaction and Positive Student Response to the Program

While the initial focus of teacher interviews dealt more broadly with teachers' perceptions of differentiated instruction, all of these lead to more specific discussion of teachers' perceptions of MA. One theme present across interviews was a reported high level of teacher satisfaction. Teachers repeatedly discussed how their jobs required a lot of work, including hours spent working during summer, before and after school. However, this did not interfere with their feelings about working at MA. As one teacher explained, "The thing you dream about if you're a passionate teacher is to do something like this. We are always wondering, okay so if something happens [to MA], what are we going to do?" A second teacher commented, "I'm thrilled. It's the best situation. It's, you know, win-win all the way around." A third teacher declared, "It's heaven," and a fourth noted, "It's wonderful. Seriously wonderful."

When discussing what made their job so satisfying teachers spoke of feeling supported and trusted by parents, and often referred to their students as their greatest source of job satisfaction. For example, one teacher said, "These kids, everyday they push me...they will ask some questions that I would not [think of] and of course I welcome those questions. And that's great. And I think that's what I needed personally." When asked to elaborate on what made her so satisfied another teacher explained:

> The kids and their willingness to go with you I guess. I feel like in some middle schools you meet resistance because at this age group they are more worried more about their societal pressures and things like that but these kids, you know, they are just willing to go along with you.

A second teacher stated, "You've seen how I can walk out of my room and they [the students] will start themselves....They are pretty trustworthy here." Another teacher observed, "The kid here at this school really does want to do well. And I can't think of a child who does just doesn't care. We don't have apathy here. Really we don't." A fourth teacher also spoke of how motivated the students were, which made teaching at MA so satisfying:

They [MA students] are already thinking, "I want to get into the best college I can." They are thinking when they are taking my [sic] class which is ninth grade credit, they know that counts towards the HOPE [Georgia college scholarship opportunity]. They understand, where your average middle schooler is thinking fifteen minutes past, not even fifteen minutes into the future. So it is a different group.

In addition to discussing their own satisfaction with MA, six out of six teachers perceived students to be highly engaged and responsive to the program. For example, one teacher noted, "Where you have motivated kids, if you make the learning engaging and meaningful they will rise to whatever challenge you put before them." Another teacher observed how this was particularly the case for some of the students who were somewhat lower in ability, but high in motivation:

I think of [Monica], oh my gosh, here is a girl who came in I would say with lower skill level than most of the kids, on the lower side of the spectrum...And yet she has blossomed. Puts herself out there, stretches herself to the limits, goes that extra distance, is on the leadership team now. I feel like that child would have probably disappeared at a regular school.

Her colleague added, "Even the students that are not labeled gifted, they are so motivated and then they can see the other ones and say ok I can do that too. And they motivate themselves

and they stretch themselves."   In another interview a teacher further added, "The kids [at MA] have been very engaged. They really do see themselves as leaders in the future of America, of the world, and scientist who...have dreams of doing really great things."

Four of the six teachers spoke about how positively students responded to their peer group at MA. Students experienced a real sense of community and social acceptance in this setting, something that teachers believed would have been different at another middle school. A teacher gave the following example:

> The first year we were here I had my...class, you know the first day "tell me about yourself" kind of thing. And so I demonstrated it. I said "My name is..., I went to college here and did this and I really like technology. I guess I'm a geek." So we went around the room and it was like geeks anonymous. But you know, you saw all of a sudden all these kids who liked these eccentric things were comfortable like that from the first day of school. And we went around just like, "My name is so and so. I'm a technology geek too." And they were all excited to be somewhere it was okay to be who they were. To be that smart kid who likes to do crazy things.

A second teacher gave the following example to illustrate the sense of community and acceptance students experienced at MA:

> I have quite a few guys that love poetry and are really good. And they really don't care. Where in your average school you were considered gay or a loser if you liked poetry. I mean, that was just taboo for a fellow. And so here it's just like, "I'm good at this. I like it. I'm going with it." So there is just more of an acceptance of this good stuff and…to do it.

  In another interview a teacher explained, "These kids in another setting probably would be the dorks or the nerds and here they are just cool." Her colleague elaborated, "They appreciate the strength of each of them. So, okay this kid isn't athletic or whatever, but if you have a computer question that's who you go to. And they are willing to help [each other]."

CHAPTER 5

DISCUSSION

Introduction

The Michelangelo Academy was created to provide high-end learning opportunities for bright, motivated students. The program applies existing aspects of gifted models and best practices from the field in a new way to meet the needs of gifted students in the county. The purpose of this research was to examine a cornerstone of the MA program: the quality of instructional delivery. Specifically, this study examined the following questions in order to address the stated purpose of and need for the research:

1. How effectively are Michelangelo Academy teachers differentiating instruction for students?

2. What are Michelangelo Academy teachers' perceptions of differentiated instruction?

3. What is the relationship between Michelangelo Academy teachers' perceptions and practices of differentiated instruction?

