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A comparative study of teaching critical thinking through persuasive writing to average, gifted and students with learning disabilities

Claire Elizabeth Hughes
William & Mary - School of Education

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A COMPARATIVE STUDY OF TEACHING CRITICAL THINKING THROUGH PERSUASIVE WRITING TO AVERAGE, GIFTED AND STUDENTS WITH LEARNING DISABILITIES

A Dissertation

Presented to

The Faculty of the School of Education

The College of William and Mary

In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Philosophy

By

Claire E. Hughes

April, 2000

A COMPARATIVE STUDY OF TEACHING CRITICAL THINKING THROUGH PERSUASIVE WRITING TO AVERAGE, GIFTED AND STUDENTS WITH LEARNING DISABILITIES

by Claire E. Hughes

Approved, April, 2000

Joyce VanTassel-Baska, Ed.D.
Chair of Dissertation Committee

Jill D. Burruss, Ph.D.

Lori Korinek, Ph.D

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ACKNOWLEDGMENTS

"Two roads diverged in a yellow wood... and I-

I took the one less traveled by, and that has made all the difference."

I find it particularly appropriate that this poem by Robert Frost would be in my dissertation because I had no idea where this journey of a doctorate was going to take me, six and a half years ago. I have walked the path with so many people who have left their imprint in my philosophies, my level of knowledge, my experiences, and my heart.

I would first like to thank the faculty at William and Mary, and in particular, my dissertation committee. Each member of the committee represented a different perspective, and the final product is the wonderful amalgam of a variety of voices. Dr. Lori Korinek was an advocate for students in special education, and the appropriateness of language that honored individuals. Dr. Jill Burruss was a font of knowledge on critical thinking and methodology. Critical thinking is, above all, a valuing of others' perspectives and an awareness of your own. All throughout my doctoral experience, I was fortunate to have such solid voices who pursued excellence.

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However, more than that, I have had the opportunity to interact with her in a variety of ways. It is from her that I learned that a passion for excellence extends to all aspects of your life.

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It helps students by telling them the road through life. It tells that he is wondering if he will ever see life as easy as it was as a child. It shows how the road has changed his life.

And the road goes on forever...

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ABSTRACT

This study examined the impact that a curriculum designed to teach critical thinking through persuasive writing had on gifted, average, and students with learning disabilities. The research addressed four questions. The first determined that there were initial differences in critical thinking abilities among fourth and fifth grade gifted, average and students with learning disabilities, as measured by performance on a persuasive writing task. Gifted students outscored average students who outscored students with learning disabilities.

The second question determined that after instruction, all ability groups significantly improved their overall writing scores when presented with a minimum of 20 hours of direct instruction in the reasoning elements of persuasive writing and when compared to a group of students of similar abilities. However, there were differences in the manner in which students of different groups improved. All students improved in their use of opinion statements. Gifted students also improved in elaboration; average students improved in all areas; and students with learning disabilities improved their use of opinion statements.

The third question determined differences between gifted students, average students, and students with learning disabilities in the opinion stances selected, the delineation of audience, and the types of reasons chosen. There were no initial differences between the ability groups in their use of positive or negative arguments. However, gifted students referred more to the moral or meaning of the poem, while students with learning disabilities referred more often to their reaction to the poem. Such differences remained consistent after instruction. Thus, while instruction was significant in the improvement of the structure of persuasive writing for students of all achievement levels, they improved in different ways.

Finally, teachers' use of critical thinking questions was a better predictor of student post-test scores than students' pre-test scores. The classrooms of teachers who implemented the curriculum over an intensive period of time showed more growth than those who implemented it over a longer, less intense period of time.

Implications from this study include the need to teach critical thinking to students at all achievement levels in an intensive, focused manner, recognizing that there will be differences in the ways that students grow.

CHAPTER ONE

Statement of the Problem

Introduction

Critical thinking has no consistent definition, is not actively encouraged in our culture, and has no comprehensive method of teaching (Cassel & Congleton, 1993), yet it has remained a consistent goal of educators over the last 20 years (Dominowski & Bourne, 1994). Even the very term is problematic. Johnson (1992) argues that "critical thinking" belongs in a "network of related terms" (p. 39), since it is alternately called associative thinking, concept formation, problem solving, creative production, reasoning, higher order thinking skills, intelligent behavior, and thinking in general, among other terms (Boyd, 1995; Burkhalter, 1993; Inch & Warnick, 1998; Paul, 1995). Such skills are sorely needed by all learners in our increasingly technological society, yet our educational system rarely rewards those students who challenge the "status quo" or argue with teachers and authority figures (Paul, 1995). However, in a 1989 survey, 47 of the 50 states stated that "critical thinking" was an explicit goal of their schools (Freeman, 1989a). Thus, there exist uneasy gaps between 1) the need to develop critical thinkers, 2) the definition and demonstration of critical thinking, and 3) the process of developing and assessing such skills in all learners.

Need for Critical Thinking

In 1985, the Association for Supervision and Curriculum Development (ASCD) passed fourteen resolutions that recognized that

> ... participation in a changing and increasingly complex society requires citizens to process large amounts of information, sometimes to change careers and jobs, to relate

> with high sensitivity to themes, and to operate effectively in ambiguous and unstructured situations. Such work demands thinking and thoughtful people. (p. 1)

Almost two decades later, students' inability to reason, make valid judgments and effectively solve problems has been found by numerous studies and panels, including the 1996 National Assessment of Educational Progress (USDOE/OERI, 1999a) study, the Third International Math and Science Study (USDOE/OERI, 1999b), and the Holmes Group report (1995). A 1995 examination of the California Assessment Program, an annual assessment that examines the language proficiency of California students, found that only 8.6% of students received a score above "adequate" on the persuasive writing prompt and 65% of students were unable to logically develop an argument and evaluate its effectiveness (Paul, 1995). These dismal findings are not limited to California. Results from the 1996 National Assessment of Educational Progress indicate that only 22% of fourth graders were able to write persuasively at a proficient level, and less than 1% of students were able to write above this level (USDOE/OERI, 1999a). Similarly, less than 1% of students were able to solve multi-step math problems and to determine reasonable solutions to real world problems involving multi-disciplinary issues (USDOE/OERI, 1999a), exercises that are judged to involve the use of critical thinking in their formulation and solution.

Yet, these reports are not comparable with student performance around the world. Comparisons between American and Asian students find that Asian students were better able to solve novel problems and evaluate viable options of action (Stevenson & Stigler, 1992). The recent Third International Math and Science Study (TIMSS) (USDOE/OERI, 1999b) found that students in other countries were better able to solve more complex, real-world types of problems than are students from the United States.

Norris (1992) asked the question "Does it make sense to have critical thinking as a goal for education?" (p. 3). The question is answered as he stated "...{critical thinking} is what many educators take to be one of the fundamental justifications for schooling- that the habits of mind and methods of thinking fostered by schooling transcends the specific content, much of what becomes obsolete" (p. 4). Yet, while schools in the United States consistently state that critical thinking is a goal, there is an assumption that the teaching of critical thinking skills will occur within the specific subject areas, and that higher-order thinking activities would implicitly occur after students had mastered basic skills (Freeman, 1989a). In contrast, the TIMSS study (USDOE/OERI, 1999b) found that Asian and European schools spent more time directly teaching evaluation and problem-solving skills to students than do American schools. Such definition of desired skills and the resultant teaching strategies that emerge from these definitions is almost certainly linked to the high quality of student performance (USDOE/OERI, 1999a; b).

