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Teachers' attitudes and practices toward differentiating for gifted learners in K--5 general education classrooms

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TEACHERS' ATTITUDES AND PRACTICES TOWARD DIFFERENTIATING FOR GIFTED LEARNERS IN K-5 GENERAL EDUCATION CLASSROOMS

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J. Denise Drain

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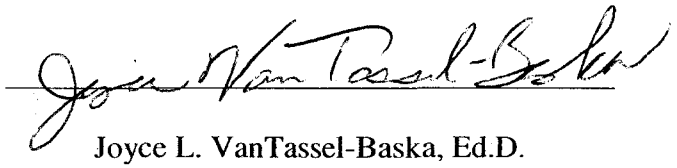

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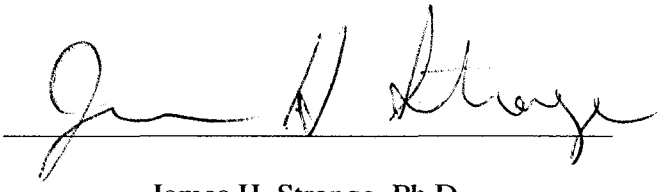

James H. Stronge, Ph.D.

Acknowledgement

George Eliot (English Novelist Mary Ann Evans, 1819-1880) once said, "It is never too late to become what you might have been." As with many women from my generation, my career trajectory has taken a non-traditional path. After raising two wonderful daughters and teaching elementary school for many years, I was blessed with the opportunity to realize a long-time dream of returning to school to study with some of the country's most distinguished academics and earn an advanced degree in education.

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Table of Contents

Tables

Figures

Abstract

Despite research that demonstrates the advantages of teaching gifted students in homogeneous groups, including more academic growth, better social and emotional health, and increased motivation, educational practice is shifting more and more toward total inclusion for all students, including the gifted.

Teacher attitudes and perceptions toward gifted students are variable and may correlate positively with certain demographic characteristics. Studies suggest that few teachers use differentiation strategies in their classrooms. Teachers who receive training and ongoing support in using a curriculum based on the Integrated Curriculum Model (ICM) differentiate more often and more successfully than other teachers. Differentiated curriculum results in significantly higher academic growth than other curriculums. Research suggests a number of curriculum and instructional practices which align with the Integrated Curriculum Model and show promise with gifted learners.

This is a descriptive study of the attitudes and classroom practices of 59 classroom teachers in grades K-5. Teachers completed surveys which included the Attitudes toward Gifted Students and the Classroom Practices Questionnaire. The researcher conducted classroom observations using the Classroom Observation Scale-Revised. Survey and observation data were analyzed using descriptive statistics, T-tests, and ANOVA.

Findings suggest teacher attitudes ranged from somewhat negative to very positive with no correlation to the demographic data. Teachers were found to

differentiate for gifted students infrequently, with a large number reporting that they never differentiate. They were also more likely to use strategies that have not been verified as gifted-friendly practice.

Recommendations for future research are centered in four areas: empirical research to further identify strategies and methods that benefit gifted students differentially to support or refute anecdotal evidence; research to study the efficacy of specific types of professional development that positively impact teacher attitudes and practices, especially toward gifted students in the regular classroom; research on the role of the administrator in promoting differentiated instruction, and the use of gifted-friendly practices to effectively differentiate for gifted students in the regular classroom.

TEACHERS' ATTITUDES AND PRACTICES TOWARD DIFFERENTIATING FOR GIFTED LEARNERS IN K-5 GENERAL EDUCATION CLASSROOMS

CHAPTER 1

Introduction to the Study

> Failure to help the gifted child reach his potential is a societal tragedy, the extent of which is difficult to measure but which is surely great. How can we measure the sonata unwritten, the curative drug undiscovered, the absence of political insight? They are the difference between what we are and what we could be as a society (Gallagher, 1985, cited in Smith, Luckasson & Crealock, 1995).

During the past four decades, education has been experiencing the growing pains of a shift toward inclusive education for all students (Stainback & Stainback, 1996). Inclusion is the practice of assigning all students to a general education classroom with a general education teacher, regardless of their special needs (Stainback & Stainback, 1990). Inclusion of all types of students into the general education classroom has presented many challenges to educators. It also has impacted services to gifted students who are often educated in the regular education classroom. In times past, students with special needs (i.e. mental retardation) were not included in the regular classroom, but instead were segregated from the mainstream of the student body; classroom teachers served students who were low-average, average, high-average, and high ability (gifted). Today, we ask teachers to meet the needs of these four groups, plus students with mental retardation (mild, moderate, severe), learning disabilities, autism, physical disabilities,

behavioral disorders, and on and on—all in one classroom (Schiever, 1993; Pierce & Adams, 2004; VanTassel-Baska, & Stambaugh, 2005).

Each time we increase the already wide range of abilities within the general education classroom, we add a new element of complexity to an already complex and exhausting list of responsibilities for the classroom teacher (Mosse, 2003). In today's climate of high-stakes testing and teacher accountability, it is often required that teachers spend the majority of class time drilling the most needy students on the basic facts they will need to meet these standards and pass the required assessments. For gifted students, this means few challenges, little teacher attention, and few chances to reach their potentials.

Statement of the Problem

Gifted Students and Inclusion: The Status Quo

Throughout America's educational history, gifted students have found themselves assigned to inclusive classrooms for most of their educational careers (Wolak, York, & Coribin, 1992). Inclusion has been the *status quo* for the gifted. Proponents of continued inclusion for gifted students see it as embracing diversity for all students (Sapon-Shevin, 1994). They believe inclusion is good for everyone--inclusion prepares all students for life in a diverse world. Despite research that demonstrates the advantages of teaching gifted students in homogeneous groups (Deslisle, 1984; Feldhusen & Wyman, 1980; Kulik & Kulik, 1992; Rogers, 1993), including more academic growth, better social and emotional health, and increased motivation, educational practice is shifting more and more toward total inclusion for all students, including the gifted.

Inclusion for all students has resulted in classrooms of children with diverse abilities, diverse backgrounds, diverse needs, and diverse capacities. While most teachers understand the importance of teaching children to their potential, they are overwhelmed with the day-to-day requirements of a classroom of diverse children as well as with competing initiatives, programs, and projects which all claim to be best practice. In short, ill-equipped teachers need new educational philosophies, curricula, and pedagogies to serve gifted students effectively within the inclusive classroom.

The second issue associated with inclusion and the gifted child is the decrease in additional services for the gifted. Over the past decade, the federal government, and state governments as well, have decreased spending on education for the gifted (Baker, 1995; Committee for Education Funding, 2005; and Rudavsky, 2002). This has resulted in many gifted classrooms being closed and many pull-out services being cancelled (Smith, Polloway, Patton, & Dowdy, 1995; Rudavsky, 2002). The end-result has been more inclusive education for gifted students, and this trend does not appear to have an end in sight. In essence, the practice of inclusion has created a situation in which many general education teachers serve on the front lines with little or no technical support, serve a diverse group of children with a myriad of needs, and face challenges for which they have not been trained. With this in mind, it is imperative that gifted educators seek to work within the paradigm of inclusion to serve gifted students. It is essential that general education teachers routinely implement *gifted-friendly practices* in their regular classrooms; however, these practices first must be identified, and then teachers must be trained in their use.

Problems Encountered with the Inclusion Model

We encounter several problems as we seek to educate our gifted students solely in the general education classroom. First, in the general education classroom, the educational needs of gifted students are often overlooked because each classroom teacher is responsible for so many students whose needs appear to be much more urgent (Buckner, 1997; and VanTassel-Baska, & Stambaugh, 2005). In medical emergencies, *triage* is a process for sorting injured people into groups based on their need for or likely benefit from immediate medical treatment. *Triage* is used on the battlefield, at disaster sites, and in hospital emergency rooms when limited medical resources must be allocated (*The American Heritage® Stedman's Medical Dictionary*, 2006). Today, the educational process in many classrooms resembles triage as teachers determine which students need the most assistance to meet state standards as they are assessed. Gifted students, seen as being "healthy," often receive little or no individual assistance in reaching their potentials.

Second, in this age of accountability and standards, the focus has shifted toward teaching a small subset of information or knowledge. The state standards of learning or, more specifically, the state assessments drive what is taught in classrooms around our country, with minimum competencies becoming the goal rather than the starting point (Renzulli & Reis, 1991). Atkin (1990) noted that the prescriptive and regulatory nature of the standards movement is not likely to motivate the most gifted students in our schools. Many times, teachers work exclusively on the memorization of disjointed facts and details that will be "on the test." Quite often, the sole determinant of whether a topic is taught rests in the answer to the question, "Is it on the test?" Countless worthwhile

subjects, topics, and issues are put aside for another day, another time, another generation.

Third, much of what we teach in classrooms across the country centers on the knowledge and comprehension levels of learning. Critical thinking, creative thinking, and other higher level thinking skills do not seem to have a place in general education classrooms (Keeley, Shemberg, Cowell, & Zinnbauer, 1995: Paul, 1996; Schoeman, 1997; Baker & Delmonico, 1999; Case, 2005). For gifted students, these are the challenges that keep life, and school, interesting. Without appropriate challenges in thinking, gifted children may not develop their potential.

In this drive to educate all children inclusively, it becomes more important than ever for proponents of gifted education to advocate for those practices that have shown promise for high ability learners in the general education classroom. According to Delisle (1999), the keys to meeting gifted students' needs in an inclusive setting are flexibility, acceleration, and variety. It should also be noted, however, that there is no one model or experience or practice that will meet the needs of all gifted students (Feldhusen, 1982; Kaplan, 1982; Rogers, 1998; Feng, VanTassel-Baska, Quek, Bai & O'Neill (2005). Even within the gifted population, there must be differentiation.

Implementation of full-inclusion has created situations where a) teachers are ill-equipped to fully serve gifted students (Buckner, 1997; and VanTassel-Baska, & Stambaugh, 2005); b) gifted students are seldom challenged (Renzulli & Reis, 1991); and, c) budget cuts have reduced or eliminated additional services for the gifted (Baker, 1995; Committee for Education Funding, 2005; and Rudavsky, 2002). Full inclusion has not been a solution for gifted education because: 1) less able students are seen as more

needy and, therefore, receive more attention (Westberg, 1999; Pierce & Adams, 2000); 2) state assessments are driving the implementation of a narrower and more shallow curriculum to meet the needs of all (Atkins, 1990); and, 3) most classroom teaching takes place at the knowledge and comprehension levels of Bloom's taxonomy (Keeley, Shemberg, Cowell, & Zinnbauer, 1995: Paul, 1996; Schoeman, 1997; Baker & Delmonico, 1999; Case, 2005).

Teacher Attitudes Toward Giftedness

In a society that prides itself on being a world leader, one would assume that attitudes toward the most intelligent, gifted, and talented citizens would be positive. Research, however, does not support this assumption. The Lee, Cramond, and Lee (2004) study of pre-service and in-service Korean teachers replicated studies done by Tannenbaum (1962), and Cramond and Martin (1987) with similar results. They found that both groups of Korean teachers, similar to American teachers, favored athleticism and non-studiousness over academic brilliance, especially in boys. A number of studies examining the attitudes of teachers toward giftedness in general and gifted education in particular are examined in Chapter Two. These studies lead to the conclusion that, although teacher attitudes are important in the classroom, attitudes toward giftedness are overall not positive. McKay (1993) suggests that the general education classroom teachers' perceptions of, attitudes toward, and understandings of gifted students will determine the amount and type of support given to students in the regular classroom.

The Proliferation of Best Practice Literature

Twenty years ago, the term "best practice" was all but unknown in the field of education. Since that time, it has become a buzz-word and seemingly everyone has

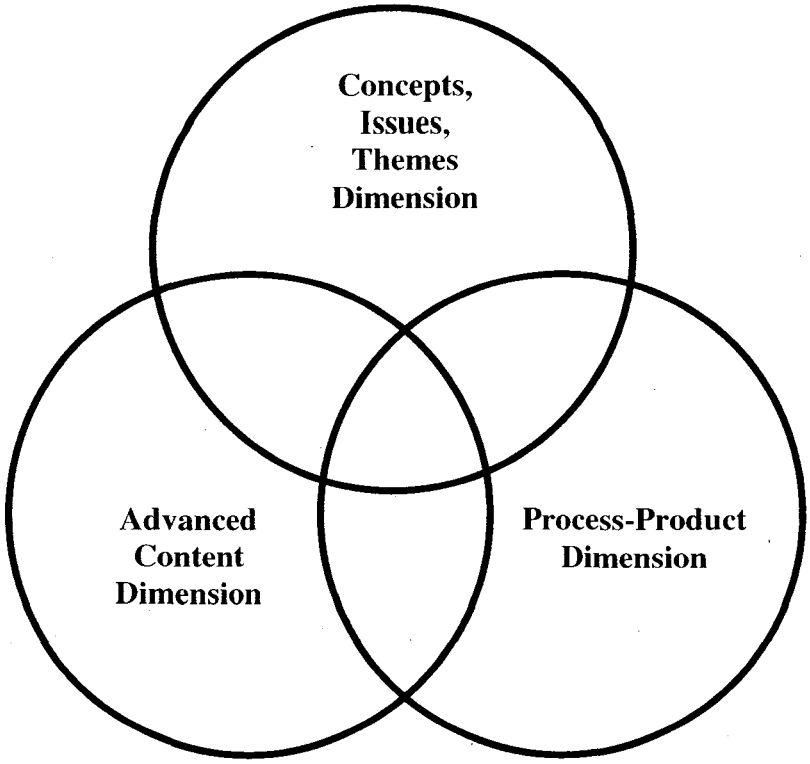
jumped on the bandwagon. Textbook companies tout their merchandise as best practice. Researchers continually investigate best practice. Teachers use best practice in their classrooms. Principals observe for best practice in their schools. Professional development seminars abound to teach best practice. However, the questions still exist: "What is best practice?" and "What standards do we use to judge best practice?"

As a part of this study, the researcher has investigated the concept of best practice, used scientific criteria to define best practice, and reviewed the literature on curricular and instructional strategies to recommend best practice for gifted students in the regular classroom. Sapon-Shevin (1994) argues that all practices typically reserved for the gifted could be used effectively with all students. Many of these practices indeed could benefit all students, not just the gifted, in stretching past the minimum standards toward real, in-depth learning. Researchers, in fact, have recommended many of these methodologies as best practice for all classrooms (VanTassel-Baska & Stambaugh, 2005). By adopting these practices in the regular classroom, general education teachers would be better able to serve all students—and most particularly the gifted.

Conceptual Framework

The Integrated Curriculum Model (VanTassel-Baska, 1986; 1995) asserts that the needs of high-ability learners are best met by curriculum that explores advanced content, high level processes and product development, and abstract concepts in an integrated fashion.

Figure 1: The Integrated Curriculum Model (ICM)
VanTassel-Baska, 1987



The dimension of advanced content is represented by 1) selection of readings that are at least two years beyond grade level, 2) use of primary source documents, 3) encouragement for in-depth study of selected content (depth versus breadth), and 4) introduction of advanced skills and ideas at earlier ages. The process/product dimension is represented by student-produced original work. These works may be in any domain and could include writings, student-created experiments, original research, or solutions to real problems. The process/product dimension also includes higher level processes including critical and creative thinking, and research. The dimension of concepts, issues, and themes focuses student learning on the "big idea" or macro-concept which provides interdisciplinary links and relationships. Research has shown that the ICM offers depth

of learning in higher level skills within the subject areas of language arts, social studies, and science (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996; VanTassel-Baska, Avery, Little, & Hughes, 2000; VanTassel-Baska, Zuo, Avery, & Little, 2002; VanTassel-Baska, 2003; Feng, VanTassel-Baska, Quek, Bai, & O'Neill, 2005).

For the purposes of this research project, it is posited that there exist a number of curriculum strategies, modifications, and innovations that are effective in meeting the academic needs of the gifted student within the guidelines of the ICM. Through a thorough review of the best practice literature, the researcher has identified those practices which have research to recommend them as gifted-friendly practice. These practices have been viewed through the lens of the ICM model, making connections to this model and supporting the use of specific practices through research.

Coleman (2003) and Kaplan (2003) propose that gifted-child pedagogy as a separate and differential pedagogy from that of the regular classroom teacher is not supported in the literature. However, they also suggest that some pedagogies are most essential to the development of gifted students in a way that does not affect average children. Pedagogy, according to Kaplan, is a response to whom and what we teach. A mismatch between the who, what, and how we teach results in poor academic success while a good match results in more success. For the purpose of this study, the "who" of the research is gifted children, the "what" is research-supported curriculum as viewed through the lens of the ICM, and the "how" is research-supported instructional strategies that integrate with and support the curricular strategies, modifications, and innovations which align with the ICM. Kaplan also reminds us that gifted students often come to school with innate strategies or pathways for learning that are found less often in average

students; however, these students still need to be taught formal and discipline-specific strategies to reinforce their natural learning strategies. For example, a child may have taught himself to do mathematical computation using a strategy of his own. In this case, the child would benefit from being taught the mathematical algorithm for computing sums, differences, products, and quotients. As he progresses to higher mathematics, these formal algorithms would expedite his problem solving. Although both Coleman and Kaplan deny the existence of a gifted-child pedagogy, they do imply certain practices are found to be more effective with some gifted students than with some average students.

Purpose of the Study

The purpose of this study is two-fold: a) to explore the attitudes and perceptions of elementary level teachers as they relate to gifted students, and b) to explore the practices of elementary level teachers as they relate to gifted-friendly practices. It is an exploratory study to examine the beliefs and practices of general education teachers in a specific location concerning gifted students and gifted practices. The study was conducted in a small school district located about thirty miles outside the state capitol of a southeastern state.

Research Questions

In this research project, the researcher attempted to answer three questions:

1) What attitudes do teachers hold concerning gifted students?

2) How do teachers perceive the way they differentiate the curriculum for gifted students?

3) What instructional practices do teachers use in the classroom to accommodate gifted students?

Significance of the Study

This paper's importance to practitioners in general lies in two areas. First, it has the ability to identify and describe effectively those practices and attitudes that would be most effective in the regular classroom for meeting the needs of included gifted students. For the school district involved, the importance of this study lies in the disclosure of current classroom practice and attitudes of teachers toward gifted students and how these compare with the ideal practices and attitudes. This descriptive account is expected to yield information that will guide the professional development in the district for the next several years as well as provide pertinent information to guide the selection of cluster teachers for the gifted as the district begins to implement this strategy.

This study's importance to research lies in its ability to shed light on the questions investigated. It is hoped this research has added one more building block to the evidence that supports a differentiated education for gifted students. It is also expected that the findings will add to the literature base which supports the premises that gifted students can benefit from exposure to certain gifted-friendly practices and positive teacher attitudes.

Definitions

The terms defined below are used throughout this study.

1) *attitudes:* Gagne (1985) operationally defines attitude as "a state that influences or modifies the individual choices of personal action" (p. 229). Stern and Keislar (1977) identify six features of attitudes: 1) attitudes deal with the way a person feels; 2) attitudes are expressed in relation to something; 3) attitudes are dispositions to act in a certain way; 4) attitudes are more validly expressed when there is a perception of choice of behavior; 5) attitudes influence behavior; 6) attitudes are learned.
2) *creative thinking*: Niu and Sternberg (2002) defined creative thinking to include eight components: innovation/imagination, intrinsic motivation, independence, risk taking, a wide range of interests, intelligence, high levels of activity/energy, and a sense of humor
3) *critical thinking:* Using the work of Ennis, Glaser, and Paul, Dixon, et.al. (2004) define critical thinking as "an active process in which the thinker considers alternatives, combines ideas, takes risks to find new connections, and evaluates steps to a conclusion."
4) *differentiation:* Tomlinson (1995, 1999, 2000) defines differentiation as giving different groups of students work that is different in content, process, or product based on student interest, ability, or learning style. The work of each group is equally important, challenging, and interesting.
5) *gifted:* In the literature, there exist many definitions for gifted children. For the purposes of this project, the term *gifted* refers to "Children and youth with outstanding talent; who perform or show the potential for performing at remarkably high levels of accomplishment when compared with others of their

age, experience or environment" (U.S. Department of Education, 1993, p.26). More specifically, the local school district identifies gifted students using a matrix and cut off scores. Students must achieve a minimum score on the matrix based on achievement test scores above 95%, ability test score above 95%, student GPA above 3.5, teacher recommendation, and performance on a creativity activity (Colonial Heights Public Schools, 2005).

6) *gifted-friendly practices:* Gifted-friendly practices are those practices that are supported by research as promoting the growth of gifted students in the regular classroom, regardless of their effect on non-gifted students (Kaplan, 2003).

7) *inclusion:* "This term is used to refer to the commitment to educate each child, to the maximum extent appropriate, in the school and classroom he or she would otherwise attend. It involves bringing the support services to the child (rather than moving the child to the services) and requires only that the child will benefit from being in the class (rather than having to keep up with the other students). Proponents of inclusion generally favor newer forms of education service delivery. **Full Inclusion** is primarily used to refer to the belief that instructional practices and technological supports are presently available to accommodate **all** students in the schools and classrooms they would otherwise attend if not disabled. Proponents of full inclusion tend to encourage that special education services generally be delivered in the form of training and technical assistance to 'regular' classroom teachers." (Rogers, 1993)

8) *problem solving*: According to Martinez (1998), problem solving is "the process of moving toward a goal when the path to that goal is uncertain." Problem

solving can be simple or significant. We problem solve every day. There is no formula for problem solving, but problem solving is rather guided by heuristics such as means-ends analysis, working backwards, successive approximations, and concrete representation.

9) *research strategies:* techniques used to gather evidence from multiple sources, interpret, draw inferences and make conclusions from them; opportunities to communicate research findings (VanTassel-Baska & Little, 2003).

Limitations and Delimitations

This study was limited by the non-random and non-representational nature of the sample and the exploratory design of the research questions and methods. It was also limited by the inability of the researcher to collect data from many of the upper-grade classrooms due to illness. Logical generalizations may only be made to the staffs of the selected schools. The study was also limited by the timeframe in which it was conducted. The ideal study would have collected multi-year data from all teachers in the sample schools. Another limitation was the use of self-report data, which may or may not reflect actual practice. Finally, the study was limited by the ability of the researcher to observe only one time and in a portion of the classrooms as opposed to doing multiple observations in all of the classrooms.

This study was delimited by the scope of inquiry and its focus on attitudes and practices of general education teachers who teach in an inclusive K-5 classroom. It was also delimited by its focus on attitudes toward and practices for gifted students.

Assumptions

During the course of the study, several assumptions were made. It was assumed that the instruments used measure the constructs they are purported to measure. It was also assumed that study participants reported their actual opinions, attitudes, and practices. In addition, it was assumed that the constructs being investigated were indeed constructs that impact the education of gifted students in the regular classroom. In choosing to investigate attitudes and beliefs of teachers, the researcher assumed that attitudes would correlate with actions on the teachers' parts. Finally, it was assumed that use of a number of research-supported, gifted-friendly strategies and practices would result in superior academic growth for gifted students.

CHAPTER 2: REVIEW OF RELEVANT LITERATURE

"What is necessary and sufficient for the non-gifted is necessary but insufficient for the gifted, who need more and different learning experiences to match their potentials." (A. J. Tannenbaum, 1983)

Introduction

In beginning the literature review for this study, it was essential to review the purpose of the study and the research questions. The two-fold purpose of the study is to a) explore the attitudes and perceptions of elementary level teachers in the selected school district as they relate to gifted education, and b) explore the practices of elementary level teachers in the selected school district as they relate to gifted education. The three research questions are:

1) What attitudes do teachers hold concerning gifted students?

2) How do teachers perceive the way they differentiate the curriculum for gifted students?

3) What instructional practices do teachers use in the classroom to accommodate gifted students?

The Framework

To engage in research which investigates the attitudes of teachers toward, and services to, gifted students in the regular classroom, it was essential to review three strands of literature. First, it was imperative to have an understanding of the literature concerning teacher attitudes toward the gifted and teacher practices in the general education classroom. It was also important to know which services and practices are

typically used in regular classrooms. The scientific literature on teacher attitudes, teacher practice, and best practice are voluminous. A few studies are of a national scope, but the majority of studies are of a small scale with a narrow scope of generalizability. In order to review the literature for this study, it was necessary to organize the studies into three strands. These resulting three literature strands are listed below:

- Strand I: Teacher Attitudes Toward and Perceptions of Gifted Students
- Strand II: Differentiation Practices of Teachers of Gifted Students in the Regular Classroom
- Strand III: Research-Based Practices and the Integrated Curriculum Model

Next, the researcher used Slavin's (1986) concept of Best Evidence Synthesis to analyze each body of literature. Slavin suggests that each sub-field in the literature is examined using the "best evidence" (p. 6) available in that sub-field; hence, not every sub-field will be evaluated according to the same criteria. If a sub-field contains many studies high in internal and external validity, then studies of less rigor might be excluded. On the other hand, if no rigorous studies are found, then less well-designed studies will be cautiously examined for information. Whereas a meta-analysis often uses statistical tests, such as effect size, as empirical evidence, Slavin argues that "reviews of social science literature will inevitably involve judgment" (p. 7). Slavin recommends a number of *a priori* criteria for study selection. The first, and most important, is germaneness to the issue at hand. The second is an evaluation of methodological adequacy--to what extent does the study design minimize bias? Third, he asserts that external validity must be valued as highly as internal validity. When a body of literature is lacking in studies, Slavin poses, it may be necessary to include, but not pool, flawed

studies, with clarification as to reasons for inclusion. If there are many high-quality studies, effect sizes across studies may be averaged; however, Slavin cautions against wholesale pooling of effects.

Three organizing decisions provide the framework for studies chosen for the review of literature concerning teacher attitudes and teacher practices. These decisions are guided by the Best Evidence Criteria, cited above, as well as the evidence-based-criteria used in the National Research Council's *How People Learn* (Bransford, Brown, and Cocking, 1999) and *How Students Learn* (Donovan and Bransford, 2005). It seemed logical that, in order to be included, the studies should represent:

- research which focuses on general education teachers in inclusive settings.
- research that has implications for the design of formal instructional environments, primarily preschools and kindergarten through middle school (PK-8).
- research which explores the possibility of helping gifted individuals achieve their fullest potential possible within an inclusive setting.

The Researcher Perspective

This is a quantitative study in which the researcher sought to collect objective data to answer the research questions outlined above. Although, as a school employee, the researcher was technically an insider, she was new to the position and had little to no insider perspectives. Using technically adequate instruments that required only minimal interpretation also helped to insure objectivity. An attempt was made to interpret the participants' perceptions in ways that would be meaningful and within the intended scope of the project (Rossman & Rallis, 2003).

The Focus

For this study, the researcher chose to focus on those practices that have research to recommend them to teachers of gifted students in the regular elementary classroom. Strand I evaluates the literature on teacher attitudes toward gifted students in the regular classroom. Strand II of the literature review analyzes research projects that investigated the differentiation practices of teachers in general education classrooms and projects which investigated teachers who were considered exemplars in educating gifted students in the general education classroom. Those teachers who were considered exemplars (Westberg and Archambault, 1995) were chosen as effective teachers based on recommendation from administrators, state gifted coordinators, and other experts in the field.

From this literature, a list of recommended practices evolved. The results from the literature review on effective practices were then sorted into four categories supported by research from the Integrated Curriculum Model: a) Concepts, Issues, and Themes; b) Advanced Content; c) Processes and Products; and d) Non-ICM-related supported practices. These practices are examined in Strand III.

Strand I: Teacher Attitudes Toward and Perceptions of Gifted Students

Strand I of the literature review examines teacher perceptions of and attitudes toward gifted students in the regular classroom. The question driving this strand is, "What attitudes do teachers hold concerning gifted students?" Additionally, "Are there certain demographics or personal relationships that correlate with more positive attitudes?"

Nearly all elementary-aged gifted students spend most of their educational careers in a heterogeneously grouped classroom (Morris, 1987, as cited in Westberg, 1993). The general education classroom teachers' perceptions of, attitudes toward, and understandings of gifted students will determine the amount and type of support given to students in the regular classroom (McKay, 1993).

Research Findings

Research revealed the exploration of teacher attitudes toward and perceptions of gifted students as a longstanding question of interest (Peachman, 1942; Justman, 1956; Wiener, 1960) with no real consensus of opinion. Many eminent researchers in the field have conducted research or contributed opinions to this body of knowledge (Colangelo, & Kelly, 1983; VanTassel-Baska, 1992; C.M. Adams, 1993; Begin & Gagné, 1994; Moon, Callahan, & Tomlinson, 1999; Pierce & Adams, 2000; McCoach & Siegle, 2005). Begin and Gagné (1994b) completed a summary of thirty studies with nearly 50 variables. Within these studies, they found a few potentially valid predictors for teacher attitudes toward and perceptions of gifted children: gender of the respondent, self-perception of giftedness, contact with gifted people, and level of education. They also identified four major problem areas within the studies they analyzed: lack of the use of a reliable and valid attitude scale, insufficient number of pertinent and adequately measured predictors, lack of a suitable sample from a relevant population, and inappropriate statistical procedures (Begin & Gagné, 1994a). They proposed that by controlling these four criteria, they could raise significantly the explaining power of a limited group of predictors of a general attitude toward giftedness and educational programs for the gifted. This work demarcates a change in the research on this topic.

After Begin & Gagné (1994a), studies more often used a reliable and valid instrument to gather data. They also began to use more consistently the statistical analyses appropriate to the study. A discussion of the research before 1994 followed by an analysis of the studies during and after 1994 follows.

Pre-1994 Studies

Michener (1980): The definitive study in the 1980's.

At the time of the Begin and Gagné review, the most definitive work on the subject was considered the Michener (1980) study. In Michener, a researcher-designed questionnaire was given to 34 administrators, 503 teachers, and 700 community members of a school district in southern New Jersey. The questionnaire collected demographic information, attitude information, and orientation to change information. The purposes of this study were to 1) determine the attitudes of administrators, teachers and community members toward the education of gifted children and youth, and 2) analyze the relationships between specifically selected variables and the attitudes toward gifted children and youth.

Michener found no significant relationship between the attitudes of the groups; however, all three groups expressed favorable attitudes toward gifted education. Favorable attitudes toward gifted education were positively correlated with the independent variables of gender (female), personal participation in a gifted program, identification of one's child as gifted, age (older ages), methods of gaining knowledge in gifted education (professional development; university coursework), and participation of one's own child in a gifted program. No significant relationships were found between the attitudes of teachers and the independent variables of educational background and

familiarity with gifted education. Michener used step-wise multiple regression analyses and ANOVA to determine statistical significance. The greatest flaw in the Michener study was the use of instrumentation that did not have validity and reliability studies to support its use; however, this study stood above any other research on this topic in the 1980's.

Other early studies.

In a group of studies done during the pre-1994 period, several researchers found that general education teachers appeared to be less tolerant of students with exceptionalities (including the gifted label) than teachers who have special training (Wiener & O'Shea, 1963; Bryan, 1974; Jacobs, 1975; Buttery, 1978; House, 1979; Forum, 1980; Forum, 1980; Nicely, Small, & Furman, 1980; Korynta, 1982; Leyser & Abrams, 1982; Jones & Southern, 1992). One study disagreed with the assessment that special training affected the perceptions and attitudes of the teachers (Awanbor, 1991). The differences found between the Awanbor results and the results of the other studies may be rooted in the cultural differences of the participants. The Awanbor sample was made up of teachers from Nigeria, Africa, while the other studies used samples of teachers from the United States. The majority of these studies agreed with the Michener findings that reported positive attitudes of teachers which were significantly correlated to professional development or university coursework in gifted education. Others found that teachers who had close contact with gifted students (i.e. teachers of gifted, parents of gifted, considered self gifted) held more positive attitudes toward the gifted and programs for the gifted (Wiener & O'Shea, 1963; Rubenzer & Twaite, 1979; Cavin, 1980; Nicely, Small, & Furman, 1980; Dettmer, 1985; Bransky, 1987; Jones & Southern, 1992).

Several studies reported the overall attitudes of teachers toward gifted students as negative (Cramond & Martin, 1987) when compared with athletic students or average ability students, while some reported overall attitudes of teachers toward gifted students (not relative to other populations of students) as negative (Forum, 1980; Copenhaver & McIntyre, 1992;), some as positive (Ferrante, 1983; Gagné, 1983; Adams, 1993), and still others as neutral (Panda & Bartel, 1972). At least one study reported negative differences between attitudes toward average students and gifted students (Leyser & Abrams, 1982), which proved non-significant. Although investigating the same phenomena, these different researchers reached different conclusions while using different instruments. In some instances, they reported differences in attitudes or negative attitudes that were not supported statistically. When Begin and Gagné (1994a) analyzed these studies they reached conclusions on only three factors as predictors of attitudes toward gifted students, two of which are appropriate to this research: gender of the respondent (female), and close contact with gifted children (teacher of, parent of, self-identified).

A New Era: Begin and Gagné (1994b)

In the Begin and Gagné study (1994b), the researchers attempted to control for four criteria which their previous study (1994a) had highlighted as flaws in general research on this topic: 1) lack of the use of a reliable and valid attitude scale, 2) insufficient number of pertinent and adequately measured predictors, 3) lack of a suitable sample from a relevant population, and 4) inappropriate statistical procedures. These concerns became the basis for and helped to add an element of rigor to many later studies.

Post-1994 Studies

During the last decade, a proliferation of doctoral dissertations has queried teachers as to their perceptions of and attitudes toward giftedness in general and gifted students in the regular classroom in particular (Lamb, 1995; Buxton, 1997; Zietlow, 1998; Thrailkill, 1999; Schulte, 2001; Song, 2001; Scott, 2002; Roache, 2003; Chipego, 2004; de Wet, 2006; Gornall, 2006; Morrissey, 2006). With so many studies, it became essential to look only at those studies which directly related to the above research questions and which met the relevant criteria imposed by the conceptual framework:

- research which focuses on general education teachers in inclusive settings.
- research that has implications for the design of formal instructional environments, primarily preschools, kindergarten through middle school (PK-8).

Hansen and Feldhusen (1994) published the results of their study on the effects of teacher training in gifted education on teacher effectiveness and competence as well as classroom climate around the same time as the Begin and Gagne study. A total of 82 teachers (54 who had between 9 and 15 graduate credit hours in gifted education and 28 with no gifted education training) who were currently teaching gifted students were observed using the TOF (Teacher Observation Form). Their students were asked to complete the CAQ (Classroom Activities Questionnaire) to analyze classroom climate. The results of these observations and questionnaires were analyzed to look for significant differences between the two teacher groups: those with training and those without training.