The first section of this chapter will review the major findings and conclusions related to each guiding research questions. Limitations of the research will be discussed, as will implications for future research and practice at both the program (MA) and discipline (gifted education) level.

Question 1

Results from teacher observations suggest that MA teachers are generally effective in their use of subscale behaviors. They consistently used a majority of the behaviors included in

the COS-R, evidenced careful planning and flexibility when implementing behaviors, and typically elicited many appropriate student responses. Furthermore, teachers regularly employ a range of such behaviors across their classes. With this said, behaviors associated with Problem Solving (PS) and Research Skills (RS) appear to be underutilized. This finding is consistent with other research using the COS-R (VanTassel-Baska, Feng, Brown, et al., 2008; VanTassel-Baska, Feng, & MacFarlane, 2008) and may be attributed to two possible causes. First, the behavior indicators included in the PS subscale were developed with the structure and intentional use of a research-based problem solving model in mind (the Osborne-Parnes Creative Problem Solving model). As VanTassel-Baska, Feng, and McFarlane (2008) noted, "the rarity of observation of PS may be due to the strict definition of the process" (p. 307). Therefore, while MA teachers used brainstorming (Item 10) 55% of the time across 22 observations, they did not follow up with the other two items included in PS (Items 11 and 12) as one would if using the formal problem solving model. VanTassel-Baska, Feng, and MacFarlane further suggested that less frequently observed use of RS may be related to the timing of observations or their "snapshot" nature. "The employment of research strategies are more related to a specific period of instructional time when research is the major focus of the instruction" (VanTassel-Baska, Feng, & MacFarlane, 2008, p. 230). Although the actual research *process* was observed infrequently during this study, the *results* of research were observed in student products, as well as in the context of classroom discussions. For example, students presented a research-based presentation on a self-selected author in one class observation, and used research to inform a persuasive writing piece during another.

Survey results also suggest that MA teachers are effectively differentiating instruction for students. Research has shown that classrooms that emphasize differentiation for high-ability

students can ideally reduce or eliminate factors including boredom, lack of motivation, and frustration with environments that ignore their talents and interests. Tomlinson (2003) elaborated that students come to school with specific needs that can be met by DI. An examination of survey means reveals that MA students somewhat agreed with statements related to the constructs of purpose ($M = 5.70$) and challenge ($M = 5.52$), suggesting teachers are meeting each of these student needs with some effectiveness. Interestingly, Item 14 (*I have the chance to do work at school that is challenging to me*) and Item 20 (*What we learn at school prepares me for my future*) had the highest mean ratings ($M = 6.28$ and $M = 6.18$); students strongly agreed with these statements, which particularly highlights how their need for challenge and purpose may be met by MA teachers' practices of DI.

In comparison, the construct of power received a slightly lower mean rating ($M = 4.85$), though this still suggests that students' need for power is met somewhat. Several factors may contribute to this lower rating. First, it is noteworthy that there were two fewer survey items for this construct. An examination of the items within this construct shows that three (Items 2, 4, and 13) had strong mean ratings ($M = 6.10$, $M = 6.06$, and $M = 5.75$). However, the remaining three of the six items (Items 3, 18, and 22) received the lowest mean ratings for the entire scale ($M = 4.11$, $M = 3.09$, and $M = 4.00$), with item 18 (*I can choose what I learn about in my classes*) receiving the lowest rating of all 22 items. These three items specifically deal with student perceptions of power associated with choice—the ability to choose what one learns about in school—and indicate that teachers' practices of DI may not be addressing this need as effectively as others. This finding will be explored in greater depth in the discussion of Question 3.

As noted in the introduction, MA hopes to instill the seven Da Vincian principles in its students through instructional programming and practices, including DI. Study data lend support to the program's efforts to do so. Examples of Connessione (interconnectedness) abounded in the interdisciplinary curriculum, through student discussions in the classroom, and artifacts on display throughout the school. Curiosita (an insatiably curious approach to life and continued learning) was observed as students were encouraged to pursue research topics of personal interest, and were engaged in sustained inquiry of topics in the classroom and the Museum of Inspired Learning. Dimostrazione (a commitment to test knowledge through experience, persistence, and a willingness to learn from mistakes) was demonstrated by students' long-term projects (including museum exhibits), questions in the classroom, and experiential learning opportunities. Sensazione (the continual refinement of the senses to enliven experience) was apparent in the emphasis on visuals through out the school, including the students' artifacts, murals, and pictures. Students were also often observed creating visuals to accompany many assignments. For example, a computer generated trailer to go along with an assigned book review for Language Arts. Sfumato (a willingness to embrace ambiguity, paradox, and uncertainty) was seen repeatedly in classroom discussions and activities structured around open-ended questions. Students were often found brainstorming multiple answers or ideas in response to teacher prompts and grappled with themes and topics with no single right answer. Through classroom activities and museum exhibits students identified questions and conducted research to make the uncertain more certain. Arte/Scienza (the development of the balance between science and art, logic and imagination) is at the core of the MA program, and was readily apparent in student artifacts around the school, museum exhibits, and classroom lessons and discussions. These included interdisciplinary lessons and teacher encouragement of critical and creative