This study explored those links between definition, teaching and student performance by: 1) selecting a particular definition of critical thinking, 2) operationalizing those skills through development of curriculum, 3) implementing curriculum that explicitly teaches these skills through the means of persuasive writing, and 4) examining the results of this instruction across a range of student achievement levels.

Conceptual Framework

The conceptual framework that shapes the manner in which critical thinking is being considered comes from a long history of trying to understand how people think, how the processes and levels of thinking can be identified, and how thinking skills might be taught and assessed. The definition and model on which this study is based is the Paul (1995) Model of Reasoning, which places critical thinking squarely in the center of needed education reform. The

model emphasized the need for students to examine the world around them, and understand it in a broad and unbiased manner. Paul defined reasoning as the process through which critical thinking occurs. In his definition, Paul (1995) defined critical thinking as:

> A unique kind of purposeful thinking in which the thinker systematically and habitually imposes criteria and intellectual standards upon the thinking, taking charge of the construction of thinking, guiding the construction of thinking according to standards, and assessing the effectiveness of the thinking according to the purpose, the criteria, and the standards (p. 21).

Thus, Paul placed considerable emphasis upon the need for thinkers to be aware of the quality, as well as the process of their thinking. Paul's definition of critical thinking was chosen as the foundation of this study for the following reasons:

First, based upon a review of the literature that may be found in Chapter Two, Paul's critical thinking model is considered highly influential in the field of critical thinking (Facione, 1990; Tsui, 1998; van Eemeren, Grootendorst & Henkemans, 1996) and is among the most comprehensive of the critical thinking models in the literature. His model integrates habits of mind, elements of reasoning, standards for reasoning, and reasoning abilities; thereby taking a perspective that includes the ability of the individual, the needs of society, and the nature of critical thinking.

Secondly, Paul incorporated an ethical component to his model that is missing in numerous other models. Since critical thinking demands that judgments and decisions be made (Paul, 1995; Lipman, 1991; Ennis, 1992), it is necessary that students consider the ramifications of their decisions from other perspectives. While some find "the aims of Paul to be overambitious" (van Eemeren, Grootendorst & Henkemans, 1996, p. 187), the emphasis on

responsibility represents an educational ideal and is one that addresses the role of the individual (Lipman, 1991).

Paul also represented a middle ground in the arena of critical thinking between assuming that reasoning skills can be taught completely in isolation (Lipman, 1991) and assuming that critical thinking must be taught only within a discipline and cannot transfer between disciplines (McPeck, 1981). Paul (1985) states that although reading and writing are content-driven- that is, one must read and write about something- they are teachable in isolation. If one can teach reading and writing and ask students to generalize those skills across domains, one can teach thinking skills in isolation and ask students to generalize those skills across domains.

Paul also represented a middle ground in the arena of critical thinking theorists through his assumption that critical thinking is a combination of skills that can be taught to students as well as dispositions within the individual that can be influenced. Whereas many theorists perceive critical thinking as a series of skills to be instructed (Beyer, 1987), and others perceive it strictly as a process deriving from the individual's ability (Nickerson, 1990; Seigel, 1988), Paul integrates the role of the ability of the individual with the teachable skills of critical thinking (Paul, 1995).

Finally, curriculum has been developed that uses the Paul model of reasoning as the foundation for the development of literary skills, including the teaching of persuasive writing (VanTassel-Baska, Johnson, & Boyce, 1994). Little curriculum exists that explicitly incorporates critical thinking skills with the direct instruction of persuasive writing skills (Burkhalter, 1995), and this direct link between developed curriculum and Paul's reasoning approach provides a valuable component to this study, since it seeks to examine the link between the teaching and learning of critical thinking.

Development and Assessment of Critical Thinking Skills

The process of teaching critical thinking is a debate that ranges from advocating that critical thinking not be taught until Grade 10 (McPeck, 1990), to advocating that it be taught at all grade levels, beginning with the primary ages and continuing through adulthood (Beyer, 1987). There is also a significant debate over whether to teach critical thinking skills in complete context (McPeck, 1990), or as isolated skills that can be transferred (Lipman, 1991), or through the use of a combinational approach (Sternberg, 1994).

There is some evidence to indicate that a combinational approach in which students receive direct instruction in critical thinking skills and the apply those skills to particular content does have a positive effect on students. A study of college students found that those who had received critical thinking instruction were better able to mount effective arguments through the use of reasoned content as well as effective structure (Wolfe, 1995). Lipman's (1991) Philosophy for Children Program, that emphasized the consequences of choices and decisions, found that students in the program significantly improved in reading, math, and general reasoning abilities (Lipman, 1991). Other studies have found that with instruction in the development of persuasive writing structure, students improved in their critical thinking abilities (Gillin, 1994).

Persuasive Writing and Critical Thinking

One of the most effective ways to teach critical thinking is through instruction in persuasive writing (Burkhalter, 1993; Inch & Warnick, 1998; Wade, 1995). The manner in which persuasive writing is structured requires students to reason, understand multiple perspectives, link concepts, and create alternatives to a problem, rather than merely analyze a

problem for its component parts (Inch & Warnick, 1998; van Eemeren, Grootendorst, & Henkemans, 1996). The link between persuasive writing and critical thinking is so strong because "the skills needed for persuasive writing are a subset of those involved in critical thinking" (Burkhalter, 1993, p. 3). Even the mere formulation of the structure of persuasive writing forces students to engage in entry-level critical thinking in order to develop the flow of the argument (Wolfe, 1995).

Paul's (1995) model of critical thinking correlates very well with the process of persuasive writing (Inch & Warnick, 1998). While typical rubrics of argumentation include the need to state an opinion, develop reasons for that opinion, and state a conclusion (Toulmin, 1958; Conner, 1990), Paul's (1995) reasoning model requires students to state a purpose, cite evidence and assumptions, and determine implications and consequences as a result of the evidence. See Table 1 for a visual representation of these similarities.

Table 1

Correspondence of Paul's Reasoning Model with Components of Persuasive Writing

Pauls' Critical Thinking Components	Persuasive Writing Elements
Issue	Definition of issue
Purpose, Concepts	Claim or opinion
Data	Reasons
Examination of Perspectives	Rebuttals
Inferences, Assumptions	Elaboration
Implications	Conclusions

Such correspondence between the model of reasoning and the process of developing a persuasive writing piece lend themselves very well to the ability to evaluate aspects of critical thinking through the examination of persuasive writing abilities.

Evaluating Critical Thinking

The examination of critical thinking through various measures remains a difficult task. While many tests that are called "critical thinking tests" are highly correlated and show evidence of measuring the same thing, there is little evidence to indicate that they are, in fact, measuring what practitioners in the field call "critical thinking" (Blatz, 1992). Practitioners tend to evaluate student thinking through student performance on tasks and assignments (Stiggins, Rubel & Quellmalz, 1988). Critical thinking measured as a pure construct determines a student's ability to transfer, or the ability to make expectations of reasoning explicit and consistent from one context to another (Blatz, 1992), whereas, critical thinking measured through a performance model allows students to express their reasoning ability in a familiar context in which they have the necessary background knowledge (Beyer, 1987).