Results of statistical analysis revealed training and grade level taught to be statistically significant independent variables. Trained teachers scored significantly higher than untrained teachers; elementary teachers scored significantly higher than

secondary teachers. Teacher age, teacher grade point average, years teaching, years teaching gifted, and satisfaction with teaching were not statistically significant variables. The higher number of credits in gifted education also significantly correlated with a higher score on the TOF. There was a low and significant correlation between teaching skill and gender, with females scoring higher than males. This finding agreed with Begin's and Gagne's findings (1994). The most pertinent finding from this study is the identification of independent variables for study: gender, and number of graduate credits in gifted education. These variables correlated with a higher incidence of gifted friendly practice in the classroom.

Pierce and Adams (2000) were interested in the question of changing teacher attitudes. They presented data from a study and discussed variables that correlate with teachers' attitudes toward academically diverse students. Their participants included two groups: 95 experienced teachers from five schools that were participating in a Jacob K. Javits Gifted Programming grant, and 85 preservice teachers participating in full-day Saturday workshops on differentiation. Results from the self-report survey, the Survey of Practices with Students of Varying Needs (SOP), showed no significant differences between the responses of preservice and in-service teachers. The SOP had been developed with reliability and validity studies completed earlier (Adams, 1993) which confirmed both face validity and content validity. Part I of the SOP consisted of 35 statements with Likert-type responses which were meant to assess attitudes toward gifted learners, special education learners, and differentiation of classroom practices. Part II asked respondents to rank the amount of time given to different groups of students. Part III asked participants to rate their confidence levels in meeting students' needs. Part IV

asked them to indicate which of fourteen different classroom practices they thought they would use with each different student group: gifted learners, average learners, special education students.

The attitudes of both teacher groups appeared to be moderately positive for gifted students. These findings could be partially explained by the fact that all of the teachers were involved, to some degree, with gifted education coursework or workshops. The predisposition of those who enroll in such courses and workshops could define participants as a special group as opposed to a randomly selected group of preservice or in-service teachers. The most pertinent results from this study lie in the fact that positive attitudes were obtained from teachers who were enrolled in gifted education workshops, thus supporting the idea that additional educational opportunities in the area of gifted education correlate with more positive attitudes toward gifted students (Rubenzer& Twaite, 1979; Starko & Schack, 1989; Rash & Miller, 2000).

Megay-Nespoli (2001) surveyed 64 preservice teachers using the Survey of Practices with Students of Varying Needs (SOP, described above). Participants completed the SOP before and after their student teaching experience. The participants were randomly placed into two groups: Group 1 participated in a three-hour workshop on *Differentiation*; Group 2 participated in a workshop called *Year One*, which included topics such as parent-teacher conferences, classroom management, and teacher-created tests. *Year One* did not address differentiation.

The pretest indicated that both groups held similar attitudes toward the different groups of students. There were no significant differences in the responses of the two groups on the pretest. The posttests, however, revealed a number of significant

differences in the responses of the two groups. In Part I, the responses to nine of the fourteen items related to advanced learners were found to have significant differences ($p<0.01$). In Part II, pretests indicated that students would spend equal amounts of time with each student group. The posttest indicated significant differences between the two groups. Group 2 spent significantly more time with struggling students, while Group 1 spent more time with the advanced learners. Although at the inception of the study, both groups expressed confidence (Part III) in meeting the needs of the academically talented, the posttest revealed that the confidence level for Group 2 decreased while the confidence level for Group 1 increased resulting in a significant difference on the posttest.

The surveys were augmented with information gained from group interviews and lesson plan analysis. Student teachers who received support from their cooperating teachers were more likely to try to differentiate their instruction in the classroom. The final results, however, indicated that although the differentiation workshop raised awareness and created an attitude supportive of differentiation, the actual practice of these teachers changed very little. When support was not available from their cooperating teachers, these student teachers reverted to whole-group instruction. Beliefs were seldom translated into action. The most salient point from this study was the fact that teacher attitudes were affected by a three-hour session on differentiation. The other point that stands out is that teacher attitude does not always translate into teacher action. The attitudes of other teachers and mentors seem to be more important than self-attitude in deciding what practices are used in the classroom.

Chipego (2004) found that teachers (n=392 elementary classroom teachers from Southeastern Pennsylvania) had "an overall ambivalent attitude toward gifted education

with a neutral to very slightly positive attitude toward special services for gifted" (p. 107) students. She also found teachers' attitudes toward acceleration and ability grouping were moderately negative. The study investigated independent variables including gender, age, years of teaching, teacher interest level, characteristics of undergraduate program, formal education, family of origin income, gifted courses, staff development, socioeconomic level of the school district, perceived workload, perceptions of parents of gifted learners, perceptions of administrative support for gifted programming, perceptions of own giftedness, and liberal/conservative position.

This researcher developed the Parent Negativity Scale (PNS) which was found to have very high reliability in measuring teachers' attitudes towards the parents of gifted learners. The most interesting variable that was found to be a powerful predictor of teacher attitude toward gifted education was the teacher score on the PNS. Other significant findings included the significance of independent variables including perceived level of district commitment, formal education, interest in teaching gifted, socioeconomic status of the district, age, having a gifted child, and political stance.

While the McCoach and Siegle (2005) study did not use a control group and had a low response rate (17.5%), it is one of the larger studies on this topic. The researchers used Gagne and Nadeau's (1991) Opinions about the Gifted and Their Education instrument to survey a national sample of teachers (n=262) concerning their training and experience teaching gifted students, their attitudes toward gifted students and gifted education, and their support for special services for high ability students.

Although they found that teachers in the sample were generally supportive of gifted education, attitudes of individuals ranged from extraordinarily negative to very

positive. Their findings were unsupportive of the findings of other studies that have suggested teacher training and teacher exposure to gifted students correlate with positive attitudes toward gifted education. They found no significant differences between the group with training and the group without training. One reason for this could be the fact that the "with training" group included a wide range of training experiences: teachers who reported 1) taking a gifted education class, 2) attending a gifted education class (as a K-12 student), 3) working as a teacher of the gifted, or 4) being certified in gifted education. Hansen and Feldhusen (1994) reported that more positive attitudes were correlated with more hours of training. By grouping teachers who had taken one class, teachers who had enough coursework for certification, teachers who were working with gifted children (regardless of coursework taken), and teachers who had been involved in a gifted classroom as a student, the authors may have introduced a confounding element into their study design.

By using a reliable survey, attempting to access the attitudes of a random sample of teachers, and using appropriate and rigorous statistical measurements, the authors attempted to design and carry out a rigorous study. Unfortunately, a low response rate and the introduction of a confounding variable worked together to produce a less rigorous study. The greatest significance of this study to the current study being undertaken is the research design, the additional validation of the Gagne-Nadeau instrument, and the finding that teacher attitudes are quite variable.

Implications from the Overall Review of the Literature on Teacher Attitudes toward and Perceptions of Gifted Students in the Regular Classroom

The overall conclusions from the literature review are that

1) Teacher attitudes toward and perceptions of gifted students in the regular classroom are variable (Michener, 1980; Begin & Gagne, 1994a; Hansen & Feldhusen, 1994; Buxton, 1997; Pierce & Adams, 2000; Megay-Nespoli, 2001; Chipego, 2004; and McCoach & Siegle, 2005).
2) There exist a number of independent variables that may positively influence teachers' attitudes and perceptions toward gifted students:
    a) gender (female) (Michener, 1980; Begin & Gagne, 1994a; and Hansen & Feldhusen, 1994);
    b) age (Michener, 1980; Buxton, 1997: Chipego, 2004);
    c) personal participation in a gifted program or perceiving oneself as gifted (Michener, 1980; and Begin & Gagne, 1994a);
    d) being the parent of an identified gifted child (Michener, 1980; and Begin & Gagne, 1994a; Chipego, 2004);
    e) knowing gifted people (Begin & Gagne, 1994a);
    f) additional professional development or university coursework in gifted education (Michener, 1980; Hansen & Feldhusen, 1994; Pierce & Adams, 2000; Megay-Nespoli, 2001; Chipego, 2004); and
    g) the related variables of family income, family educational level (Begin & Gagne, 1994a), socioeconomic level of the school district and perceived level of district commitment to gifted education (Chipego, 2004).

Table 1: Table of Specifications:

Teacher Attitudes toward and Perceptions of Gifted Students

Authors	Synopsis
Michener, 1980	1.) No significant relationship was found between the attitudes of administrators, teachers and community members toward the education of gifted children and youth. All three groups expressed relatively favorable attitudes toward gifted education. 2) Significant relationships were found between the attitudes of administrators, teachers and community members toward the education of gifted children and youth as measured by any and all of Scales 1, 2 and 3 and the independent variables of sex, personal participation in a gifted program, identification of one's child as gifted, age, methods of obtaining knowledge in gifted education and participation of one's child in a gifted program. 3) A significant relationship was found between the orientation to change factor and the three groups--administrators, teachers and community members. 4) No significant relationships were found between the attitudes of

(Table continues)

Table 1 (Continued)

	administrators, teachers, and community members toward the education of gifted children and youth and the independent variables of educational background and familiarity with gifted education.
Begin & Gagne, 1994	Summary of 30 studies with nearly 50 variables. Found only 3 potentially valid predictors for teacher attitudes toward and perceptions of gifted children and services: sex of respondent, contact with gifted children, teachers vs. parents. Teachers who have worked with gifted children have more positive attitudes toward them than teachers who have no experience teaching gifted children. "Contact with gifted children, past participation in a gifted program, the presence of a gifted program in a participant's school, and perceived knowledge of giftedness were statistically significant predictors of attitudes toward the gifted in the majority of studies which included these variables."

(Table continues)

Table 1 (Continued)

Authors	Synopsis
Hansen & Feldhusen, 1994	Sample: 82 teachers (54 with gifted coursework/28 without coursework) of the gifted. The students were asked to report their classroom activities and the teachers were observed. Trained teachers scored significantly higher than untrained on their attitudes toward the gifted.
Pierce & Adams, 2000	Sample: 95 experienced teachers participating in Javits grant workshop; 85 pre-service teachers participating in Saturday workshop on differentiation. All participants were found to hold positive attitudes toward gifted education.
Chipego, 2004	Teachers had an overall ambivalent attitude toward gifted education and a neutral to very slightly positive attitude toward special services for the gifted (p. 107). Teachers' attitudes toward acceleration and ability grouping were moderately negative.

(Table continues)

Table 1 (Continued)

Authors	Synopsis
McCoach & Siegle, 2005	Potential predictors of attitudes toward the gifted include: training/experience in gifted education; training/experience in special education; self-perceptions as gifted. 262 teachers responded, from a pool of 1500. Teachers were generally supportive of gifted education (M=5.45) Teachers attitudes about acceleration were more mixed (M=4.46/higher scores mean more negative attitudes). The elitism scale (M=3.88) was near the midpoint of 4.0 indicating neither agree or disagree. Teachers who had received training in gifted education held higher perceptions of themselves as gifted. Teachers' self-perceptions as gifted were completely unrelated to their attitudes toward gifted education; special education teachers held slightly lower attitudes toward the gifted.

Strand II: Differentiation Practices of Effective Teachers of Gifted Students in the Regular Classroom

There are a number of studies which focus on actual teacher practice as it relates to differentiation for gifted students in the inclusive general education classroom. The National Middle School Association and The National Association for Gifted Children (2005) issued a joint position statement that included using the practice of differentiation as a standard of middle school education for high ability students. VanTassel-Baska (2005) noted differentiation of curriculum and instruction as two of the "nonnegotiables" (p. 90) of gifted education. The question driving this literature strand is, "How do teachers perceive the way they differentiate the curriculum for gifted students?" The conceptual framework for reviewing these practices is the Integrated Curriculum Model.

In this section, the researcher has looked at studies that have examined teachers' use of differentiated practices in the general education classroom, including the use of differentiated curriculum. Although a number of survey instruments (Archambault, Westberg, et.al., 1993; Cassady, Neumeister, Adams, Cross, Dixon, & Peirce, 2004; Borko & Stecher, 2006; and Hong, Greene, & Higgins, 2006) have been created to gather information on this question, few researchers have undertaken large scale projects to determine which practices are performed in the general education classroom. A landmark study for this topic is Archambault, Westberg, Brown, Hallmark, Zhang, and Emmons (1993) which surveyed 6,000 teachers nationwide. The researchers used stratified random selection to identify approximately 7,400 third- and fourth-grade teachers throughout the United States. The strata for the selection included the four

regions of the United States (Northeast, North Central, South, and West) and types of communities (Urban, suburban, rural). They also used four other sample groups representing teachers from schools where the minority student population was greater than 25% in each of the four minorities: African American, Asian American, Native American Indian, and Hispanic-American. Their return rate was about 50% across all of the samples giving an error estimate of 2.2% which is within the acceptable range for confidence at the 95% level and therefore generalizable (Rea & Parker, 1997).

Participants were asked to complete the *Classroom Practices Survey* to determine if, and to what extent, modifications were being made in the general education classroom to meet the needs of high-ability students. They found that few teachers made modifications for their gifted students and those who did indicated that they assigned advanced readings (ES=.622), enrichment worksheets (ES=.400), projects (ES=.309) and reports (ES=.291). The study was later replicated with a different sample of teachers (Westberg & Daoust, 2003) with similar findings. It is generally accepted that effect sizes of 0.2 are small, 0.5 are medium, and 0.8 are large (Cohen, 1988). One of the more noteworthy findings was that teachers in classrooms with five or more identified gifted students provided significantly more opportunity for challenge, choice, and curriculum modifications than teachers with fewer than five gifted students. These teachers provided curricular modification opportunities to all of their students, not only the gifted, thus enhancing the educational experiences of all students.

The study of modifications in the classroom has its importance; however, it is also important to understand what modifications are being made. It is important that when teachers make modifications, these modifications are research-based practice.

Whitton (1997) used an instrument she designed, the Regular Classroom Practices Surveys (RCPS) to survey a stratified sample of teachers in New South Wales, Australia. More than 600 teachers responded to the survey (35.3% response rate). There were responses from government, Catholic, and independent schools throughout the state in percentages that roughly reflected the actual population of schools. The respondents reported few instances of differentiating curriculum for gifted students. One item, "repeat instruction of more difficult concepts for more students," had an effect size of 1.08. This item is not considered a gifted-friendly practice, and could be the attempt of the teacher to differentiate for struggling students. Other significant effect sizes were for items concerning assigning work from a higher level textbook (ES=.55), and assigning more advanced readings (ES=.62). Both of these strategies fit into the Advanced Content Dimension of the ICM model. Although this study attempted to determine teacher practice, there was no delineation of practices supported for use with gifted students versus non-supported practices.

In a study of three middle schools, Hertberg-Davis and Brighton (2006) found three different types of leadership related to differentiated education among three types of principal support: strong principal support, weak principal support, and principal sabotage. In one school, the principal encouraged differentiation, supported teachers' efforts to differentiate instruction, and transmitted his belief that differentiation was difficult but possible. The teachers in this school made great strides toward embracing and practicing differentiated instruction in their classrooms.

In the second school, the principal was judged to express verbal support of differentiation but engage in behaviors that indicated it was not a high priority. She did

not encourage her teachers to participate in differentiation. She also did not attend professional development workshops presented to her teachers on the topic of differentiation. Teachers in this school reflected the same attitude as the principal. They verbally supported differentiation but their behavior did not reflect a commitment to the practice. These teachers were observed to make few strides toward integrating differentiation into their classrooms.

The third middle school principal was seen as authoritarian, giving her teachers little decision-making power. She was also seen by her teachers as inconsistent. She did not attend professional development for differentiation and sometimes failed to inform teachers of the scheduled professional development sessions. The teachers perceived differentiation as a burden to carry that was not supported by the administration. Few teachers in this school attempted to use differentiation in their classrooms.

The conclusions of the study were that a) Teachers' responses to differentiation mirror those of the principal, b) Teachers needed administrator support to successfully implement differentiation, c) Effective implementation of differentiation required an administrator who desired the change and believed it was possible, and, d) Encouraging teachers to differentiate requires long-term vision and focus on the part of the administrator.

Studies on Practices Grounded in Differentiated Curriculum

The VanTassel-Baska, Bass, Ries, Poland, and Avery (1998) study investigated the efficacy of the science unit *Acid, Acid Everywhere*, based on the Integrated Curriculum Model. The unit was used in 45 classrooms in 15 school districts in 7 states.

It was used in a variety of class configurations including self contained gifted, pull out gifted, heterogeneous with cluster grouping, and heterogeneous. The purpose of the study was to assess student growth on integrated science process skills. The researchers also were interested in assessing implementation issues. The unit, *Acid, Acid Everywhere*, is a prototype unit for other units. Data gathered from this study was to be used to improve and/or justify other units of study. Student pre- and post-test was the Diet Cola Test (in two forms) developed by Fowler (1990). Although the units also contained science content objectives and macro-concept objectives, this study only reported on the process skills objectives. Teachers received summer training or week-end training on the curriculum and volunteered to participate. Trainings lasted from 2 to 5 days.

Researchers reported a significant difference between the posttest data from the experimental group and the comparison group on designing a science experiment, with an effect size of 1.30, which is considered a large effect. Teachers perceived the strengths of the unit to be the hands-on, problem-based, and student-centered aspects of the curriculum. Teachers in heterogeneous classes observed that all students benefited from the curriculum, not just the gifted students.

VanTassel-Baska, Zuo, Avery, & Little (2002) investigated the efficacy of a language arts curriculum based on the ICM (Integrated Curriculum Model) for students in grades 2-8 from 10 states and 46 schools over a period of five years. The study was limited by non-random selection; however, participating schools did provide both experimental and comparison groups. All students were identified as gifted using the local identification procedures of the individual schools. Teachers were given from one

to four days of training on the curriculum materials by trained staff members or trained teachers/administrators. Trainings supported teachers in the use of differentiated learning practices within the units. These practices included a focus on higher level thinking, concept development, use of advanced readings, use of research, use of inquiry, and various forms of independent learning.

Study results showed a statistically significant difference between experimental and comparison groups favoring the experimental group for literary interpretation (ES =.070--considered a moderate effect) and for persuasive writing (ES=.242--considered a very strong effect). The treatment was deemed effective for students regardless of gender, SES level, or grouping strategy.

Feng, VanTassel-Baska, Quek, Bai, & O'Neill (2005) examined the longitudinal effects of using the William and Mary language arts and science curricula at grades 3 through 5 in a suburban school district over a six-year period. The purpose of this study was to assess the effects of the differentiated curriculum over time. Students were exposed to the language arts units *Journeys and Destinations*, *Literary Reflections*, and *Autobiographies* in grades 3, 4, and 5, respectively. They used science units *What a Find*, *Electricity City*, and *Acid, Acid Everywhere* over the same time period.

A total of 973 students participated during the six-year period from 1996 to 2002. The study used mixed-methods design, incorporating both quantitative and qualitative data. Survey instruments and focus groups for students, teachers, administrators, and parents allowed for deeper understanding of the benefits received from the curricula. District performance data were also used to determine student academic growth.

Researchers found that students' academic growth was statistically significant with a magnitude of moderate to large. They also found that overall growth steadily increased from lower to higher grade levels in all domains assessed. Results suggested that in both language arts and science, there appears to be a positive effect related to repeated exposure, with the highest gains seen after the third year of implementation.

Project Athena, (VanTassel-Baska, Bracken, Feng, & Brown, 2007) a Javits Grant supported scale-up project, used the William and Mary language arts curriculum units at grades 3-5, along with supplemental materials for scaffolding, as a reading comprehension and integrated language arts program for inclusive general education classrooms in a number of Title One schools across three states. The experimental design included 2,113 students across three years of implementation along with 39 experimental and 38 control teachers. The experimental students were of all ability levels, multiple ethnicities, both genders and all socio-economic levels. The schools, labeled as Title One Schools, had a higher than average number of children in poverty.

Experimental teachers were given the William and Mary curriculum units along with supplemental materials such as the *Jacob's Ladder* curriculum as well as the readings and novels to support the units. Teachers received training following the format of 1) introducing the model for teaching, 2) providing practice using the model, and 3) debriefing the model. Experimental teachers participated in a three-day workshop during the summer, followed by a one-day workshop mid-year. The second year, continuing teachers received advanced training during the summer while teachers new to the project received the initial training. This was again followed by mid-winter training and debriefing. Teachers were also able to communicate with the project coordinators for

additional assistance during the course of the implementation. Teachers were observed using the COS-R (Classroom Observation Scale-Revised) and given coaching and feedback on their teaching performance during the course of the project as well.

Findings from the VanTassel-Baska, Bracken, Feng, and Brown (2007) study demonstrated a number of positive outcomes. First, experimental students scored significantly higher in both critical thinking and comprehension. All ability groups and all ethnic groups registered significant growth gains from using the curriculum. Not only did experimental teachers score significantly higher than control teachers on frequency of use of differentiated strategies, but they also scored significantly higher on effective use of differentiated strategies. Finally, experimental teachers in their second year of implementation demonstrated significantly more effective use of differentiated strategies over first-year experimental teachers. The authors concluded that the use of high-powered curriculum coupled with powerful teaching and learning models and multiple modes of assessment all supported by appropriate teacher training can result in high levels of student challenge and excitement in learning.

Table 2: Table of Specifications: Differentiation Practices of Effective Teachers of Gifted Students in the Regular Classroom

Strand	Authors	Findings
Differentiation Practices with Gifted Students	Archambault, Westberg, Brown, Hallmark, Zhang, Emmons, 1993	National study of classroom practices of 3rd and 4th grade teachers. Major findings included: 1.) few teachers made accommodations for their gifted students; 2.) those that did make accommodations used advanced readings (ES=.622), enrichment worksheets (ES=.400), projects (ES=.309), and reports (ES=.291); 3.) Teachers in classrooms with 5 or more gifted students provided significantly more opportunity for challenge, choice, and curriculum modifications for all students.
	Whitton, 1997	More than 600 teachers in New South Wales, Australia, reported few instances of differentiating curriculum for gifted students.

(Table continues)

Table 2 (Continued)

Strand	Authors	Findings
	Hertberg-Davis & Brighton, 2006	A study in which principals and teachers in three middle schools participated in differentiation professional development. The study concluded that the principal's commitment to and support of differentiation set the stage for the building. Teachers tended to practice differentiation at the level supported by the principal.
	VanTassel-Baska, Bass, Ries, Poland, & Avery (1998)	This study of an experimental design project reports on student growth in integrated science process skills after using Acid, Acid Everywhere, a differentiated science unit based on the ICM (Integrated Curriculum Model) used in 45 experimental classrooms in 15 school districts across 7 states. There were also 17 comparison classrooms. The study also assessed implementation issues. Researchers found that students in the experimental group made significant gains when compared to the comparison group. Teachers in the heterogeneous groups found that all students benefited from the unit, not just the gifted.

(Table continues)

Table 2 (Continued)

Strand	Authors	Findings
	VanTassel-Baska, Zuo, Avery, & Little (2002)	A five year quasi-experimental study, including over 2,000 students (grades 2-8) from 46 school districts in 10 states. Demonstrated the success of language arts units based on the ICM in advancing student performance in language and persuasive writing. Academic gains were statistically significant regardless of gender, SES, or grouping strategy.
	Feng, VanTassel-Baska, Quek, Bai, & O'Neill (2005)	A longitudinal assessment of gifted students' learning, using the ICM (Integrated Curriculum Model) for units in language arts and science, studying grades 3-5 in one suburban school over a 6-year period. The curriculum features differentiation within each unit. Researchers employed mixed methods including stakeholder surveys, focus groups, pre- and post-tests. Academic gains we statistically significant in all domains assessed. Students who were exposed to the curriculum repeatedly over time demonstrated the mean differences were statistically higher suggesting a positive repeated curriculum exposure effect.

(Table continues)

Table 2 (Continued)

Strand	Authors	Findings
	VanTassel-Baska & Stambaugh, 2006 (Project Athena)	A language arts curriculum intervention with teacher training study using experimental design with random selection at the classroom level; Sample included 2,113 students (in inclusive general education classrooms at a Title 1 School) and 39 experimental and 38 control teachers. Experimental teachers received intermittent and repeated training in order to implement a minimum of 24 lessons from an exemplary curriculum designed for gifted students but used with all students, incorporating scaffolding as needed. After two years, experimental students scored significantly higher than control students in critical thinking and comprehension. All ability groups and ethnic groups showed significant growth from using the curriculum; Experimental teachers scored significantly higher on frequency of use and effective use of differentiation strategies (using the COS-R). Teachers with 2 years training and experience demonstrated significantly greater use of differentiation strategies over first year teachers.

Implications from the Overall Review of the Literature on Differentiation Practices of Effective Teachers of Gifted Students in the Regular Classroom

The overall conclusions from Strand II of the literature review are:

1) Few teachers use differentiation strategies in their regular classrooms (Archambault, Westberg, Brown, Hallmark, Zhang, & Emmons, 1993; Westberg. 1993; Whitton, 1997; and Westberg & Daoust, 2003).

2) Teachers who do differentiate in regular classrooms may provide advanced readings, enrichment worksheets, projects, reports, and work from higher level textbooks (Archambault, Westberg, Brown, Hallmark, Zhang, & Emmons, 1993; and Whitton, 1997).

3) Teachers in classrooms where gifted students are clustered into groups of five or more are significantly more likely to differentiate for all of their students (Archambault, Westberg, Brown, Hallmark, Zhang, & Emmons, 1993).

4) Teachers' attitudes and practices related to differentiation more often than not match the attitudes of the building administrators (Hertberg-Davis & Brighton, 2006).

5) Teachers who receive training and ongoing support in using a curriculum based on the Integrated Curriculum Model (ICM) differentiate more often and more successfully than other teachers (VanTassel-Baska, Zuo, Avery, & Little, 2002; and VanTassel-Baska, Bass, Ries, Poland, & Avery, 1998).

6) Differentiated curriculum, coupled with teacher training on the materials, results in significantly higher academic growth than the use of comparison curriculum

(VanTassel-Baska, Bass, Ries, Poland, & Avery, 1998; VanTassel-Baska, Zuo, Avery, & Little, 2002; and Feng, VanTassel-Baska, Quek, Bai, & O'Neill, 2005).

Strand III: Research-Based Practices that Align with the Integrated Curriculum Model

Strand III of the literature review has been organized in a different manner than the first two strands. Strands I and II were organized according to each major study, describing the study and explaining the outcomes related to the questions of interest. In this section, the research is organized according to the constructs of the Integrated Curriculum Model: a) Concepts, Issues, and Themes; b) Advanced Content; c) Processes and Products; and d) Non-ICM supported practices with subcategories for each individual instructional or curricular strategy being investigated. Some strategies have a significant number of studies to recommend them; others have a paucity of research, and still others have no available research to endorse them.

In Strand II of the literature review, a number of instructional practices have been identified as practices used by successful teachers of the gifted which align with the Integrated Curriculum Model. Other strategies of successful teachers have been identified that do not fit within the ICM. These identified strategies lead into Strand III in which each strategy is investigated in more depth. The final outcome is a list of strategies that have been shown to be used by effective teachers of the gifted and that have independent research to recommend them as effective with gifted students.

Hanushek (1986) found that teachers and schools differ dramatically in their effectiveness. Using a systems analysis approach to measure inputs and outputs in a meta-analysis of 147 studies, he theorized that teacher skill created the difference seen in output: student growth between .5 grade levels and 1.5 grade levels in the course of one school year. This theory points to the importance of teacher skill as well as attitude. Other studies have reported that teacher attitude and teacher intention do not always

translate into teacher action (Megay-Nespoli, 2001; McCoach & Siegle, 2005). The earlier described studies note a number of independent variables that correlate with positive teacher attitude toward the gifted; however, in order for the gifted to be well-served in the regular education classroom, those attitudes must translate into action.

In the course of the literature review, it became necessary to apply Slavin's idea of Best Evidence Synthesis (1986) to determine which practices have strong support, which have reasonable support, which have limited support and which have no support for use with gifted students. Some recommended best practices have been shown effective with all learners, and some have been shown effective with average learners, however, may not be effective with gifted learners. Examples of strategies that may be effective with average learners but not effective with gifted learners include the use of heterogeneous grouping, repetition, and cooperative learning.

Practices with a minimum of four studies or a meta-analysis to recommend them for gifted students are judged to have strong support. Practices with gifted students supported by three studies are judged to be reasonably well supported. Practices supported by fewer than three studies with gifted students are judged to have limited support. Where no studies have been found to support the practice with gifted students, the practice is judged to be unsupported. Table 3 illustrates the summary of the research support for each practice based on these studies and meta-analyses. Table 4 is a table of specifications for studies which have identified these practices. A table of specifications for studies and meta-analyses by topic may be found in Table 5.

Table 3: Research Support for Educational Practices with Gifted Students

Practice	Strong Support	Reasonable Support	Limited Support	No Support
Acceleration	X			
Active learning experiences	X			
Advanced level content and projects	X			
Authentic assessment		X		
Concept teaching	X			
Creative thinking skills	X			
Critical thinking skills	X			
Curriculum compacting/Diagnostic-Prescriptive Instruction/ Compression of Content	X			
Curriculum extensions			X	
Curriculum modifications/ Depth vs Breadth	X			
Departmentalized teaching				X
Enrichment/learning centers				X
Flexible grouping strategies	X			
Higher-order questioning strategies		X		
Imagery training				X
Independent self-selected study			X	

(Table continues)

Table 3 (continued)

Practice	Strong Support	Reasonable Support	Limited Support	No Support
Inquiry learning and teaching			X	
Integrated language arts		X		
Metacognition	X			
Multi-modal learning				X
Problem finding			X	
Problem solving	X			
School-wide theme-based enrichment	X			
Socratic discussion			X	
Special curriculum	X			
Student choice				X
Students as practitioners in a field (authentic practice)	X			
Synectics			X	
Understanding vs. Memorizing	X			
Using primary sources	X			

Westberg and Archambault (1995) identified a number of practices associated with successful teaching of gifted students within an inclusive setting. The practices that emerged from this study were sorted into the three dimensions of the ICM and a 4th dimension for practices not associated with the ICM. Westberg and Archambault used purposive sampling to select 3rd, 4th, and 5th grade classrooms in 10 elementary schools. They chose regular classrooms with teachers who had a reputation for effective implementation of differentiation practices to meet the needs of high ability students. Interviews, observations, and document review provided triangulation of data and yielded rich information concerning effective practices. A number of practices were found to be used by these effective teachers. Of special interest was the finding that effective teachers of the gifted in the general education classroom often have advanced training in a sub-field of education such as special education, gifted education, or reading—all areas that emphasize the needs of the individual child versus the group.

Johnsen and Ryser (1996) examined 675 articles and 83 abstracts in order to identify what were considered research-based classroom practices for gifted students in the regular classroom. From these articles and abstracts, after eliminating studies which did not meet their criteria, they gleaned a list of thirty-seven references which examined the effects of a variety of classroom practices. They divided these studies into classroom variables: content, rate, preference, environment, and instructional strategies. *Content* relates to the way a teacher organizes content, processes and products to meet student interest and ability. *Rate* includes acceleration or varying the pace of instruction. *Preference* relates to a match between students and learning style or interest. *Environment* relates to classroom organization, grouping, and the use of other settings.

Instructional Strategy encompasses methods and pedagogy used in the classroom. Although the authors noted that none of the studies were rigorous, they were able to draw some tentative conclusions concerning best practice for gifted students in the regular classroom.

In a study requested by the U.S. Department of Education and the Office of Educational Research and Improvement, Bransford, Brown, and Cocking (1999), identified and distilled information from research, representing what has been learned about human learning in the fields of cognitive sciences, developmental psychology, neuroscience, anthropology, and others. Their objective was to learn "what is required for learners to reach deep understanding, to determine what leads to effective teaching, and to evaluate the conditions that lead to supportive environments for teaching and learning" (p. unknown). They assert that although many instructional strategies appear to yield equivalent results when the measures of learning are at a low cognitive level, differences become more apparent when evaluations gauge transfer of learning to new situations, problems, and settings. These practices are recommended for all students, not just high ability students.

Recently, Robinson, Shore, and Enersen (2007) published an evidenced-based guide to best practices in gifted education in which they explore 29 research-supported best practices. This is a follow-up to an earlier work (Shore, Cornell, Robinson, & Ward, 1991) in which the authors cited 101 recommended practices for gifted education. In this newest study, Robinson, Shore, and Enersen have organized the strategies into the categories of *Home*, *Classroom*, and *School*, although these categories may overlap.

Robinson, Shore and Enersen suggest that research supports a number of gifted-friendly practices that can and should be incorporated in gifted education.

Table 4: Table of Specifications for Research-Based Practices that Align with the Integrated Curriculum Model: Identifying Effective Practices

Strand	Authors	Findings
Identifying Effective Practices with Gifted Students	Westberg & Archambault, (1995)	A study in which researchers created a list of 21 research-supported practices by evaluating teacher practice in a purposive sample of 3rd, 4th, and 5th grade classrooms. Classroom teachers were chosen for their reputation for effective implementation of differentiation practices to meet the needs of high ability learners. Effective practices included: Integrated Language Arts, Curriculum Extensions, Curriculum Modifications, Advanced Level Content, Curriculum Compacting, Higher Order Questioning Strategies, Advanced Level Projects, Acting as a Practitioner in the Field, Active Learning Experiences for Students, Higher Order Thinking Skills, Departmentalized Teaching, and Flexible Grouping.

(Table continues)

Table 4 (Continued)

Strand	Authors	Findings
	Johnsen & Ryser, (1996)	A meta-analysis of 675 articles and 83 abstracts resulting in 30 research supported best practices: Concept Models, Acceleration and Rapid Pacing, Curriculum Compacting, Curriculum Modifications, Depth vs. Breadth, Acting as a Practitioner in the Field (Real Problems, Problem Finding, Open Ended, Problem Solving , Authentic Assessment), Independent Study, Imagery Training, Higher Order Questioning, Synectics, Teaching Creativity, Higher Level Thinking, Student Choice, Enrichment and Learning Centers

(Table continues)

Table 4 (Continued)

Strand	Authors	Findings
	Bransford, Brown, & Cocking, (1999)	A study requested by the DOE and OERI to identify and distill research about human learning. The most relevant portion of the study identified strategies that promote learning: Organizing knowledge around important ideas or concepts, Curricula that leads to conceptual understanding, Clustering information into meaningful units, Curricula that emphasize breadth of knowledge, Understanding vs. memorizing, Multi-modal learning, Inquiry learning, Metacognition, Speed pattern recognition.
	Robinson, Shore,& Enersen (2007)	An evidence-based guide which identifies and explores 29 research-supported best practices. Among the practices recommended by this guide are school-wide theme-based projects, integrated language arts, acceleration, advanced level content & projects, compacting the curriculum, curriculum modification, curriculum extension, using primary sources, inquiry-based learning and teaching, active learning experiences, higher-level thinking, higher order questioning strategies, encouraging creativity, flexible grouping.