thinking. Students could be seen demonstrating Corporalita (the cultivation of grace, ambidexterity, fitness, and poise) through extracurricular activities, including drama and P.E. In particular, students could be seen leading visitors through the museum and presenting work in the classroom with poise. Although not directly observed, students further had the opportunity to develop Corporalita through participation in extracurricular sports and activities at neighboring Renaissance Middle School. Taken together these student demonstrations of the seven Da Vincian principles lend additional support for the effectiveness of teachers' differentiated instruction and MA's efforts to reach its mission.

Question 2

A review of the major themes that emerged from interview data shows that MA teachers' perceptions of DI are consistent with the descriptions of DI found in the research literature.   For example, teachers' perception that DI is an imperative teacher practice that requires much time and planning is consistent with Tomlinson's (2000) assertion that DI isn't something a teacher does when time permits, but is rather a philosophy of teaching and learning. Teachers' also perceived that DI is very much student centered, involving an awareness of individuals' needs, tailoring instruction in response to student readiness and interest, and allowing for student choice. This too is consistent with the research literature on DI, including Tomlinson's (1999) description of DI as the modification of instructional content, process, and products in response to students' readiness, interests, and preferred mode of learning. A belief that the job of the school is to allow each child to reach his or her full potential by maximizing individual students' learning opportunities (Cooper, 2009; Tomlinson, 2000) is also central to DI. This assertion is reflected in MA teachers' perceptions of both the necessity and the student-centered nature of DI. Program documentation has said that a hallmark of the MA curriculum is systematic

differentiation of challenge level of required material. In this regard teacher perceptions of DI support a stated mission of the school.

While the initial focus of teacher interviews dealt more broadly with teachers' perceptions of DI, these conversations lead to a more specific discussion of teachers' perceptions of MA. Several research studies (Moon et al., 2003; Moon et al. 2007) found that teachers feel much pressure and frustration with standardized curriculum that affords them little time to respond to student diversity. It follows that when education is focused on what is being assessed on state mandated tests, instruction becomes increasingly standardized; attention to individual student needs diminishes in favor of "one-size-fits-all" instruction (Gentry, 2006; Moon et al., 2003). Schools' emphasis on state standardized assessments can lessen teachers' willingness to try innovative or creative teaching strategies or to differentiate for the diverse learning needs of students (Moon et al., 2003; Moon et al., 2007). Research has further shown that gifted students experience boredom and disengagement in classrooms that emphasize test preparation and standardized curricula (Betts, 2004; Burke-Adams, 2007; Moon et al., 2003). In contrast to these findings, MA teachers reported a high level of satisfaction with their jobs and perceived positive student response to the program, demonstrated by teachers' perceptions of high student engagement. This may be the result of specific program characteristics. These include the curriculum and instruction, which emphasize the *integration* of state standards versus use of standards as the curriculum itself. Performance on isolated standards, and state mandated tests by extension, are deemphasized in favor of the more broadly stated goal "to instill lifelong intellectual curiosity and commitment to learning by building an extraordinary educational foundation on students' strengths and interests" (Jordan, 2009, August 8). This may result in decreased pressure on teachers to "teach to the test" and more freedom to respond to student

variance with innovative and creative teaching strategies. Students may in turn respond positively to curriculum and instruction, which can additionally contribute to teachers' job satisfaction.   In short, it is the "win-win" situation described by one MA teacher: Teachers feel good about teaching and students feel good about learning.

Question 3

Teachers' perceptions and practices of DI converge in a number of notable ways. When interviewed teachers expressed a belief in the importance of DI, how it is an imperative practice, not a choice. This belief is reflected in teachers' consistent, relatively effective use of behaviors associated with DI across all observations. This finding is also consistent with MA teachers' perception that DI requires much time and planning. It is likely that teachers' could not differentiate as consistently or comprehensively as observed without actually investing the time they perceived DI required.

Teachers also discussed perceptions of DI as being student centered. For example, during interviews teachers repeatedly described how they made instructional decisions, including curriculum compacting, acceleration, and the inclusion of interest-based activities, in response to students' readiness and interest. In general, teachers seemed to know their students as individuals. This finding is also consistent with teacher observations. For example, teachers were observed using behaviors associated with the Accommodations for Individual Differences (AID) subscale for 81% of the total possible occurrences. This subscale includes behaviors like "provided opportunities for independent or group learning to promote depth in understanding" (Item 6), and "accommodated individual or subgroup differences" (Item 7). Of the six subscales AID also had the highest mean rating (2.88) across all 22 observations. In this regard teachers'

knowledge and understanding of their students as individuals appeared to facilitate their ability to respond to student characteristics, a hallmark of DI.