There are two choices of measures available to assess the construct of critical thinking. These include 1) standardized tests that may lack construct validity; and 2) tests that are non-standardized and highly dependent upon context (Blatz, 1992). Standardized test information is limited (Linn, 1991) and numerous researchers have expressed dissatisfaction with the results of multiple-choice formats (Blatz, 1992; Kennedy, Fisher & Ennis, 1991; Linn, 1991). Authentic assessment allows a means of accessing the results of thinking that standardized tests often miss (Burger & Burger, 1994; Linn, 1991). Meyers (1986) notes that valid, authentic assessments for critical thinking include the development of skills, a focus on real problems and issues, and clear and unambiguous instructions.

Persuasive writing is a common, and frequently used vehicle for studying the development of students' thinking. In a study of information reasoning, Perkins, Farady and Bushey (1991) asked students to take a stance on an issue and write a persuasive piece about it. In a study of the relationship between persuasive writing and a standardized critical thinking test, a positive correlation was found (Wallace, 1992). Beyer (1987) claimed that essays in which students are asked to construct an argument are perhaps the most effective means of directly assessing students' critical thinking. These essays "will produce better assessment of student proficiency in thinking skills than most current practices" (p. 236). The use of persuasive writing as a means of evaluating critical thinking was bolstered by Scardamalia, Bereiter and Goelman's (1982) findings that writing quality is rarely affected by mechanical abilities. Conner (1990) also found that the quality of student's writing mechanics were not related to the quality of their persuasive pieces, while McCutcheon and Perfetti (1982) note that differences in writing ability are directly linked to developmental differences in students' metacogntive search strategies. When one examines the products of a persuasive writing piece, one is directly examining the results of the critical thinking process (Burkhalter, 1993; Inch & Warnick, 1998).

Individual Differences

There are developmental levels of expertise in persuasive writing and critical thinking abilities. According to Burkhalter (1993), there are two primary stumbling blocks in the progression from novice to expert in persuasive writing. These include: 1) the highly structured and abstract form of organization in persuasive writing that requires synthesis and hierarchical thinking; and 2) the issue of understanding the audience's perspectives and what counter positions the audience may posit. The novice writer often sticks to the "rules of spoken discourse" (p. 5), which is similar to the form of narrative writing. However, persuasive writing

requires that the writer anticipate the audience's response and present opposing positions to this unspoken response. Such manipulation of opposing viewpoints requires a sophisticated, or "expert" use of critical thought (Paul, 1996). The evidence of effective or ineffective manipulation of thought as expressed through writing is often linked with issues related to age (Poulsen, 1997), gender and race (USDOE/OERI, 1999), and to the diagnosis of disabilities and/or giftedness (Perkins, 1981).

According to Paul (1990), to cultivate critical thinking "one does not force students to think in sophisticated ways before they are ready... different students achieve different levels of understanding" (p. 452). Poulsen (1997) found that students in the third, fourth and fifth grades who were in the concrete operational stage of Piaget did not benefit significantly from instruction in persuasive writing, a finding reinforced by Farmer (1999) who determined that fourth grade students did not improve significantly on persuasive writing tasks when given instruction. Both recommended that students in elementary grades not be given instruction in persuasive writing because of their lack of developmental readiness. This ability to take multiple perspectives linked to development was also found in a study by Atkin (1983) where it was found that the ability to incorporate audience values and perspectives improved with age.

Gender and ethnic differences are also present in persuasive writing performances. Atkins (1983) found that at sixth grade, there were gender differences that emerged in students' ability to perceive multiple perspectives. These results were also found in the 1996 NAEP data (USDOE/OERI, 1999a) where females outscored males on writing tasks at the fourth, eighth, and twelfth grade levels. NAEP also found that racial differences were present at all three grade levels.

A study examining the critical thinking abilities across achievement tracks, as measured by a standardized critical thinking test, found a significant difference between high achievers and low achievers (Gillin, 1994). Often, because many gifted students have mastered the content at their grade level, programs for gifted students tend to focus on "higher order thinking skills" as a separate emphasis, ignoring the role of content and the discipline areas (Maker, 1996). In contrast, students with learning disabilities tend to perform best in classrooms where the thinking process has been scaffolded for them, they are given explicit instruction, and are asked to think critically within the context of a discipline (Pressley, et. al., 1996).

However, while gifted students have been found to be better writers in terms of fluency and use of metacognitive strategies (Schunk & Swartz, 1993), there is some evidence to indicate that gifted students may not reason better than their age peers in all respects. Perkins, Farady, and Bushey (1991) have found that IQ scores correlate with persuasiveness through the volume of reasons provided, but there is no correlation with the elaborateness of their arguments; Woodrum and Savage (1989) found that there were no differences between gifted students and students with learning disabilities on measures of deductive reasoning. Stanovich (1993) has proposed that a new type of learning disability, "dysrationality" be identified, indicating that reasoning is not defined by intelligence alone.

Teaching Persuasive Writing

Although critics indicate that students in intermediate elementary grades are not ready for the developmentally challenging activity of persuasive writing (Poulson, 1997; Farmer, 1999), Burkhalter (1995) found that both fourth grade students and sixth grade students improved in writing persuasive essays with instruction, although older students did out-perform younger students. Clark, Willihnganz, and O'Dell (1985) also found that brief (less than 10 hours) of

instruction had a positive impact on fourth grade students' tendency to use compromise in their writing, a strategy more likely to be favored by older students (Knudson, 1992).

A study of a language arts program that developed persuasive writing found that fourth and fifth grade gifted students improved significantly in their ability to state a position on a topic and formulate reasons to support that position (VanTassel-Baska, Johnson, Hughes & Boyce, 1996). In a study of writing strategies, Schunk and Swartz (1993) found that teaching gifted students a writing strategy and providing feedback on their progress "raises achievement outcomes and transfer" (p. 229). Similarly, in a study involving fourth and fifth grade students with learning disabilities, Sullivan, Mastropieri, and Scruggs (1995) found that students who were provided prompts and direct instruction improved more in their reasoning abilities than a group that was provided with only explanations and a group that was provided with no explanation nor prompting at all.

In order to develop the thinking abilities of students, the nature of the instruction in critical thinking should reflect the nature of the student (Halonen, 1995). The role of the teacher (Paris & Winograd, 1990), the questions employed during instruction (King, 1995), the content, process and products required of the students (Maker & Nielson, 1995) and the concepts within the curriculum (VanTassel-Baska, 1997) should be adapted to the characteristics of the student. However, it is unclear what differences, if any, exist between students of different abilities in their initial differences in reasoning abilities, or if there are different patterns in how they respond to instruction designed to improve their thinking skills.

Purpose and Research Questions

The purpose of this study is to examine the quantitative and qualitative differences in critical thinking that are exhibited between (1) gifted students, (2) average students and (3) students with learning disabilities on pre-, mid-point and post-test measures of persuasive writing after being provided instruction in persuasive writing that integrates Paul's (1995) model of critical thinking.