In the next stage, the researcher investigated each of the practices identified by these studies. The researcher looked for studies which have investigated these practices with gifted students. The above studies sought to identify what teachers were doing in the classroom that might contribute to successful teaching. The following studies investigate each of these practices either isolated or in combination with other practices, looking at the symbiotic relationship. The purpose of this extended review of the literature was to find support for each of the practices observed in classrooms where teachers were considered exemplars.

Instructional Strategies without a Research Base to Recommend them as Gifted-Friendly Student Choice

In looking deeper into the literature for each of the above cited strategies, there were some that did not have a research base to recommend them. The first strategy that was not supported as gifted-friendly is "providing student choice" in curriculum and instructional models. Although there were no studies found to address this construct, it was echoed in nearly every curriculum model in the literature. In The Parallel Curriculum (Tomlinson & Kaplan, 2002), teachers are encouraged to include student choice in several ways including choice of product, methodology, level of interest, materials, etc. In her work on differentiation, Tomlinson (1999) uses student choice and student interest as variables for choosing activities, types of instruction, and evaluation methods. VanTassel-Baska (2006) allows for student choice in the product dimension of the Integrated Curriculum Model, as well as in the selection of materials. Renzulli's Enrichment Triad Model is rooted in student interest and student choice (Renzulli, 1985).

Although the amount of choice and the method of choice vary, student choice appears to be a staple of gifted curriculum.

The researcher found no competing evidence to suggest that choice was not effective for gifted students in the regular classroom; however, she was unable to find research evidence to support the idea.

Enrichment Centers and Learning Centers

Another strategy that is not supported in research is the use of enrichment centers and learning centers. Although centers are often used as a method for introducing challenge and choice into the classroom, the researcher did not find research to support them specifically. There is evidence that these centers could be used to provide enrichment activities at a deeper or broader level for topics being studied in the general education curriculum. Students who are more deeply interested in a topic would be able to study the topic in a more appropriate depth. Enrichment Centers could incorporate several of the strategies discussed by Robinson, Shore, and Enersen (2007) as best practices, including using primary sources, tapping instructional technology, introducing career education, encouraging creativity, and adapting to multiple intelligences. The conclusion is that, although centers may be used as a delivery system to provide students with best practice curricula or instruction, in and of themselves they are not a best practice—simply a delivery system. Enrichment, as a strategy, has been shown effective and is discussed in a later section.

Departmentalized teaching

A third strategy that was not supported in the literature as best practice for gifted students was departmentalized teaching. Many elementary schools have begun to

structure their classes in a semi-departmentalized format while departmentalization has been a staple of high school and middle school structures for many years. A study by McGrath and Rust (2002), however, found that fifth and sixth grade students who remained in self-contained, heterogeneously-grouped classes achieved significantly more than comparable students from departmentalized, heterogeneously-grouped classes on Total Battery, Language, and Science subtests of the Tennessee Comprehensive Assessment. No differences were found on the subtests for reading, mathematics, or social studies. Although the study was not limited to gifted students, it is probable that gifted students were included in the classes. Alspaugh and Harting (1995) found that student achievement dropped significantly when students transitioned from self-contained classrooms to departmentalized classrooms; however, students recovered the loss in performance within the next year, following the transition year. These findings held regardless of the grade level in which the transition occurred. No other research was found to support this as a gifted friendly strategy.

The above described strategies have not been supported by research as gifted best practice or gifted friendly. Some may eventually be shown to benefit gifted students, but at present they do not have the research base to recommend them.

Imagery Training

Imagery training is often used in the arena of sports and physical training, but several studies have been found that have investigated the use of imagery and imagery training with children. In looking at the research, the researcher was unable to find evidence that imagery training benefits high ability students.

One of the earliest references to the use of imagery was more than 100 years ago by Sir Francis Galton. After interviewing more than 100 adults, he concluded that an overreliance on mental pictures was detrimental to acquiring the habits of highly-generalized and abstract thought (Hollenberg, 1970). Hollenberg explored the possible role of visual imagery in the learning of language. She chose 64 grade-school children whose scores on tests of visual imagery were designated as high (n=32) or low (n=32) who were matched on grade, sex, and IQ. She found that students who were high in visual imagery thinking learned the non-sense names of a series of objects in fewer trials than children who were weak in the tendency to use imagery. She also found that students who were low in use of imagery were significantly more likely to attain mastery of the overall concept. She concluded that students with a strong tendency to think in visual images demonstrated superior skill in learning specific associations, but had less of a tendency to group into categories, while students with a weak tendency to think in visual images grasped the categories more readily and were able to remember the associations as a series of objects belonging to a category. The weak visual image thinkers were also more apt to remember the objects and categories at a later time than the strong visual thinkers.

In a study of kindergarten students, Ryan, Ledger, and Week (1987) found that imagery training was highly effective in improving students' recall for pictograph sentences. A study by Center, Freeman, Robertson, and Outhred (1999) found that visual imagery training for low performing children in grade two improved their listening and reading comprehension skills. They did not assess the effect on gifted children. Another study done by Pinion (1999) used imagery with students in grades two, four, and five.

Students were shown images of state map outlines and given verbal information including the state name, capitol, and nickname. The same information was given for other states without showing an image. Short-term memory of facts was improved concerning the states shown with an image, however, when tested two weeks later, students showed improved memory of the visual image (state map outline) but little to no memory for the capitol or nickname for those states associated with visualization. In fact, the students remembered the nicknames of the non-imagery states more often. The author concluded that imagery may be useful for recall of visual information, but may compete with memory for auditory information.

Pressley and Levin (1980) studied imagery retrieval with and without retrieval cueing in students in grades two and six. They found that the younger students only benefited from imagery training if they were given the same imagery cues upon testing. Older students did equally well with and without the cues at testing.

Multi-modal learning

Although Gardner (1993) pressed teachers to look at multiple modes of learning in his work on multiple intelligences, the research concerning multi-modal learning is sparse. Koren, Klavia, and Goaodetsky (2005) reported on a project done which involved 234 sixth grade students. Students spent the first 2/3 of each semester studying a specific subject via teacher lecture and the last 1/3 of the semester constructing a representation of their knowledge in a new and creative medium. Their knowledge of the topic was tested after 2/3 of the semester and again at the end of the semester. During the second year of the study, students spent 2/3 of the semester studying a specific subject in an open environment where they examined and learned from the previous years' students'

representations. Final learning outcomes from these two groups and a third group which studied all semester with a teacher-lecturer showed a significant difference. The group which was involved with the teacher-lecturer for 2/3 of the semester followed by creating a representation of their knowledge scored significantly higher on the final test. The researchers concluded that students who produce higher levels of creatively represented products will gain more knowledge. They also concluded that use of multiple modes of learning, when matched to a student's strengths, will result in higher performance. The study did not refer to ability levels of students. No other studies were found to investigate this strategy.

The Dimension of Concepts, Issues, and Themes

In the concepts, issues, and themes section of the ICM, practices include clustering information into meaningful units, concept models, curricula that lead to conceptual understanding, organizing knowledge around important ideas or concepts, integrated language arts, and school-wide theme-based projects. In this section, the researcher addresses and describes research that supports these practices.

Taba (1967) described a three level approach to curriculum: 1) specific facts, 2) significant ideas, and 3) concepts. By teaching children at all three levels, she demonstrated that students would move from concrete thought, through representational thought, to abstract thought much more quickly. The Taba Model of concept teaching has been incorporated into the William and Mary Curriculum with great success. Students have been shown to make great gains in their critical thinking and content knowledge when exposed to these models (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996; VanTassel-Baska & Avery, 2002; VanTassel-Baska, 2003; VanTassel-

Baska & Stambaugh, 2006). The Problem Based Learning (PBL) Curriculum (Gallagher, 1996) is another curriculum type which has been shown to foster higher-order thinking and does not negatively affect the amount of subject content that is learned.

The National Science Education Standards (NRC, 2007) indicate that all K-12 students should develop understanding aligned with advanced concepts and processes. These concepts include the concepts of systems, order, and organization; evidence, models, and explanation; constancy, change, and measurement; evolution and equilibrium; and form and function.

Integrated language arts

A study of integrated language arts harkens to the debate of whole language or skills-based instruction. Research in gifted education, however, has revealed integrated language arts as appropriate, and possibly essential, for optimal academic growth among gifted students (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996; VanTassel-Baska & Stambaugh, 2006). Although the phrase "integrated language arts" does not appear in the national standards, the IRA/NCTE Standards for the English Language Arts (2007), the reading, writing, and speaking standards are combined under the umbrella of literacy education.

Xue and Meisels (2004) reported on a longitudinal study of 13,609 kindergarten children who received language and literacy instruction using phonics, integrated language arts, or a combination of the two practices. They found that classroom mean outcomes were significantly higher when teachers used both integrated language arts and phonics. They also found that children with low initial performance benefited less from

integrated language arts instruction measured by direct measures of achievement. No differential effect was found for high ability students.

The William and Mary language arts curriculum integrates the language arts of reading, writing, and research across grade levels. Research has shown these units of instruction to improve student academic performance, increase students' abilities to write persuasively, and improved students' literary skills (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996; VanTassel-Baska, Zuo, Avery, & Little, 2002; and VanTassel-Baska & Stambaugh, 2006).

School-wide theme-based enrichment

Although enrichment may take many forms, the most researched enrichment programs are the School wide Enrichment Model (Renzulli, 1994), which evolved from the Enrichment Triad Model (1979); the Purdue Three-Stage Enrichment Model (Feldhusen & Kolloff, 1979, 1986; Moon & Feldhusen, 1991), sometimes referred to as Program for Academic and Creative Enrichment (PACE); and the Talents Unlimited Model (Schlichter & Palmer, 2002). These studies have shown theme-based enrichment to be an effective practice with gifted students. Measures show higher student efficacy, higher levels of interest, and academic growth.

Special curriculum for gifted students

Over the years, there have been several curricula developed specifically for gifted students. Some of these have a history of research behind them to recommend them to us. One of these is the Junior Great Books Program (Nichols, 1992) which has been used successfully for many years. The College of William and Mary curricula have been hailed as exemplary for use with gifted students (VanTassel-Baska, Johnson, Hughes, &

Boyce, 1996; VanTassel-Baska & Avery, 2002; VanTassel-Baska, 2003; VanTassel-Baska & Stambaugh, 2006) and have been tested in the regular classroom as well. The University of Connecticut has recently published an elementary math curriculum, Project M3, which also has a research base (Project M3, 2006) to recommend it for gifted students. A three year study has demonstrated that gifted students in experimental classrooms showed significantly higher scores in mathematics, on all measured items, compared with students in control classrooms. The curriculum units are targeted to grades 3-5.

The Advanced Placement courses used in many high school programs are another example of specialized curriculum (Robinson, Shore, & Enersen, 2007). These specialized curricula generally use a variety of the research-based practices explored in this paper. By combining gifted-friendly practices—acceleration, depth, breadth, critical and creative thinking, metacognition, and macro-concept teaching—curriculum writers are able to create materials that meet the needs of gifted students. The research base for these curricula is growing.

The Dimension of Advanced Content

The Advanced Content component of the ICM includes strategies such as acceleration and rapid pacing—including curriculum compacting, use of advanced level content, use of curriculum extensions and modifications—especially depth vs. breadth, understanding vs. memorizing, and using primary sources. Research for each of these is found in this section.

Acceleration

VanTassel-Baska identified acceleration as one of two integral components of a program for gifted students (1992). Acceleration means moving through the traditional curriculum at rates faster than typical (Colangelo, Assouline, & Gross, 2004). Acceleration has been consistently supported through research as a viable option for educating gifted students. At the 1993 annual meeting of the National Association of Gifted Children, two former radically accelerated students, now adults, were asked to reflect on their experiences (Charlton, Marolf, & Stanley, 1994). They described the difficulties encountered in initiating acceleration and positive experiences once they were accelerated.

It is generally accepted that the earliest example of acceleration in public schools was in St Louis, Missouri in the mid-nineteenth century (Kulik & Kulik, 1984). In 1862, St. Louis schools began requiring advanced students to be reclassified and promoted frequently. Within a few decades, other schools throughout the nation began to use different forms of acceleration. However, throughout the years, support for gifted education, in general, and acceleration, more specifically, have waxed and waned as our country has tried to balance equality and excellence (Gardner, 1961).

The most recent and definitive work on acceleration has been *A Nation Deceived* (Colangelo, Assouline, & Gross, 2004), which presents research to support acceleration and also to dispel the myths associated with acceleration. The work of many in the field of gifted was brought to bear on the question of acceleration with the result being a resounding endorsement of acceleration as one of the most cost-effective, research-supported practices in gifted education (Richardson & Benbow, 1990; Swiatek, 1993; and

Brody, 2001). Some of these programs and practices are described in more detail in the following sections.

Study of mathematically precocious youth.

The most information-rich study is the on-going longitudinal Study of Mathematically Precocious Youth. The study participants were identified as the top 3% of learners at ages 12-13 (Grades 7 and 8) using the SAT (Scholastic Aptitude Test) off level between 1972 and 1987. Some students were selected using the verbal section of the SAT while others were selected using the mathematics section of the SAT. Four cohorts of students are being followed for what is intended to be a 50-year longitudinal study. A number of articles have appeared to report on findings. One such article (Swiatek & Benbow, 1991) reported the findings on the ten-year follow-up of ability matched accelerated and non-accelerated students. They found that academic variables tended to favor the accelerates while no significant differences were found on the psychosocial variables. At age 23, 85% of males and 86% of females had completed at least a bachelor's degree. Doctorate degrees had been completed by 28% of males and 17% of females, advanced degrees less than Doctorate had been completed by 15% of males and 17% of females, and 42% of males and 52% of females had completed bachelor's degrees. Gender differences were apparent as males were statistically more likely than females to be involved in inorganic sciences (Lubinski & Benbow, 1994).

At age 33, the cohorts were again surveyed. At age 33, data from cohort #1 showed 87% of males and 89.5% of females had completed bachelor's degrees, 37% of males and 36% of females had completed master's degrees, and 26% of males and 21% of females had complete doctorate degrees. The completion rates of cohort #2 were

slightly higher for both genders at every level. These are well beyond the expected rates of 23% (bachelor's), 7% (master's), and 1% (doctorate). Overall, including all four cohorts, 90% of the SMPY participants had earned a bachelor's degree and 26% had earned a doctorate. Males tended to dominate the inorganic sciences and engineering fields while females were more often in the medical arts of biological sciences, as well as the social sciences, arts and humanities (Benbow, Lubinski, Shea, & Eftekhari-Sanjani, 2000).

In 2003 and 2004, participants were surveyed at the mean age of 33.6 years. Talent Search participants had now earned doctorates at a rate of 51.7% for males and 54.3% for females. When examining three indicators: having earned and M.D. degree, earning at least $100,000 annually, or securing a tenure-track position in a top-50 institution, 42.3% of the talent search participants qualified on at least one indicator. Participants reported overall career and life satisfaction comparable to that reported by normative populations (Lubinski, Benbow, Webb, & Bleske-Rechek, 2006).

Early entrance studies.

A study on early entrance to college (Brody, Assouline, & Stanley, 1990) reported on 65 students who entered a highly selective university from 1980 to 1984. These students entered either two years early (n=60), or one year early with sophomore standing (n=5). The accelerants were compared to non-accelerants at the same university during the same tenure. Accelerants were shown to graduate sooner, earn concurrent bachelor's and master's degrees, maintain a higher overall GPA, and earn more honors than the non-accelerants.

One program which acknowledges this radical acceleration factor is Mary Baldwin University in Virginia where young women, as early as Grade 8, may enter the university and complete high school and a bachelor's degree simultaneously. The Early Entrance Program at the University of Washington also allows for the matriculation of junior high school aged students (Janos & Robinson, 1985). Between 1977 and 1983, ten students between the ages of 10 and 14 at matriculation had graduated with bachelor's degrees and proceeded to graduate schools. A study of 24 accelerated students found them to score favorably when compared to other students at the university. Their GPA's and credits earned were comparable to those of National Merit Scholars.

Although acceleration and grade skipping have been shown to be an inexpensive yet positive modification for some gifted students, schools still are reluctant to advance students. Private schools may be more willing to accelerate students than public schools (Witham, 1994); however, student acceleration happens infrequently, at best.

The Kulik and Kulik meta-analysis of research on acceleration (1984).

Kulik and Kulik (1984) analyzed 26 studies which were chosen for their methodological rigor. Each study included a control group and reported quantitative results. They found two types of studies: those which used same-age peers for the control group and those which used older-age peers for the control group. Of the 13 studies with same-age controls, all of the accelerated classes demonstrated greater student achievement than the control classes; however, only nine of them showed statistically significant differences. The average effect size in the 13 studies with same-aged controls was .88, considered a large effect (Cohen, 1988).

Five of the thirteen studies with older control groups reported a higher level of achievement in the accelerated class, with two of these being significantly higher. The remaining eight studies reported a higher level of achievement in the non-accelerated class, with two of these showing a significant difference. The average effect size in the studies with older controls was .05, considered a trivial effect (Cohen, 1988). The conclusions suggest that talented students are able to handle the academic challenge of acceleration. They performed as well as the older-age non-accelerants and better than their same-age non-accelerated peers.

Kulik and Kulik found that the studies varied dramatically on their findings concerning non-academic variables and were thus unable to draw conclusions. This study followed on the heels of other meta-analyses which demonstrated similar findings (Terman & Oden, 1947; Flesher, 1954; Goldberg, 1958; Gowan & Demos, 1964). The authors concluded that acceleration is the most viable accommodation for gifted students, yet remains underutilized due to social customs and traditions.

In the two decades since the Kulik and Kulik meta-analysis, a number of studies examining the construct of acceleration have been published (Brody, Assouline, & Stanley, 1990; Southern & Jones, 1991). These studies unanimously support acceleration as a gifted friendly practice.

Curriculum Compacting

Curriculum compacting is defined as a strategy whose intent is to assess high-ability students' knowledge and skill development prior to instruction in order to identify what is already known and mastered, then provide these students with instruction and curricula to meet their personal academic needs (Robinson, Shore, & Enersen, 2007). It

is a special case of content acceleration. Curriculum compacting (Renzulli, Smith, & Reis, 1982; Reis, & Renzulli, 1992) has also been seen as diagnostic-prescriptive instruction (Stanley, 1978) and compression of content (VanTassel-Baska, 1989) in the literature.

Stanley (1978) pioneered the idea of the fast-paced mathematics course in the Study of Mathematically Precocious Youth (SMPY) in which students covered a full-year of a mathematics course in a few weeks during the summer. By using diagnostic-prescriptive instruction, instructors were able to determine what mathematics concepts students already knew and then focus on those concepts that were unknown. Although diagnostic-prescriptive instruction and compacting are slightly different, they often work hand-in-hand. Renzulli, Smith, and Reis (1982) introduced the concept of curriculum compacting in 1981 as a mechanism to move through regular classroom material at a faster pace. Formal or informal assessment is used to determine whether a student has already mastered content before the unit of instruction is taught. If a student demonstrates mastery, he or she is "compacted out" of those lessons and is given alternate assignments or released time to pursue other interests.

This strategy is one of the twenty-nine endorsed by the Robinson, Shore, and Enersen study of best practices (2007). The Reis study in 1990-91, the only large-scale study of compacting, (Reis, 1993; Reis, Westberg, Kulikowich, & Purcell, 1998) investigated the types and amount of content that could be eliminated for high-ability students without having a negative impact on student achievement. The results of the study indicated that "approximately 40-50% of traditional classroom material could be eliminated for targeted students in one or more of the following content areas:

mathematics, language arts, science, and social studies" (Reis, 1993, p. xi). The major challenges of implementing curriculum compacting lie in the arena of what to do with the released time that will be challenging and meet the needs of the gifted student.

Advanced Level Content and Projects

Advanced level content and projects have been shown to be an essential part of gifted education. Stanley (1978) found that students could easily handle advanced level content at a rapid pace with no negative consequences reported. Leung (2005) noted that, in a classroom video study, those students in classrooms in countries where TIMSS 1999 math scores were highest were classrooms where more advanced mathematics content was taught. In this study, United States schools were observed teaching at the moderate level about 40% of the time and the moderate/advanced level about 20% of the time. There were, however, no noted instances of U.S. mathematics instruction at the advanced level. Teachers in countries such as Hong Kong were observed teaching at the advanced level as much as 20% of the time, moderate/advanced level 45% of the time, and moderate level 20% of the time.

VanTassel-Baska (2003b) has reported on a number of curriculum projects in language arts, social studies, and science, which have research to recommend the practice of using advanced level content and products. In the National Language Arts Curriculum Project (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996), the ICM was used as a framework to deliver literature selections that were at a reading level two years beyond the grade level of targeted students. In the science curriculum developed in the National Science Curriculum Project for High Ability Learners (VanTassel-Baska, Bass, Ries, Poland, & Avery, 1998), advanced science content was selected for each unit. In the

social studies curriculum (Little, Feng, VanTassel-Baska, Rogers, & Avery, 2007), students were given advanced reading materials and participated in primary source document analysis. Data collected on the use of these curricula showed positive results in student growth in advanced content as well as the areas of concept development and advanced processes.

Curriculum Extensions

For years, our textbooks have included additional activities and readings to extend the basic learning. We have organizations such as museums, zoos, and community organizations which offer classes to young people on topics that will extend the school curriculum. Clubs such as Girl/Boy Scouts, Girls'/Boys' Clubs, and 4-H include activities that extend the curriculum as well. As early as 1930, Houston, a high school principal exhorted schools to create extra-curricular activities that correlated with the curriculum and acted as a motivator (1930). Today, many of our extra-curricular activities in schools do correlate with and extend the regular curriculum. These may be clubs related to courses offered by the school (foreign language clubs; science or math clubs; newspaper staff; FHA; FFA; and others).

Leung (2003), summarizing two studies completed in Hong Kong, reported that researchers Fung and Shi found that students who participated in extra-curricular activities reported positive effects on academic performance. Research has shown that extra-curricular activities strengthen the content and quality of the curriculum experience (Dentemaro & Kranz, 1993; Fung & Wong, 1991). Studies have demonstrated that students participating in extra-curricular activities attain higher academic achievement (Holland & Andre, 1987; Camp, 1990; Crittendon, 1998).

Curriculum Modifications and Depth versus Breadth

Although most research on curriculum modifications has been centered in the use of modification strategies to remodel the regular classroom curriculum for access by students with disabilities (Richards & Dooley, 2004; Lee, Amos, Gragoudas, Youngsun, Shogren, Theoharis, & Wehmeyer, 2006), a limited amount of research has been done in the area of gifted education. When looking at the arguments that support curriculum modifications for students with special education needs, it is logical to assume that some of these same practices might be successful with gifted students. Renzulli (2000) states that curriculum modifications for the gifted include such practices as curriculum compacting (discussed earlier), textbook analysis and surgical removal of repetitious material from textbooks, and a planned approach for introducing greater depth into regular curricular material. His research on the School-wide Enrichment Model verifies that these practices do indeed benefit gifted students in measures of social and emotional adjustment (Renzulli & Reis, 1995).

In gifted education the mantra has been "depth rather than breadth." Hirsch (2001) suggests that a broad general knowledge is the best basis for deep knowledge. Bloom (1956) suggested that the only reason for teaching at the knowledge and comprehension levels is to allow students to have the knowledge necessary to use as fodder for the higher thinking strategies. It would seem that some breadth of learning is necessary, if for no other reason than to acquire background knowledge to facilitate higher learning and understanding. Wilkins, Wilkins, and Oliver (2006) reported on a study of the Mathematics Investigation Center. They found that elementary level gifted students excelled academically when they were given activities that provided depth of

instruction by moving from a computation level of instruction to a problem solving level of instruction. The William and Mary curricula also use the practice of moving students to a deeper level of instruction. These units have shown superior student advancement in content and concept learning based on depth of instruction (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996; VanTassel-Baska, Avery, Little & Hughes, 2000; VanTassel-Baska, Zuo, Avery, & Little, 2002; Feng, VanTassel-Baska, Quek, Bai, & O'Neill, 2005; Little, Feng, VanTassel-Baska, Rogers, & Avery, 2007).

Understanding versus Memorizing

The AAAS (American Association for the Advancement of Science, 1993) urged less emphasis on memorizing science facts and more emphasis on students developing a deeper understanding of science ideas. A study by Singer, Marx, Krajcik, and Chambers (2000) reported on the results of an implemented science curriculum for the middle grades. The curriculum emphasized developing an understanding of science rather than memorizing science facts. The results demonstrated a positively significant difference in the experimental group who received the treatment (curriculum) over the control group who received the regular science curriculum. The William and Mary science curriculum also demonstrated academic growth in students who were exposed to a curriculum emphasizing understanding of real world problems and the concept of systems over memorization (Gallagher, Stephien, Sher, & Workman, 1995; Feng, VanTassel-Baska, Quek, Bai, & O'Neill, 2005).

Using primary sources

The National Council for the Social Studies, in its curriculum guidelines, advocates for "use a variety of primary and secondary sources that accommodate a wide

range of reading abilities and interests" (no page number). In a case study of three fourth-grade teachers in the state of New York, Libresco (2007) found that when the state included the use of questions related to primary source documents, teachers began to use these primary source documents in their classrooms as well. They also found that teacher instruction began to emphasize concepts and big ideas more and student understanding and content knowledge improved significantly. The William and Mary social studies units emphasize the use of primary source documents and have been found to affect positively student learning (Little, Feng, VanTassel-Baska, Rogers, & Avery, 2007).

Tally and Goldenberg (2005) completed a pilot study of five middle- and high-school social studies teachers. Students were taught using primary documents from the Library of Congress's American Memory collection. Students were instructed in six habits of mind considered necessary for experts in the humanities: observation, sourcing, inferencing, evidence, question posing, and corroboration. They were asked to complete an online analysis of an historical document from an era they had not studied. Students at all levels were able to apply these habits of mind and analyze the documents effectively without prior direct teaching about the historical era or context. The authors concluded that students in classrooms where teachers use primary sources are learning the skills needed to interpret and analyze historical documents. They are also integrating acquisition of historical content knowledge and development of historical thinking skills.

The Dimension of Processes and Products

Higher Order Questioning strategies

Shore, Cornell, Robinson, and Ward (1991) point to several studies concerning the use of higher order questioning with highly-able students. These included studies by

Winne, (1979); Evertson, Anderson, Anderson, and Brophy (1980); and Redfield and Rousseau (1981). Their conclusion was that the need for higher order questioning was inconclusive. More recent research (Dixon, 1993; Thompson, 1996; VanTassel-Baska, Johnson, Hughes, Boyce, 1996; and Dixon, Prater, Vine, Wark, Williams, Hanchon, & Shobe, 2004) has shown that higher order questioning strategies, combined with rigorous texts, is successful in producing more advanced thinking skills in students. Thus, it would seem that higher-order questioning strategies alone may or may not increase student thinking skills; however, when combined with rigorous texts, the evidence shows growth in students' advanced thinking skills. Because of insufficient information from the earlier studies, it is not possible to discern whether or not any of those studies used rigorous texts. The recommended practice, for the purpose of the current project, is revised to include higher order questioning combined with rigorous texts.

Socratic Discussion

Socratic discussion is a special form of questioning rooted in the work of the philosopher Socrates. Because of its specialized format, it has been included here with questioning strategies. One study (Yang, Newby, & Bill, 2005) indicated that the use of Socratic questioning strategies with university-level students resulted in gains in their critical thinking skills. Another study (Philips, 2000) in which Socratic dialogue was used with elementary school children showed success in developing critical thinking skills in young children as well. Socratic dialog has been shown effective in building students' thinking skills in the classroom.

Thinking Skills

A number of thinking skills have been endorsed and used by general education classroom teachers. Several of the studies from Strand II found that teachers used higher order thinking skills in their classrooms. Higher-level thinking is recommended as a best practice by Robinson, Shore, and Enersen (2007). The terms higher-order thinking and higher-level thinking are somewhat nebulous, however. Pogrow (1990, 2005) created a curriculum to teach higher orders thinking skills (HOTS) and presented research to demonstrate that, through using this curriculum, students gained academically on national and state tests. The HOTS program, however, teaches thinking skills alongside memorization of facts as the crux of the program.

A thinking skill is defined as by Robinson, Shore, and Enersen as "a competency that contributes to some type of reasoning" (2007, p. 101). Higher-level thinking has also been defined as that thinking that exceeds the knowledge or comprehension level of Bloom's Taxonomy (Bloom, 1956). Lewis and Smith (1993) evaluated the growth of the term "higher order thinking" through the lens of the philosophers and the psychologists of the twentieth century and created a definition that combined the work of those in both fields. They included the work of Robert Ennis, Richard Paul, N.R.F. Maier, F.M. Newman, The National Council of Teachers of Mathematics, and others. With philosophers focusing on critical thought and psychologists focusing on problem solving, Lewis and Smith have defined higher order thinking as that thinking which "occurs when a person takes new information and information stored in memory and interrelates and/or rearranges and extends this information to achieve a purpose or find possible answers in perplexing situations" (p. 136). They believe higher order thinking includes the skills of

critical thinking (Ennis, 1985; Winocur & Maurer, 1997), creative thinking (Sternberg, 1985; Runco, 1987, 2004), problem solving, and decision making. This study uses this definition and will investigate these four constructs as elements of higher order thinking. Also included here is the construct of metacognition (Shore & Dover, 1987; Sternberg, 2004; Robinson, Shore, & Enersen, 2007).

Critical thinking.

A cursory look at a set of elementary textbooks reveals that more than 80% of the questions are at the knowledge and comprehension level of Bloom's taxonomy (Reis, 1993). This leads to a dilemma. Bloom (1956) suggested that the main reason for teaching at the knowledge and comprehension level is to supply students with the underlying knowledge-base needed for solving real-life problems—application. He advised that the real effectiveness of a school program is shown by how well a student is able to apply his knowledge to new situations, i.e. transfer.

Most literature on critical thinking harkens back to the work of Ennis (1962). Ennis used a 12-part model for critical thinking which he derived from a study of the literature and his own philosophy. A more recent researcher, Paul (1990) identified eight elements of reasoning and included these in a critical thinking model that has been used by many teachers and educators in teaching the skills associated with critical thinking.

A study of 4th and 5th grade gifted students by Dixon, Prater, Vine, Wark, Williams, Hanchon, and Shobe (2004) demonstrated the Dixon-Hegelian method as a viable method to promote critical thinking through productive discussion. In another study, Dixon (2002) found that improving critical thinking in adolescents required participation in synthesis and evaluation level activities on a regular basis. In a separate

study, Dixon, Cassady, Cross, and Williams (2005) found that use of technology (computer word processing) resulted in a gender-specific effect in which male students received higher ratings on critical thinking when using word processing compared with males creating hand-written essays. Reger (2007) found that participation in inquiry-based activities promoted higher order thinking skills in fifth grade students.

The curriculum work done at the Center for Gifted Education (CFGE) at the College of William and Mary has used critical thinking as a centerpiece (VanTassel-Baska, Johnson, Hughes, Boyce, 1996; VanTassel-Baska & Stambaugh, 2006; Little, Feng, VanTassel-Baska, Rogers, & Avery, 2007). Students have been shown to demonstrate advanced critical thinking and content knowledge after participation in these units of study. During implementation of Project Athena, a longitudinal study of students in Grades 3-5, CFGE staff created the Test of Critical Thinking (TCT). The test uses Paul's Reasoning Model as the framework for the assessment. At the end of two years, experimental students scored significantly better on critical thinking when compared with control students (VanTassel-Baska & Stambaugh, 2006). During year 3, experimental students continued to outscore control students on critical thinking (Project Athena, 2007). On-going research into the effectiveness of teaching critical thinking skills to students supports this as a best practice.

Creative thinking.

Torrance (1964) noted that, although college students often produce creative products such as inventions, books, and articles, these are almost exclusively created outside the requirements of university coursework. Cropley and Urban (2000) cited studies by Stone (1980), Howieson (1984) and Obuche (1986) which showed that

teachers dislike the characteristics associated with creativity in students. Piirto (1992) defines *creativity* as the ability to make something new. Csikszentmihalyi (as cited in Robinson, Shore, and Enersen, 2007) put forth the idea of personal creativity (little "c") and cultural creativity (big "C"). He suggested that Big "C" Creativity is only achieved after one becomes skillful in a domain that is socially and culturally relevant. Many of our children who show little "c" creativity never fully develop into Big "C" Creative adults (Isenberg and Jalongo, 1997).

Nickerson (1999) suggested that creative expression is determined by both nature and nurture, and that creativity can be enhanced. He concluded that creativity must extend what currently exists, but cannot be so innovative as to be far removed from the current accepted standard; otherwise the ideas would not be acceptable to social or cultural norms.

Amabile (1983) argued that anyone with normal cognitive abilities can be trained to enhance their creativity. Through divergent and convergent exercises, students can become more creative thinkers. Researchers (Treffinger & Ripple, 1971) found that use of the Creative Problem Solving (CPS) Model increased student creativity in children as well. In 2005, Treffinger and Isaksen published an article outlining more than fifty years of research on the effectiveness of the CPS Model, much of which focused on the use of CPS with gifted students. The model is currently in its sixth major version and its use has been supported by a large volume of research (Fierstien & Treffinger, 1983; Treffinger, 1993; and McCluskey, Baker & McCluskey, 2005; Treffinger & Isaksen, 2005). Treffinger and Isaksen adapted the earlier works of Osborn, Parnes, and Noller as they applied new understandings from the fields of psychology, cognitive science, learning

theory, and management. These studies have demonstrated that using the CPS model is effective in facilitating creative thinking across a wide variety of contexts and situations for a wide span of ages: primary school children through adults.

In another series of studies (McCluskey, Baker, & McCluskey, 2005), at-risk, drop-out, and under-represented students were taught life skills and career education using the CPS model resulting in a success rate of over 60% of the participants returning to school, graduating, and/or finding employment.

Clark (1996) found that teachers who were successful in nurturing creativity in their students exhibited certain characteristics: emphasized creative production, were flexible, accepted alternate answers and explanations, encouraged individual expression of ideas, and encouraged humor. Renzulli's Three Ring Conception of Giftedness (1979) explores the role of creativity as an indicator of giftedness. In his essay, *Enhancing Creativity*, Nickerson (1999) explores creativity's ties with problem finding and problem solving. He proposed that creativity is an essential element of problem finding and problem solving.