Another finding that emerged from interviews was teachers' perception of MA students' engagement in response to the program. While the COS-R did not specifically include an item related to this, scale developers encouraged the recording of detailed, anecdotal notes of observed classes in order to rate behaviors included in the scale—a practice with which I complied. These notes included descriptions of students' responses to classroom instruction, and support the convergence of teacher perceptions' and practices. Across all of the observations students appeared very engaged in response to teacher instruction. This engagement was evidenced in a number of ways, including lively discussion in response to teacher prompts and questions; active participation by students in response to classroom activities; high levels of on-task behavior, indicated by time students spent working in response to a task or teacher direction and no observed behavior problems (e.g., side conversations unrelated to the class topic) across all observations; and the types of questions and comments posed by students across classrooms.

There was one instance where teachers' perceptions and practices of DI appear to have diverged. Three of the six teachers interviewed discussed the importance of allowing for student choice, giving students some control over their learning. Teachers were observed giving students choices in regards to assignments, tasks, or topics researched/developed for student projects. These findings are reflected in COS-R data for Item 7 (see Table 11 and Appendix A). In contrast, survey results suggest that students do not feel their need for power is met as strongly as their need for purpose and challenge, especially as this need relates to choice. This is evidenced by mean student ratings ($M = 3.09$) for survey Item 18 (*I can choose what I learn about in my classes*) and Item 22 ($M = 4.00$; *I don't get to make choices about my assignments*).

Based on these findings, students don't appear to perceive themselves as being able to make choices about what they learn or do in their classes.

This finding may be attributed to several factors. During survey administration several students asked if they should complete the items in response to the class it was administered in, or to the program as a whole. They discussed how they did not necessarily agree with some of the statements for all of the classes. For example, they didn't feel like they could make choices in math the way they did in social studies. In one particular incident, a student explained that they were going to give an item a middling rating as a result, since they strongly agreed with it for some classes but disagreed in relation to others. Lower ratings for survey items related to power, and specifically choice, may be a reflection on inconsistencies in students' perceptions of different classes versus a reflection of their feelings about the program as a whole.

A second factor that could contribute to the disconnect between teacher and student perceptions of students' freedom to make choices at school may be the age group under consideration. Educators and scholars in the field of middle school education agree that early adolescence is a unique period of life characterized by rapid, dramatic changes in physical, emotional, social and intellectual being (Alexander, 1969/2005; Hall, 1904/2005; Jackson & Davis, 2000; Lesko, 2001; Nakula, 2003; National Middle School Association, 1992; National Middle School Association, 2003; National Middle School Association, 2010; Ross & Wright, 1985). Middle school students may experience a strong desire to be independent, and first start questioning authority. Young adolescents may further experience the conflicting desires for independence from and regulation by adults. Ross and Wright (1985) elaborated on this conflict between independence and dependence, stating that middle school students "have trouble making up their minds, but they don't want others deciding for them" (p. 1). In summary, this

characteristic desire for increased independence from adults may contribute to MA students' perception that they do not get to make choices about what they learn in school.

Tomlinson, Brimijoin, and Narvaez (2008) explained that differentiation is a balance of teacher and student choice. While MA teachers appear to give students choice related to assignments and topics explored within a larger given field, they are still making instructional decisions in the context of a given curriculum with certain goals and objectives. Students do not have complete control over what they do and learn in the classroom; MA teachers are making choices as well. With this said, this finding warrants additional research into the causes of the disconnect between teacher and student perceptions regardless of whether or not MA students' perceived inability to make choices is related to the social and emotional characteristics of young adolescence.

Limitations

There are several limitations of this research to consider that may affect the validity of the findings. The first concerns the small sample size of participating teachers, which was limited due to the nature of the research and the size of the program under study. The generalization of findings from participating teachers is limited as a result. Furthermore, inferences made based on qualitative findings also may not generalize to other populations or school settings due to the uniqueness of the program under study and small sample size of teachers (Johnson & Onwuegbuzie, 2004). The sample of participating teachers was also purposive, and may not be representative of other teachers of the gifted; study participants' experiences and beliefs about DI may very well have influenced their decision to work at MA. Lastly, the specially tailored hiring process may further limit the generalization of these findings. The teachers hired to work at MA were carefully screened to help ensure they would be a good

fit for the program. This included the completion of required essays and demonstration of teachers' ability to design and implement interdisciplinary units that fostered creativity. As a result, findings may not generalize to other programs that do not employ similar hiring provisions.