Specifically, this research addressed four questions:

1) Are there significant and/or important differences in critical thinking abilities among fourth and fifth grade gifted students, average students, and students with learning disabilities as measured by performance on a persuasive writing task?
2) Are there differential rates of growth in critical thinking abilities between fourth and fifth grade gifted students, average students, and students with learning disabilities, as measured by performance on a persuasive writing task, when presented with a minimum of 20 hours of direct instruction in the reasoning elements of persuasive writing and when compared to a group of students of similar abilities?
3) To what extent are there differences between gifted students, average students, and students with learning disabilities in the opinion stances selected, the delineation of audience, and the types of reasons chosen?
4) To what extent did teachers exhibit behaviors facilitative of student growth?

Synopsis of Methodology

The intervention curriculum was developed by incorporating specific learning strategies and direct instruction components into a persuasive writing curriculum previously developed for gifted students (Coleman, VanTassel-Baska, Johnson, & Hall, 1994). The curriculum was

piloted and amended, based on teacher feedback. Validity of the curriculum was determined by content expert analysis.

Data sources included student works, scores received by students, direct teacher observations and teacher self-reports through the use of curriculum logs. Student works were in response to the writing prompt, while students' scores were determined using an adapted scoring rubric of Toulmin's (1958) analysis of argument (Burkhalter, 1993). Reliability of the Toulmin scoring rubric was established through inter-rater and test-retest reliability. Validity of the scoring rubric measuring critical thinking was determined by content expert analysis. Teacher behaviors were determined using a Teacher Observation Scale, observation log notes, and the teacher report logs that responded to questions concerning implementation of the unit.

Data analysis was conducted at the level of the individual student in order to determine achievement impacts, as opposed to classroom impacts, in a manner similar to "traditional cognitive perspectives {that}focus on the individual as the basic unit of analysis" (Putnam & Borko, 2000, p. 4). The first two research questions were dependent upon quantitative analysis of students' persuasive writing pieces, while the third and fourth questions employed a mixed design of thematic analyses and quantitative measurements. Data analysis techniques included the use of repeated measures analysis of co-variance to determine significant differences between groups over time for the first two questions. The third question involved a series of statistical analyses, including chi-square analysis and McNemer tests for the analysis of positive and negative opinion stances; thematic analysis and grouping of types of arguments (Miles & Huberman, 1994) and repeated measures analysis of co-variance to determine changes in usage over time. Finally, the fourth question, examining teacher effects, employed a dominant-less dominant design using both quantitative and qualitative data. Scores derived from the Teacher

Observation form were determined and two sets of regressions were run. The first was run to predict the effect of pre-test scores and teacher behaviors on the post-test score, and the second to predict the effect of teacher behaviors on the growth of a student, or the difference between the pre-test and post-test scores. Qualitatively, teacher behaviors were determined and described through analysis of the themes and concepts found in the observations conducted by the researcher and the self-report logs of the teachers (Miles & Huberman, 1994).

Context for the Research

This study builds upon national research conducted by the Center for Gifted Education at the College of William and Mary that used gifted students as the primary audience for the development of specially-designed standards-based curriculum. With the advent of national standards and state testing programs, there is a significant need at the division level to understand the effects of curriculum on a variety of students. The researcher was an administrator in a school division that was exploring ways to boost writing scores, and the curriculum was in response to the needs of the division. As a result, the students who were intended as the recipients of the curriculum were primarily urban and highly diverse in racial makeup, and in achievement ability. Teachers had taught for at least two years, and tended to be white females.

Significance of the Study

This study adds to the literature of gifted education, special education and critical thinking in three significant ways. First, this study determined if students of the same age, but different ability and achievement levels benefited significantly from the same curricular intervention. According to Swanson, Hoskyn, & Lee (1999) there are very few studies that conduct an intervention study using both students who achieve outside the norm and normally achieving peers. As schools increasingly move towards inclusive and heterogeneous grouping

patterns (Friend & Cook, 1996), the effects of the same curriculum upon different types of students are critical to know. As Paris and Winograd (1990) reminded us, "We must pay careful attention to the conditional applicability of the various instructional approaches in our repertoire. It is unreasonable to assume that one instructional technique can be used with equal effectiveness ... for all kinds of students" (p. 42).

Secondly, the results of this study may add to the argument expounded by many educators that calls for different interventions based on differences in learning ability. Both gifted educators and special educators have consistently recommended that exceptional students be provided materials and differentiated strategies that are appropriate to their learning needs. As schools strive to develop the critical thinking abilities of all students, this study shed light on the differential outcome expectations in persuasive writing that might be appropriate for different groups of students.

Finally, the results of the study have implications for future curriculum development of critical thinking and writing tasks. As curriculum developers examine their target audiences, information about the learning rates and qualitative differences among students of different abilities becomes very important in formulating educational programs, lessons, and teacher preparation programs. Since the development of critical thinking is a goal stated by numerous school divisions, the extent to which students of different abilities who are exposed to the same curriculum can 1) develop such skills and 2) demonstrate them through a means such as persuasive writing, becomes an issue in programming and curricular decisions.

Definition of Terms

The terms below are used extensively throughout this study. Instruments that define, operationalize, and measure some of these terms are described in Chapter Three.

Average student. The average student is one who is not labeled as having significant needs that cannot be met within the general education classroom context and materials (Gallagher & Gallagher, 1994; Turnbull, Turnbull, Shank, & Leal, 2000). The average students in this study have achievement scores between the fourth and seventh stanines on the verbal section of a nationally-normed test.

Conclusions. Conclusions are the final statements of a persuasive piece of writing and reassert the original opinion (Inch & Warnick, 1998). It is in this final stage, that the evaluation of the argument is made and implications are drawn (van Eemern, Grootendorst, & Henkemans, 1996).

Critical thinking. In this study, critical thinking is defined by Paul (1995) as "purposeful thinking in which the student determines the purpose for, imposes standards, and assesses the results of his or her thinking in light of the established standards" (p. 21). For purposes of this study, critical thinking will be demonstrated through persuasive writing, and will be measured by the scores received on persuasive writing prompts.

Data. Data as used in this study is a persuasive writing term in which the author offers evidence to support the original claim or opinion statement (Toulmin, 1958). This evidence "consists of facts or conditions that are objectively observable, beliefs or statements generally accepted as true by the recipient" (Inch & Warnick, 1998, p. 9).

Elaboration. In order to connect data to opinion, elaboration is used (Stay, 1996). Elaboration provides the explicit nature of the relationship between ideas, facts and hypotheses (Toulmin, 1958). Elaboration statements "function very much like inferences" (Inch & Warnick, 1998, p. 311).

Gifted. Gifted students are traditionally defined as students 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" (USDOE/OERI, 1994a, p. 26). The group of students identified as gifted in this study were identified within the last two years by the school division. They scored above the 75th percentile on a nationally-normed achievement test in the area of language arts and above the 80th percentile on a nationally-normed aptitude measure.

Learning Disabilities. For the purposes of this study, students who are identified as having a learning disability must 1) be identified by the school division as having a learning disability, 2) language achievement test scores at least below the 30th percentile on the writing section of a nationally-normed achievement test, and 3) a general ability level that falls within one and half standard deviations from the norm as measured by a nationally-normed aptitude test. Learning disabilities is a term that indicates a learning problem in a specific academic area, and it implies a significant discrepancy between a student's expected performance and his/her actual performance (Hallahan, Kauffman, & Lloyd, 1996). By federal guidelines, students with learning disabilities must have average to above average intelligence.