Synectics.

Synectics is a strategy that facilitates creative thinking (Gordon, 1961). It is also known as metaphoric thinking and relies on analogies to help solve problems by making new connections that can lead to innovation. Although, especially during the 1980's and 1990's, there have been a number of authors who have recommended *Synectics* as an effective practice for gifted students (McAuliff & Stoskin, 1987; Montgomery, Overton, Bull, Kimball, and Griffin, 1993; and Soriano de Alencar, 1993), only one study was found which tested this hypothesis (Meador, 1994).

Meador (1994) set up an experimental design to compare the effects of synectics training on Kindergarten students. She included five kindergarten classrooms. She set up a two-by-two model with two variables: giftedness/non-giftedness; synectics training/no training. The classrooms were matched on demographics and pre/post tested using the Kauffman Brief Intelligence test, the Einstein Readiness Test, the Kauffman Assessment Battery for Children, and the Williams test of Divergent Thinking. The results showed significant differences between the groups who received training and the groups who did not receive training in synectics when comparing the pre- and post- tests. While there was significant growth in the groups receiving training, there was no significant difference in the growth of gifted students versus non-gifted students. The qualitative portion of the study indicated that gifted students began and ended with higher levels of abstract responses when compared with their non-gifted peers; however, the non-gifted students appeared to show more development toward abstract thinking than the gifted students. This could speak to the fact that children are often identified as gifted because they have had an enriched environment. Some non-identified students may have been potentially gifted, but not have had the advantages of some other students. If this were the case, then we could explain the qualitative observations concerning the additional growth seen in the non-gifted population. With the current available information, we must consider synectics a practice that develops creativity in all children, not just the gifted; however, it does meet the earlier definition of gifted-friendly practice.

Metacognition.

Metacognition has been defined as "paying attention to one's own thought processes and of taking responsibility for one's thinking" (Nickerson, 1999, p. 417).

More specifically, it has been defined as having three general aspects: declarative metacognitive knowledge, cognitive monitoring, and strategy regulation and control (Alexander, Carr, & Schwanenflugel, 1995). Sternberg suggested that metacognition is necessary for the development of expertise (1998). Runco (1987, 1990) and Swartz and Perkins (1990) explored the idea that metacognition is a necessary component of creative thinking and found enough evidence to recommend it as a best practice in the classroom. Benito (2000) suggested that metacognitive abilities are not domain-specific, but rather transfer to many domains. Although Robinson, Shore, and Enersen (2007) do not recommend metacognition as a best practice, they do include it as a part of their work in the subject-specific domains.

Over the years, a number of studies have been done to investigate the construct of metacognition. Many of these have focused on the differences in students of average abilities and students with learning disabilities (Mulcahy, 1993); however, several have investigated the construct as it relates to giftedness and gifted children (Kurtz, & Weinert, 1989; Bouffard-Bouchard, Parent, & Larivee, 1993; McVey, 1993; Alexander, Carr, & Schwanenflugel, 1995; Laveault, Leblanc, & Leroux, 1999; Eidson, 2000; Berkowitz, & Cicchelli, 2004). The consensus of the above cited studies is that metacognition can be taught, that use of metacognitive strategies does not favor the gifted over the non-gifted, but may differ between students based on developmental levels as opposed to cognitive levels as measured by IQ. Shore (1986) went so far as to suggest that measurement of metacognitive ability may be a better indicator of giftedness than IQ. A meta-analysis by Alonso (1999) found a medium but significant effect size when exploring the effect between being gifted and metacognition. Another meta-analysis (Cheng, 1993) analyzed

both theoretical conceptions and empirical research of metacognition. Evidence suggested that superior metacognitive ability is an essential component of giftedness and gifted children demonstrate superior metacognition over their average peers. It has been recognized as a gifted-friendly practice, despite its usefulness with students of average ability as well.

Students as Practitioners in the Field

From earliest child play (Butzin, 2005) to graduate school, students learn by doing—by acting as practitioners in the field. Honig (2006) suggests twelve benefits young children receive from play including sharpening cognitive and language skills, developing number and time concepts, and clarifying the world of pretend versus real. Children take on the roles of practitioners in the field, although at a primitive level, each time they engage in socio-dramatic play. Robinson, Shore, and Enersen (2007) recommend best practices according to subject area: reading, language arts, science, mathematics, the arts, and multiple languages. In each of these areas, however, the recommendations can be summarized as students acting as practitioners in a specific field: acting as mathematicians, writers, scientists, and historians as they complete authentic tasks. In all of these activities, students encounter inquiry-based learning, which is also recommended as best practice by Robinson, et.al.

In language arts, students should be encouraged to become storytellers (Black, 2005) and writers (Sasser & Zorena, 1991). They engage in the same enterprises in which professionals engage. In mathematics, they should become problem solvers and strategists (Shoenfeld, 1992; Wieczerkoski & Prado, 1993). They use the mathematics they have learned to solve real-world problems, thus increasing the thinking levels of

their work. In science, students are encouraged to think like scientists from the preschool science units designed for gifted students through the units used at Math/Science High Schools and into college and graduate school courses, as well (Sternberg, 1982). By learning to "do" science, children move beyond the mere consumption of facts into the sphere of scientific understanding (Feng, VanTassel-Baska, Quek, Bai, & O'Neill, 2005). In social studies, the use of primary source documents helps students study history as do historians (Gallagher & Stepien, 1996; Korbin, 1996; Reis and Hebert, 1985). They move into deeper understandings of history rather than memorizing names, dates, and places. As they engage in authentic work in a domain, they move past the low-level learning that so concerned Bloom (1956) and into the levels of application, analysis, synthesis, and evaluation. Much of the research on the School wide Enrichment Model (Renzulli, 1986) focuses on the student acting as a practitioner in the field.

Problem finding and solving.

Four essential parts of *Acting as a Practitioner in the Field* are using real problems, using open-ended problems, problem finding and problem solving. Guilford (1964) suggested that problem finding and solving are essentially the same skill as creative thinking. Newell, Shaw, and Simon (1962) describe creative activity as a special case of problem finding and solving. Feldhusen and Treffinger (1986) argue that creativity and problem solving are the same constructs—that creativity is an indispensable component of problem solving. There have been many models created for problem solving (Nickerson, 1999) which all involve a process of phases or steps that lead to a viable solution. Nickerson suggests that teaching these processes enhances creativity and problem solving in students. Whether or not problem finding and solving

is the same construct as creativity, many curricula include problem finding and solving as the basis for their activities.

First, the researcher focused on the larger issue of what is problem solving and is it a viable option for gifted students. Perkins (1981) described the role of schemata, defined as "a mental structure that allows a person to perceive or act effectively by anticipating the organization of what the person apprehends or does, so the person needn't function as much from scratch" (p. 173), in problem finding. Kay (1992) agreed that, in order to be creative, one must be well versed in the rules of a discipline or field of study. In her study, she found that those experts who were best grounded in the field of art tended to be more able to find and define problems in the field of art. Getzels and Csikszentmihalyi (1976), in a longitudinal study of problem finding in art, found that the problem finding scores of art students were significant predictors of later success in the field of art.

Delcourt (1995) reported on a research study involving 18 high school students which investigated the question of student creative and productive behavior. The participants were selected because of their exemplary performance in a program based on the Renzulli Enrichment Triad Model. Students reported that think time and idea incubation are necessary at the stage of problem finding. They found they needed to immerse themselves in the topic then allow time for reflection and contemplation. Students found they often identified problems when they were subconsciously reflecting on topics of interest. These studies all point to the need for students to have a deep understanding of the topic and time for reflection in order to problem find. The research, especially that of Getzels and Csikszentmihalyi (1971, 1976), offers support for using the

skill of problem finding with gifted students. In a study of thirty-one male artists from a foremost art school, Getzels and Csikszentmihalyi observed that artists who engaged in more highly developed problem-finding behaviors created products evaluated to be more creative than those of their peers.

The practice of problem solving has been used in the medical field for decades and has found its way into K-8 education, especially through the use of project based curriculum, problem based curriculum, and inquiry curriculum. The Council of Teachers of Mathematics includes problem solving as one of the national mathematics standards (2002). It is considered an integral part of all mathematics learning, but is not limited to the field of mathematics. The National Research Council (2007), in its National Science Education Standards, also recommended problem solving as a best practice.

In a study of 5 gifted and 15 non-gifted students, Kanevsky (2004) found that students' use of functions such as problem solving positively and significantly correlated with their measures of cognitive ability. This research suggests that problem solving ability may be an indicator of intelligence. Defeyter and German (2003) performed research using children ages 5 to 7, finding that children who had more information about a tool's normal use were less able to solve a problem that required use of the tool for an atypical purpose. This suggests that creative problem solving may be hindered by extensive concrete knowledge.

Research studies on the William and Mary curriculum units that focus on real problems and problem solving have reported positive results with students across grade levels (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996; VanTassel-Baska, Avery, Little, & Hughes, 2000; VanTassel-Baska, Zuo, Avery, & Little, 2002). The science

units use open-ended problems to engage students in real scientific work. These units have been reported to have positive outcomes for gifted students in designing their own experiments.

Authentic assessment

Newmann and Archbald (1992) indicated that a major goal for authentic achievement was to cultivate higher-order thinking and problem-solving capacities of individuals. They believed that authentic assessment should focus on authentic learning goals. Wiggins (1993) suggests that performance assessments be used in a holistic manner as an authentic assessment. Perkins and Salomon (1989) demonstrated that learning occurs best within context and is dependent on domain-specific schema.

Authentic assessments have been shown to be relevant to curricula for high-ability students (VanTassel-Baska, Bass, Ries, Poland, & Avery, 1998). Authentic assessments have also been shown effective with curricula that focus on higher-level thinking (VanTassel-Baska, Zuo, Avery, & Little, 2002). Darling-Hammond (1997) suggests that authentic assessment helps teachers gain a deeper understanding of student learning.

In a study including elementary and middle school classrooms, Moon, Brighton, Callahan, and Robinson (2005) created and validated a number of authentic assessments in classrooms in two states. They found evidence that authentic assessments can be developed and used effectively in regular classrooms to obtain information concerning academic goals and knowledge or concept acquisition. They also found that use of these assessments moved students from memorization modes to conceptual understanding of the content material.

Active learning experiences.

Active learning, also known as hands-on learning, refers to strategies that actively engage students in activities such as performing science experiments, participating in independent research, simulations, discovery activities, and drama (Caine and Caine, 1991; Harmin, 1994; Jacobs, 1989; Lazear, 1991; Marzano, 1992; Renzulli & Reis, 1985). Pratton and Hale (1986) concluded that active participation made a positive and significant difference in student learning. Some studies have shown that active learning workshops have been effective in increasing participants' knowledge of and skills in teaching using active learning (Lee, 1984; Mahler & Benor, 1983; Rowland, 1987; Shainline, 1986). Other studies have shown that after training, teachers have successfully implemented active learning in their classrooms (Dunkelberger & Shyder, 1985; Mahler & Benor, 1983; Wynn, 1988; Hollingsworth, Johnson, & Smith, 1998).

The majority of research on active learning has been conducted at the university level in classes from accounting to bio-chemistry to engineering with positive results being reported across the board (Mundrake, 1999; Bot, Gossiaux, Pol-Bernard, Rauch, & Tabiou, 2005; and Yoder & Hochevar, 2005; Shekar, 2007). A few studies were found related to K-12 education including Hanna (1932) and Pratton and Hale (2001).

Pratton and Hale (2001) examined the effects of active participation on student learning. They randomly assigned 20 fifth-grade classrooms to treatment groups. Trained teachers taught a lesson to four classes (two with and two without active participation). Class mean scores on posttests confirmed that active participation does

significantly increase student learning. Another benefit was that students spent proportionally more time thinking, responding, and learning.

Independent Study / Self-selected, Independent Study

One way teachers introduce challenge and choice into their curriculum is through self-selected, independent study. Renzulli's Enrichment Model (Renzulli, 1985), VanTassel-Baska's Research Model (VanTassel-Baska, Johnson, Hughes, & Boyce, L., 1996; VanTassel-Baska, Bass, Ries, Poland, & Avery, 1998), and The Parallel Curriculum Model's Curriculum of Practice (Tomlinson & Kaplan, 2002) all suggest ways to direct students in self-selected, independent study. Although used in these models, research has not examined separately the construct of independent study in the models. Models using independent study, along with appropriate level materials, have been shown effective with gifted students.

Inquiry Learning and Teaching

The National Committee on Science Education Standards and Assessment (NSES), National Research Council (2007) included inquiry learning and inquiry teaching as the centerpiece of the national science standards. They identified three main usages of inquiry: scientific inquiry, inquiry learning, and inquiry teaching. The NSES stated that inquiry learning is an active process which students engage in. Inquiry teaching is described as being driven by authentic questions generated from student experiences. It is process-oriented and refers to activities which develop knowledge and understandings of scientific ideas as well as an understanding of how scientists do science. Anderson (2002) looked at a number of meta-analyses on the topic of inquiry teaching of science. He found that, although difficult to compare because of differences

among definitions for the concept, all of the meta-analyses demonstrated positive results for inquiry teaching. Different studies looked at different constructs; however, some studies demonstrated substantial effect sizes in favor of inquiry-oriented materials on various measures including cognitive achievement, process skills, and attitude toward science.

Non-ICM supported practices

Flexible grouping strategies were not within the scope of the ICM because they are an organizational arrangement as opposed to a practice; however, they had a respectable amount of research to recommend them as gifted best practice. They are explored in the following sections.

Flexible Grouping Strategies

Although grouping strategies does not fit within the framework of the ICM, it was found to be an essential element used by effective teachers of gifted students in nearly every study. the researcher began with the work of Rogers (1993; 1998; 2002) on grouping strategies. She identified seven grouping strategies that had sufficient outcome research to recommend or preclude them from routine use with gifted students. These seven strategies included *full-time gifted program placement*, which was defined as placing gifted students into a homogeneously grouped classroom with like-ability peers. The second type of grouping mechanism was that of *cluster grouping within heterogeneous classrooms*, defined as placing groups of 4-8 like-ability students into a heterogeneous classroom where their needs could be addressed as a group. The third strategy was *grouping for acceleration of the curriculum,* defined as grouping and re-

grouping based on students' needs a one point in time for one subject or topic. The fourth strategy was *regrouping for enriched learning in specific subjects,* defined as grouping according to student interest. The fifth strategy was *enrichment pull-out program placement*, defined as the typical pull-out program found in many elementary schools where students are with like-ability peers for a few hours each week. The sixth strategy was *within-class ability grouping*, defined as grouping and regrouping within a classroom by ability—usually for math and language arts instruction. Finally, the last strategy studied was *cooperative grouping for regular instruction,* defined as heterogeneously grouped units of students who work together on projects or problems. Of these seven, the only practice found to have negative outcomes for the gifted was cooperative grouping for regular instruction. This meta-analysis was rooted in the works of Oakes (1985) and Slavin (1990, 1992), which attack ability grouping as causing social and economic inequality, and Kulik and Kulik (1992) as well as Vaughn, Feldhusen, and Asher (1991), which dispute the findings of Slavin and Oakes for the gifted population. the researcher also reviewed the work of Allan (1991), and Fiedler, Lange, and Winebrenner (1993) and Winebrenner and Devlin (2001) as it related to grouping. Finally, using a pre-test/intervention/post-test condition in which age 10 students were studied, Davenport and Howe (1999) found that students who were taught mathematics in cooperative learning groups had significantly different outcomes from those who were taught in traditional ways. Students of low ability gained the most in the cooperative learning group, while students of high ability regressed in their ability to use successful strategies to solve problems.

Tieso (2002, 2003) cited evidence that the majority of students are taught using whole group methods most of the time. She found evidence to support between-class grouping, and within-class grouping based on student readiness. The work of Gentry (1999), Gentry and Owen (1999), and Gentry and Keilty (2004) with cluster grouping has supported this type of grouping as advantageous to not only gifted students, but other students as well, when they are grouped according to their current achievement levels and provided challenging work.

For gifted students in the regular classroom, several grouping strategies have research bases that are strong enough to support their uses. These include full-time gifted program placement, cluster grouping within heterogeneous classrooms, grouping for acceleration of the curriculum, grouping for enriched learning in specific subjects, enrichment pull-out program placement, within-class ability grouping, and between-class ability grouping. The consensus seems to be that groups should be flexible and changing as opposed to the decades-old practice of tracking which was neither flexible nor changing; however, rather than throwing out the concept of grouping, we should embrace it as a best practice for gifted students in the regular classroom. VanTassel-Baska (1992) described grouping as an "integral component of a program designed to meet adequately the learning needs of gifted students (p. 68)."

Research seems to bear out that teachers, however well-intentioned, do not often use gifted-friendly practices in the general education classroom. Teachers may be more likely to use these practices when they have five or more gifted students in the classroom. When they do use these practices, they do not use them exclusively for the benefit of the identified gifted students, but adapt them for use with non-gifted students as well.

Research also appears to support the premise that a number of specific curricular and instructional strategies are effective.

Table 5: Table of Specifications for Research-Based Practices that Align with the Integrated Curriculum Model: Studies and Meta-analyses Reporting on Specific Practices Deemed Effective

Authors	Strands	Findings
Alexander, Carr & Schwanenflugel (1995);	Meta-cognition	Meta-analysis of more than 40 studies on the construct of metacognition. 3 sub-topics of the domain: cognitive monitoring, declarative metacognitive knowledge, and strategy regulation and control. Metacognition processes accounts for most individual differences in intelligence. Declarative metacognitive knowledge: gifted are advantaged at all ages. Cognitive monitoring: equally difficult for gifted and non-gifted children with no giftedness advantage at any age. Strategy Use: conclusions are inconsistent—few developmental differences found during elementary school; some evidence that differences may increase with age—favoring the gifted.

(Table continues)

Table 5 (continued)

Authors	Strands	Findings
Bouffard-Bouchard, Parent, & Laribee (1993);	Meta-cognition	Study examined the differences between 23 average and 22 gifted 8th grade students on self-regulation component of metacognition on a concept identification task including cognitive, metacognitive, and motivation. Gifted students used metacognitive strategies more consistently.
Brody, Assouline, & Stanley (1990)	Acceleration	A study of 65 students who entered highly selective universities one or two years early. Accelerants graduated earlier, earned concurrent bachelor's and master's degrees, maintained higher GPA's, and earned more honors than non-accelerants.
Davenport & Howe (1993)	Flexible Grouping Strategies (delivery system)	Empirical study of 10-year-old students taught math in cooperative learning groups. Found that gifted students, when grouped cooperatively, regressed in their abilities to solve problems.

(Table continues)

Table 5 (continued)

Authors	Strands	Findings
Defeyter & German (2003)	Problem Solving	Research involving children ages 5 to 7. Children with more information about a tool's normal use were less able to solve a problem requiring use of the tool for an atypical purpose.
Dentemaro & Kranz (1993)	Curriculum Extensions	Survey study demonstrated that extra-curricular activities strengthen the content and quality of the curriculum experience.
Fung & Wong (1991)	Curriculum Extensions	Study of 294 Hong Kong secondary students showed that involvement in extracurricular activities correlated positively with academic performance.
Dixon (2002)	Critical Thinking Skills	Study found that improving critical thinking in adolescents required participation in synthesis and evaluation level activities on a regular basis.
Dixon, Prater, Vine, Wark, Williams, Hanchon, & Shobe (2004)	Higher Order Questioning Strategies	Case study of a 4^{th}- 5^{th}- grade multi-grade classroom based on the Dixon-Hegelian method. Study confirmed that higher order questioning strategies COMBINED WITH advanced texts resulted in growth in students' advanced thinking skills.

(Table continues)

Table 5 (continued)

Authors	Strands	Findings
Feng, VanTassel-Baska, Quek, Bai & O'Neill (2005);	Curriculum Modifications and Depth versus Breadth Understanding versus Memorizing Students as Practitioners in the Field	Study of the impacts of William and Mary language arts and science curriculum on gifted students in grades 3-5. Sample of 973 students. Student learning was enhanced: critical reading, persuasive writing, scientific research design skills, and academic achievement. Also demonstrated that teachers need to teach a unit 3 consecutive years for maximum results.
Gallagher & Stepien (1996);	Students as Practitioners in the Field Thinking skills Depth/Breadth Understanding versus Memorizing	Studies of 167 10^{th} grade students demonstrated that students gained as much content knowledge through use of problem based curriculum as other students who used traditional curriculum. They also gained more in thinking skills. Show that students who act as historians move into deeper understandings of history.

(Table continues)

Table 5 (Continued)

Authors	Strands	Findings
Gentry (1999);	Flexible grouping strategies (delivery system)	Causal-comparative, longitudinal study of cluster grouping. Sample- 197 students in grades 3-5. Teachers stated that cluster grouping resulted in more students being identified as advanced & made it easier to teach to individual needs. Students in the treatment scored significantly higher in total battery NCE scores than comparison school.
Gentry & Keilty (2004)	Flexible Grouping Strategies (delivery system)	Study investigated staff development practices to support long-term applications of cluster grouping. Resulted in six steps for implementing program development: conversations, research, choosing a course of action, implementation, supporting the new initiative, maintenance and growth.
Getzels & Csikszentmihalyi (1976)	Problem Finding	In a longitudinal study of problem finding in art, the researchers demonstrated that problem finding scores in art students were significant predictors of later success in the field of art.

(Table continues)

Table 5 (Continued)

Authors	Strands	Findings
Hollenberg, (1970)	Imagery Training	An empirical study of visual imagery among 64 grade school children. Concluded the strong visual student demonstrates superior skill in learning specific associations, but has less tendency to group into categories; students with weak visual imagery grasp categories more readily and are apt to remember objects and categories at a later time.
Janos & Robinson, (1985)	Acceleration	A study of junior high aged students who participated in the Early Entrance Program at the University of Washington. They were found to score favorably when compared with other university students (GPA and credits earned were comparable to those of National Merit Scholars).
Kanevsky (2004)	Problem Solving	A study of 5 gifted and 15 non-gifted students. Found that students' use of problem solving positively and significantly correlated with their measures of cognitive ability.

(Table continues)

Table 5 (Continued)

Authors	Strands	Findings
Koren, Klavia, & Goaodetsky (2005)	Multi-modal Learning	Project involved 234 sixth grade students. Concluded that use of multiple modes of learning, when matched to a student's strengths, resulted in higher performance.
Kulik & Kulik (1984)	Acceleration	Meta-analysis of 26 studies concerned with acceleration. Concluded that talented students were able to handle the academic challenge of acceleration, performing as well as the older-age, non-accelerated students.
Kurtz & Weinert (1989);	Metacognition	Study of 10- and 12-year-olds. Declarative Metacognitive knowledge. Found that metacognitive strategies could be taught. Study found that gifted were more likely to use metacognitive strategies than non-gifted. Also found that strategy use increased with age.
Leung (2003)	Curriculum Extensions	Summarized two studies from Hong Kong which reported that students who participated in extra-curricular music activities reported positive effects on academic performance. Surveys. N=426.

(Table continues)

Table 5 (Continued)

Authors	Strands	Findings
Leung (2005)	Advanced Level Content and Projects	Examination of TIMSS data. Found that classrooms where TIMSS 1999 math scores were highest were classrooms where advanced mathematics content was taught.
Libresco (2007)	Using Primary Sources	Case study of three fourth-grade teachers found that teacher instruction emphasized concepts and big ideas more and student understanding and content knowledge improved significantly when teachers were required to use primary source material.
Mahler & Benor (1983); McVey (1993);	Active Learning Experiences Metacognition	Study of teaching methods in medical school. Suggested that active learning experiences increase long-term retention of information. Experimental design. 40 subjects (13 – and 14-year-olds) who scored at least 430 on SAT math section. Comparison group of 38 16-, 17-, and 18-year-olds scoring average on the SAT math. Stratified random selection. Treatment explored analogical transfer. Concluded that there are differences between gifted and average students in analogical transfer performance and among gifted students as well.

(Table continues)

Table 5 (Continued)

Authors	Strands	Findings
Meador (1994)	Creative Thinking Skills	An empirical study to compare the effects of synectics training on Kindergarten students as a strategy to facilitate creative thinking. There was a positive significant difference in the creativity of students receiving synectics training
Moon, Brighton, Callahan, & Robinson (2005)	Authentic Assessment Conceptual Learning	A study including elementary and middle school classrooms. Found evidence that authentic assessments can be used effectively in regular classrooms to obtain information concerning academic goals and knowledge or concept acquisition. Students moved from memorization modes to conceptual understandings.
Pinion (1999)	Imagery Training	An empirical study of visual imagery in students in grades 2, 4, and 5 concluded that imagery may be useful for recall of visual information, but may compete with memory for auditory information.
Pratton & Hale (2001)	Active Learning Experiences	Study examined effects of active participation on student learning. Empirical study of 20 fifth-grade classrooms. Confirmed that active participation significantly increased student leaning.

(Table continues)

Table 5 (Continued)

Authors	Strands	Findings
Pressley & Levin (1980)	Imagery Training	An empirical study of students in grades 2 and 6. Concluded that younger students only benefited from imagery training if they were given the same imagery cues upon testing. Older students did equally well with and without the cues at testing.
Reis & Renzulli (1992)	Curriculum Compacting/ Diagnostic-Prescriptive Instruction/ Compression of Content	Study of 465 classroom teachers grades 2-6, 3 experimental groups each receiving different levels of staff development on curriculum compacting. 4th group was control group. Curriculum Compacting is a mechanism to move thorough regular classroom materials at a faster pace. Study shows that students who are "compacted" score as well on standardized tests as those who are not. The more prof dev. Teachers had, the more varied were their replacement strategies.

(Table continues)

Table 5 (Continued)

Authors	Strands	Findings
Renzulli (1994)	School-wide Theme-based Enrichment Curriculum Compacting Curriculum Modifications Active Learning Experiences Acting as a Practitioner Using Primary Sources	Article summarizes and reports on a number of studies on the SEM. Results included the following: teacher participation in SEM raised teacher attitudes/perceptions of giftedness; students who received additional lessons on how to conduct a Type III project during Type II lessons were 62% more likely to complete Type III's; students who participated in SEM for 4 years engaged in more than twice the number of creative activities than the comparison group; GT/LD students attitudes toward learning improved significantly; students participating in the SEM felt accepted by peers; SEM resulted in reduced labeling of students as "gifted"—such labeling has been seen as negative from the GT student perspective; underachievers who participated in Type III activities raised achievement significantly; although self-efficacy is a significant predictor of initiating a Type III project, completing Type III's did not result in a change of self-efficacy; the number of creative projects completed was a significant predictor of self-efficacy.

(Table continues)

Table 5 (Continued)

Authors	Strands	Findings
Renzulli & Reis (1995)	Curriculum Modifications and Depth versus Breadth	Study supports the use of curriculum modifications such as curriculum compacting, textbook analysis, surgical removal of repetitious material from textbooks, and planned approach for introducing greater depth into regular curricular material.
Richardson & Benbow (1990);	Acceleration	Longitudinal Study of Mathematically Precocious Youth (SMPY). Academic variables tend to favor accelerates over non-accelerates. No significant differences were found on the psychosocial variables.
Rogers (1993, 1998, 2002)	Flexible Grouping Strategies	Meta-analyses on a number of grouping strategies. Found six grouping strategies that were efficacious for gifted students
Rogers, Treffinger & Ripple (1971)	Creative Thinking Skills	Study found that use of the Creative Problem Solving Model increased student creativity in children. Need for systematic method of integrating CPS into curriculums.

(Table continues)

Table 5 (Continued)

Authors	Strands	Findings
Runco (1987)	Metacognition Creative thinking	Study of 228 children (97 gifted, 53 talented, 78 non-gifted) grades 5, 6, 7, &8 explored the idea that metacognition is a necessary component of creative thinking. Divergent thinking was found to correlate with creative performance. Gifted and non-gifted did not differ significantly in their creative performance; but gifted were rated higher on metacognition.
Ryan, Ledger, & Week, (1987)	Imagery Training	An empirical study of visual imagery in kindergartners' (n=66) recall of pictographs. Found imagery training was highly effective in improving students' recall for pictograph sentences.
Singer, Marx, Krajcik, & Chambers (2000)	Understanding versus Memorizing	Study included a created, high-powered, standards based, inquiry science curriculum. Results demonstrated a positively significant difference in the learning of students who were taught a science curriculum based on understanding over the group taught fact-based curriculum.

(Table continues)

Table 5 (Continued)

Authors	Strands	Findings
Swiatek (1993)	Acceleration	A review of several studies (SMPY). Concluded that accelerated students benefited academically without suffering on the social or emotional factors; accelerated students did not demonstrate any "gaps" in their knowledge; early burnout was not found to be a by-product of acceleration; students express high levels of satisfaction with their acceleration.
Swiatek & Benbow (1991)	Acceleration	10-year longitudinal study (SMPY). Accelerates academic successes were slightly higher than non-accelerate comparison group; acceleration was not found to be harmful to students.
Thompson (1996);	Higher Order Questioning Strategies	Study confirmed that higher order questioning strategies COMBINED WITH advanced texts resulted in growth in students' advanced thinking skills.
Tally & Goldenberg (2005)	Using Primary Sources	Research using five middle- and high-school teachers. Concluded that students in classrooms where teachers use primary sources are learning the skills needed to interpret and analyze historical documents. Students also developed historical thinking skills.

(Table continues)

Table 5 (Continued)

Authors	Strands	Findings
VanTassel-Baska, Johnson, Hughes, & Boyce (1996);	Higher Order Questioning Strategies Curriculum Modifications and Depth versus Breadth Critical Thinking Skills Independent Study/ Self-selected Study Problem Solving Concept teaching Special Curriculum for Gifted Students	Quasi-experimental research study demonstrated that science units which focus on real problems and problem solving result in positive outcomes for gifted students across grade levels. Studies found that critical thinking activities in the William and Mary Curriculum resulted in students demonstrating advanced thinking and content knowledge. Research suggests William and Mary Units provide depth of instruction along with advanced content and concept learning which result in superior student advancement. Study of William and Mary Curriculum Units in science, language arts, and social studies for grades K-12. Concept teaching can be used successfully with K-12 students in the areas of social studies, science, and language arts.

(Table continues)

Table 5 (Continued)

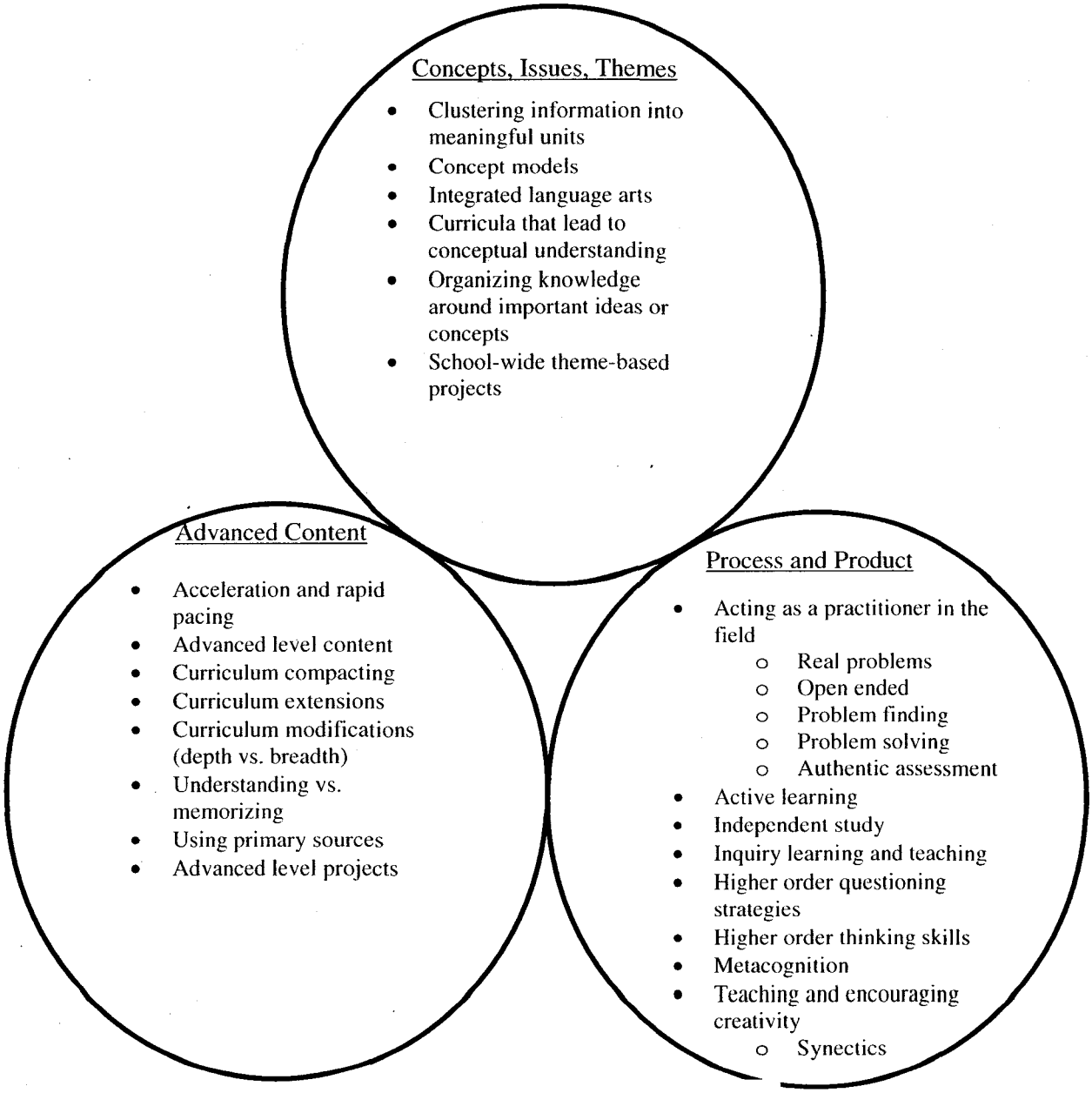
Authors	Strands	Findings
VanTassel-Baska, Zuo, Avery, & Little (2002)	Curriculum Modifications Depth versus Breadth Problem Solving Authentic Assessment Independent Study/ Self-selected Study Integrated Language Arts	Quasi-experimental study demonstrated that William and Mary Curriculum Units (n= 2,189 gifted students; grades 2-8) which integrate language arts improved student academic performance, increased students' ability to write persuasively, and improved students' research skills, literary analysis, and interpretation skills. Authentic assessments were shown effective with curriculums that focus on higher level thinking.
Xue & Meisels (2004)	Integrated Language Arts	A study of 13,603 Kindergarten children reported that students demonstrated significant gains when taught using both integrated language arts and phonics.