The sample size of students for the final survey is also relatively small, which affects the potential for generalization of survey findings. As previously noted, there were also several limitations to the survey validation. The forced three-factor solution only accounted for 48% of the total variance explained, and some of the survey items loaded on factors different from those anticipated. Findings from the PAF indicated that caution be exercised when interpreting final survey results and making inferences from these data.

Another limitation relates to teacher observations. First, there were an unequal number of observations of teachers. Four teachers were observed four times and two teachers were observed three times, though all observations were aggregated for the purposes of data analysis. Second, the COS-R provides a snap shot of teacher practice, and observations were limited in number. All observations were also undertaken during a specific seven-week period at the end of the school year. As a result, findings may not truly represent the spectrum of teachers' practice of DI across a school year. In this regard the full picture of teachers' DI practice may not be represented in the study.

Implications for Research and Practice

This study adds to the existing body of research on DI, and suggests that effective differentiation can contribute to gifted students' responsiveness to curriculum and instruction. Interestingly, this research also suggests that there may be a link between teachers' ability to fully differentiate instruction and their job satisfaction. This may be attributed to the fact that

differentiation allows teachers the freedom and flexibility to address the needs of their students in innovative and creative ways. Both teachers and students are actively engaged in the construction of knowledge. This is in stark contrast to the current trend in many American classrooms, where teachers have become deliverers of standardized curriculum and students are transformed into recipients of test preparation material.

Research reveals that teachers are not consistently differentiating for gifted students in the classroom (Archambault et al., 1993; Callahan et al., 2000; Reis et al., 1993; Westberg et al., 1993). However, studies further show that it's not that teachers don't *want* to differentiate, but rather they feel they *can't* do so in heterogeneous classrooms that emphasize performance on standardized assessments (Hertberg-Davis, 2009; Moon et al., 2003; Moon et al., 2007). MA teachers perceived that some of the factors that may serve to limit DI are absent from the program, and teachers appear to be effectively differentiating in response. This suggests that school districts, administrators, and other education leaders could possibly encourage increased differentiation by adopting some of the characteristics of a program like MA. One of these characteristics is a de-emphasis on explicit standards in favor of a richer curriculum focused on thematic, interdisciplinary enduring understanding. A second characteristic is the relatively small size of the program when compared to a traditional middle school faculty and student body. While MA teachers acknowledged that having fewer faculty limited common planning and often required teachers to undertake additional duties and responsibilities, MA's small size appears to have contributed to the school community, teacher knowledge of students, and teacher planning for DI. In the midst of the de-tracking movement and push for inclusion, findings from this study further show that there may be some very tangible benefits to grouping motivated, high ability students. For example, teachers reported it was easier to differentiate instruction

effectively for gifted students at MA compared to at a traditional middle school program. Teachers further perceived social and emotional benefits for these students, most notably through the formation of a strong school community that celebrated student strengths, and allowed students to interact with similar peers. MA's broadened conception of giftedness, which relies on multiple criteria and formal and informal data from a variety of sources, can help reduce some of the stigma traditionally associated with such programs.

It is a reasonably logical assumption that one's perceptions may influence his or her practice. This connection is supported by the present study, where teachers' perceptions and practices of DI converged. MA teachers' perceptions of DI are consistent with the literature, and their practice of DI appears to be relatively successful. As noted, all MA teachers are required to either hold or be working towards their gifted endorsement, which requires the completion of coursework in gifted education. This coursework includes preparation in the curriculum and instruction of the gifted, as well as the characteristics of gifted students. This type of staff development may have influenced MA teachers' perceptions and practices of DI examined in this study. Such training could have similar effects on other teachers.

Increased student engagement, achievement, problem-solving abilities, creativity, motivation, positive feelings about school and self, and self-efficacy are just a few of the benefits high-ability students can reap from curriculum and instruction tailored to their aptitudes, characteristics, and preferences (Dobyns et al., 1993; Kulik & Kulik, 1987; Moon, 2009; Reis et al., 1993; Tomlinson, 1999; Tomlinson, 2000; Tomlinson, 2003). This research offers support to the claim that MA teachers are effectively differentiating instruction for gifted students. Additional research is now needed to examine the link between teachers' practices of DI and MA student outcomes. One important question that remains is how do teachers' practices of DI

influence student performance on measures of creativity, motivation, and academic achievement. Research comparing the performance of MA students with gifted students in a traditional middle school setting could further strengthen the link between MA practices and student outcomes. Qualitative research could also help paint a richer picture of what DI at MA looks like in the classroom. Both of these types of research are important considerations for school districts looking to replicate a similar program.