Learning Strategy. This term refers to "a complex plan one formulates for accomplishing a learning goal" (Derry, 1991, p. 348). The "hamburger model", the persuasive writing model employed by the curriculum in the study and of unknown origin (British Columbia Ministry of

Education, 2000; Hawaii Department of Education, 2000), acts as a learning strategy since it provides a framework for students to think about how to accomplish a persuasive writing task.

Opinion. An opinion is a statement in which the author clarifies the issue and clearly states the intended outcome or conclusion that the author wants achieved (Stay, 1996; Inch & Warnick, 1998).

Persuasive Writing. Persuasive writing is defined as a style of writing in which the author makes an appeal to an audience, designed to change their belief or behavior, in which the issue, content, purpose and audience are specified in a logical and reasoned manner (Carrick & Finsen, 1997).

Reasoning. Reasoning as defined in this study is a derivation of the definition used by psychologists and others within the critical thinking field, and not the definition used by logicians and artificial intelligence experts. As such, reasoning is defined as a skill within a subset of skills that together constitute critical thinking (Paul, 1995). It comprises the largest process in persuasive writing and is operationalized by Paul (1995) who stated that "reasoning is the drawing of conclusions or inferences from observations, facts, or hypotheses... When students write a persuasive paper, we want them to be clear about their reasoning" (p. 549).

CHAPTER TWO

Review of the Literature

Introduction

The ability of students to think, reason and make valid judgments has been found by many panels and studies to be lacking in today's educational system (Holmes Group, 1986; USDOE/OERI, 1999a; USDOE/OERI, 1999b). The need for students to exhibit thinking skills that transcend content knowledge becomes extremely relevant when one realizes that experts have hypothesized that the amount of knowledge available to students doubled between the years 1990 and 2000 (Boulton & Panizzon, 1998). Richard Reich, former Secretary of Labor, stated that "each nation's primary assets will be its citizens' skills and insights" (Reich, 1992, p. 3).

The seminal study of the 1980's (U.S./ National Commission on Excellence in Education, 1983) A Nation at Risk, found that only 40% of American students could draw simple inferences from a reading passage, only 20% could write a persuasive essay at a proficient level or above, and only 33% of students could solve a multi-step math problem. While one might hope that such results would improve over the years, recent reports from the 1998 National Assessment of Educational Progress (USDOE/OERI, 1999a) found that less than 1% of fourth graders were able to write elaborated persuasive writing responses, while only 13% gave adequate or above responses. This means that 86% of American students performed below what is considered merely adequate in today's schools. In addition, trend analysis of student writing from 1984 to 1996 has found that there has been no significant improvement in the intervening 12 years (USDOE/ OERI, 1998).

However, these dismal results are not reflective of students around the world. The Third International Math and Science Study (TIMSS) (USDOE/OERI, 1999b) study found that by the time students graduate from high school, American students were significantly below the international average in math and science. The results are even more sobering when looking at the most talented students. Among the top 10% of students in each country, American students were second- to-last in math, surpassing only Austria, and the very last in science achievement. These results are not limited to math and science. Stevenson and Stigler (1995) also found that Asian students are better able to solve novel problems and evaluate viable options of action than American students. Such a disparity has led to significant change within American education and a call for greater accountability by states and school divisions.

Curriculum Directions and Links to Standards

The advent of the standards-based reform initiatives in American education is in direct response to students' poor achievement (McLaughlin & Shepard, 1995), and classroom-level implementation of challenging standards is one of the most successful components in raising student achievement (USDOE/ OERI, 1999c). This emphasis on standards at both the federal and state level has galvanized educators to identify and implement curriculum that more appropriately challenges students (Cawelti, 1995). In addition, curriculum reform has emphasized the need to raise the level of performance of all students, including those identified as gifted and talented (USDOE/ OERI, 1994) and those identified as having a disability (Bigge & Stump, 1999). There has been a wide-spread call for curriculum that improves student performance, while providing adaptations and modifications that are appropriate for students with disabilities (Bigge & Stump, 1999). Gifted education has often been the source of challenging curriculum that emphasizes complexity of thought (Callahan, 1996), while special

education has often provided sources of curriculum adaptations and modifications for different modes of learning (Swanson, 1993). The literature base, therefore, focuses on those aspects that are necessary components of curriculum development: (a) a process model of specific skills that is implemented systemically, (b) content knowledge that demonstrates the underlying issues and nature of the discipline, and (c) understanding of the characteristics and needs of the learners involved (Bigge & Sharp, 1999; VanTassel-Baska, 1996).

Organization of Review of the Literature

Kennedy, Fisher, and Ennis (1991) delineated three primary aspects of needed research in the field of critical thinking, including: (a) the need for a coherent definition, (b) the need to study the teaching of critical thinking and (c) the understanding of how individual student characteristics influence the development of critical thinking. In response to this need, this study examined the results of a persuasive writing curriculum that integrated a particular critical thinking model, and the consequential results on gifted students, average students, and students with learning disabilities. This review of literature focused on current theory and research across four major strands of research. These strands included (a) critical thinking theory; emphasizing definition, teaching and learning components, (b) persuasive writing, with an emphasis as a content area in which critical thinking is developed, (c) curriculum development and implementation for gifted learners, and (d) curriculum development and implementation for students with learning disabilities. The following strands contain a summary of the key points found within the literature.

Strand One- Critical Thinking

The need to purposefully direct one's thinking in novel situations towards a decision or the evaluation of possible solutions has not gone unnoticed in American schools. Indeed, "concern with something called 'critical thinking' has reached almost obsessive proportions " (Smith, 1990, p. 92). However, the term "critical thinking" is rarely used outside the field of education.

> One reason the term "critical thinker" is not used very much outside of the rituals of education may be because it is not particularly complimentary. Critical thinkers are critical; they are argumentative and unsettling... they may not always be comfortable to know. Critical thinkers challenge the status quo. One wonders how serious are some of the people who advocate critical thinking, especially in education" (Smith, 1990, p. 105).

As Paul (1990) noted, "Parents and teachers rarely cultivate this tendency" (p. 449). However, it still remains a stated goal of education, and what it is and how one teaches it, still remain issues.

Definitional Issues of Critical Thinking

The meaning of "critical thinking" is a tricky one. In a self-admitted less-than-exhaustive search for terms, Smith (1990) listed 104 separate terms that can be defined as "critical thinking", including: reasoning, proving, pondering, analyzing, evaluating, synthesizing, and problem-solving. Teachers, administrators, and researchers use terms interchangeably (Kennedy, Fisher & Ennis, 1991) and fine distinctions that psychologists and philosophers make are often lost in the "crucible of the classroom". "The term critical thinking is one of the most abused terms in our thinking skills vocabulary. Generally, it means whatever its users stipulate it to mean" (Beyer, 1987, p. 5). Indeed, some argue that a definition should not be sought. Paul (1995) stated that "Since critical thinking can be defined in a number of different ways consistent

with each other, we should not put a lot of weight on any one definition. Definitions are, at best, a scaffolding for the mind" (p. 91). Smith (1990) went even further to conclude that a definition should not be sought, since "Definitions distort and constrain the use of words in language... they have a multiplicity of senses and applications" (p. 8-9).