Implications from the Overall Review of the Literature on Gifted Friendly Practices

Strand III of the literature review began with a number of practices typically observed in general education classrooms with included gifted students. Each of these practices led to an investigation of the literature as the practice related to gifted students. Some practices had no research base to recommend them for gifted students, some had meager research, and others had a plethora of research to recommend them. The illustration in Figure 3: Best Practices in Gifted Education and the ICM shows the practices that have been supported as gifted friendly or gifted best practice. These practices are viewed through the lens of the Integrated Curriculum Model.

Flexible grouping is often used as a component of gifted programming, but does not fit into the ICM because it is not an instructional or curricular strategy, but rather an organizational model. However, there is a rich research base to recommend it as a gifted friendly practice or gifted best practice in the literature.

Figure 2: Best Practices in Gifted Education and the ICM



Implications from the Review of the Literature on Research-Based Practices that Align with the Integrated Curriculum Model

The Integrated Curriculum Model has been used in this study to describe gifted best-practice. With the exception of flexible grouping, all of the supported practices are defined through the ICM. Figure 2 delineates the recommended practices as viewed through the lens of the Integrated Curriculum Model. The Concepts, Issues, and Themes dimension includes strategies such as clustering information into meaningful units, using concept models, teaching integrated language arts, using curricula that lead to conceptual understanding, organizing knowledge around important ideas or concepts, and using school-wide theme-based projects.

The dimension of advanced content includes acceleration and rapid pacing, advanced level content, curriculum compacting, curriculum extensions, curriculum modifications (including teaching depth as opposed to breadth), understanding versus memorizing, using primary sources, and completing advanced level projects.

The product and process dimension includes activities such as acting as a practitioner in the field, which includes real problems, open-ended assignments, problem finding, problem solving, and authentic assessments. It also includes active learning, independent study, inquiry learning and teaching, using higher order questioning strategies, teaching higher order thinking skills including critical thinking, creative thinking, and metacognition. It includes teaching and encouraging creativity as well.

Implications from the Overall Review of the Literature

In order to answer the questions at hand, three major literature strands have been investigated. First, the literature suggested that teacher attitudes toward gifted students

may be a major determinant of how gifted students are served in the general education classroom. Research suggests there may be some independent variables that correlate with positive teacher attitude; however, there are disagreements concerning what these variables are and how large the correlations. Studies also disagree as to the nature of teacher attitudes toward gifted students, demonstrating that teacher attitude is variable.

The investigation of differentiation in the general education classroom revealed that few teachers differentiate their lessons. When teachers do differentiate, they are most likely to assign advanced readings, enrichment worksheets, projects, or reports. Teachers who have clusters of five or more students in their classrooms are more likely to differentiate instruction than teachers who have fewer gifted students. Teachers who modify instruction for gifted students are more likely to modify instruction for all students.

A review of studies of classroom practice revealed a number of strategies and practices that are typically used in general education classrooms and more specifically in general education classrooms with included gifted students. These strategies and practices have been examined, using the Integrated Curriculum Model as a conceptual framework.

Finally, the investigation of these specific practices revealed a number of practices found effective with gifted students. Some practices typically used in the general education classroom were not supported as gifted best practice because of a lack of research to support their use with gifted students.

CHAPTER 3: METHODOLOGY

"So much promise stretches before us. Americans have always reached for the impossible, looked to the next horizon and asked, 'What if?'"

(Senator John Kerry, 2004)

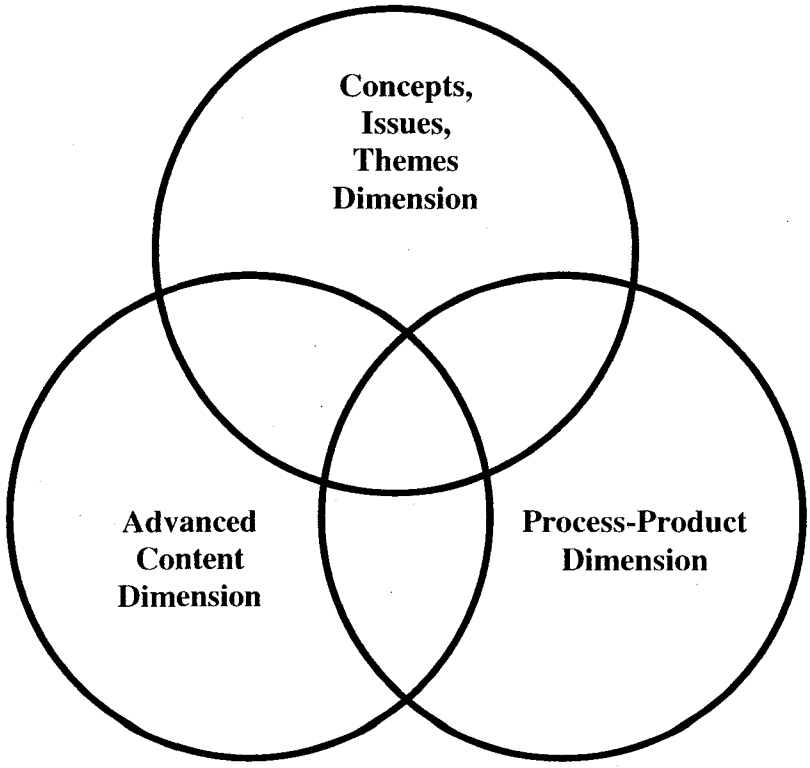
Introduction

This study was designed to contribute to the literature on teachers' perceptions and attitudes toward gifted students, and teachers' practices in meeting the needs of gifted students in the regular classroom. The purposes of this study are two-fold: 1) to explore the attitudes of elementary level teachers (teachers of grades K-5) in the targeted school district's elementary schools as they relate to inclusive gifted education, and 2) to explore practices of elementary level teachers (teachers of grades K-5) as they relate to inclusive gifted education.

Conceptual Framework

The conceptual framework for the study is the Integrated Curriculum Model (VanTassel-Baska, 1986; 1995) described in Chapter 1. It asserts that the needs of high-ability learners are best met by curriculum that explores advanced content, high level processes and product development, and abstract concepts in an integrated fashion.

Figure 3: The Integrated Curriculum Model (ICM)
VanTassel-Baska, 1987



The dimension of advanced content includes 1) selection of readings that are at least two years beyond grade level, 2) use of primary source documents, 3) encouragement for in-depth study of selected content (depth versus breadth), and 4) introduction of advanced skills and ideas at earlier ages. The process/product dimension is represented by student-produced original work. These works may be in any domain and could include writings, student-created experiments, original research, or solutions to real problems. It also includes higher level processes including critical and creative thinking, and research. The dimension of concepts, issues, and themes focuses student learning on the "Big Idea" or macro-concepts which provide interdisciplinary links and relationships. Research (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996;

VanTassel-Baska, Avery, Little, & Hughes, 2000; VanTassel-Baska, Zuo, Avery, & Little, 2002; VanTassel-Baska, 2003; Feng, VanTassel-Baska, Quek, Bai, & O'Neill, 2005) has shown that the ICM offers depth of learning in higher level skills within the subject areas of language arts, social studies, and science. Research is ongoing in these subjects as well as in mathematics.

Research in gifted education demonstrates that there exist a number of curricular strategies, modifications, and innovations that are effective in meeting the academic needs of the gifted student within the guidelines of the ICM. Through a thorough review of the best practice literature, practices have been identified which have research to recommend them as gifted-friendly practice and viewed these practices through the lens of the ICM model.

Research Questions

Three questions guided the research. The methodologies that follow were chosen to elucidate the following:

1) What attitudes do teachers hold concerning gifted students?

2) How do teachers perceive the way they differentiate the curriculum for gifted students?

3) What instructional practices do teachers use in the classroom to accommodate gifted students?

Table 6 summarizes the research questions and how each was examined, including the instruments used, the sample size, and the data analysis performed.

Table 6

Table of Specifications: Research Questions

Research Questions	Instrumentation	Sample Size	Analysis Used
What attitudes do teachers hold concerning gifted students?	The Attitudes Toward Giftedness Survey (ATGS)	N=44	Descriptive Statistics • Frequencies • Descriptives • Crosstabs ANOVA (post hoc—Tukey)
How do teachers perceive the way they differentiate the curriculum for gifted students?	The Classroom Practices Questionnaire (CPQ)	N=44	Descriptive Statistics • Frequencies • Descriptives • Crosstabs
What instructional practices do teachers use in the classroom to accommodate gifted students?	The Classroom Observation Scale-Revised (COS-R)	N=39	Descriptive Statistics • Frequencies • Descriptives • Crosstabs

Data Collection Instruments

Three instruments were used to answer the above questions: 1) The Classroom Practices Questionnaire (CPQ—See Appendix A); 2) The Classroom Observation Scale-Revised (COS-R—See Appendix C); and 3) The Attitudes toward Giftedness Survey (ATGS—See Appendix D).

Instrument to assess perceived teacher practice: Classroom Practices Questionnaire (Archambault, Westberg, Brown, Hallmark, Zhang, & Emmons, 1993)

The Classroom Practices Questionnaire was developed at the National Research Center on the Gifted and Talented at the University of Connecticut and has been used in a number of large scale studies (Archambault et al., 1993; Whitton, 1997; Robinson, 1998; Westberg & Daoust, 2003; Manning, 2005) with numbers of respondents ranging from 543 to more than 7,000.. These studies used samples that included teachers of grades two, three, four, and seven. Westberg and Daoust (2003) reported an internal consistency ranging from .90 to .94. The CPQ is divided into four parts: 1) teacher demographic information; 2) school and district information; 3) Classroom Issues; and 4) Classroom Practices. The items in Part Four required a teacher to respond to a Likert-type scale to indicate practices used with gifted students and practices used with non-gifted students. This allowed me to look for differentiation of practices for gifted students. The response scale included the choices of "never, once a month or less, a few times a month, a few times a week, daily, and more than once a day." Because this study was conducted within one school district, only Part 4: Classroom Practices (Appendix A)

and Part 1: Teacher Demographic Information data were gathered (Appendix B); therefore, sections two and three were not used.

The instrument included a list of 39 usual practices often seen in classrooms, and teachers indicated the frequency of use for each practice. The instrument also asked teachers to indicate frequency of use for regular education students and the frequency of use for gifted students. This feature of the instrument allowed the researcher to make judgments concerning the amount of differentiation present in each classroom as perceived by the teachers.

Permission to use the instrument was sought but not needed because it is not a copyrighted instrument (K. Westberg, personal communication, November 7, 2006). This instrument helped answer research question, "How do teachers perceive the way they differentiate the curriculum for gifted students?"

Instrument to examine teacher classroom instructional practices: The Classroom Observation Scale-Revised (VanTassel-Baska, Avery, Struck, Feng, Bracken, Drummond, & Stambaugh, T., 2005)

The Classroom Observation Scale-Revised has evolved through several stages of development throughout the last decade or more. It was originally called the Classroom Observation Form (COF). Over time, it has been refined and distilled to its current form: the COS-R (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996; VanTassel-Baska, Avery, Little, & Hughes, 2000). In its current form (Appendix C), the COS-R contains six cluster areas with a total of 25 items. The clusters are 1) curriculum planning and delivery; 2) accommodations for individual differences; 3) problem solving; 4) critical thinking strategies; 5) creative thinking strategies; and 6) research strategies. The

instrument includes subject-specific indicators to provide the observer with illustrative examples of the targeted behaviors. Each scale is rated as effective, somewhat effective, ineffective, or not observed. The rating scale has a numeric value to provide a scale for quantitative comparisons.

The COF and the COS-R underwent several iterations based on data gathered from pilot applications. The current version of the COS-R was used during the first implementation of Project Athena, a Jacob Javits grant project exploring the effects of a language arts curriculum treatment on students in grades 3, 4, and 5.

The COS-R is considered technically adequate for the purposes of collecting data concerning teachers' classroom practice. During the Project Athena observations, the COS-R was found to have an overall reliability of .91 to .93. The subscale reliability for all clusters averaged above .70 (VanTassel-Baska, Quek, & Feng, 2007).

Because of the subjective nature of observations, inter-rater reliability was established to ensure consistency in scoring. Observers participated in a half-day training session on the form. The author of this study participated in this training at the Center for Gifted Education at the College of William and Mary in October, 2004 and again in November, 2005. She also participated as an observer in a previous research project for the Center for Gifted Education. Inter-rater reliability for the COS-R was established as .87 and .89 during the Project Athena study.

The COS-R was reviewed by four experts in gifted education to establish content validity. These experts were asked to rate the COS-R on the importance of each behavior and the accuracy of the language used to describe the behavior. Based on the responses

from these experts, the validity of the importance of each behavior was .86 and the clarity of language was .99. This resulted in an overall content reliability of .98.

The COS-R was used as an observation tool to collect data in participating classrooms. It was expected to help answer question three: What instructional practices do teachers use in the classroom to accommodate gifted students?

Comparison of the CPQ and the COS-R

In a review of the CPQ and the COS-R, it was determined that the two instruments are not directly comparable, but have similarities. To some extent, they assess different constructs and represent different approaches to analyzing practices. The CPQ asks teachers to indicate the number of times they use each of 39 practices with gifted students and with non-gifted students. These practices are encompassed in six subscales: Questioning and Thinking, Providing Challenges and Choice, Reading and Writing Assignments, Curriculum Modification, Enrichment Centers, and Seatwork. The COS-R provides a framework for observing in a classroom for effective practice in specific areas of interest related to strong teaching. These areas include Curriculum Planning and Delivery, Accommodations for Individual Differences, Problem Solving, Critical Thinking Strategies, Creative Thinking Strategies, and Research Strategies. Table 7 shows the item numbers by subscale. The CPQ was used to gather teachers' self-perception of the strategies they use in the classroom. The most pertinent information from the CPQ was the self-assessment of teachers concerning their differential treatment of gifted versus non-gifted students. Additionally, knowing what ways they differentiate instruction shed light on the question of interest. The COS-R investigates actual classroom use of strategies rather than self-report.

Table 7

Content Analysis of the COS-R and the CPQ by Subscale

COS-R Subscale	COS-R Items	CPQ-Subscale	CPQ Items
Curriculum Planning and Delivery	1, 2, 3, 4, 5	Curriculum Modification	12, 13, 15, 16, 19
Accommodations for Individual Differences	6, 7, 8, 9	Providing Challenges and Choice	18, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34
Problem Solving	10, 11, 12		
Critical Thinking Strategies	13, 14, 15, 16	Questioning and Thinking Strategies	22, 35, 36, 37, 38
Creative Thinking Strategies	17, 18, 19, 20		
Research Strategies	21`, 22, 23, 24, 25		
		Reading and Writing Assignments	3, 5, 6, 7, 9, 10
		Enrichment Centers	11, 17, 20, 21
		Seatwork	1, 2, 4, 8

Instrument to investigate teacher attitudes toward gifted education and teaching gifted students: Attitudes toward Giftedness Survey (Gagné & Nadeau 1985)

The Attitudes toward Giftedness Survey was originally designed by Nadeau (1984) in his Master's Thesis (See Appendix D). Begin and Gagné used the *Gagné and Nadeau Attitude Scale toward Gifted Education* for gathering data. This scale was previously tested and shown to have content validity and reliability. They found that 15% of the variance on the scale could be explained by family income and educational level, and that 25% of the variance could be explained by five variables: the two aforementioned components, perceiving oneself as gifted, knowing gifted people, and gender of the respondent, with females having more positive attitudes than males. This instrument was further developed and confirmed in a variety of studies including Gagné and Nadeau's (1994) study of 139 professional educators and 138 parents. The instrument has two parallel forms, each containing 60 statements (30 of which are common to both forms), and using a 5-point Likert-type scale (from strongly agree to strongly disagree). According to Begin and Gagné (1994b), the survey items relate to a general attitude about giftedness. The items also include principles, common objections, and needs of the gifted. Finally, some of the items reflect preferable types of interventions such as acceleration and enrichment. Nadeau ascertained its content validity through a review of existing attitude scales, analysis of news articles, and interviews with parents and teachers. The 90 items included on the two forms of the survey were then chosen by a group of ten specialists in the field of gifted education.

Reliability coefficients (Cronbach's Alpha) of .91 were obtained for each of the two forms. Giving a numeric value to the scale (1=strongly disagree to 5=strongly agree), Gagné (1991) suggested that an individual's mean score below 2.0 indicates a very negative attitude, while a score above 4.0 indicates a very positive attitude. Means between 2.75 and 3.25 reflect an attitude of ambivalence.

Research Design

This research project is a descriptive study that examines the questions of interest. An assessment of the scientific literature on gifted-friendly practices and recommended best practices for gifted students provided an overview of the research on effective approaches for teaching gifted students in the regular classroom. Instructional and curriculum strategies judged effective by this researcher using best evidence synthesis and the conceptual framework of the ICM served as the theoretical foundation through which findings have been interpreted. Observations and survey results were compared to research-supported strategies to determine the scope of teachers' use of gifted-friendly practices in the regular education classroom. These results were compared to one another to determine the extent to which teachers' self-report data align with classroom observation data.

Sample

In order to diminish the likelihood of a low response rate resulting in a small sample, the researcher intended to attend a regularly scheduled faculty meeting at each school and ask teachers to complete the surveys before leaving. Because of extenuating circumstances, this was not possible. Originally, it was planned to observe a number of randomly selected teachers who represented a minimum of 30% of the participants using

the COS-R, in order to provide additional information. The goal was that the results of the COS-R would provide data to describe more fully the actual classroom practices of these teachers concerning the use of gifted-friendly practices in the regular classroom. In practice, teachers were a convenience sample.

Seventy-one elementary level (grades K-5) teachers within a single school district were asked to participate with a total of 58 responding at some level as noted in Tables 8 and 9. Some teachers participated with all three instruments, some teachers were observed (COS-R) but did not return the surveys (CPQ & ATGS), and some teachers returned the surveys but were not observed. Teachers from school #3 were less likely to respond to the survey than teachers from the other two schools. This may have been related to the personalities of the school liaisons chosen to distribute and collect the surveys. These are discussed in a later section: Stage I Data Collection.

Table 8

Sample and Participation by School

School	Number Invited to Participate	CPQ	ATGS	COS-R	Teachers Completing at Least One Instrument
School #1	15	80% (n=12)	80% (n=12)	73% (n=11)	100% (n=15)
School #2	18	89% (n=16)	89% (n=16)	61% (n=11)	100% (n=18)
School #3	38	42% (n=16)	42% (n=16)	45% (n=17)	66% (N=25)
Total	71	62% (n=44)	62% (n=44)	55% (n=39)	82% (n=58)

Table 9

Sample and Participation by Grade Level

Grade Level	Number Invited to Participate	CPQ	ATGS	COS-R	Teachers Completing at Least One Instrument
K	11	36% (n=4)	36% (n=4)	91% (n=10)	91% (n=10)
1	13	77% (n=10)	77% (n=10)	100% (n=13)	100% (n=13)
2	12	67% (n=8)	67% (n=8)	92% (n=11)	92% (n=11)
3	11	55% (n=6)	55% (n=6)	45% (n=5)	73% (n=8)
4	12	67% (n=8)	67% (n=8)	-- (n=0)	67% (n=8)
5	12	67% (n=8)	67% (n=8)	-- (n=0)	67% (n=8)
Total	71	62% (n=44)	62% (n=44)	55% (n=39)	82% (n=58)

Data Collection

Stage I: Data Collection

During the first stage of the study, the researcher asked K-5 teachers (n=71) to complete a survey which included the CPQ (Appendix A), the ATGS (Appendix D), and demographic data (Appendix B). The first section of the survey included a permission to participate statement (Appendix E). Demographic data for the teachers in the sample included items such as years of experience, types of degrees and certification endorsements, personal relationship to gifted children/adults, types and amounts of professional development participation. Participants received a small token gift for their participation. The researcher set up a time, during or immediately following a regularly scheduled faculty meeting, for teachers to complete the survey. It was expected to take about one-half hour to complete the survey. Results of the surveys were anonymous and confidential. Each teacher was asked to identify him/herself with a pseudonym. These pseudonyms were also used when referring to information gathered during the classroom observations.

The week before the surveys were to be conducted the researcher became critically ill and was unable to complete the task. To collect the survey data, the researcher contacted one teacher at School #2 and the principal at School #1 and asked that they distribute and collect the surveys. Because School #3 had a larger population of teachers, the researcher asked two teachers—one primary level and one intermediate level—to distribute and collect the surveys. The contact(s) at each school served as the liaison for Stage I data collection. School #3 responses were fewer than anticipated,

likely due to the position and commitment of the liaisons. At school #1, the principal requested teacher participation and followed up on the request. At school #2, the teacher-leader who served as liaison was a self-proclaimed advocate of gifted education and followed up on a number of occasions to ascertain teacher participation at her building site. The liaisons at building three did not follow up with teachers who did not return the surveys, but simply served as a collection agent for the surveys. This "hands-off" approach to data collection resulted in fewer teachers responding from school #3 than from the other two sites.

Stage II: Data Collection

In Stage Two, the researcher selected a number of the teachers to participate in the observation component of the study. Observations often give additional insight into participants' perspectives and opinions (Patton, 2002). These teachers were selected using stratified random selection to ensure teachers from every grade level and every school would be represented. The strata were grade level and home school. All teachers from each grade level were available for selection. The researcher randomly selected 30% of the teachers at each grade level by drawing names in a blind draw. After teacher selection, a number of teachers chose not to participate in the observation. The actual sample observed using the COS-R is described in tables 9 and 10. Participants were to be observed during their language arts or social studies lessons for one 30-45 minute period. The researcher used the COS-R to collect and record classroom data (i.e. number and diversity of students, desk arrangements, etc.) as well as observational data. Due to circumstances outside the control of the researcher, the spring semester data collection was interrupted before collection was complete. Some of the COS-R data reported for

grades K-2 was archival data obtained through classroom observations by the researcher in the course of her work as gifted consultant for grades K-2 during the 2006-2007 school year. The balance of the COS-R data for grades K-2 and grade 3 was obtained in the course of this study during the spring of 2007.

Procedures

As soon as the researcher received permission from human subjects to proceed with this study, the superintendent of the targeted school district was contacted permission to move forward (Appendix F). Next, the researcher met with each of the three principals whose schools were participating. The researcher again described the study and asked each of the principals for permission to conduct the research at that site (Appendix G). The next step was to be to randomly select teachers from each grade (grades K-5) at each school (stratified random selection) for observations. These observations were to take place concurrently with the surveys. the researcher contacted each teacher who was selected and personally asked for a time when they could be observed during an active teaching lesson. Appointments were scheduled for a convenient time that had very little lead time. The purpose for scheduling sooner was to reduce the chance that teachers would email to cancel the appointment. It also served to help ensure that teachers would be engaged in a normal and usual lesson as opposed to their "best" lessons. This was important because the researcher was interested in the usual, day-to-day instruction that happens in the classroom. This part of the data collection was expected to take several weeks to complete. Many selected teachers chose not to participate; therefore, the actual sample was a convenience sample (Tables 8 and 9).

The researcher began observing in classrooms, but because of illness the observations were cut short. She was able to observe in five third-grade classrooms, six second grade classrooms, seven first grade classrooms and six kindergarten classrooms. Because of her position at the school district, she was able to use supplement these observations with COS-R archival data that had been collected during the first month of the 2006-2007 school year for grades K-2. This data had been collected as a part of the on-going evaluation and improvement process. In her position as primary level gifted teacher, she had been charged with evaluating the current program and making recommendations for changes for the future K-2 program. In this capacity, she had used the COS-R to gather data related to classroom practice. These archival data consisted of observations in 6 Kindergarten classrooms, 7 first-grade classrooms, and 6 second-grade classrooms.

The researcher had arranged to have other trained observers complete sixteen additional observations in grades 4 and 5; however, the superintendent felt it was not appropriate to have unknown observers in these classrooms. The final outcome was that the last eight observations in grades 4 and 5 were cancelled and not rescheduled.

After the data had been collected, the researcher used statistical analysis to answer the research questions and attempted to make some generalizations concerning the attitudes and practices of teachers in the regular classroom as they relate to gifted students.

Data Analysis Procedures

Gall, Gall, and Borg (2007) define quantitative research as "inquiry that is grounded in the assumption that features of the social environment constitute an objective

reality that is relatively constant across time and settings (p. 650)." It is also called positivist research. The dominant methodology is to collect numerical data on observable behaviors and subject these data to statistical analysis.

The COS-R, the CPQ, and the ATGS yielded quantitative data which were analyzed using descriptive statistics. One-way ANOVA's, along with the Tukey post-hoc test, were run to test for differences between demographic data and teacher attitudes.

Limitations and Delimitations

This study was limited by the non-random and non-representational nature of the sample and the exploratory design of the research questions and methods. It was also limited by the inability of the researcher to collect data from many of the upper-grade classrooms due to illness. Logical generalizations may only be made to the staffs of the selected schools. The study was also limited by the timeframe in which it was conducted. The ideal study would have collected multi-year data from all teachers in the sample schools. Another limitation was the use of self-report data, which may or may not reflect actual practice. Finally, the study was limited by the ability of the researcher to observe only one time and in a portion of the classrooms as opposed to doing multiple observations in all of the classrooms.

This study was delimited by the scope of inquiry and its focus on attitudes and practices of general education teachers who teach in an inclusive K-5 classroom. It was also delimited by its focus on attitudes toward and practices for gifted students.

Confidentiality and Other Ethical Considerations

All responses from participants were held in strict confidence. During the course of the study, participants were allowed to choose and authorize the use of a pseudonym known only to the participant and the researcher. Any and all reference to a participant was done through the use of this pseudonym. The schools and school district also was referred to using pseudonyms. Once data was translated in an anonymous form, any original documents of a personally identifying nature were destroyed.

Participants were notified of their rights to participate, not participate, or withdraw from participation at any point (Creswell, 2003). They were informed of the nature of the study and its possible impact on them. *Agreement to Participate* forms which outline the participation level and participants' rights were available to the superintendent, the school principals, and the participating teachers. These forms were signed by the participants before the study began.

CHAPTER 4: FINDINGS

"Most teachers waste their time by asking questions which are intended to discover what a pupil does not know whereas the true art of questioning has for its purpose to discover what the pupil knows or is capable of knowing." (Albert Einstein, ND)

Introduction

The current research was carried out using three instruments: the Classroom Practices Questionnaire (CPQ) and the Attitudes Toward Giftedness Survey (ATGS), to collect survey data from the elementary level teachers at the selected site, and the Classroom Observation Scale-Revised (COS-R) to collect observation data in the selected elementary level classrooms. A convenience sample of 71 teachers was asked to participate with a total of 58 responding at some level as noted in Tables 8 and 9. Some teachers participated with all three instruments; some teachers were observed but did not return the survey; and some teachers returned the survey but were not observed due to circumstances described in Chapter 3.

Research questions included:

1) What attitudes do teachers hold concerning gifted students?

2) How do teachers perceive the way they differentiate the curriculum for gifted students?

3) What instructional practices do teachers use in the classroom to accommodate gifted students?

The survey responses and the observational data were compared to the collected demographic data for predictors of interest using independent samples t-tests. The proposed sample included 71 teachers of grades Kindergarten through five. In the end, fifty-eight teachers participated at some level in the research (Tables 8 & 9). At school #1, all of the teachers participated at some level. Eighty percent (n=12) of these teachers returned the CPQ and ATGS surveys and 73% (n=11) were observed using the COS-R. All of the teachers had agreed to be observed; however, because of extenuating circumstances only 11 were observed. At school #2, all of the teachers participated at some level. Eighty-nine percent (n=16) completed the surveys (CPQ and ATGS) and 61% (n=11) were observed using the COS-R. Again, all of these teachers had agreed to be observed. School #3 was somewhat less involved in the research project. This was the largest of the three schools, but delivered only slightly more participants than the other two schools which were less than half the size. Forty-two percent (n=16) of the teachers at school #3 completed the surveys and 45% participated in the observations. A number of the teachers at school #3 declined to be observed. This may have been due to the culture of the school where teachers were unaccustomed to being observed by anyone (personal conversation with Principal of School #3, April 24, 2006). Lack of participation with the surveys was discussed in Chapter 3.

Sample

As noted in Table 10, the participants were from all three elementary schools and all six grade levels. They represented teachers with one year experience to teachers with

more than 30 years experience. About two-thirds of the teachers have bachelor's degrees and about one-third have master's degrees. Nearly half of the participants reported having no training for teaching gifted students while only two of the teachers (3.4%) reported having a gifted endorsement. Another 29% said they had attended at least one workshop on gifted education and another 19% claimed to have attended at least one university course in gifted education. All of the respondents were White and 98% (N=57) were female. The average teacher would be described as White, female, having 17-years of teaching experience, having had gifted students included in her classroom for 15 of the 17 years. She has no relatives that are gifted and does not consider herself gifted. She has no unidentified gifted students in her classroom. She has no training in gifted education and has earned a bachelor's degree.

Table 10

Demographic Descriptors of Participants

Independent Variables	N	Percent
Participants by School		
School #1	15	25.9
School #2	18	31.0
School #3	25	43.1
Participants by Grade Level		
Kindergarten	10	17.2
First	13	22.4
Second	11	19.0
Third	8	13.8
Fourth	8	13.8
Fifth	8	13.8
Participants by Years of Teaching Experience		
1-5 years	10	17.2
6-10 years	8	13.8
11-15 years	9	15.5
16-20 years	6	10.3
21-25 years	8	13.8
26-30 years	12	20.7
Over 30 years	5	8.6

(Table Continues)

Table 10 (continued)

Independent Variables	N	Percent
Participants by Highest Degree Completed		
Bachelors	38	65.5
Masters	20	34.5
Participants by Training in Gifted Education		
None	28	48.3
Inservice	17	29.3
University	11	19.0
Endorsement	2	3.4

Table 11

Teacher Self-Report Data

	N	Percent
Q: Do you consider yourself gifted?		
Yes	11	19
No	47	81
Q: Do you have children, siblings, other relatives who have been identified gifted?		
Yes	28	48.3
No	30	51.7
Q: Are there students in your classroom you believe are gifted but have not been formally identified?		
Yes	21	36.2
No	37	63.8
Q: Do you prefer teaching gifted students, non-gifted students, or no preference?		
Gifted	3	5.2
Non-Gifted	4	6.9
No Preference	51	87.9
Q: How many years have you taught gifted students in your regular classroom?		
None	1	1.7
1-5 years	17	29.3
6-10 years	6	10.4
11-15 years	6	10.4
16-20 years	7	12.1

(Table continues)

Table 11 (continued)

	N	Percent
21-25 years	7	12.1
26-30 years	9	15.5
Over 30 years	5	8.6

Non-participants vs. Participants

In this study, the population of all elementary level classroom teachers in one particular school district (n=71) were invited to participate. From this group, 81.7% (n=58) participated. When in the course of data collection some subjects chose not to participate, it is important to determine whether the participants differ significantly from the non-participants on any of the predictors of interest. Results of independent samples *t-tests* showed that on six of the ten descriptors, there were no significant differences between the responders and the non-responders. There were, however, significant differences between the two groups ($p<.05$) on four of the descriptors. The differences between the participants and non-participants limit the generalizations of the study to those teachers from this school district who participated in the study.

Results

To address Research Question 1, *What attitudes do teachers hold concerning gifted students?* the researcher used the *Attitudes Toward Giftedness Survey Form A* (Gagne & Nadeau, 1991) described in Chapter 3. Forty-four teachers completed and returned the ATGS. The negative statements were re-coded to create a situation where positive attitudes related to higher scores and negative attitudes related to lower scores.

The translation of the scores includes Very Negative Attitude (0.00 to 1.99), Somewhat Negative Attitude (2.00 to 2.74), Ambivalent Attitude (2.75 to 3.25), Somewhat Positive Attitude (3.26 to 3.99) or Very Positive Attitude (4.00 to 5.00). The ATGS data for Form A is classified into 12 subscales. Table 12 illustrates the constructs and the items that make up each subscale on Form A of the ATGS. The complete ATGS survey can be seen in Appendix D.

Table 12

Conceptual Definitions of Constructs ATGS (Form A)

Construct	Conceptual Definition	Number of Items
Social Value	Special education for gifted students has social value	4
Objections in Principle	Special services for gifted students create elitism and inequality	6
Rights of the Gifted	Gifted students have a right to an appropriate education	6
Status of Services	School already serves gifted adequately	3
Need for Support	The role of the school in meeting the needs of the gifted	6
Problems and Special Needs	Gifted students have special leaning needs and problems	7
Characteristics	Knowledge of the characteristics of gifted children	7
Acceleration	Knowledge of the facts concerning acceleration	6
Enrichment	Knowledge of the facts concerning enrichment	3
Special Classes	Knowledge of the facts concerning special classes for gifted students	5
Impact of Interventions	Results of special programming for gifted students	4
Envy	The role of envy in the education of gifted students	3

Of the 44 teachers who completed the ATGS, the lowest overall mean score was 2.58 (somewhat negative) and the highest score was 4.2 (very positive). The average score was 3.40 (somewhat positive). Twenty-five percent of the teachers indicated an ambivalent attitude toward gifted students while 70% expressed a somewhat positive attitude toward gifted students and 2% expressed a very positive attitude. ATGS Mean Scores for Subjects (Appendix H) displays the total mean score on the ATGS for each of the responding teachers. Overall, responses reflected an ambivalent attitude toward giftedness. Using the *One-Way ANOVA* to compare overall means revealed no significant differences among the participants related to any of the demographic information collected (Table 13). Results of the One-Way ANOVA can be seen in Appendix I.

Table 13

Means and Standard Deviations of Attitude Scores as a Function of the Value of Each Predictor

Variable	N	ATGS Mean	SD
Years of Teaching Experience			
1-5 years	8	3.33	0.12
6-10 years	7	3.30	0.21
11-15 years	7	3.36	0.42
16-20 years	6	3.35	0.18
21-25 years	6	3.46	0.42
26-30 years	7	3.56	0.19
Over 30 years	3	3.59	0.09
Highest Degree Attained			
Bachelor's	30	3.42	0.30
Master's	14	3.38	0.21

(Table continues)

Table 13 (Continued)

Variable	N	ATGS Mean	SD
Training in Gifted Education			
None	16	3.31	0.25
Inservice Professional Development	16	3.39	0.20
University Coursework	11	3.53	0.34
Completion of Gifted Ed Cert.	1	3.80	--
Perception of Oneself as Gifted			
Yes	8	3.30	0.42
No	36	3.43	0.23
Having a Relative Who Is Gifted			
Yes	22	3.45	0.33
No	22	3.36	0.18
Preference for Teaching the Gifted			
Prefer Gifted Student	3	3.53	0.27
Prefer Non-gifted Students	2	3.28	0.16
No Preference	39	3.40	0.28

Table 14 shows the means and standard deviations for participants on each of the subscales of the ATGS. The means for the subscales range from 2.61 (neutral) to 3.97 (somewhat positive). Teachers expressed somewhat negative attitudes toward gifted students on the constructs of acceleration (M=2.73; SD=0.60) and enrichment (M=2.61; SD=0.47). Teachers expressed ambivalence in the areas of special classes for gifted students and the idea that gifted students have problems and special needs related to their giftedness. They expressed somewhat positive attitudes on the other eight subscales.