Summary

Observation data suggest MA teachers are generally effective in their use of behaviors associated with DI, employing a range of these behaviors across their classes. This finding is further supported by survey results, which suggest students' need for purpose and challenge are met at MA. Students' need for power, specifically as it relates to the ability to make choices at school, appears to be met somewhat less. Teachers' practices of DI may not be addressing this need as effectively as others, or at least students don't perceive it as such.

Teachers' perceptions of DI appear to be consistent with descriptions found in the research literature. This includes beliefs that DI is a necessary practice that requires much time and planning, and is students centered. MA teachers further reported a high level of job satisfaction and perceived positive student response to the program. Both of these factors may be attributed to specific program characteristics, including the curriculum and instruction.

In general teachers' practices and perceptions of DI converged. This finding is exemplified in teachers' belief that DI is an imperative practice and their consistent, relatively effective use of behaviors associated with DI. Teacher practices additionally supported their perception of DI as being student centered. Observed student responses to instruction further supported teachers' perceptions of students' engagement in response to the program. In one

instance teachers' perceptions and practices of DI appeared to diverge. While teachers discussed the importance of allowing for student choice in learning, survey results suggest students do not feel they have the power to make such choices at school.

Conclusion

As discussed, high-ability students placed in unchallenging environments are at risk for a number of problems, including boredom, frustration, decreased motivation, and underachievement. In contrast, an appropriately challenging environment reduces the likelihood of the obstacles gifted students face in classrooms that fail to meet their needs and allows them to fully develop their talents (Moon, 2009).

At the heart of the problem facing gifted students is what Tomlinson et al. (2003) described as "patterns of inattention to student variance". Research reveals that tens of thousands of gifted students across the country have their needs unmet and abilities unrecognized in their classrooms; studies have found that teachers do not regularly differentiate instruction in response to all students' needs. As a result, gifted students must wait for their peers to master the skills they have learned several years earlier before moving on in school (Archambault et al., 1993; Callahan et al., 2000; Feldhusen, 1989; Gentry, 2006; Moon et al., 2003; Moon et al., 2007; Reis et al., 1993; Westberg et al., 1993).

Luckily there are a number of things educators can do to remedy these problems potentially experienced by high ability students. As previously introduced, Rogers (2007) highlighted five such best practices based on a synthesis of the research on educational practice for gifted and talented students. These five lessons repeatedly encountered in the literature are presented in Table 14. Findings from this study suggest that the curriculum and instruction at MA appear to reflect these best practices, also shown in Table 13. In this regard these

preliminary findings offer some support to the program's aims to be responsive to the

educational and social-emotional needs of the high-ability students the program serves.

Table 14

Presence of Best Educational Practices for Gifted and Talented Students at MA as Supported by Study Evidence

Best Practice	Sources of Evidence
1. Gifted and talented students need daily challenge in their areas of specific talent	Student survey results and teacher interview data
2. Gifted and talented students need regular opportunities to be unique and work independently in their areas of talent and passion	Teacher observations and teacher interview data
3. Teachers must provide various forms of grade-based and subject-based acceleration to meet the educational needs of gifted and talented students	Student survey results and teacher interview data
4. Gifted and talented students need opportunities to learn and socialize with like-ability peers	Teacher interview data
5. Instructional delivery must be differentiated in pace and content presentation for specific curriculum areas.	Student survey results, teacher interview data, and teacher observations

Note. Best practices from "Lessons Learned About Educating the Gifted and Talented," by K. Rogers, 2007, *Gifted Child Quarterly, 51*, 382-396.

An examination of these five best practices in gifted education against the research on DI

reveals that each one has roots in the practice of differentiation. For example, effective DI can

allow gifted and talented students regular opportunities to be unique and work independently in

their areas of talent and passion. In this regard it can be argued that teachers' effective use of DI,

reflected in and influenced by their perceptions of this practice, contributes to MA's pursuit of

excellence for gifted and talented students.

In closing, while continued research is necessary to further examine MA's methods and outcomes, the reactions of those touched by the program speak to the effect MA is having on its students. This is perhaps best evidenced by the words of one such individual—a MA parent and middle school counselor—in the following letter to a MA administrator (S. Krisel, personal communication, May 5, 2011):

I think you should know that I can clearly tell the difference in the way Dana views her education. She is very motivated and wants to excel in her studies. I truly think that Dana being at MA has contributed to her desire and ability to advance in the manner that she has. When Dana was in 5th grade she had a teacher make her feel insecure and inadequate in her reading ability. Last year she exceeded expectations on the reading part of the CRCT. She tells me she feels pretty confident about this year's test as well. I think that the size of the school has been a great asset to the learning environment for Dana. In my profession I have a unique view of the troubles that can occur for children in middle school. I can tell you from my communication with Dana that many of the issues that are faced at a traditional public middle school are not nearly as prevalent at MA....I share all of this because I think it is important to acknowledge the positive outcomes that occur in the lives of our children. I know that I work hard to instill positive values and morals in my children. However, I also understand and value the importance that education has in shaping their values and morals as well. I am grateful for the educational opportunities and experiences that my child has had as a result of being at MA. Please feel free to share this information as you desire and use Dana as an example when discussing the difference that MA is making in the lives of students.