It seems necessary, Smith's (1990) cautions to the contrary, that a bit of scaffolding does need to be established in order to distinguish between thinking that "occurs in all intelligent cognitive activities" (Ericsson & Hastie, 1994, p. 38), and thinking that is problem-oriented and includes complex activities, such as decision-making, effective judgement-making and reasoning (Kennedy, Fisher, & Harris, 1991; Paul, 1995). Despite the "conceptual swamp" (Cuban, 1984, p. 656) that surrounds critical thinking, a number of authors have tried to define it.

A Delphi project, using 46 experts in critical thinking theory and assessment and aimed at establishing a consensual definition of critical thinking, found that many of the definitions overlapped in terms of the skills which characterized critical thinking (Facione, 1990). Critical thinking is often interchanged with analysis, associative thinking, concept formation, creative thinking, higher-order thinking, intelligent behavior, problem-solving, reasoning, and thinking in general (Burkhalter, 1993; Facione, 1990). All of the various definitions require many cognitive skills, base their outcomes on knowledge that is derived from the disciplines, have an affective component, and recognized that attitudinal factors are pervasive (Johnson, 1992). Many theoreticians in the area of critical thinking vary in the extent that they integrate critical thinking into a system of thinking, including (a) its concomitant definitions with judgments, reasoning, and problem-solving (b) the relationship between critical thinking and creative thinking, (c) the internal versus the external nature of critical thinking, (d) the role of subject knowledge, and (e) the use of standards and criteria. Multiple definitions were examined although seven different

definitional structures were examined in-depth, including: Paul (1995; 1990), Lipman (1991), Smith (1990), Beyer (1989; 1987), Ennis (1992; 1990), McPeck (1990a; 1981), and Perkins (1990; 1981), because of the respect accorded to these individuals by other researchers (Cassel & Congleton, 1993; Facione, 1990; Johnson, 1992; Idol & Jones, 1990; Inch & Warnick, 1998), and the coherence and multidimensionality aspects of their definitions. Appendix A presents the findings of these seven different definitions of critical thinking explored in this literature review.

Concomitant Definitions. One of the major issues of defining critical thinking are the number of terms that are simultaneously used to describe critical thinking, define critical thinking, and to link critical thinking with other forms of thinking. Four major themes that consistently emerged from the literature included the relationship between critical thinking and reasoning, problem-solving, decision-making, and creativity.

Lipman (1991) defined critical thinking as a component of higher order thinking and reasoning as a component of critical thinking. Characteristics of reasoning include the processing and consequential increase in knowledge, the dependence upon the initial base of knowledge in order to form logical conclusions, and the need to restrain the thinking processes so that the conclusions are plausible (Bisanz, Bisanz, & Korpan, 1994). This key role of knowledge of material is critical to the development of reasoning. "Attention is directed towards reasoning processes by using tasks that emphasize the use of information, especially relational information" (Dominowski & Bourne, 1994, p. 30). "Educators who wish to promote general reasoning capability must not only teach practical thinking skills, but also must insist that fundamental curricular knowledge is well-constructed" (Derry, 1991, p. 347). Reasoning is often depicted as an expansion of knowledge about a problem that continues until we reach a solution

(Hunt, 1994). In that respect, reasoning is remarkably similar to the process known as problem-solving (Hunt, 1994).

Critical thinking is often linked with problem-solving, since critical thinking has a purpose or a goal (Paul, 1990) and a judgment as its end result (Lipman, 1991). This goal is the key factor of defining a problem (Ormrod, 2000). "The essential features of a problem are that an organism has a goal, but lacks a clear, or well-learned route to the goal (Dominowski & Bourne, 1994, p. 23). Problem-solving is often defined as the development of a path through a problem, or the search for a solution (Hunt, 1994; Ormrod, 2000). Through trial and error, insight, or previously learned strategies, people determine ways that will achieve their goal (Dominowski & Bourne, 1994). Often, these strategies call for processes that include: problem identification, determination of options, determination of possible criteria for the solution, and finally a solution. At each point along the way to solution, a person has to respond to a representation of the situation as they understand it at that point. While limits on working memory determine how complicated that representation can be (Hunt, 1994), critical thinking can provide scaffolding for the problem-solving process. People can memorize certain schema for solving problems that moves the process along, since it then moves the burden of mental representation from short-term working memory to longer term storage patterns, where people are strongest (Ashbaker& Swanson, 1996). Such a process is reflective of an Information-Processing Model, in which "children acquire, think about, remember, and mentally change information" (Ormrod, 2000, p. 50). Once people have determined the appropriate solution to a problem, they make a decision, and solve the problem.

The concept of decisions emerging from the process of critical thinking is one that proliferates throughout many definitions. Ennis (1992) reiterated this emphasis on the act of thinking as "reasonable reflective thinking focused on deciding what to believe or do" (p. 22). Perkins (1990) "narrowly" defined critical thinking as resulting in particular evaluations and decisions, distinguishing his definition from the more commonly held "wide" meaning of critical thinking as merely effective thinking. This notion of the emergence of a valid decision after a period of thinking is reinforced by Lipman (1988) who defined critical thinking as "skillful responsible thinking that facilitates good judgments because it 1) relies on criteria, 2) is self-correcting, and 3) is sensitive to context" (p. 39).

It is this determination of the context that determines the name with which thinking is imbued. The common understanding of creative thinking and critical thinking make the two appear vastly different (Lipman, 1991), and indeed Beyer (1987) definitively stated "Clearly, they are not the same" (p. 36). He defined creative thinking as divergent, violating accepted principles, and whose purpose is to generate new ideas; while critical thinking is perceived as convergent, whose purpose is to determine the worth or validity of an action or thought.

However, "{a}lthough the outer natures of creative and critical thinking show considerable contrast, the same cannot be said for their inner natures" (Paul, 1990, p. 427). Lipman (1991) encapsulated this dualistic perspective by stating "It is common to talk as through critical thinking and creative thinking were different... It might be better to say that the process is not all that different in the two cases, but the circumstances are changed" (p. 80). Perkins (1981) determined that "Intuitive processes and analytical processes don't really contradict each other... the two strategies occur mixed in behavior" (p. 104). It is this interplay between the origination of a thought and the analysis of it that Lipman (1991) called "complex thinking".

Paul (1995) noted that "All thinking that is properly called 'excellent' combines these two dimensions in an intimate way" (p. 196), and it this interplay that "largely accounts for the driving dynamism of higher order thinking" (Lipman, 1990, p. 68). Thus, the origination, or creation, of a thought may come from intuition; however, the manner in which a thought is developed is through the process of critical thinking. Thus, critical thinking is integrally linked to creative thinking with the origination of an idea and the subsequent imposition of standards or criteria for that thought. Perkins (1981) described the imposition of standards as the driving force behind "creative" endeavors. "The properties the maker imparts to the product in after-the-fact, corrective ways gradually becomes imparted in original acts of production... Makers do not always- and maybe never- catch up with their critical sensitivities, which continue to develop" (p. 129).

Use of Standards and Criteria. The role of evaluation as a significant function is a hallmark of critical thinking (Perkins, 1981; Paul, 1995; Ennis, 1992). Paul (1995) observed that "We don't achieve excellence in thinking with no end in view " (p. 196). Perkins (1981) noted that "Evaluative responses, on the whole, in amateur and professional alike, involved little explicit analysis, ... {yet} very often, critical remarks combine in a single term, the pro or con judgment and reasons for it" (p. 106-107). Paul (1995) noted that critical thinking entails self-improvement through the usage of standards by which one evaluates one's own thinking. Indeed, Lipman (1991) defined critical thinking as "thinking that 1) facilitates judgment because it 2) relies on criteria, 3) is self-correcting, and 4) is sensitive to context" (p. 116). Paul's (1995) definition placed the use of standards in the center of his definition of critical thinking, in which "the thinker systematically and habitually imposes criteria and intellectual standards upon the

thinking... guiding the construction of the thinking according to the standards, and assessing the effectiveness of the thinking according to the purpose, the criteria, and the standards" (p. 21).