Table 14

Means and Standard Deviations by Subscale (N=44)

Subscale	Mean	SD
Social Value	3.97	0.58
Objections in Principle	3.79	0.69
Rights of the Gifted	3.87	0.49
Status of Services	3.55	0.64
Need for Support	3.61	0.55
Problems and Special Needs	2.91	0.50
Characteristics	3.78	0.25
Acceleration	2.73	0.60
Enrichment	2.61	0.47
Special Classes	2.92	0.42
Impact of Interventions	3.50	0.49
Envy	3.45	0.44

ANOVA followed by Tukey post hoc analysis revealed significant differences in attitudes among teachers on four subscales. Where only two levels of answers exist, post hoc analysis cannot be used. For the descriptors *having relatives who have been*

identified as gifted and *highest degree earned*, means were compared using *t-tests*, with the demographic data as the independent variable and the ATGS category as the dependent variable, to obtain the direction of the significance.

Table 15

Analysis of Variance for Attitudes Toward Giftedness

Rights of the Gifted Subscale	*df*	*SS*	*F*	$\dot{\eta}^2$
Having relative(s) who have been identified as gifted	1	1.64	7.96**	1.64
Enrichment Subscale				
Highest Degree Earned	1	1.06	1.06*	1.06
Social Value Subscale				
Years Teaching Experience	6	5.969	4.24**	5.97
Problems and Special Needs Subscale				
School	2	1.46	0.73*	1.46

*p< .05. **p<.01.

Teachers with more than 26 years of experience (26- to 30- years; Over 30 years) were statistically more likely than teachers with 6- to 10-years of experience to have a positive attitude on the subscale of *Social Value* (p=0.011 for teachers with 26- to 30-years of experience; p= 0.014 for teachers with more than 30 years of experience). Teachers from School #2 were statistically more likely than teachers from School #1 to have positive attitudes on the subscale of Problems and Special Needs (p=0.046). Teachers who claimed relatives who had been identified as gifted were statistically more likely than those without gifted relatives to report a positive attitude on the subscale of Rights of the Gifted (p=0.007). Teachers with Master's Degrees were statistically more

likely than those with only a Bachelor's Degree to have positive attitudes toward enrichment for gifted students (p=0.028).

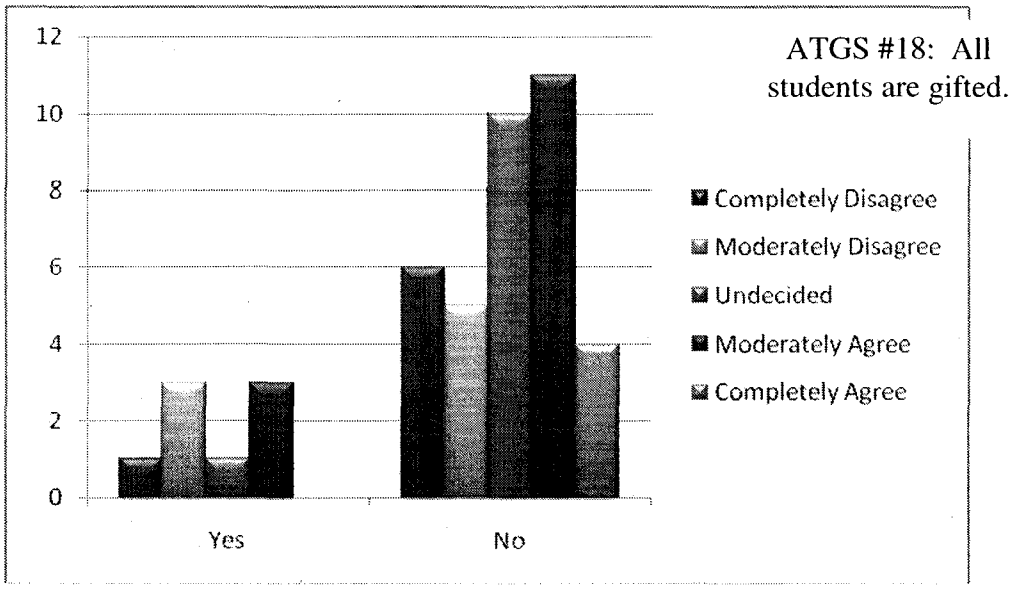
Item 18 on the ATGS was related to the idea that all children are gifted. Although 18 of 44 teachers moderately agreed or completely agreed that all children are gifted, only 8 teachers qualify themselves as gifted (Table 16).

Table 16

ATGS Q #18 (All Children Are Gifted) by Self-described Giftedness

All Children Are Gifted	Completely Disagree	Moderately Disagree	Undecided	Moderately Agree	Completely Agree
Are you gifted?					
Yes	1	3	1	3	0
No	6	5	10	11	4

Figure 4: Teachers' Concepts of Giftedness



Are you gifted? Yes or No

Discussion of significant differences in attitudes toward giftedness and demographic descriptors.

When analyzing the ATGS data and the demographics of the sample, the researcher found significant differences among or between groups on the total ATGS score. When comparing the demographic "years of teaching experience" with each of the categories on the ATGS, an ANOVA revealed teachers with 26- to 30-years of experience and teachers with more than 30-years of experience were both significantly more likely than teachers with 6- to 10-years of experience to see education for gifted students as an investment in the social structure and future of our society. Teachers from School #2 were significantly more likely than School #1 to believe gifted students have special problems and needs related to their giftedness. Teachers who claim to have relatives who have been identified gifted are significantly more likely than those without gifted relatives to believe that gifted students have a right to a differentiated education. Finally, teachers with a Master's degree are significantly more likely to believe gifted students benefit from enrichment activities. Several factors that have been suggested to be correlated with positive attitudes toward giftedness by earlier researchers were not supported in this study. These findings are discussed in more detail in Chapter 5.

To address Research Question 2, *How do teachers perceive the way they differentiate the curriculum for gifted students?* the researcher used the data collected from the CPQ survey. One way that has been used to understand teacher practice is self-report survey. Using the Classroom Practices Questionnaire (CPQ), the researcher asked teachers to examine their use of 39 different strategies that are common to elementary classrooms. Teachers were asked to rate the frequency of use for average students and for gifted students on each of the 39 indicators. Not all indicators are considered best

practice, nor gifted best practice; however, differential use of any of the commonly used practices would be an indicator of the teachers' attempts to differentiate learning experiences for gifted students. The CPQ was not used in its entirety, however. Since the instrument was used in a single school district, the researcher eliminated Parts Two and Three because these data were standard across the district. Teachers were asked to complete Part 1 (teacher demographic data) and Part 4 (classroom practices). The one-way ANOVA was used to identify differences on the CPQ related to background characteristics of the participants.

Of the 58 teachers in the sample, 76% (n=44) completed the CPQ. Of those who completed the survey, nine completed the section for average students only, stating they did not have any gifted students in their classrooms. The remaining 35 participants' responses were coded as follows:

1 Never

2 One time per month or less

3 A few times a month

4 A few times a week

5 Daily

6 More than once per day

The 39 items were clustered into six subscales (Archambault, Westburg, Brown, Hallmark, Emmons, & Zhang, 1993) as shown in Table 17.

Table 17

Conceptual Definitions of Constructs on the CPQ

Construct	Conceptual Definitions	Number of Items	Alpha Reliability
Questioning and Thinking	Teaching with higher order thinking strategies and advanced questioning	5	.824
Providing Challenges and Choices	Student-selected activities, groups, locations; Independent study/project; competitive/higher level programming	13	.780
Reading and Written Assignments	Reports, projects, advanced readings and writings	6	.773
Curriculum Modifications	Differentiated curriculum; Curriculum compacting	5	.687
Enrichment Centers	Self-selected activities at learning/enrichment centers in the room	4	.710
Seatwork	Student individual work including worksheets, instructional kits, puzzles.	4	.499

Of the 35 participants who had gifted students in their classrooms, 23% (n=8) reported that they never differentiate for gifted students on any of the 39 indicators listed.

Twenty-seven teachers (77%) reported differentiating for gifted students on at least one item at some time. Appendix J reports the mean and standard deviation for each item on the CPQ. Table 18 reports the mean and standard deviation for each subscale of the CPQ.

Table 18

The CPQ and Teachers Who Differentiate by Subscale

CPQ Subscales	Gifted		Average (Control)		*p*	Effect Size *d*
	X	SD	X	SD		ES
Questioning and Thinking	4.61	0.79	4.48	0.85	.280	0.15
Providing Challenges and Choices*	1.99	0.81	1.95	0.79	.008	0.05
Reading and Written Assignments*	2.49	0.45	2.25	0.55	.001	0.44
Curriculum Modifications*	2.77	1.01	2.75	0.97	.027	0.02
Enrichment Centers	3.14	1.13	3.06	1.09	.110	0.07
Seatwork	3.34	0.57	3.20	0.58	.095	0.24

*Indicates significance at $p<.05$

Teachers reported differentiating for gifted students statistically more often in the areas of providing challenges and choices, reading and written assignments, and curriculum modifications. The Effect Sizes of these differences, however, are negligible.

Although the three areas of differentiation mentioned above were significant, the frequency of differentiation was limited or occasional. Items in the subgroups *Challenge and Choice* and *Reading and Written Assignments* were used infrequently—once a month or less. Items in the subgroup *Curriculum Modifications* were used occasionally—a few times a month. No differentiation strategies were reported more frequently than a few times a month.

Using independent samples *t-tests*, the researcher compared the sample on the demographic descriptors. There was no significant difference in overall teacher practice for average vs. gifted students related to any of the demographic descriptors. In other words, there were no correlations between the amount or type of differentiation and teacher demographic information.

Teacher self-reported instructional practices in the classroom used to accommodate gifted students.

Looking again at the CPQ, descriptive statistics revealed which of the 39 practices were used in the general education classrooms most often —regardless of whether teachers differentiated on the strategy. The mean frequency of use for each practice on the CPQ is shown in Appendix J. It should be noted that many strategies and practices considered best practice or gifted-best practice were used a few times a month or less often.

Looking at the subscales, the most often used strategies, used a few times a week, related to questioning and thinking. Enrichment centers and seatwork were used a few times a month. Strategies represented in these three subscales, the most often used strategies, were the same for gifted students and non-gifted students. In other words,

teachers did not differentiate on these instructional methods for gifted students. The strategies that made up the other three subscales were engaged in a few times a month at best. These strategies are where teachers demonstrated significant differences in their instruction for gifted students versus non-gifted students. Differentiation for gifted students and gifted friendly practices are seldom used in the regular classroom, despite research which indicates many of these practices are effective to some degree with non-gifted students as well.

To address Question 3, *What instructional practices do teachers use in the classroom to accommodate gifted students?* the researcher used the data collected from observations using the *COS-R.* The Classroom Observation Scale-Revised was used in 39 classrooms, in grades K-3, to observe one 30- to 45-minute class period. These observations were completed as shown in Table 19.

Table 19

COS-R Observations by Grade Level

Grade Level	Number of Teachers Observed
Kindergarten	10
Grade One	13
Grade Two	11
Grade Three	5

The COS-R was used to record observation data in six subscales: a) general teaching behaviors, b) individual accommodations, c) problem solving strategies, d) critical thinking strategies, e) creative thinking strategies, and f) research strategies. Teachers were scored according to whether they engaged in the behavior effectively (score =3), somewhat effectively (score = 2), or ineffectively (score = 1), or whether they did not engage in the behavior (score = 0). Results were analyzed both including those teachers who did not engage in the behavior and excluding those teachers. Table 20 shows the descriptive statistics for teachers observed on the COS-R, including those teachers who engaged in the behaviors (N^1) as well as for all teachers observed (N^2). It also illustrates the descriptive statistics for only those teachers who engaged in the behaviors by subscale and item number, and the same statistics for all observed teachers.

Table 20:

COS-R Descriptive Statistics

Sub-scale	Item #	N[1]	X	SD	N[2]=39		Sub-scale X	Sub-scale SD
					X	SD		
General	COSR 1	38	2.0789	.81809	2.03	0.8732		
Teaching	COSR 2	35	2.1714	.78537	1.95	0.9987		
Behaviors	COSR 3	19	1.9474	.77986	0.95	1.1227		
	COSR 4	32	2.0313	.73985	1.67	1.0345		
	COSR 5	32	2.1875	.69270	1.72	1.0748	1.66	0.7006
Individual	COSR 6	23	1.9565	.82453	1.15	1.1594		
Accommo	COSR 7	10	1.9000	.87560	0.49	0.9423		
dations	COSR 8	17	2.1176	.78121	0.92	1.1784		
	COSR 9	23	2.0870	.66831	1.23	1.1576	0.95	0.8013
Problem	COSR 10	9	2.2222	.66667	0.51	0.9966		
Solving	COSR 11	9	2.0000	.70711	0.46	0.9132		
Strategies	COSR 12	9	2.1111	.78174	0.49	0.9699	0.49	0.8748

(Table continues)

Table 20 (continued)

Subscale	Item #	N^1	X	SD	X	SD	Subscale X	Subscale SD
Critical	COSR 13	11	1.9091	.70065	0.54	0.9416		
Thinking	COSR 14	11	1.9091	.70065	0.54	0.9416		
Strategies	COSR 15	24	2.2500	.67566	1.38	1.2272		
	COSR 16	10	2.0000	.81650	0.51	0.9699	0.74	0.7641
Creative	COSR 17	16	1.8750	.71880	0.77	1.0378		
Thinking	COSR 18	7	1.8571	.69007	0.33	0.7723		
Strategies	COSR 19	3	1.3333	.57735	0.10	0.3835		
	COSR 20	7	1.7143	.48795	0.31	0.6941	0.38	0.5126
Research	COSR 21	0	.0000	.00000	0.00	0.0000		
Strategies	COSR 22	0	.0000	.00000	0.00	0.0000		
	COSR 23	1	2.0000	--------	0.05	0.3203		
	COSR 24	1	3.0000	--------	0.08	0.4804		
	COSR 25	1	3.0000	--------	0.08	0.4804	0.04	0.2009
COS-R	All						0.73	0.4227

In Table 20 the N^1 for each item refers to the number of teachers who were judged as having attempted to use the strategy. The number of teachers observed (N=39) is referred to as N^2. When analyzing only teachers who attempted the strategy, results are

skewed, yielding higher mean scores for each strategy; however, when all observed teachers are analyzed, the resulting mean is more accurate in reporting actual classroom practice across all classrooms. Not all strategies were attempted by all teachers. In fact, only two teachers attempted any of the strategies in Subgroup 6: Research. More teachers attempted the general teaching behaviors in Subscale 1 than the strategies in the other subscales.

When analyzing the data by subscale, the mean scores ranged from 0.04 to 1.66. The results for "General Teaching Behaviors," the most often observed items, had a mean of 1.66—at the low end of the "somewhat effective" range. All of the other subgroups have mean scores below 1.0 (ineffective or unobserved). Questions 21 through 25 of the COS-R relate to research strategies, the subgroup with the lowest mean. Only two teachers were observed participating in any of these behaviors. The overall mean for "Research Strategies" was 0.04. The COS-R manual (VanTassel-Baska, Avery, Struck, Feng, Bracken, Drummond, & Stambaugh, 2005) reports on research which establishes that it is "atypical for these to be observed in one session." Because the researcher observed each classroom only one time, opportunity to observe for the research strategies was limited.

For the 39 teachers observed, mean scores on the COS-R ranged from a low of .28 (n=2) to a high of 1.88 (n=1) with an overall mean of 0.73. This illustrates the fact that no teachers were found to be effective using the COS-R as a measure. Three teachers were found to have overall mean scores above 1.5 (1.52, 1.56, and 1.88) which equates with the descriptor "somewhat effective". All other teachers (n=36) were found to be ineffective, based on the COS-R observations. Using ANOVA to compare COS-R

scores with demographic descriptors revealed only one statistical correlation with COS-R scores (Table 21). Teachers with between 16- and 20- years of experience (X= 1.35) scored significantly higher than teachers with from 6- to 10-years of experience (X= 0.35). Although the more experienced group was considered ineffective in the behaviors, the less experienced group did not attempt the behaviors.

Table 21: Analysis of Variance for COS-R Mean Scores

Demographic Descriptor	df	F	p	□
	Between subjects			
School	2	.776	0.468	.140
Grade Level	3	1.656	0.194	.281
Years Teaching	6	2.450*	0.046	.356
Highest Degree Earned	1	.895	0.350	.160
Gifted Training	3	.551	0.651	.102
Self-identified as Gifted	1	.588	0.448	.106
Having Relatives Who Are Gifted	1	.014	0.908	.002
Preference for Teaching Gifted Students	2	1.255	0.297	.221

* P < .05

Summary of Findings

Research Question #1: What attitudes do teachers in the sample elementary schools hold concerning gifted students?

Teachers of the selected elementary schools have variable attitudes concerning giftedness ranging from 2.58 (somewhat negative) to 4.20 (very positive) with no teachers expressing an overall very negative attitude toward giftedness. Only one teacher expressed an overall attitude of somewhat negative, and only one teacher expressed an overall attitude of very positive. Additionally, 11 teachers reported an ambivalent attitude and the remaining 31 teachers expressed a somewhat positive attitude. Although some questions elicited negative responses, the overall average of each teacher ranged from somewhat negative to very positive. None of the demographic descriptors were found to significantly correlate with positive attitudes toward giftedness. It was found, however, that teachers with a Master's degree were significantly more likely to have positive attitudes toward enrichment for gifted students. Teachers with more years experience were significantly more likely to see the social value of gifted education. Those who had relatives considered gifted were significantly more likely to believe gifted students have a right to a specialized education. Finally, the teachers from School #2 were significantly more likely to be aware of the special needs and problems of gifted students.

Research Questions #2: How do teachers perceive the way they differentiate the curriculum for gifted students?

This study revealed teacher-reported differentiation in three subgroups that reached significance: a) Challenge and Choice, b) Reading and Written Assignments, and c) Curriculum Modifications. However, the frequency of differentiation was infrequent: one time per month for the first two, and a few times a month for the third

subgroup. No significant differences were seen between teachers who differentiate and those who do not differentiate on any of the demographic descriptors. When looking at the strategies used by these teachers, they were found to use unsupported strategies most often. The strategies used most often were used equally with gifted and non-gifted students, demonstrating no differentiation on those strategies.

Research Question #3: What instructional practices do teachers use in the classroom to accommodate gifted students?

Although teachers who were observed engaging in the targeted behaviors were sometimes judged to be at least somewhat effective, the majority of teachers were not observed to engage in the behaviors successfully or at all. These observations revealed that teachers seldom accommodate their gifted students in the regular classroom. Even the teachers who attempted to accommodate students generally were unsuccessful in their attempts.

Classroom observations revealed that teachers were more likely to engage in the behaviors from the COS-R subscale *Curriculum Planning and Delivery* than any other subscale. All teachers attempted at least some of the items in this subscale. Teachers were more likely to be successful in setting high expectations, incorporating activities for students to apply new knowledge, encouraging students to express their thoughts, asking students to reflect on what they had learned, and providing opportunities for students to generalize from concrete data or information to the abstract.

Of all of the strategies observed, teachers were least likely to effectively encourage students to demonstrate open-mindedness and tolerance of imaginative, playful solutions to problems. Teachers were very unlikely to use the strategies associated with research.

CHAPTER 5: CONCLUSION, DISCUSSION, AND IMPLICATIONS OF THE STUDY

> "Until every gifted child can attend a school where the brightest are appropriately challenged in an environment with their intellectual peers, America can't claim that it's leaving no child behind." -- Jan and Bob Davidson

Introduction

This study was designed to discover the attitudes and practices of general education teachers in a specific school district toward their included gifted students. Using the Attitudes Toward Giftedness Survey revealed information related to teacher attitude, while the Classroom Practices Questionnaire (also a survey) shed light on teachers' beliefs about their classroom practices for gifted students. Finally, the Classroom Observation Scale-Revised was used to collect observation data on actual teacher practice in one snapshot. Although the observation data was limited, taken as a whole, some guarded conclusions can be drawn concerning teacher practice.

Discussion

The first research question, "What attitudes do teachers hold concerning gifted students?" was investigated using the data collected using the demographic data and the ATGS. The second question, "How do teachers perceive the way they differentiate the curriculum for gifted students?" was explored using the CPQ. Question 3, "What instructional practices do teachers use in the classroom to accommodate gifted students?" was explored with the COS-R. The three instruments were used to collect survey data

and observation data to shed light on the attitudes and practices toward differentiating for gifted learners in K-5 general education classrooms.

Of the 44 teachers who completed the ATGS, the scores ranged from 2.58 (somewhat negative) to 4.2 (very positive). The average score was 3.4 (somewhat positive). Overall, teachers had a somewhat positive attitude toward gifted students, although 27% of the teachers indicated ambivalent or negative attitudes. This agrees with Chipego (2004) who found teachers held neutral to very slightly positive attitudes toward giftedness. Pierce and Adams (2000) found that teachers held positive attitudes toward giftedness; however, their sample included teachers who were either in a gifted endorsement class or pre-service professional development related to gifted education. The sample in the current study was a more heterogeneous group, based on their interest in gifted education.

The current study found that teachers' attitudes toward acceleration and enrichment were somewhat negative, also a finding of Chipego (2004). The implications for negative attitudes toward acceleration and enrichment are of great concern. Acceleration is well supported as best practice for gifted students. The finding that teachers have negative attitudes toward acceleration as a practice to benefit gifted students demonstrates a disconnect between research and practice. None of the demographic factors correlated with attitude toward acceleration. When asked to describe their differentiation practices using the Classroom Practices Questionnaire, teachers did not report a significant amount of differentiation on any item related to acceleration or advanced work. Observations recorded using the Classroom Observation Scale-Revised concur that teachers do not use acceleration with their gifted students in

the regular classroom. Since acceleration is the most documented and supported strategy for gifted students, it should be the most often used strategy. Gifted students in this school district are not being well served if they cannot move forward at a pace appropriate to their abilities. They are indeed among the students being left behind.

Support for enrichment is somewhat less straight-forward in the literature. Although no specific support exists for enrichment centers as a delivery mode, specific types of enrichment are supported as gifted best practice: curriculum modifications offering depth vs. breadth, enrichment activities involving problem solving, school-wide theme-based enrichment, use of primary sources, and special curricula which often are enrichment-based. Analysis (ANOVA) determined that teachers with Master's degrees (ambivalent) were statistically more likely than teachers with Bachelor's degrees (somewhat negative) to endorse enrichment activities for gifted students ($p=.028$); however, they still did not report significant use of enrichment strategies. On the Classroom Practices Questionnaire, teachers reported a statistically significant difference in their treatment of average and gifted students in the areas of challenge and choice (once a month or less), reading and written assignments (once a month or less), and curriculum modifications (a few times a month). These results reveal that teachers do not have a positive attitude toward enrichment and they do not often practice it in their classrooms. COS-R data confirms that teachers were not observed using enrichment in their classrooms. Because the two most often used and best supported strategies for meeting the needs of gifted students are acceleration and enrichment, it can be concluded that gifted students in this district are not having their needs met in the regular classroom.

Research (VanTassel-Baska, Johnson, Hughes, Boyce, 1996; VanTassel-Baska, Zuo, Avery, & Little, 2002; Feng, VanTassel-Baska, Quek, Bai, O'Neill, 2005; and Little, Feng, VanTassel-Baska, Rogers, & Avery, 2007) has demonstrated that repeated and in-depth professional development has positive effects on teachers and teacher practice. The district has engaged in non-mandatory professional development in differentiation strategies for the past five years (conversation with Instructional Coordinator, Oct., 2006). The professional development has not been successful in changing teacher attitude nor behavior. The district has need of consistent, mandated professional development supported by school level administrators.

While an overall slightly positive attitude was found, when attitudes were disaggregated based on teacher demographics to determine whether certain teacher traits correlated with positive or negative attitudes, no correlations were found. Several studies (Michener, 1980; Hansen & Feldhusen, 1994; Pierce & Adams, 2000; Megay-Nespoli, 2001; Chipego, 2004) have found statistical differences based on the amount of training teachers have in gifted education. However, based on the categories of 1) no additional training, 2) in-service training, 3) university coursework, and 4) gifted endorsement completion, independent samples t-tests revealed no such differences in this sample of teachers which agrees with the results of research of McCoach and Siegle (2005). It should be noted, though, that the two teachers who had gifted endorsement training had completed the training more than 25 years ago (personal communication, March, 2007). One was teaching at-risk, low-level second grade students and the other was teaching kindergarten. Neither teacher was interested in teaching gifted students. Throughout the observations it appeared that teachers were much more influenced in their day-to-day

practice by the cultural norms of the schools as opposed to the training they received. More than half of the teachers in the sample had been in the school district for more than 15 years. Tradition was strongly enforced and innovation was often sanctioned. It is reasonable to suppose that sanctioning and enforced tradition may have influenced teacher attitude as well as practice.

Previous research (McCoach & Siegle, 2005) concluded that teachers who self-identified as gifted held statistically more positive attitudes toward giftedness than those who did not. When using independent samples t-tests to compare those who viewed themselves as gifted with those who did not, no significant differences were found. Teachers were much more likely and willing to pronounce students gifted than to claim the label for themselves. An interesting phenomenon emerged related to the idea that all children are gifted. Of 44 teachers surveyed, 41% (n=18) agreed (moderately or completely) that all children are gifted. Of these same teachers, only 8 qualified themselves as gifted. Among teachers who claimed they themselves were not gifted (n= 36), 42% (n=15) agreed (moderately or completely) that all children are gifted while another 28% (n=10) were undecided. This may reflect the egalitarian nature of our society and its reluctance to elevate some students above others in any way—especially related to academics. It is also an interesting note that teachers were reluctant to self-identify as gifted and those who did self-identify were no more likely to express positive attitudes toward giftedness than teachers who did not self identify.

Having gifted children or relatives and/or being personally acquainted with gifted people (Michener, 1980; Begin & Gagne, 1994a; Chipego, 2004) have been associated with positive attitudes toward giftedness. Analysis of the ATGS suggested that teachers

who have relatives who have been identified as gifted were significantly more likely (p=.007) to believe gifted students have a right to an appropriate differentiated education than teachers without gifted relatives. These beliefs did not translate into classroom practice. Analysis of the CPQ data revealed no statistical differences in perceived classroom practice related to this characteristic. The COS-R data also did not reveal significant relationships on this descriptor. This could relate to the small size of the sample or the fact that the sample may have been skewed. It also could be that as previous research has shown, attitude does not necessarily translate into classroom practice.

The district uses the pull-out model for gifted education in which identified gifted students are served twice each week for 45-minutes by a resource teacher. ATGS data showed that teachers reported ambivalent attitudes toward special classes for gifted students. McKay (1993) suggests that the general education classroom teachers' perceptions of, attitudes toward, and understandings of gifted students will determine the amount and type of support given to students in the regular classroom. With an ambivalent attitude toward gifted students, using McKay's premise, one would expect teachers in the sample to be inconsistent in their services for gifted students. The idea that gifted students have problems and special needs related to their giftedness was another area where teachers were undecided. Teachers at school #2 were statistically more likely than teachers at school #1 to be sympathetic to the special needs and problems of gifted students; however, none of the other demographic descriptors correlated with these attitudes. Although teachers at school #2 held significantly more positive attitudes toward giftedness in this area, their services to the gifted students as

measured on the COS-R observations and the CPQ surveys were not significantly different from services to gifted students at school #1. Again, this points to the conclusion that attitude does not necessarily produce action.

A final area of significant differences in attitudes is in the subscale of social value. Teachers with the most classroom experience, 25 to 30 years and more than 30 years, were significantly more likely to believe in the social value of gifted education than were teachers who had from 6 to 10 years of experience. Years of experience has not been found to be a significant factor in other research studies. Additional study would be needed to determine whether years of experience is the true dependent variable or whether some other variable, such as age, is causing an interaction effect.

Kindergarten teachers had significantly more favorable attitudes toward grade skipping than other grade level teachers. They were also more likely to believe equal opportunity for students means adapting programs to meet the specific needs of each child. These attitudes may be related to the constructivist ideas imbedded into the kindergarten curriculum in this district. Kindergarten was considered *developmental* as opposed to *academic*, although many academic activities were incorporated in the kindergarten classrooms. It also may be related to the fact that kindergarten teachers were under much less scrutiny concerning state standards of learning which were seen to be the driving force in all other classrooms.

Question Two, "How do teachers perceive the way they differentiate the curriculum for gifted students?" was investigated using the CPQ survey. Using the CPQ, 44 teachers reported their use of differentiation for gifted students. Not all strategies on the CPQ are considered gifted best practice; however, they are commonly-used classroom

practices. Teacher intent was measured by the number of differentiations that were made, not whether the practices they used were best practice. Nine of the 44 teachers stated they did not have any gifted students in their classrooms. Of the 35 teachers who reported having gifted students, 23% (n=8) reported that they never differentiate for gifted students. The remaining 27 teachers' responses were evaluated to compare the survey data. Looking at Table 18 (Chapter 4), one sees immediately that very little differentiation was reported. The majority of the classroom teachers were observed to use whole group instruction almost exclusively. The data revealed three areas where practice for gifted students was statistically different from practice with average students. These subscale practices included providing challenge and choice (p=.008), reading and written assignments (p=.001), and curriculum modifications (p=.027). Although gifted students engaged in these activities statistically more often than regular education students, the frequency of strategy use ranged from once a month or less to only a few times a month. This results in classrooms where about a fifth of teachers deny that gifted students are present, another fifth report they do not differentiate in any way, and the remaining teachers very seldom differentiate for their gifted students. None of the demographic descriptors significantly correlated with the use of differentiation strategies to meet the needs of gifted students.

These findings agree with the Archambault, Westberg, Brown, Hallmark, Zhang, and Emmons (1993) study where few teachers were found to make accommodations for their gifted students and those who did generally used advanced readings, enrichment worksheets, projects, and reports. Whitton (1997) also found few instances of differentiation for gifted students. Even though more than a decade has passed since

these two studies were completed, the use of accommodations for gifted students has still not taken hold in the regular classrooms. Westberg and Daoust (2003) repeated the 1993 study on a smaller scale with the same findings. This points to the fact that ten years later professional development and teacher training alone has not made any difference in classroom practice for gifted students. In a study of principals and teachers in three middle schools, Hertberg-Davis and Brighton (2006) concluded that the principal's commitment to and support of differentiation set the stage for the building. Teachers tended to practice differentiation at the level supported by the principal. The implication of this research is that principals should be trained in the art of differentiation and should create a well-defined system of training and support for their teachers.

The model of teacher training and professional development used at the Center for Gifted Education at the College of William and Mary has demonstrated effective changes in classroom behaviors (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996; VanTassel-Baska, Bass, Ries, Poland, & Avery, 1998; VanTassel-Baska, Avery, Little, & Hughes, 2000; VanTassel-Baska, Zuo, Avery, & Little, 2002; Feng, VanTassel-Baska, Quek, Bai, & O'Neill, 2005). This training model includes on-going teacher training sessions where teachers 1) learn about the curriculum and instruction strategies, 2) practice the strategies in a workshop format, 3) use the curriculum and instruction strategies in the classroom, 4) receive coaching from observers, and 5) participate in follow-up training. This training model is used over a period of several years as opposed to the "one-shot" professional development sessions that are often used in education. In order to change teacher behaviors in the regular classroom to make these classrooms more appropriate for gifted

students, teachers should be engaged in professional development opportunities crafted around the William and Mary Center for Gifted Education teacher training model.

The teachers' self report data from the CPQ demonstrate that very little differentiated instruction is taking place in these elementary classrooms. Using the observational data from the COS-R, teachers' mean score on the subscale Individual Accommodations was 0.95 (ineffective). This supported the finding of the CPQ self-report data. VanTassel-Baska's (2005) notion that differentiated curriculum and instruction are the "non-negotiables" of gifted education has not gained a foothold in the elementary schools in the sample school district.

The Archambault, Westberg, Brown, Hallmark, Zhang, and Emmons (1993) study also concluded that teachers in classrooms with five or more gifted students provided significantly more opportunity for challenge, choice, and curriculum modification. In the sample schools, nine classrooms had five or more gifted students enrolled; however, no significant differences were found between these classrooms and other classrooms on the amount of classroom differentiation.

Teachers often feel extreme pressure to "cover" the tested topics and concepts rather than being able to address individual needs of students (Reis, 1993). The state assessment generally consists of multiple-choice, knowledge level questions (Newmann, & Archbald, 1992). Teachers express concern that if students do not follow the prescribed course of study, the students will not perform well on the state assessment (Reis, 1993). Teachers are fearful of stepping outside their traditional lessons to spend time on critical thinking, creativity, or unrelated topics. They often cited the *time* factor—not having enough time to teach everything that will be assessed. These fears

and concerns, quite legitimate in today's climate of accountability and *No Child Left Behind*, contribute to a classroom where gifted students are left to languish in an environment of rote memory rather than to excel in an environment of enrichment and acceleration.

The Word Study differentiated curriculum was introduced at two of the schools as a new initiative during the school year in which this study was conducted. Teachers began to use *Word Study* to differentiate for their students in January at one site and in March at a second site. *Word Study* appeared to be a differentiated program; however, it was differentiated on the understanding and use of phonics to decode words and students were required to stay in each level for a minimum of seven weeks before advancing to a higher level (Fresch & Wheaton, 1992; Fresch, 2001). All of the research supporting the *Word Study Program* supports its use with struggling students. No research was found that addresses its effectiveness with high-average or gifted students. What might have been more effective would be to allow gifted students to move through the levels at a faster pace, acquiring the skills and moving on. To ask an advanced reader to work at a pre-primer level for seven weeks to gain phonemic awareness is neither efficient nor economical. It appeared that the teachers were trying to follow the lead of the administrators in differentiating for students, as suggested in the Hertberg-Davis and Brighton (2005) study; however, the program chosen by the administrators was fundamentally inappropriate for gifted students.