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APPENDIX A

THE WILLIAM AND MARY CLASSROOM OBSERVATION SCALE, REVISED

The William and Mary Classroom Observation Scales, Revised
Teacher Observation

Joyce VanTassel-Baska, Ed.D.   *Linda Avery, Ph.D.*   *Jeanne Struck, Ph.D.*   *Annie Feng, Ed.D.*
Bruce Bracken, Ph.D.   *Dianne Drummond, M.Ed.*   *Tamra Stambaugh, M.Ed.*

Directions: Please employ the following scale as you rate each of the checklist items. Rate each item according to how well the teacher characteristic or behavior was demonstrated during the observed instructional activity. Each item is judged on an individual, self-contained basis, regardless of its relationship to an overall set of behaviors relevant to the cluster heading.

3=Effective	2=Somewhat Effective	1=Ineffective	N/O = Not Observed
The teacher evidenced careful planning and classroom flexibility in implementation of the behavior, eliciting many appropriate student responses. The teacher was clear, and sustained focus on the purposes of learning.	The teacher evidenced some planning and/or classroom flexibility in implementation of the behavior, eliciting some appropriate student responses. The teacher was sometimes clear and focused on the purposes of learning.	The teacher evidenced little or no planning and/or classroom flexibility in implementation of the behavior, eliciting minimal appropriate student responses. The teacher was unclear and unfocused regarding the purpose of learning.	The listed behavior was not demonstrated during the time of the observation. (NOTE: There must be an obvious attempt made for the certain behavior to be rated "ineffective" instead of "not observed".)

General Teaching Behaviors

Curriculum Planning and Delivery	3	2	1	N/O
The teacher…				
1. set high expectations for student performance.				
2. incorporated activities for students to apply new knowledge.				
3. engaged students in planning, monitoring or assessing their learning.				
4. encouraged students to express their thoughts.				
5. had students reflect on what they had learned.				
Comments:				

Differentiated Teaching Behaviors

Accommodations for Individual Differences	3	2	1	N/O
The teacher…				
6. provided opportunities for independent or group learning to promote depth in understanding content.				
7. accommodated individual or subgroup differences (e.g., through individual conferencing, student or teacher choice in material selection and task assignments.)				
8. encouraged multiple interpretations of events and situations.				
9. allowed students to discover key ideas individually through structured activities and/or questions.				
Comments:				

Problem Solving	3	2	1	N/O
The teacher…				
10. employed brainstorming techniques.				
11. engaged students in problem identification and definition				
12. engaged students in solution-finding activities and comprehensive solution articulation.				
Comments:				

Critical Thinking Strategies	3	2	1	N/O
The teacher…				
13. encouraged students to judge or evaluate situations, problems, or issues				
14. engaged students in comparing and contrasting ideas (e.g., analyze generated ideas)				
15. provided opportunities for students to generalize from concrete data or information to the abstract.				
16. encouraged student synthesis or summary of information within or across disciplines.				
Comments:				

Creative Thinking Strategies	3	2	1	N/O
The teacher…				
17. solicited many diverse thoughts about issues or ideas.				
18. engaged students in the exploration of diverse points of view to reframe ideas.				
19. encouraged students to demonstrate open-mindedness and tolerance of imaginative, sometimes playful solutions to problems.				
20. provided opportunities for students to develop and elaborate on their ideas.				
Comments:				

Research Strategies	3	2	1	N/O
(It is atypical for these to be observed in one session. Some teachers, however, may use Items #21-25 within a single period to illustrate the full research process to students. Please note those observations in the comments section.)				
The teacher…				
21. required students to gather evidence from multiple sources through research-based techniques (e.g., print, non-print, internet, self-investigation via surveys, interviews, etc.).				
22. provided opportunities for students to analyze data and represent it in appropriate charts, graphs, or tables.				
23. asked questions to assist students in making inferences from data and drawing conclusions.				
24. encouraged students to determine implications and consequences of findings.				
25. provided time for students to communicate research study findings to relevant audiences in a formal report and/or presentation.				
Comments:				

Additional Comments:

APPENDIX B

FINAL STUDENT SURVEY

Directions: Circle the number that best answers each question.