So what are standards? They are a set of minimal levels of expectations that are explicitly stated (Lipman, 1991). According to Perkins (1981), "An analytical way of behaving involves deliberate analysis. One scrutinizes the object for various features and rates them against explicit standards" (p. 105). He contrasted this form of thinking with intuition or "when there are no conscious reasons for it" (p. 105). "Criteria-- and particularly standards among them-- are among the most valuable instruments of rational procedure. Teaching students to recognize and use them is an essential aspect of teaching critical thinking (Lipman, 1991, p. 120). This link between the explication of standards and the ability to think critically is emphasized by Scardamalia and Bereiter (1986):

... cognitive processes develop in real life through striving to produce an adequate product, and the more realistically learners are aware of what product characteristics they should be striving for and of how successful they are in achieving them, the more likely it is that the attendant cognitive processes will develop (p. 798).

Internal versus External Nature of Critical Thinking. Integral to the definition of critical thinking is the debate as to whether critical thinking is a series of skills that can be taught, or whether it is dispositional to the individual and activated by the nature of the task. The varying definitions tend to fall along a continuum of thinking; at one end is the algorithmic version in which the process defines the action and thinking is perceived as a series of skills; at the other end is the heuristic version in which the results of critical thinking define its existence, and dispositions within the individual must be awakened (Lipman, 1991; Marzano, 1991; Norris, 1992).

At the algorithmic end of the continuum, Beyer (1987) referred to critical thinking as the second step in a series of processes and skills. The first step, or Level One thinking, consisted of "microthinking skills" that included individual information processing and reasoning skills, such as recall, interpretation, analysis, synthesis, and evaluation. Level Two consisted of what he defined as critical thinking, or the use of standards on the Level One skills. It is the process of critical thinking that allows one to determine the credibility of data and to detect bias. Beyer's Level Three consisted of problem-solving, conceptualizing, and decision making, in which critical thinking strategies and the microthinking skills are placed in a context with a purpose or goal in mind. Similar to Beyer, Lipman (1991) defined critical thinking in terms of the orchestration of particular skills, including: inquiry, reasoning, and information-organizing skills. However, Lipman (1991) did point out the limitations of an emphasis on mere skills alone. "Learning to speak is not mastering a technique or acquiring a skill; it is having something to say" (p. 79).

At the other end of the continuum of the skills-disposition debate is the definition by which critical thinking is an inherent facet of the human person. Smith (1990) stated that thinking is a "single, continual, all-embracing operation of the mind" (p. 107) and that critical thinking doesn't need to be defined, rather it needs to be described. He observed that most words describing thinking actually "described activities of people, not their brains" (p. 2). Affirming Smith's rejection of critical thinking as a series of skills, Nickerson (1990) noted that:

> The goal seems to be to reduce thinking to its basic constituents, the assumption being that if one can identify those constituents, one will then know how to improve thinking as a whole... but it's possible that the mind is not that type of entity and that the reductionist approach is not appropriate in this context (p. 501).

Reiterating this perspective, Marzano (1991) noted that "At its core, critical thinking is dispositional in nature. Specifically, it is the activation of such dispositions... that renders one's thinking critical, rather than using specific mental processes" (p. 426).

McPeck (1991) integrated these two concepts of skills and disposition in his definition of critical thinking as "the skill and propensity" to engage in an activity with reflective skepticism" (p. 81). Paul (1995) also integrated the concepts of skills and dispositions in his definition of critical thinking as "A unique, purposeful kind of thinking" (p. 21). Paul referred to critical thinking in terms of skills and the macroprocesses of thinking, including Socratic questioning, conceptual analysis, determination of issues, and the reconstruction of viewpoints. However, he integrated these skills with the disposition of the individual, or "habits of mind", such as independence, faith and curiosity. It is the integration of skills, dispositions, standards and the context that is critical thinking.

This sensitivity to context intertwines critical thinking with ethics. Lipman (1991) and Ennis (1992) both defined critical thinking as thinking that is directed towards higher ethical behavior. In contrast, McPeck (1990a) perceived critical thinking as a process towards a goal, and that the ethical dimensions of the goal are defined by the context; by itself, critical thinking is neither "good" nor "bad". However, Paul (1990) asserted that the determination of the context is critical to the process of critical thinking and warned of the danger of "an approach to thinking that relies... on the goal of technical competency, without making central the deeper philosophical or normative dimensions of thinking" (p. 474), thereby making critical thinking itself an ethical behavior that is "undergirded by the value of figuring out the significance of life" (p. 459).

Definition for this Study. Many definitions of critical thinking have been proposed, and all of them are concerned with students examining issues, reaching decisions, and making judgments based upon careful, examined thought. In this research, the definition of critical thinking put forth by Richard Paul (1995; 1990) was chosen primarily because of its sensitivity to context. This relationship between the thinker and the context is critical to the definition of critical thinking. Smith (1990) argued that as a society, we are governed by certain values and common sense, as well as logic, and that differences in opinion originate not from differences in logic, but from different points of view. This need to understand other points of view was accentuated by Lipman (1991) who argued that critical thinking is "thinking from which all bias, egocentricity, and self-deception have been eliminated" (p. 58). Paul (1995) established the understanding of perspectives as a key component in his process of critical thinking. However, he defined the role of the thinker as one who is involved in the process and who seeks to define and improve the system in which it finds itself (Paul, 1995). Indeed, "{c}ritical thinking is, for Paul, an ongoing fight against dogmatism, narrow-mindedness, and intellectual manipulation" (Lipman, 1991, p. 56). Because critical thinking does not occur in a vacuum, five primary components that frame critical thinking are explicit in Paul's model.

The first reason for selecting this model is that Paul incorporates an ethical component to his model that is missing in numerous other models. Since critical thinking demands that judgments and decisions be made (Paul, 1995; Lipman, 1991; Ennis, 1992), it is necessary that students consider the ramifications of their decisions from other perspectives. While some find "the aims of Paul to be overambitious" (van Eemeren, Grootendorst & Henkemans, 1996, p. 187), the emphasis on responsibility represents an educational ideal and is one that addresses the role of the individual (Lipman, 1991).

The second reason for selection is that Paul represents a middle ground between assuming that critical thinking can be taught completely in isolation (Lipman, 1991) and assuming that it must be taught only within a discipline and cannot transfer between disciplines (McPeck, 1981). Paul (1995) stated that although reading and writing are content-driven- that is, one must read and write about something- they are teachable in isolation. If one can teach reading and writing and ask students to generalize those skills across domains, one can teach thinking skills in isolation and ask students to generalize those skills across domains.

The third reason is that Paul again represents a middle ground position through his assumption that critical thinking is a combination of skills that can be taught to students as well as dispositions within the individual that can be influenced. Whereas many theorists perceive critical thinking as a series of skills to be instructed (Beyer, 1987), and others perceive it strictly as a process deriving from the individual's ability (Nickerson, 1990; Seigel, 1988), Paul integrated the role of the ability of the individual with the teachable skills of critical thinking.