The one strategy that enjoyed substantial, differential use with gifted students by teachers in this study was "using computers" in the classroom. Teachers reported significantly more computer use with gifted students than with regular students. From

general observations in the classrooms over the course of one school year, nearly all of the computer use observed was in conjunction with students taking Accelerated Reader quizzes. Instruction in computer labs (one 40-minute period each week) was more variable; however, in the general education classroom, little to no other use of the computers was observed. At each of the participating schools, the Accelerated Reader program was marketed to the students more than any other program or activity. Posters were used to list the names of students who had achieved specific levels (points) in the program and prizes were awarded to successful students. One teacher remarked, "I can tell who is gifted in my classroom by looking at the Accelerated Reader chart. If they are motivated to read and take the tests, that is definitely a mark of giftedness." Unfortunately, Accelerated Reader quiz questions are generally written at the knowledge or comprehension level with little or no need to think deeply or critically. The program is designed to check for understanding and comprehension. It is not a gifted-friendly program. However, this, as well as participation in *Word Study*, does illustrate that teachers can be receptive to using pre-packaged programs to differentiate for their gifted students when they receive administrative and other supports. This is a good direction for general education classroom teachers of gifted students. By providing gifted-friendly, pre-packaged programs along with research-supported professional development; teachers may be able to more effectively meet the needs of these students in the regular classroom. The William and Mary Curriculum units are one such program for teaching social studies, science, and language arts (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996; VanTassel-Baska, Bass, Ries, Poland, & Avery, 1998; VanTassel-Baska, Avery, Little, & Hughes, 2000; VanTassel-Baska, Zuo, Avery, & Little, 2002; Feng, VanTassel-

Baska, Quek, Bai, & O'Neill, 2005). These curricula have a well established research base to recommend them for gifted students, and are well-differentiated for gifted students. Teachers are afforded training on the units in a structured, research-supported training model. Schools which have used these curricula along with the training model have seen successes with gifted students in the regular classroom.

Question 3, "What instructional practices do teachers use in the classroom to accommodate gifted students?" investigated actual classroom practice by way of a classroom observation. Previous research (VanTassel-Baska, Bass, Ries, Poland, & Avery, 1998; VanTassel-Baska, Zuo, Avery, & Little, 2002; Feng, VanTassel-Baska, Quek, Bai, & O'Neill, 2005) has demonstrated that differentiated instruction results in more student academic growth than does the traditional, whole-group instruction. The observation results on the COS-R did not support the self-report data related to the teachers' assertions that they differentiate for gifted students on challenge and choice, reading and written assignments, and curriculum modifications. Of the 39 teachers observed, few were observed in these behaviors. The difference between the self-report data and the observation data could be explained a number of ways. First, self-report data are often considered a biased form of data. Given the fact that teachers were aware of the researcher's intent to report on classroom practice that supports gifted students, teachers may have been more likely to give favorable responses. On the other hand, self-report data may reflect a teacher's intention rather than actual practice (Megay-Nespoli, 2001; McCoach & Siegle, 2005). In addition, the limited nature of the observations may also have impacted the correlation between the two instruments. Only one limited observation was conducted, thereby limiting the ability to draw conclusions and make

generalizations concerning actual classroom practice. The use of only one 45-minute observation per classroom combined with the fact that teachers who differentiate on these strategies do so only on a limited basis—a few times a month to once a month or less—influence the expectation of observing these activities. It was not surprising that few teachers were observed in gifted-friendly teaching practices.

Every teacher was observed to engage in at least one of the targeted behaviors in the COS-R subscale of General Teaching Practices. Even so, the mean score for teachers on this subscale was 1.66 (somewhat effective). All other subscales had an overall mean in the range of ineffective or not observed. These practices have all been supported by numerous studies as best-practice for gifted students (Rogers, Treffinger, & Ripple, 1971; Thompson, 1996; VanTassel-Baska, Johnson, Hughes, & Boyce, 1996; Dixon, 2002; Dixon, Prater, Vine, Wark, Williams, Hanchon, & Shobe, 2004; Feng, VanTassel-Baska, Quek, Bai, & O'Neill, 2005), but they have not become a part of the tradition in these schools. The district has espoused a focus on "differentiation" for the past several years; however, school administrators were not observed as supporters of the initiative. Lesson plans were seldom checked and were not assessed for their inclusion of any of these practices. Three teachers, part of a cohort trained to teach low-level, at-risk students, were observed on the COS-R providing different levels of readings based on student ability (VanTassel-Baska, Zuo, Avery, & Little, 2002; Little, Feng, VanTassel-Baska, Rogers, & Avery, 2007), using pre-tests to determine student prior knowledge (Reis, & Renzulli, 1992;), using fluid grouping strategies to group students by ability and teaching to the needs of the group (Gentry, 1999; Davenport & Howe, 1993; Gentry & Keilty, 2004), and differentiating homework based on student need. These teachers formed a

small group of their own and were often sanctioned by other teachers for their departure from the norm. They were often excluded by other teachers. It was typical to hear other teachers criticize them saying that they, too, could do those things if they had been given the extra summer planning time, the additional resources, and the small class size.

Indeed, to expect teachers to use best practice, administrators do need to offer them support by way of professional development, coaching, planning time, and resources. However, it should also be noted that the average class sizes at the three schools were 16.5, 16.8, and 19.3, respectively, while the average class size for these special classrooms was 14.0. The national average class size for elementary schools is 23.0 (National Center for Education Statistics, 2007). Although the average class size in these schools was well below the national average, teachers believed their classes were too large for them to effectively differentiate for all students (qualitative data from COS-R debriefing).

Conclusion

Based on the data collected, a number of conclusions can be drawn related to the research questions. Teachers from the targeted school district expressed variable attitudes concerning giftedness and gifted students, but rarely expressed negative attitudes. Their attitudes ranged, with few exceptions, between neutral and somewhat positive. These attitudes did not result in positive classroom modifications for gifted students. Few teachers differentiated curriculum or instructional methods and those who did were more likely to differentiate for low-performing students. Teachers who differentiated curriculum or instructional methods were unlikely to differentiate using best practice. They were more likely to differentiate using programs (i.e. Accelerated

Reader; Word Study) which receive administrative support, and offer professional development, and publication although being of dubious value to gifted learners.

Implications

The implications of the study include the need for targeted professional development to inform teachers' opinions and attitudes toward gifted students; the need for required, and supported use of classroom differentiation strategies; the need for appropriate computer programs and curricula for meeting the needs of gifted students; and the need for targeted professional development in the areas where teachers are already experiencing some successes with meeting the needs of gifted students.

First, teachers in the regular classroom, who are more often than not the primary educators for our gifted students, need to be informed of the needs and identities of gifted children. Just as Megay-Nespoli (2001) found that teachers held stereotypical ideas about gifted students, this study found many teachers held similar stereotypical ideas about the gifted students in these classrooms. They often expressed beliefs that gifted students can "make it on their own," that gifted education perpetuates social inequalities, that acceleration is an inappropriate response to giftedness, and that special education for gifted students goes against the democratic principles of our country. These teachers need to participate in well-defined models of professional development which focus on giftedness and gifted students. Pre-service teachers need to be exposed to these constructs and ideas before they enter classrooms (Adams, 1993). Overall, teachers need to participate in activities that will help produce more positive attitudes toward giftedness and the education of gifted students. Because the amount of training of the sample did

not correlate significantly with teachers' attitudes in this study, it is important to determine what types of training have been successful in changing teacher attitude and to use targeted professional development with teachers in this district.

Second, teachers in the regular classroom must be required to differentiate instruction and curriculum for gifted students. This study reports that very little differentiation has been observed or reported in the regular classrooms of the sample schools, even when teachers reported positive attitudes toward giftedness. This has also been the finding of other studies of a more national scope (Westberg, 1993; Westberg & Daoust, 2003). Although teachers in the sample were reluctant to differentiate instruction, they did so when the administration required it (i.e. Accelerated Reader and Word Study). Unfortunately for our gifted population, such differentiation is inappropriate to meet their needs. In order to serve our gifted students appropriately, administrators must require the practice, support the practice, and insure that the practice is developmentally and academically appropriate to the needs of these students.

Administrators, as well as teachers, need to participate in professional development where their stereotypical ideas of giftedness are dispelled and they can gain a more precise understanding of giftedness and gifted students. In order for differentiation to become part of the school culture, administrators must take an active role in promoting and requiring evidence of differentiation for all students, especially the gifted (Hertberg-Davis & Brighton, 2006). This study revealed that teachers, when required and monitored, did differentiate for all students. Unfortunately, they did not have the expertise nor the materials needed to do so effectively. As well, there are few research-supported programs available for use with gifted students.

Administrators should consider adopting programming that can be differentiated for all students in a meaningful way. Teachers must receive targeted and specific training in differentiation as well as being coached in the use of differentiated lessons in the classroom. Without a culture of differentiation that is supported wholly and significantly by administrators, teachers will be lax in implementing this difficult and time-consuming practice (Hertberg-Davis & Brighton, 2006).

Third, teachers need to have access to individualized computer programs that allow students to move above the basic knowledge level to higher levels of thought and reasoning. This study revealed that teachers were more likely to differentiate for students via computer use. Building on this strength is important. The schools observed had cultures of support in participating in the Accelerated Reader program. Librarians and administrators lauded and rewarded students' participation in the program. If teachers were given high-level, pre-packaged programs, and if they were encouraged to use them, gifted students would be better served. If there were an advocate for the selected programming, student rewards, and student recognition, a culture of excellence for all students could be achieved. Unfortunately, few pre-packaged programs exist that allow for student acceleration and depth of learning.

Teachers also used the Word Study program to differentiate for students in two of the schools. They were provided with the curriculum, a mandate from the administration, and support from a reading specialist. If they were given high-powered gifted curriculum with the same mandates and support, it is reasonable to believe that they would implement them as well.

Fourth, teachers need to be encouraged in the appropriate differentiation practices they are already doing. These practices included encouraging students to participate in discussions, teaching thinking skills, encouraging reasoning and logical thinking, asking open-ended questions, and encouraging students to ask higher-level questions. Through targeted professional development, classroom coaching, and the choice of exemplary curriculum, teachers could be encouraged to use these strategies more often. Other teachers could be recruited to the ranks of those who are practicing these strategies.

Suggestions for Future Research

Recommendations for future research are centered in four areas: empirical research to further identify and support gifted best practice, research to study the types of professional development that positively impact teacher attitudes and practices, research on the role of the administrator in promoting differentiated instruction, and the use of gifted best practice to effectively differentiate for gifted students in the regular classroom.

First, more empirical research is needed to further identify strategies and methods that benefit gifted students differentially. Many strategies recognized as gifted best practice have anecdotal support rather than empirical evidence. There exists a need to pursue empirical evidence to support a number of the strategies investigated in this study (e.g. enrichment and learning centers, imagery training, multi-modal learning, and student choice). The current move to use gifted curriculum with all students needs further study as well. Some models in gifted education have tested the efficacy of gifted curriculum and instructional strategies with all students (e.g. Integrated Curriculum Model); however, there is a need to pursue additional research on other high-powered curriculum and instruction models.

Second, research should be initiated to study the efficacy of specific professional development models and topics. Are there some courses, some instructors, or some specific interventions that result in positive attitudes toward giftedness and gifted students while others have little impact on teacher attitude? What kind of professional development results in real and enduring change in teacher behaviors? How can we help teachers make the connection between attitude and action?

Third, research is needed to correlate observed classroom differentiation with the attitudes toward differentiation expressed and supported by the administrators. It appears that administrators can at times have a positive effect on teachers' use of differentiation. What administrator behaviors most successfully support classroom differentiation?

Fourth, research is needed to explore how computers can be used to facilitate higher level thinking and reasoning in the general education classroom. What programs and activities are advantageous for gifted students? How can teachers be indoctrinated into the use of these programs? Would these programs increase the educational advancement of our gifted students?

Supporting new research into these areas and extending research on specific classroom practices where research is lacking should be a priority for researchers in the field of gifted education as we continue to explore what works for gifted students in the regular classroom.

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Appendix A:

Classroom Practices Questionnaire

Classroom Practices: This questionnaire is designed to provide information about the instructional strategies and approaches you use in your classroom. It is very important that the answers you provide reflect actual practices. Please be assured that your individual responses will be held in the strictest confidence. If you have students in your class formally identified as gifted, answer items 1-39 for average and gifted students. If you do not have students in your class formally identified as gifted, but you have students you believe are gifted, check here ____ and respond to items 1-39 for average and gifted students. If you have neither identified gifted students nor students you believe to be gifted, check here ____ and respond to items 1-39 for average students only.

Response Scale: 0 – Never
1 – One time per month or less
2 – A few times a month
3 – A few times a week
4 – Daily
5 – More than once per day

Average Students							Gifted Students					
0	1	2	3	4	5	1. Use basic skills worksheets	0	1	2	3	4	5
0	1	2	3	4	5	2. Use enrichment worksheets	0	1	2	3	4	5
0	1	2	3	4	5	3. Assign reading of more advanced level work	0	1	2	3	4	5
0	1	2	3	4	5	4. Use self-directed instructional kits such as S.R.A.	0	1	2	3	4	5
0	1	2	3	4	5	5. Assign reports	0	1	2	3	4	5
0	1	2	3	4	5	6. Assign projects or other work requiring extended time for students to complete	0	1	2	3	4	5
0	1	2	3	4	5	7. Assign book reports	0	1	2	3	4	5
0	1	2	3	4	5	8. Use activities such as puzzles or word searches	0	1	2	3	4	5

0	1	2	3	4	5	9. Give creative or expository writing assignments on topics selected by the teacher	0	1	2	3	4	5
0	1	2	3	4	5	10. Give creative or expository writing assignments on topics selected by the students	0	1	2	3	4	5
0	1	2	3	4	5	11. Make time available for students to pursue self-selected interests.	0	1	2	3	4	5
0	1	2	3	4	5	12. Use pretests to determine if students have mastered the material covered in a particular unit or content area	0	1	2	3	4	5
0	1	2	3	4	5	13. Eliminate curricular material that students have mastered	0	1	2	3	4	5
0	1	2	3	4	5	14. Repeat instruction on the coverage of more difficult concepts for some students	0	1	2	3	4	5
0	1	2	3	4	5	15. Substitute different assignments for students who have mastered regular classroom work	0	1	2	3	4	5
0	1	2	3	4	5	16. Modify the instructional format for students who learn better using an alternative approach	0	1	2	3	4	5
0	1	2	3	4	5	17. Encourage students to move around the classroom to work in various locations	0	1	2	3	4	5
0	1	2	3	4	5	18. Allow students to leave the classroom to work in another location, such as the school library or media center	0	1	2	3	4	5
0	1	2	3	4	5	19. Assign different homework based on student ability	0	1	2	3	4	5

0	1	2	3	4	5	20. Use learning centers to reinforce basic skills	0	1	2	3	4	5
0	1	2	3	4	5	21. Use enrichment centers	0	1	2	3	4	5
0	1	2	3	4	5	22. Teach thinking skills in the regular curriculum	0	1	2	3	4	5
0	1	2	3	4	5	23. Teach a unit on a thinking skill, such as critical thinking or creative problem solving	0	1	2	3	4	5
0	1	2	3	4	5	24. Participate in a competitive program focusing on thinking skills/ problem solving, such as Future Problem Solving, Odyssey of the Mind, etc.	0	1	2	3	4	5
0	1	2	3	4	5	25. Use contracts or management plans to help students organize their independent study projects	0	1	2	3	4	5
0	1	2	3	4	5	26. Provide time within the school day for students to work on the independent study projects	0	1	2	3	4	5
0	1	2	3	4	5	27. Allow students within your classroom to work from a higher grade level textbook	0	1	2	3	4	5
0	1	2	3	4	5	28. Provide a different curricular experience by using a more advanced curriculum unit on a teacher-selected topic	0	1	2	3	4	5
0	1	2	3	4	5	29. Group students by ability across classrooms at the same grade level	0	1	2	3	4	5
0	1	2	3	4	5	30. Send students to a higher grade level for specific subject area instruction	0	1	2	3	4	5

0	1	2	3	4	5	31. Establish interest groups which enable students to pursue individual or small group interests	0	1	2	3	4	5
0	1	2	3	4	5	32. Consider students' opinion in allocating time for various subjects within your classroom	0	1	2	3	4	5
0	1	2	3	4	5	33. Provide opportunities for students to use programmed or self-instructional materials at their own pace	0	1	2	3	4	5
0	1	2	3	4	5	34. Give assignments that encourage students to organize their own work schedule to complete a long range project	0	1	2	3	4	5
0	1	2	3	4	5	35. Provide questions that encourage reasoning and logical thinking	0	1	2	3	4	5
0	1	2	3	4	5	36. Ask open-ended questions	0	1	2	3	4	5
0	1	2	3	4	5	37. Encourage students to ask higher-level questions	0	1	2	3	4	5
0	1	2	3	4	5	38. Encourage student participation in discussions	0	1	2	3	4	5
0	1	2	3	4	5	39. Use computers	0	1	2	3	4	5

Please provide any comments you believe will help in understanding classroom practices within your school.

Appendix B

Teacher Demographics Questions for the Survey

A little information please…

1. Years teaching experience: _____

2. Highest degree earned: _____

List your areas of concentration or endorsement: _____

_____

3. Training in Gifted Education:

- O None
- O Inservices (Number:_____)
- O University Courses (Number: ____)
- O Endorsement

4. Grade level now teaching: _____

5. What is the number of formally identified gifted students in your classroom? _____

6. Are there students in your classroom you believe are gifted but have not been formally identified? _____

7. Do you consider yourself gifted? _____

8. Do you have children, siblings, other relatives who have been identified gifted? _____

9. How many years have you taught gifted students in your regular classroom? _____

10. Do you prefer teaching gifted students, non-gifted students, or no preference?

_____

Appendix C

The William and Mary
Classroom Observation Scales
Revised

Classroom Observation Scales Development Team:
Joyce VanTassel-Baska, Ed.D
Linda Avery, Ph.D.
Jeanne Struck, Ph.D.
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The College of William and Mary
School of Education
Center for Gifted Education

2003

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The William and Mary Classroom Observation Scales, Revised (Part 1)
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.

Observer_____ **Date**_____ **# of minutes observed**_____

School_____ **Grade**_____

Teacher_____ **Course/lesson**

Observed_____

Student Information: Total #_____

Observed Gender: #Boys_____ #Girls_____

Observed Ethnicity: #White_____ #African American_____ #Hispanic_____ #Asian American_____ #Other_____

Gifted: #Identified Gifted _____

Classroom Desk Arrangement: Desks in rows and columns ____ Desks in groups____ Desks in circle_____

Other (specify)

_____

Service Delivery Model: *(as designated by the coordinator)*

Self-contained ____ Inclusion ____ Cluster group ____ Pullout ____ Other_____

Please outline what you have observed in the classroom with respect to curriculum and instruction-related activities. Describe the specific lesson, its organization, instructional methods used, characteristics of the learning experience and environment, texts and materials used, questions asked by the teacher, and any other relevant observations and impressions that may influence your completion of the attached checklist.

Lesson Outline: *(See attached lesson plan script, pp. 11-13)*

Texts and Materials: *(List any materials, novels, texts, etc. used by students and/or the teacher.)*

The William and Mary Classroom Observation Scales, Revised (Part 2)
Teacher Observation
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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:				

Appendix D
Attitudes Toward Giftedness Survey

Directions: Indicate your agreement or disagreement using the five-point Likert-scale. Circle the appropriate number for each question below.

Response Scale:
1 – Completely Disagree
2 –Moderately Disagree
3 – Undecided
4 – Moderately Agree
5—Completely Agree

1. Talent is a rare commodity which we must encourage.	**1**	**2**	**3**	**4**	**5**
2. Devoting special funds to the education of gifted children constitutes a profitable investment in the future of our society.	**1**	**2**	**3**	**4**	**5**
3. Offering special help to the gifted helps perpetuate social inequalities.	**1**	**2**	**3**	**4**	**5**
4. Special services for the gifted constitute an injustice to other children.	**1**	**2**	**3**	**4**	**5**
5. Special programs for gifted children have the drawback of creating elitism.	**1**	**2**	**3**	**4**	**5**
6. Since we invest supplementary funds for children with difficulties, we should do the same for the gifted.	**1**	**2**	**3**	**4**	**5**
7. It is unfair to deprive gifted children of the enrichment which they need.	**1**	**2**	**3**	**4**	**5**
8. Children with difficulties have the most need of special educational services.	**1**	**2**	**3**	**4**	**5**
9. In our schools, it is not always possible for gifted children to fully develop their talents.	**1**	**2**	**3**	**4**	**5**
10. Our schools are already adequate in meeting the needs of the gifted.	**1**	**2**	**3**	**4**	**5**
11. Gifted children don't need special educational services.	**1**	**2**	**3**	**4**	**5**
12. The gifted are already favored in our schools.	**1**	**2**	**3**	**4**	**5**
13. Whatever the school program, the gifted will succeed in any case.	**1**	**2**	**3**	**4**	**5**
14. Because of a lack of appropriate programs from them, the gifted of today may become the dropouts and delinquents of tomorrow.	**1**	**2**	**3**	**4**	**5**
15. The gifted waste their time in regular classes.	**1**	**2**	**3**	**4**	**5**
16. If the gifted are not sufficiently motivated in school, they may become lazy.	**1**	**2**	**3**	**4**	**5**
17. The gifted come mostly from wealthy families.	**1**	**2**	**3**	**4**	**5**
18. All children are gifted.	**1**	**2**	**3**	**4**	**5**
19. People are born gifted, you can't become gifted.	**1**	**2**	**3**	**4**	**5**

20. A greater number of gifted children should be allowed to skip a grade.	1	2	3	4	5
21. Most gifted children who skip a grade have difficulties in their social adjustment to a group of older students.	1	2	3	4	5
22. Schools should allow gifted students to progress more rapidly.	1	2	3	4	5
23. Enriched school programs respond to the needs of gifted children better than skipping a grade.	1	2	3	4	5
24. An enriched school program can help gifted children to completely develop their abilities.	1	2	3	4	5
25. The best way to meet the needs of the gifted is to put them in special classes.	1	2	3	4	5
26. Most teachers do not have the time to give special attention to their gifted students.	1	2	3	4	5
27. By separating students into gifted and other groups, we increase the labeling of children as strong-weak, good-less-good, etc.	1	2	3	4	5
28. Special programs for gifted children make them more motivated to learn.	1	2	3	4	5
29. When the gifted are put in special classes, the other children feel devalued.	1	2	3	4	5
30. Often, gifted children are rejected because people are envious of them.	1	2	3	4	5
31. Gifted children might become vain or egotistical if they are given special attention.	1	2	3	4	5
32. The speed of learning in our schools is far too slow for the gifted.	1	2	3	4	5
33. I am sometimes uncomfortable before people I consider to be gifted.	1	2	3	4	5
34. Average children are the major resource of our society, so, they should be the focus of our attention.	1	2	3	4	5
35. We should give special attention to the gifted just as we give special attention to children with difficulties.	1	2	3	4	5
36. Some teachers are jealous of the talents their gifted students possess.	1	2	3	4	5
37. It isn't a compliment to be described as a "whiz kid."	1	2	3	4	5
38. The enrichment track is a good means with which to meet certain special needs of gifted children.	1	2	3	4	5
39. The gifted need special attention in order to fully develop their talents.	1	2	3	4	5
40. It is less profitable to offer special education to children with difficulties than to gifted children.	1	2	3	4	5
41. Gifted students often disturb other students in the class.	1	2	3	4	5

42. The idea of offering special educational services to gifted children goes against the democratic principles of our society.	1	2	3	4	5
43. Sooner or later, regular school programs may stifle the intellectual curiosity of certain gifted children.	1	2	3	4	5
44. We have a greater moral responsibility to give special help to children with difficulties than to gifted children.	1	2	3	4	5
45. In order to progress, a society must develop the talents of gifted individuals to a maximum.	1	2	3	4	5
46. Gifted children are often unsociable.	1	2	3	4	5
47. The gifted should spend their spare time helping those who progress less rapidly.	1	2	3	4	5
48. It is parents who have the major responsibility for helping gifted children develop their talents.	1	2	3	4	5
49. It is more damaging for a gifted child to waste time in class than to adapt to skipping a grade.	1	2	3	4	5
50. Equal opportunity in education does not mean having the same program for everyone, but rather programs adapted to the specific needs of each child.	1	2	3	4	5
51. Special educational services for the gifted are a mark of privilege.	1	2	3	4	5
52. Generally, teachers prefer to teach gifted children rather than those who have difficulties.	1	2	3	4	5
53. Some children are more gifted than others.	1	2	3	4	5
54. In our schools, it is possible to meet the educational needs of the gifted without investing additional resources.	1	2	3	4	5
55. A child who has been identified as gifted has more difficulty in making friends.	1	2	3	4	5
56. All children could be gifted if they benefited from a favorable environment.	1	2	3	4	5
57. When gifted children are put together in a special class most adapt badly to the fact that they are no longer at the head of the class.	1	2	3	4	5
58. Skipping a grade emphasizes scholastic knowledge too much.	1	2	3	4	5
59. Skipping a grade forces children to progress too rapidly.	1	2	3	4	5
60. There are no gifted children in our school.	1	2	3	4	5

Please add any comments you think would be helpful in understanding your point of view:

Appendix E
Teacher Attitude Survey and Classroom Practices Questionnaire Permission

I, _____, agree to participate in a study involving teachers who teach gifted students in a regular education classroom. The purpose of the study is to collect information concerning teachers' attitudes toward and practices concerning gifted students in the regular classroom. As a doctoral student at the College of William and Mary, completing a dissertation study, the researcher is interested in learning about teachers' attitudes toward gifted students and their classroom practice.

My participation will involve completing an online survey that has three parts: demographic information, an attitude survey, and a classroom practices questionnaire. The entire survey is expected to take about 30 minutes. If at anytime I am uncomfortable answering a question or responding to an item, I have the right to refrain from answering or sharing with no penalty. I understand that I have the right to refuse to participate in the project at anytime, including before or during the online session, with no consequence.

I understand that the researcher will protect the identities of participants through the use of pseudonyms in this and any future publications or presentation. As a participant, I understand that participants may be quoted directly but their names will not be used in any part of the report. All data will be stored in a secure location at all times. Furthermore, I understand that my participation in this study is voluntary. My principal, superintendent or colleagues will not be made aware of my preference not to participate, if I so choose, and no consequences shall exist because of my refusal to participate. I understand that I may withdraw from the study at any time, without prejudice or reprimand.

If I have any questions regarding this study, I can contact, Dr. Joyce VanTassel-Baska, project director and professor of education at 757-221-2362 or jlvant@wm.edu. I understand that I may report any problems or dissatisfaction to Dr. Thomas Ward, chair of the School of Education Internal Review Committee at 757-221-2358 or tjward@wm.edu or Dr. Michael Deschenes, the chair of the Protection of Human Subjects Committee at the College of William and Mary at 757-221-2778.

My signature below signifies that I am at least 18 years of age, that I have received a copy of this consent form, and that I consent to participating in this study.

_____	_____
Date	Signature of Teacher
_____	_____
Date	Signature of Researcher

THIS PROJECT WAS FOUND TO COMPLY WITH APPROPRIATE ETHICAL STANDARDS AND WAS EXEMPTED FROM THE NEED FOR FORMAL REVIEW BY THE COLLEGE OF WILLIAM AND MARY PROTECTION OF HUMAN SUBJECTS COMMITTEE (Phone 757-221-3966) ON AND EXPIRES ON .

Preferred pseudonym: _____

Appendix F
Superintendent Permission to Conduct Research

I, _____, agree to participate in a study involving teachers who teach gifted students in a regular education classroom. The purpose of the study is to collect information concerning teachers' attitudes toward and practices concerning gifted students in the regular classroom. As a doctoral student at the College of William and Mary, completing a dissertation study, the researcher is interested in learning about teachers' attitudes toward gifted students and their classroom practice.

My participation will involve giving permission for the researcher to conduct the research in this school division. I understand that elementary level classroom teachers will be asked to complete an online survey that has three parts: demographic information, an attitude survey, and a classroom practices questionnaire. The entire survey is expected to take about 30 minutes. If at anytime teachers are uncomfortable answering a question or responding to an item, they have the right to refrain from answering or sharing with no penalty. I understand that I have the right to refuse participation of my school division in the project at anytime, including before or during the project, with no consequence.

I understand that the researcher will protect the identities of participants through the use of pseudonyms in this and any future publications or presentation. Participants may be quoted directly but their names will not be used in any part of the report. All data will be stored in a secure location at all times. Furthermore, I understand that all participation in this study is voluntary. The superintendent, principals, other teachers will not be made aware of an individual's preference not to participate, if they so choose, and no consequences shall exist because of refusal to participate. I understand that I may withdraw my division from the study at any time, without prejudice or reprimand.

If I have any questions regarding this study, I can contact, Dr. Joyce VanTassel-Baska, project director and professor of education at 757-221-2362 or jlvant@wm.edu. I understand that I may report any problems or dissatisfaction to Dr. Thomas Ward, chair of the School of Education Internal Review Committee at 757-221-2358 or tjward@wm.edu or Dr. Michael Deschenes, the chair of the Protection of Human Subjects Committee at the College of William and Mary at 757-221-2778.

My signature below signifies that I am at least 18 years of age, that I have received a copy of this consent form, and that I consent to participating in this study.

_____	_____
Date	Signature of Superintendent
_____	_____
Date	Signature of Researcher

THIS PROJECT WAS FOUND TO COMPLY WITH APPROPRIATE ETHICAL STANDARDS AND WAS EXEMPTED FROM THE NEED FOR FORMAL REVIEW BY THE COLLEGE OF WILLIAM AND MARY PROTECTION OF HUMAN SUBJECTS COMMITTEE (Phone 757-221-3966) ON AND EXPIRES ON .

Preferred pseudonym: _____

Preferred pseudonym for the school division: _____

Appendix G
Principal Permission to Conduct Research

I, _____, agree to participate in a study involving teachers who teach gifted students in a regular education classroom. The purpose of the study is to collect information concerning teachers' attitudes toward and practices concerning gifted students in the regular classroom. As a doctoral student at the College of William and Mary, completing a dissertation study, the researcher is interested in learning about teachers' attitudes toward gifted students and their classroom practice.

My participation will involve giving permission for the researcher to conduct the research in this school. I understand that elementary level classroom teachers will be asked to complete an online survey that has three parts: demographic information, an attitude survey, and a classroom practices questionnaire. The entire survey is expected to take about 30 minutes. If at anytime teachers are uncomfortable answering a question or responding to an item, they have the right to refrain from answering or sharing with no penalty. I understand that I have the right to refuse participation of my school in the project at anytime, including before or during the project, with no consequence.

I understand that the researcher will protect the identities of participants through the use of pseudonyms in this and any future publications or presentation. Participants may be quoted directly but their names will not be used in any part of the report. All data will be stored in a secure location at all times. Furthermore, I understand that all participation in this study is voluntary. The superintendent, principals, other teachers will not be made aware of an individual's preference not to participate, if they so choose, and no consequences shall exist because of refusal to participate. I understand that I may withdraw my division from the study at any time, without prejudice or reprimand.

If I have any questions regarding this study, I can contact, Dr. Joyce VanTassel-Baska, project director and professor of education at 757-221-2362 or jlvant@wm.edu. I understand that I may report any problems or dissatisfaction to Dr. Thomas Ward, chair of the School of Education Internal Review Committee at 757-221-2358 or tjward@wm.edu or Dr. Michael Deschenes, the chair of the Protection of Human Subjects Committee at the College of William and Mary at 757-221-2778.

My signature below signifies that I am at least 18 years of age, that I have received a copy of this consent form, and that I consent to participating in this study.

_____	_____
Date	Signature of Superintendent
_____	_____

Date Signature of Researcher

THIS PROJECT WAS FOUND TO COMPLY WITH APPROPRIATE ETHICAL STANDARDS AND WAS EXEMPTED FROM THE NEED FOR FORMAL REVIEW BY THE COLLEGE OF WILLIAM AND MARY PROTECTION OF HUMAN SUBJECTS COMMITTEE (Phone 757-221-3966) ON AND EXPIRES ON .