1. What I learn in school is useful to me now.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
  disagree   nor disagree   agree

2. I make choices that contribute to my success in school.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
  disagree   nor disagree   agree

3. My teachers don't give me choices about what I am supposed to learn.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
  disagree   nor disagree   agree

4. I have the support at school that I need to be successful.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
  disagree   nor disagree   agree

5. I understand what we do at school.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
  disagree   nor disagree   agree

6. I see significance in what we do at my school.

1	2	3	4	5	6	7

Completely   Neither agree   Completely
 disagree   nor disagree   agree

7. What we learn at school reflects me and my world.

1	2	3	4	5	6	7

Completely   Neither agree   Completely
 disagree   nor disagree   agree

8. The work we do at school makes a difference in the world.

1	2	3	4	5	6	7

Completely   Neither agree   Completely
 disagree   nor disagree   agree

9. The work at school absorbs me.

1	2	3	4	5	6	7

Completely   Neither agree   Completely
 disagree   nor disagree   agree

10. I don't think what we do at school makes a difference in my world.

1	2	3	4	5	6	7

Completely   Neither agree   Completely
 disagree   nor disagree   agree

11. The work at school stretches me.

1	2	3	4	5	6	7

Completely   Neither agree   Completely
 disagree   nor disagree   agree

12. I have to work hard at school to do well.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
 disagree   nor disagree   agree

13. I am accountable for my own growth and my contribution to the growth of others.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
 disagree   nor disagree   agree

14. I have the chance to do work at school that is challenging to me.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
 disagree   nor disagree   agree

15. I don't see the significance in what we do at school.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
 disagree   nor disagree   agree

16. The work at school complements my ability.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
 disagree   nor disagree   agree

17. I learn something new every day.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
 disagree   nor disagree   agree

18. I can choose what I learn about in my classes.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
 disagree   nor disagree   agree

19. The work at school does not require me to think.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
 disagree   nor disagree   agree

20. What we learn at school prepares me for my future.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
 disagree   nor disagree   agree

21. I can finish my assignments quickly and with minimal effort.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
 disagree   nor disagree   agree

22. I don't get to make choices about my assignments.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Completely   Neither agree   Completely
 disagree   nor disagree   agree

APPENDIX C

CORRELATION MATRIX FOR SURVEY ITEMS ON DRAFT SURVEY

	i1	i2	i3	i4	i5	i6	i7	i8	i9	i10	i11	i12	i13	i14	i15	i16	i17	i18	i19	i20	i21	i22
i1	--	.33	.12	.38**	.24**	.48**	.42**	.42**	.43**	.19*	.23**	.12	.18*	.06	.31**	.29**	.26**	.32**	-.03	.38**	-.19	.14
i2		--	.09	.34**	.35**	.35**	.47**	.33**	.35**	.22**	.22**	.17*	.23**	.23**	.26**	.28**	.32**	.19*	.14	.22**	.07	.07
i3			--	.21**	.28**	.28**	.13	.23**	.12*	.24**	.04	-.10	-.01	.15	.32**	.14	.28**	.39**	.10	.15	.12	.35**
i4				--	.40**	.45**	.44**	.34**	.42**	.21**	.22**	.24**	.28**	.22**	.36**	.44**	.48**	.27**	.20**	.33**	.02	.24**
i5					--	.35**	.34**	.20**	.33**	.11	.05	-.06	.05	.02	.35**	.35**	.19*	.23**	.02	.19*	-.13	.17*
i6						--	.64**	.56**	.54**	.49**	.31**	.08	.37**	.25**	.57**	.44**	.49**	.38**	.20**	.56**	.03	.24**
i7							--	.57**	.52**	.43**	.36**	.10	.38**	.31**	.47**	.52**	.44**	.28**	.19*	.45**	.03	.11
i8								--	.44**	.46**	.22**	.17*	.29**	.15	.42**	.35**	.35**	.33**	.17*	.56**	-.06	.30**
i9									--	.37**	.41**	.17*	.26**	.30**	.46**	.42**	.37**	.31**	.25**	.45**	-.03	.21**
i10										--	.15**	.09	.19*	.10	.57**	.21**	.28**	.08	.23**	.39**	.13	.20**
i11											--	.25**	.20**	.36**	.24**	.30**	.25**	.22**	.22**	.15*	.22**	.11
i12												--	.42**	.24**	.19*	.25**	.31**	.05	.49**	.33**	.35**	.13
i13													--	.33**	.31**	.37**	.36**	.20**	.23**	.40**	.17*	.34**
i14														--	.17*	.33**	.39**	.24**	.39**	.13	.37**	.12
i15															--	.39**	.38**	.28**	.19*	.53**	.11	.34**
i16																--	.47**	.36**	.32**	.38**	.13	.17*
i17																	--	.38**	.40**	.52**	.27**	.17*
i18																		--	.08	.29**	.07	.33**
i19																			--	.26**	.48**	.14
i20																				--	.04	.21**
i21																					--	-.04
i22																						--

Note. Item numbers may be cross-referenced with item statements in Appendix B.
*p<05. **p<.01