Preferred pseudonym: _____

Preferred pseudonym for the school: _____

Appendix H

ATGS Mean Scores for Subjects

N	ATGS Mean Score	Attitudes	%
1	2.58	Somewhat Negative Attitude	2%
2	2.90	Ambivalent Attitude	25 %
3	3.08		
4	3.13		
5	3.18		
6	3.18		
7	3.20		
8	3.20		
9	3.22		
10	3.23		
11	3.25		
12	3.25		
13	3.27	Somewhat Positive Attitude	71 %
14	3.28		
15	3.28		
16	3.28		
17	3.30		

18	3.30
19	3.30
20	3.37
21	3.38
22	3.40
23	3.40
24	3.42
25	3.42
26	3.43
27	3.43
28	3.48
29	3.50
30	3.50
31	3.52
32	3.55
33	3.55
34	3.55
35	3.55
36	3.55
37	3.57
38	3.62
39	3.62
40	3.70

41	3.75	
42	3.77	
43	3.92	
44	4.20	Very Positive Attitude 2%

Appendix I
Analysis of Variance for the ATGS by Grade Level

Question #	Grade Level	N	Mean	Standard Deviation	K	LSD Post Hoc p-value 1	2	3	4	5
ATGS 1	Kindergarten	4	3.7500	.95743		.947	1.00	.763	.874	.750
	First	10	3.8000	1.31656	.947		.935	.763	.774	.743
	Second	8	3.7500	1.48805	1.00	.935		.718	.846	.697
	Third	6	4.0000	1.09545	7.63	.763	.718		.589	1.00
	Fourth	8	3.6250	1.40789	.874	.774	.846	.589		.560
	Fifth	8	4.0000	1.06904	.750	.743	.697	1.00	.560	
ATGS 2	Kindergarten	4	4.5000	.57735		.542	.623	.756	.623	.223
	First	10	4.2000	.91094	.542		.899	.756	.899	.411
	Second	8	4.2500	1.03510	.623	.899		.852	1.00	.369
	Third	6	4.3333	.51640	.756	.756	.852		.852	.310
	Fourth	8	4.2500	.46291	.623	.899	1.00	.852		.369
	Fifth	8	3.8750	.99103	.223	.411	.369	.310	.369	
ATGS 3	Kindergarten	4	4.2500	.95743		.538	.619	.601	.250	.409
	First	10	3.8000	1.30247	.538		.163	.958	.468	.764
	Second	8	4.6250	.51755	.619	.163		.238	**.048**	.110
	Third	6	3.8333	1.47196	.601	.958	.238		.492	.754
	Fourth	8	3.3750	1.18773	.250	.468	**.048**	.492		.685
	Fifth	8	3.6250	1.30247	.409	.764	.110	.754	.685	
ATGS 4	Kindergarten	4	4.5000	.57735		.863	.676	.430	.532	.405
	First	10	4.4000	.96609	.863		.452	.430	.554	.390
	Second	8	4.7500	.46291	.676	.452		.161	.205	.130
	Third	6	4.0000	1.26491	.430	.430	.161		.813	1.00
	Fourth	8	4.1250	.83452	.532	.554	.205	.813		.798
	Fifth	8	4.0000	1.30931	.405	.390	.130	1.00	.798	
ATGS 5	Kindergarten	4	3.2500	.95743		.220	.598	.320	1.00	1.00
	First	10	4.1000	.99443	.220		.391	.868	.128	.128
	Second	8	3.6250	1.18773	.598	.391		.551	.519	.519
	Third	6	4.0000	1.09545	.320	.868	.551		.236	.236
	Fourth	8	3.2500	1.28174	1.00	.128	.519	.236		1.00
	Fifth	8	3.2500	1.28174	1.00	.128	.519	.236	1.00	
ATGS 6	Kindergarten	4	4.2500	.50000		.492	.507	.146	1.00	.507
	First	10	4.5000	.70711	.492		1.00	**.012**	.392	1.00
	Second	8	4.5000	.53452	.507	1.00		**.015**	.417	1.00
	Third	6	3.6667	.81650	.146	**.012**	**.015**		.084	**.015**
	Fourth	8	4.2500	.46291	1.00	.392	.417	.084		.417
	Fifth	8	4.5000	.53452	.507	1.00	1.00	**.015**	.417	

ATGS 7	Kindergarten	4	4.5000	.57735		.838	.805	.216	1.00	.622
	First	10	4.4000	.96609	.838		.567	.189	.799	.374
	Second	8	4.6250	.51755	.805	.567		.082	.762	.762
	Third	6	3.8333	1.47196	.216	.189	.082		.141	**.046**
	Fourth	8	4.5000	.46291	1.00	.799	.762	.141		.546
	Fifth	8	4.7500	.46291	.622	.374	.762	**.046**	.546	
ATGS 8	Kindergarten	4	2.7500	.95743		.624	.312	.915	.735	.612
	First	10	2.4000	1.26491	.624		.485	.668	.297	.965
	Second	8	2.0000	1.06904	.312	.485		.309	.103	.534
	Third	6	2.6667	1.21106	.915	.668	.309		.609	.654
	Fourth	8	3.0000	1.30931	.735	.297	.103	.609		.303
	Fifth	8	2.3750	1.18773	.612	.965	.534	.654	.303	
ATGS 9	Kindergarten	4	3.2500	1.70783		.709	.473	.733	.473	.590
	First	10	3.5000	1.17851	.709		.642	.395	.642	.816
	Second	8	3.7500	.70711	.473	.642		.225	1.00	.825
	Third	6	3.0000	1.26491	.733	.395	.225		.225	.310
	Fourth	8	3.7500	1.16496	.473	.642	1.00	.225		.825
	Fifth	8	3.6250	.91613	.590	.816	.825	.310	.825	
ATGS 10	Kindergarten	4	3.7500	.95743		.567	.692	.900	.553	.430
	First	10	3.7500	1.26491	.567		.838	.617	.959	.759
	Second	8	3.5000	.75593	.692	.838		.765	.808	.628
	Third	6	3.6667	.81650	.900	.617	.765		.601	.456
	Fourth	8	3.3750	.91613	.553	.959	.808	.601		.808
	Fifth	8	3.2500	1.16496	.430	.759	.628	.456	.808	
ATGS 11	Kindergarten	4	4.0000	1.41421		.695	.636	1.00	.813	.479
	First	10	4.2000	.78881	.695		.903	.654	.428	.669
	Second	8	4.2500	.46291	.636	.903		.592	.386	.772
	Third	6	4.0000	1.09545	1.00	.654	.592		.788	.422
	Fourth	8	3.8750	.99103	.813	.428	.386	.788		.250
	Fifth	8	4.3750	.51755	.479	.669	.772	.422	.250	
ATGS 12	Kindergarten	4	4.0000	.81650		.738	.545	.309	.315	.229
	First	10	3.8000	1.13529	.738		.715	.373	.377	.255
	Second	8	3.6250	.51755	.545	.715		.593	.621	.459
	Third	6	3.3333	1.03280	.309	.373	.593		.939	.878
	Fourth	8	3.3750	1.30247	.315	.377	.621	.939		.804
	Fifth	8	3.2500	.88641	.229	.255	.459	.878	.804	
ATGS 13	Kindergarten	4	4.0000	.81650		.300	**.024**	.496	.111	.053
	First	10	3.3000	1.15950	.300		.092	.733	.431	.214
	Second	8	2.3750	1.18773	**.024**	.092		.072	.380	.660
	Third	6	3.5000	.83666	.496	.733	.072		.311	.159
	Fourth	8	2.8750	1.24642	.111	.431	.380	.311		.660
	Fifth	8	2.6250	1.18773	.053	.214	.660	.159	.660	

ATGS 14	Kindergarten	4	2.0000	.81650		.769	.723	.266	.859	.859
	First	10	2.2000	1.54919	.769		.412	.290	.891	.553
	Second	8	1.7500	.70711	.723	.412		.087	.516	.828
	Third	6	2.8333	1.32916	.266	.290	.087		.259	.129
	Fourth	8	2.1250	1.24642	.859	.891	.516	.259		.664
	Fifth	8	1.8750	.64087	.859	.553	.828	.129	.664	
ATGS 15	Kindergarten	4	1.2500	.50000		.370	.336	.174	.097	.059
	First	10	1.7000	.67495	.370		.901	.493	.292	.175
	Second	8	1.7500	1.03510	.336	.901		.584	.377	.240
	Third	6	2.0000	1.09545	.174	.493	.584		.784	.584
	Fourth	8	2.1250	.83452	.097	.292	.377	.784		.767
	Fifth	8	2.2500	.70711	.059	.175	.240	.584	.767	
ATGS 16	Kindergarten	4	3.5000	1.73205		.667	.862	.826	1.00	1.00
	First	10	3.2000	1.03280	.667		.448	.826	.591	.591
	Second	8	3.6250	1.18773	.862	.448		.646	.832	.832
	Third	6	3.3333	1.03280	.826	.826	.646		.793	.793
	Fourth	8	3.5000	.92582	1.00	.591	.832	.793		1.00
	Fifth	8	3.5000	1.30931	1.00	.591	.832	.793	1.00	
ATGS 17	Kindergarten	4	4.5000	1.00000		.495	.536	.299	.220	.680
	First	10	4.9000	.31623	.495		.104	**.042**	**.018**	.171
	Second	8	4.1250	1.12599	.536	.104		.585	.450	.800
	Third	6	3.8333	.98319	.299	**.042**	.585		.876	.437
	Fourth	8	3.7500	1.28174	.220	**.018**	.450	.876		.315
	Fifth	8	4.2500	1.03510	.680	.171	.800	.437	.315	
ATGS 18	Kindergarten	4	2.7500	.95743		.827	.085	.320	.860	.483
	First	10	2.9000	.99443	.827		.051	.320	.618	.242
	Second	8	4.0000	1.41421	.085	.051		.427	**.022**	**.004**
	Third	6	3.5000	1.22474	.320	.320	.427		.168	.052
	Fourth	8	2.6250	.91613	.860	.618	**.022**	.168		.519
	Fifth	8	2.2500	1.28174	.483	.242	**.004**	.052	.519	
ATGS 19	Kindergarten	4	2.7500	.95743		.707	.717	.567	.209	.717
	First	10	3.0000	1.33333	.707		1.00	.774	.246	.352
	Second	8	3.0000	1.06904	.717	1.00		.784	.270	.377
	Third	6	3.1667	1.32916	.567	.774	.784		.452	.276
	Fourth	8	3.6250	.51755	.209	.246	.270	.452		.051
	Fifth	8	2.5000	1.19523	.717	.352	.377	.276	.051	
ATGS 20	Kindergarten	4	2.5000	1.29099		.230	.532	.792	.676	.215
	First	10	1.8000	1.22927	.230		.485	.294	.335	.914
	Second	8	2.1250	.99103	.532	.485		.693	.798	.445
	Third	6	2.3333	1.03280	.792	.294	.693		.875	.273
	Fourth	8	2.2500	.70711	.676	.335	.798	.875		.309
	Fifth	8	1.7500	.46291	.215	.914	.445	.273	.309	

ATGS 21	Kindergarten	4	3.0000	.81650		.096	.075	.390	.259	.259
	First	10	2.1000	.87560	.096		.814	.390	.519	.519
	Second	8	2.0000	.53452	.075	.814		.305	.405	.405
	Third	6	2.5000	1.22474	.390	.390	.305		.796	.796
	Fourth	8	2.3750	1.06066	.259	.519	.405	.796		1.00
	Fifth	8	2.3750	.74402	.259	.519	.405	.796	1.00	
ATGS 22	Kindergarten	4	3.5000	.57735		.869	1.00	.801	.842	.552
	First	10	3.6000	1.26491	.869		.837	.900	.959	.332
	Second	8	3.5000	.75593	1.00	.837		.764	.808	.466
	Third	6	3.6667	.81650	.801	.900	.764		.940	.331
	Fourth	8	3.6250	.51755	.842	.959	.808	.940		.333
	Fifth	8	3.1250	1.45774	.552	.332	.466	.331	.333	
ATGS 23	Kindergarten	4	2.5000	1.00000		.102	.138	.209	.085	.138
	First	10	1.7000	.67495	.102		.897	.751	.846	.897
	Second	8	1.7500	.70711	.138	.897		.850	.759	1.00
	Third	6	1.8333	1.16905	.209	.751	.850		.636	.850
	Fourth	8	1.6250	.74402	.085	.846	.759	.636		.759
	Fifth	8	1.7500	.70711	.138	.897	1.00	.850	.759	
ATGS 24	Kindergarten	4	1.7500	.50000		.389	1.00	.307	.816	.487
	First	10	2.2000	1.13529	.389		.284	.769	.437	.857
	Second	8	1.7500	.70711	1.00	.284		.223	.776	.395
	Third	6	2.3333	1.03280	.307	.769	.223		.337	.661
	Fourth	8	1.8750	.35355	.816	.437	.776	.337		.570
	Fifth	8	2.1250	.99103	.487	.857	.395	.661	.570	
ATGS 25	Kindergarten	4	2.2500	.50000		.444	.220	.696	.306	1.00
	First	10	2.7000	1.25167	.444		.524	.696	.710	.341
	Second	8	3.0000	.75593	.220	.524		.352	.801	.135
	Third	6	2.5000	.83666	.696	.696	.352		.484	.640
	Fourth	8	2.8750	1.12599	.306	.710	.801	.484		.211
	Fifth	8	2.2500	.88641	1.00	.341	.135	.640	.211	
ATGS 26	Kindergarten	4	2.0000	1.41421		.156	**.043**	.130	.089	.089
	First	10	3.0000	1.24722	.156		.372	.784	.654	.654
	Second	8	3.5000	1.06904	**.043**	.372		.600	.671	.671
	Third	6	3.1667	.98319	.130	.784	.600		.896	.896
	Fourth	8	3.2500	.88641	.089	.654	.671	.896		1.00
	Fifth	8	3.2500	1.38873	.089	.654	.671	.896	1.00	
ATGS 27	Kindergarten	4	2.7500	1.50000		.937	.565	.903	.848	.340
	First	10	2.8000	1.03280	.937		.401	.808	.729	.185
	Second	8	2.3750	.91613	.565	.401		.612	.638	.638
	Third	6	2.6667	1.03280	.903	.808	.612		.942	.348
	Fourth	8	2.6250	.91613	.848	.729	.638	.942		.349
	Fifth	8	2.1250	1.12599	.340	.185	.638	.348	.349	

ATGS 28	Kindergarten	4	3.5000	1.00000		.373	.829	.585	.518	.284
	First	10	4.0000	1.05409	.373		.405	.733	.780	**.016**
	Second	8	3.6250	1.06066	.829	.405		.683	.597	.118
	Third	6	3.8333	.75277	.585	.733	.683		.935	.066
	Fourth	8	3.8750	.64087	.518	.780	.597	.935		**.040**
	Fifth	8	2.8750	.99103	.284	**.016**	.118	.066	**.040**	
ATGS 29	Kindergarten	4	3.2500	.95743		.936	.846	.724	.846	.335
	First	10	3.3000	1.25167	.936		.881	.604	.726	.254
	Second	8	3.3750	.91613	.846	.881		.533	.635	.345
	Third	6	3.0000	1.00000	.724	.604	.533		.835	.151
	Fourth	8	3.1250	.99103	.846	.726	.635	.835		.160
	Fifth	8	3.8750	.99103	.335	.254	.345	.151	.160	
ATGS 30	Kindergarten	4	2.5000	1.00000		.855	.381	.781	.660	.381
	First	10	2.4000	.84327	.855		.178	.578	.733	.366
	Second	8	3.0000	.92582	.381	.178		.507	.112	**.036**
	Third	6	2.6667	.81650	.781	.578	.507		.407	.188
	Fourth	8	2.2500	.88641	.660	.733	.112	.407		.590
	Fifth	8	2.0000	1.06904	.381	.366	**.036**	.188	.590	
ATGS 31	Kindergarten	4	3.0000	1.15470		.762	.715	1.00	.855	.855
	First	10	3.0000	1.13529	.762		.925	.729	.888	.888
	Second	8	3.2500	1.03510	.715	.925		.679	.823	.823
	Third	6	3.0000	.89443	1.00	.729	.679		.836	.836
	Fourth	8	3.1250	1.12599	.855	.888	.823	.836		1.00
	Fifth	8	3.1250	1.24642	.855	.888	.823	.836	1.00	
ATGS 32	Kindergarten	4	2.7500	1.50000		.794	.530	.690	.834	1.00
	First	10	2.9000	.99443	.794		.626	.427	.552	.745
	Second	8	3.1250	.83452	.530	.626		.238	.307	.442
	Third	6	2.5000	.83666	.690	.427	.238		.812	.634
	Fourth	8	2.6250	.91613	.834	.552	.307	.812		.797
	Fifth	8	2.7500	.88641	1.00	.745	.442	.634	.797	
ATGS 33	Kindergarten	4	4.7500	.50000		**.019**	**.025**	.314	.217	.594
	First	10	3.1000	1.44914	**.019**		.963	.134	.160	**.023**
	Second	8	3.1250	1.24642	**.025**	.963		.163	.196	**.034**
	Third	6	4.0000	1.09545	.314	.134	.163		.840	.546
	Fourth	8	3.8750	1.24642	.217	.160	.196	.840		.385
	Fifth	8	4.3750	.51755	.594	**.023**	**.034**	.546	.385	
ATGS 34	Kindergarten	4	3.2500	.95743		.122	.823	.888	.656	.656
	First	10	4.1000	.99443	.122		**.029**	.054	.172	.172
	Second	8	3.1250	.99103	.823	**.029**		.933	.414	.414
	Third	6	3.1667	.98319	.888	.054	.933		.501	.501
	Fourth	8	3.5000	.75593	.656	.172	.414	.501		1.00
	Fifth	8	3.5000	.75593	.656	.172	.414	.501	1.00	

ATGS 35	Kindergarten	4	4.2500	.50000		.888	1.00	.829	.733	.733
	First	10	4.2000	.78881	.888		.860	.914	.539	.792
	Second	8	4.2500	.46291	1.00	.860		.797	.677	.677
	Third	6	4.1667	.40825	.829	.914	.797		.520	.897
	Fourth	8	4.3750	.74402	.733	.539	.677	.520		.406
	Fifth	8	4.1250	.35355	.733	.792	.677	897	406	
ATGS 36	Kindergarten	4	3.5000	1.91485		.109	.694	.217	.432	.173
	First	10	4.5000	.70711	.109		.133	.755	.312	.799
	Second	8	3.7500	.70711	.694	.133		.300	.630	.232
	Third	6	4.3333	.51640	.217	.755	.300		.552	.941
	Fourth	8	4.0000	1.41421	.432	.312	.630	.552		.470
	Fifth	8	4.3750	.91613	.173	.799	.232	.941	.470	
ATGS 37	Kindergarten	4	3.0000	1.15470		.261	.558	.325	.436	.696
	First	10	3.7000	1.05935	.261		.512	.951	.686	.366
	Second	8	3.3750	1.06066	.558	.512		.605	.811	.811
	Third	6	3.6667	1.03280	.325	.951	.605		.767	.461
	Fourth	8	3.5000	.92582	.436	.686	.811	.767		.632
	Fifth	8	3.2500	1.03510	.696	.366	.811	.461	.632	
ATGS 38	Kindergarten	4	4.0000	.00000		.734	1.00	1.00	.414	.682
	First	10	4.1000	.31623	.734		.672	.697	.144	.916
	Second	8	4.0000	.53452	1.00	.672		1.00	.318	.616
	Third	6	4.0000	.63246	1.00	.697	1.00		.355	.642
	Fourth	8	3.7500	.46291	.414	.144	.318	.355		.137
	Fifth	8	4.1250	.64087	.682	.916	.616	.642	.137	
ATGS 39	Kindergarten	4	4.2500	.50000		.586	.431	.618	.599	.431
	First	10	4.0000	1.05409	.586		.734	1.00	1.00	.734
	Second	8	3.8750	.83452	.431	.734		.765	.747	1.00
	Third	6	4.0000	.00000	.618	1.00	.765		1.00	.765
	Fourth	8	4.0000	.53452	.599	1.00	.747	1.00		.747
	Fifth	8	3.8750	.83452	.431	.734	1.00	.765	.747	
ATGS 40	Kindergarten	4	4.7500	.50000		.474	.089	**.023**	.142	.458
	First	10	4.4000	.69921	.474		.184	**.040**	.309	.949
	Second	8	3.8750	.83452	.089	.184		.401	.761	.229
	Third	6	3.5000	.83666	**.023**	**.040**	.401		.265	.055
	Fourth	8	4.0000	.75593	.142	.309	.761	.265		.365
	Fifth	8	4.3750	1.06066	.458	.949	.229	.055	.365	
ATGS 41	Kindergarten	4	3.2500	1.25831		.621	.308	.914	.308	.495
	First	10	3.6000	1.42984	.621		.482	.484	.482	.791
	Second	8	4.0000	.75593	.308	.482		.201	1.00	.676
	Third	6	3.1667	1.32916	.914	.484	.201		.201	.368
	Fourth	8	4.0000	1.06904	.308	.482	1.00	.201		.676
	Fifth	8	3.7500	1.16496	.495	.791	.676	.368	.676	

ATGS 42	Kindergarten	4	3.7500	1.89297		.797	.535	.896	.409	.409
	First	10	3.9000	.87560	.797		.631	.896	.169	.455
	Second	8	4.1250	.99103	.535	.631		.584	.082	.800
	Third	6	3.8333	.98319	.896	.896	.584		.276	.435
	Fourth	8	3.2500	.70711	.409	.169	.082	.276		**.048**
	Fifth	8	4.2500	.70711	.409	.455	.800	.435	**.048**	
ATGS 43	Kindergarten	4	2.0000	.00000		.049	.418	.155	.148	.259
	First	10	3.5000	1.35401	.049		.147	.607	.529	.297
	Second	8	2.6250	1.18773	.418	.147		.426	.427	.690
	Third	6	2.0000	1.16905	.155	.607	.426		.951	.667
	Fourth	8	3.1250	.99103	.148	.529	.427	.951		.690
	Fifth	8	2.8750	1.64208	.259	.297	.690	.667	.690	
ATGS 44	Kindergarten	4	3.7500	1.25831		.834	.182	.594	.613	.400
	First	10	3.6000	1.17379	.834		.144	.669	.695	.409
	Second	8	2.7500	.88641	.182	.144		.374	.304	.536
	Third	6	3.3333	1.03280	.594	.669	.374		.949	.750
	Fourth	8	3.3750	1.18773	.613	.695	.304	.949		.679
	Fifth	8	3.1250	1.55265	.400	.409	.536	.750	.679	
ATGS 45	Kindergarten	4	4.2500	.50000		.340	1.00	.235	.296	.098
	First	10	3.7000	1.05935	.340		.236	.690	.870	.331
	Second	8	4.2500	.46291	1.00	.236		.157	.202	**.045**
	Third	6	3.5000	1.04881	.235	.690	.157		.811	.633
	Fourth	8	3.6250	.74402	.296	.870	.202	.811		.441
	Fifth	8	3.2500	1.38873	.098	.331	**.045**	.633	.441	
ATGS 46	Kindergarten	4	3.0000	.81650		.481	.290	.590	.141	.290
	First	10	3.4000	1.07497	.481		.621	.893	.299	.621
	Second	8	3.6250	.91613	.290	.621		.573	.602	1.00
	Third	6	3.3333	1.03280	.590	.893	.573		.298	.573
	Fourth	8	3.8750	.83452	.141	.299	.602	.298		.602
	Fifth	8	3.6250	.91613	.290	.621	1.00	.573	.602	
ATGS 47	Kindergarten	4	3.7500	1.25831		.938	.709	.723	.353	.456
	First	10	3.8000	1.22927	.938		.563	.723	.197	.292
	Second	8	3.5000	1.06904	.709	.563		.399	.494	.648
	Third	6	4.0000	.63246	.723	.723	.399		.144	.208
	Fourth	8	3.1250	.99103	.353	.197	.494	.144		.819
	Fifth	8	3.2500	1.16496	.456	.292	.648	.208	.819	
ATGS 48	Kindergarten	4	3.5000	1.29099		.538	.577	.814	.577	1.00
	First	10	3.9000	.87560	.538		.141	.320	.141	.443
	Second	8	3.1250	1.12599	.577	.141		.725	1.00	.495
	Third	6	3.3333	1.03280	.814	.320	.725		.725	.778
	Fourth	8	3.1250	.99103	.577	.141	1.00	.725		.495
	Fifth	8	3.5000	1.30931	1.00	.443	.495	.778	.495	

ATGS 49	Kindergarten	4	2.7500	1.25831		.670	.837	.516	1.00	.837
	First	10	3.0000	1.05409	.670		.427	.745	.596	.427
	Second	8	2.6250	.91613	.837	.427		.315	.801	1.00
	Third	6	3.1667	.98319	.516	.745	.315		.438	.315
	Fourth	8	2.7500	.70711	1.00	.596	.801	.438		.801
	Fifth	8	2.6250	1.06066	.837	.427	1.00	.315	.801	
ATGS 50	Kindergarten	4	5.0000	.00000		.109	.194	.103	**.005**	.328
	First	10	4.4000	.69921	.109		.735	.835	.081	.447
	Second	8	4.5000	.53452	.194	.735		.620	**.050**	688
	Third	6	4.3333	.51640	.103	.835	.620		.177	.387
	Fourth	8	3.8750	.64087	**.005**	.081	**.050**	.177		**.020**
	Fifth	8	4.6250	.74402	.328	.447	.688	.387	**.020**	
ATGS 51	Kindergarten	4	4.2500	.50000		.354	.863	.233	.389	.063
	First	10	3.6000	1.26491	.354		.351	.662	.964	.200
	Second	8	4.1250	1.12599	.863	.351		.218	.398	**.039**
	Third	6	3.3333	1.03280	.233	.662	.218		.647	.473
	Fourth	8	3.6250	.91613	.389	.964	.398	.647		.208
	Fifth	8	2.8750	1.55265	.063	.200	**.039**	.473	.208	
ATGS 52	Kindergarten	4	2.2500	.50000		.612	.600	.740	.861	.485
	First	10	2.6000	1.34990	.612		.964	.868	.392	.786
	Second	8	2.6250	1.50594	.600	.964		.843	.393	.830
	Third	6	2.5000	.83666	.740	.868	.843		.552	.691
	Fourth	8	2.1250	.83452	.861	.392	.393	.552		.287
	Fifth	8	2.7500	1.16496	.485	.786	.830	.691	.287	
ATGS 53	Kindergarten	4	4.7500	.50000		.655	.155	.495	**.036**	.719
	First	10	4.6000	.51640	.655		.197	.733	**.030**	.926
	Second	8	4.2500	.70711	.155	.197		.416	.380	.190
	Third	6	4.5000	.54772	.495	.733	.416		.108	.683
	Fourth	8	4.0000	.53452	**.036**	**.030**	.380	.108		**.032**
	Fifth	8	4.6250	.51755	.719	.926	.190	.683	**.032**	
ATGS 54	Kindergarten	4	4.5000	.57735		.247	.221	.268	.163	.118
	First	10	3.7000	1.41814	.247		.891	.956	.716	.555
	Second	8	3.6250	.74402	.221	.891		.947	.829	.666
	Third	6	3.6667	.81650	.268	.956	.947		.790	.641
	Fourth	8	3.5000	1.06904	.163	.716	.829	.790		.829
	Fifth	8	3.3750	1.50594	.118	.555	.666	.641	.829	
ATGS 55	Kindergarten	4	4.2500	.50000		.116	.608	.626	.307	.797
	First	10	3.5000	1.08012	.116		.189	.227	.508	.103
	Second	8	4.0000	.75593	.608	.189		1.00	.530	.753
	Third	6	4.0000	.00000	.626	.227	1.00		.561	.771
	Fourth	8	3.7500	.88641	.307	.508	.530	.561		.348
	Fifth	8	4.1250	.64087	.797	.103	.753	.771	.348	

ATGS 56	Kindergarten	4	4.2500	.95743		.052	.130	.715	.060	.253
	First	10	3.0000	1.33333	.052		.620	.074	1.00	.324
	Second	8	3.2500	1.16496	.130	.620		.196	.638	.638
	Third	6	4.0000	.00000	.715	.074	.196		.087	.385
	Fourth	8	3.0000	1.06904	.060	1.00	.638	.087		.349
	Fifth	8	3.5000	.92582	.253	.324	.638	.385	.349	
ATGS 57	Kindergarten	4	4.0000	.81650		.838	.621	.532	.459	.459
	First	10	4.1000	.99443	.838		.373	.312	.229	.229
	Second	8	3.7500	.70711	.621	.373		.852	.762	.762
	Third	6	3.6667	.51640	.532	.312	.852		.925	.925
	Fourth	8	3.6250	.91613	.459	.229	.762	.925		1.00
	Fifth	8	3.6250	.74402	.459	.229	.762	.925	1.00	
ATGS 58	Kindergarten	4	3.7500	.95743		.124	**.019**	**.021**	.188	.126
	First	10	2.9000	.87560	.124		.233	.237	.819	.954
	Second	8	2.3750	.74402	**.019**	.233		.933	.179	.281
	Third	6	2.3333	.81650	**.021**	.237	.933		.185	.279
	Fourth	8	3.0000	.92582	.188	.819	.179	.185		.786
	Fifth	8	2.8750	1.12599	.126	.954	.281	.279	.786	
ATGS 59	Kindergarten	4	4.0000	.81650		.094	**.010**	.300	**.045**	**.017**
	First	10	3.0000	1.05409	.094		.188	.515	.595	.290
	Second	8	2.3750	.74402	**.010**	.188		.079	.450	.801
	Third	6	3.3333	1.21106	.300	.515	.079		.279	.125
	Fourth	8	2.7500	1.03510	**.045**	.595	.450	.279		.614
	Fifth	8	2.5000	.92582	**.017**	.290	.801	.125	.614	
ATGS 60	Kindergarten	4	5.0000	.00000		.174	.272	**.041**	1.00	1.00
	First	10	4.7000	.48305	.174		.775	.297	.092	.092
	Second	8	4.7500	.46291	.272	.775		.214	.180	.180
	Third	6	4.5000	.54772	**.041**	.297	.214		**.016**	**.016**
	Fourth	8	5.0000	.00000	1.00	.092	.180	**.016**		1.00
	Fifth	8	5.0000	.00000	1.00	.092	.180	**.016**	1.00	

Appendix J

Means and Standard Deviations of Responses to the Classroom Practices Items for Gifted and Average Students

Classroom Practices Item	Gifted		Average		Difference[1]	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
1. Use basic skills worksheets	4.74	0.98	4.89	0.83	-0.14	0.49
2. Use enrichment worksheets	3.94	1.21	3.57	1.27	0.37	0.69
3. Assign advanced level reading	3.71	1.47	2.51	1.29	1.20	1.39
4. Use self-instructional kits	1.29	0.71	1.29	0.71	0.00	0.00
5. Assign reports	1.89	0.72	1.86	0.69	0.03	0.17
6. Assign projects	1.77	0.69	1.77	0.73	0.00	0.24
7. Assign book reports	1.57	0.56	1.60	0.55	-0.03	0.17
8. Use puzzles or word searches	3.37	0.91	3.34	0.97	0.03	0.38
9. Creative writing: teacher's topic	3.43	0.78	3.37	0.81	0.06	0.34
10. Creative writing: student's topic	2.54	1.01	2.37	1.03	0.17	0.51
11. Time for self-selecte interests	3.29	1.45	3.17	1.42	0.11	0.47
12. Pretests to determine mastery	2.57	1.04	2.49	1.09	0.09	0.37
13. Eliminate material students master	2.77	1.44	2.57	1.36	0.20	0.53
14. Repeat difficult concepts for some	3.57	1.44	4.31	1.18	-0.74	1.42
15. Different work students mastering	2.80	1.32	2.40	1.38	0.40	0.69
16. Alternative instructional formats	3.69	1.41	3.77	1.31	-0.09	0.70
17. Work in locations other than class	3.74	1.31	3.69	1.32	0.06	0.34
18. Various locations around classroom	2.09	1.40	2.00	1.31	0.09	0.28
19. Different homework based on ability	2.00	1.57	1.94	1.45	0.06	0.54
20. Use learning centers for basic skills	3.06	1.55	3.09	1.56	-0.03	0.17
21. Use enrichment centers	2.49	1.69	2.46	1.67	0.03	0.17
22. Thinking skills in regular curriculum	4.17	1.38	4.20	1.35	-0.03	0.17
23. Unit on thinking skills	2.17	1.58	2.14	1.58	0.03	0.30
24. Competitive thinking skills program	1.31	1.11	1.40	1.33	-0.09	0.92
25. Contracts for independent study	1.71	1.25	1.71	1.25	0.00	0.80
26. Time for independent study projects	2.26	1.42	2.06	1.41	0.20	0.53
27. Work from higher grade textbook	1.71	1.51	1.57	1.24	0.14	0.55
28. More advanced curriculum unit	1.97	1.53	1.88	1.43	0.09	0.38
29. Group by ability across classrooms	2.88	1.89	2.88	1.89	0.00	0.00
30. Higher grade for specific instruction	1.44	1.21	1.29	0.97	0.15	0.50
31. Establish interest groups	1.59	1.02	1.59	1.02	0.00	0.00
32. Student's opinion in allocating time	2.26	1.89	2.26	1.89	0.00	0.00
33. Programmed materials	2.71	1.51	2.65	1.50	0.06	0.24
34. Encourage long-range projects	1.71	0.94	1.59	0.92	0.12	0.41
35. Questions to encourage reasoning	4.18	1.38	4.12	1.41	0.06	0.24
36. Ask open-ended questions	4.53	1.13	4.53	1.11	0.00	0.25
37. Encourage highe3r-level questions	4.66	0.97	4.57	1.09	0.09	0.45
38. Encourage discussions	5.51	0.51	5.46	0.56	0.06	0.24
39. Use computers	4.63	0.69	4.51	0.74	0.11	0.32

[1] The difference score is calculated by subtracting the respondent's average score and the gifted score.

Means and standard deviations are calculated from these different scores. Difference scores are subject to

rounding error.

Appendix K: *Strategies Used in the General Education Classroom and Their Efficacy*

Frequency	Strategy	Research Support as Best Practice for Gifted
Established	Encouraging students to participate in discussions	Strong support
	Use of computers	No support
	Use of basic worksheets	No support
Persistent	Repeated instruction for difficult concepts	No support
	Modifying the instruction format (multi-modal)	No support
	Encouraging students to move around the classroom	No support
	Teaching thinking skills in the regular curriculum	Strong support
Occasional	Providing questions to encourage reasoning and logical thinking	Strong support
	Asking open-ended questions	Reasonable support
	Encouraging students to ask higher level questions	Reasonable support
	Enrichment worksheets	No support

(Appendix K Continues)

Appendix K (continued)

Limited	Assign reading of more advanced level work	Strong support
	Use activities such as puzzles or word searches	No support
	Give creative or expository writing assignments on topics selected by the teacher	Reasonable support
	Make time available for students to pursue self-selected interests.	Limited support
	Use pretests to determine if students have mastered the material covered in a particular unit or content area	Strong support
	Eliminate curricular material that students have mastered	Strong support
	Substitute different assignments for students who have mastered regular classroom work	Strong support
	Use learning centers to reinforce basic skills	No support
	Use enrichment centers	No support

(Appendix K Continues)

Appendix K (continued)

Limited	Group students by ability across classrooms at the same grade level	Strong support
	Consider students' opinion in allocating time for various subjects within your classroom	No support
	Use self-directed instructional kits such as S.R.A.	No support
	Assign reports	Limited support
	Assign projects or other work requiring extended time for students to complete	Reasonable support
	Assign book reports	No support
	Give creative or expository writing assignments on topics selected by the students	Reasonable support
	Allow students to leave the classroom to work in another location, such as the school library or media center	No support
	Assign different homework based on student ability	Strong support

(Appendix K Continues)

Appendix K (continued)

Limited	Teach a unit on a thinking skill, such as critical thinking or creative problem solving	Strong support
	Participate in a competitive program focusing on thinking skills/ problem solving, such as Future Problem Solving, Odyssey of the Mind, etc.	Strong support
	Use contracts or management plans to help students organize their independent study projects	Limited support
	Provide time within the school day for students to work on the independent study projects	Limited support
	Allow students within your classroom to work from a higher grade level textbook	Strong support
	Provide a different curricular experience by using a more advanced curriculum unit on a teacher-selected topic	Strong support

(Appendix K Continues)

Appendix K (continued)

Limited	Send students to a higher grade level for specific subject area instruction	Strong support
	Establish interest groups which enable students to pursue individual or small group interests	Limited support
	Consider students' opinion in allocating time for various subjects within your classroom	No support
	Give assignments that encourage students to organize their own work schedule to complete a long range project	No support

Vita

Birthdate: December 22, 1955

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2004 – 2008	The College of William and Mary Williamsburg, Virginia Ph.D. in Educational Policy, Planning, and Leadership
2002—2004	Ball State University Muncie, Indiana M.A. in Educational Psychology
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