The fourth reason is that the model has been linked to specific content. Curriculum has already been developed that uses the Paul model of reasoning as the foundation for the development of literary skills, including the teaching of persuasive writing (VanTassel-Baska, Johnson, & Boyce, 1994). Little curriculum currently exists that explicitly incorporates critical thinking skills with the direct instruction of persuasive writing skills (Burkhalter, 1995), and this direct link between developed curriculum and Paul's reasoning approach provides a valuable component to this study since it examines the link between the teaching and learning of critical thinking.

Finally, Paul's critical thinking model is considered highly influential in the field of critical thinking (Facione, 1990; Tsui, 1998; van Eemeren, Grootendorst & Henkemans, 1996) and is among the most comprehensive of the critical thinking models in the literature. His model integrates habits of mind, elements of reasoning, standards for reasoning, and reasoning abilities, thereby taking a perspective that considers the ability of the individual, the needs of society, and the nature of critical thinking.

In his definition, Paul (1995) defined critical thinking as:

> A unique kind of purposeful thinking in which the thinker systematically and habitually imposes criteria and intellectual standards upon the thinking, taking charge of the construction of thinking, guiding the construction of thinking according to standards, and assessing the effectiveness of the thinking according to the purpose, the criteria, and the standards (p. 21).

Thus, Paul places considerable emphasis upon the need for thinkers to be aware of the quality, the process, and the consequences of their thinking.

Teaching Critical Thinking

"Interest in greater emphasis on the teaching of thinking and problem-solving in public schools appears to be at an all-time high" (Nickerson, 1994, p. 412). Despite the resurgence of interest, the teaching of thinking is not limited to the last decade. Dewey's work led to the development of reasoning ability as a major stated goal of education as early as the 1920's and 30's. (Nickerson, 1994). There is "guarded optimism that enough is now known about thinking and problem-solving that serious attempts to teach them in classrooms... can be expected to produce at least moderately positive results" (Nickerson, 1994, p. 435).

Role of Content Knowledge. In order to critically think about something, one must know something, and in order to know something, one must understand the relationships that exist between isolated pieces of knowledge. "A wrong or inappropriate conclusion is usually the consequence of not knowing enough in the first place" (Smith, 1990, p. 16). The concepts of thinking and knowledge are so interwoven that many researchers describe them as interdependent (Kennedy, Fisher & Ennis, 1991; Tsui, 1998). Paul (1995) stated that "Genuine knowledge is inseparable from thinking minds" (p. 540).

The role of knowledge in critical thinking is perceived by McPeck (1990b) to be developmental in nature, and he advocated that students should not be exposed to critical examination of content until Grade 10, or until they have acquired a large body of knowledge in a field, and to do so would be counter-productive to teaching efforts. In contrast, Paul (1990; 1995) advocated that critical thinking instruction should begin as early as kindergarten, so that students could acquire the habits of mind necessary for in-depth thinking. Paul (1995) acknowledged that the results of thinking would be different at different grade levels, but the process was necessary to evolve to higher levels of thought and the habits of mind established early would determine the results of thinking later in life. Such a stance is reinforced by research that found that with direct instruction in analogical reasoning, 4- and 5-year olds significantly improved on tests of analogical reasons when compared to a similar group who repeatedly received tests of their analogical reasoning but no instruction (Alexander et al, 1989). A meta-analysis of instruction in critical thinking also found that "younger students benefited more from critical thinking instruction than did students in high school or college" (Bangert-Drowns & Bankert, 1990, p. 6), as evidenced by an effect size of .50 for younger students, as compared to an effect size of .21 standard deviations for older students.

Knowledge itself is frequently confused with recall, rather than the deeper understanding of content (Paul, 1995). In Bloom's (1956) taxonomy of thinking skills, knowledge is defined as "those behaviors... which emphasize the remembering... of ideas, material or phenomena" (Anderson & Sosniak, 1996, p. 9). There are three aspects of knowledge that must be addressed when examining critical thinking, including (a) the type of knowledge itself, (b) the conversion of content to thought, and (c) an understanding of the different subject areas in which thinking occurs (Beyer, 1987).

Knowledge itself is often divided by psychologists into declarative and procedural knowledge (Ormrod, 2000). In addition, humans tend to categorize knowledge, both procedural and declarative, into two types: specific knowledge that is necessary for comprehension or problem-solving, and inert knowledge that is deemed to be not useful (Bransford, Vye, Kinzer, & Risko, 1991). Central to the intertwined concepts of knowledge and thinking is this issue of relevancy. "One cannot think critically about trivial or purposeless matters" (Smith, 1990, p. 126). Thus, in order to think critically, the person must acquire content that is relevant to them.

The conversion of knowledge into active thought, or the manner in which information is interpreted, placed into a representational system, preserved, and accessed provides an understanding of the thinking processes involved (McNamara, 1994). "Mental representation is as fundamental to cognitive psychology as force is to physics" (McNamara, 1994, p. 83). The importance of connecting new knowledge to old knowledge is emphasized by Derry (1991), who defined learning as a process of elaboration. When the learner can spontaneously and appropriately elaborate upon old knowledge, he can then form relationships between connected ideas. When the learner can neither spontaneously nor appropriately elaborate upon old knowledge, learning strategies must be provided for him (Ausubel, 1968). Through the use of

learning strategies, students can learn to interpret, store and access information in ways that allow rapid usage and are more likely to transfer to novel situations and across multiple contexts (Ormrod, 2000).

The nature of the discipline is the third aspect of understanding the relationship between knowledge and critical thinking. According to Grant (1988), there are two aspects of discipline structure that impact on the thinking process, including (a) the content of the subject, and (b) the accepted manner in which one produces or verifies information within that discipline. The "what" of the thinking process must be considered carefully in the study of critical thinking. "Rationality, in the most general sense, must include not only an ability to think, but a willingness to give some thought to what to think about " (Nickerson, 1994, p. 441).

Subject- Specificity of Critical Thinking. Nickerson (1994) noted that there are essentially two ways in which to teach critical thinking: (a) as a series of basic operations or processes that are global across domains or (b) through domain-specific knowledge. Ennis (1989) described these methods as the a) general method, which teaches critical thinking explicitly, the b) immersion method, in which critical thinking evolves through a deep understanding of particular content, and the c) infusion method, which integrates specific skills within a particular context. McPeck (1990) certainly argued that critical thinking is subject-specific, and should be taught only within the context of the individual fields. Lockhart (1992) also argued that "whereas certain schema for critical thinking may have wide application, they may, in fact, be content-bound in their application by virtue of the fact that access to their schema is content-bound" (p. 56). Ennis (1992) reiterated this concept by noting that since critical thinking must be about something, and that something is content from a discipline, there can be no general critical thinking skills.

In contrast, numerous programs for critical thinking have taken the opposite perspective that critical thinking can be taught separately and can be transferred from the self-contained setting to other subjects. The Cognitive Research Trust (CoRT) programs (DeBono, 1983), Philosophy for Children (Lipman, 1981), and Instrumental Enrichment (Feurstein et al, 1991) have developed programs of critical thinking as an isolated skill. Paul (1995) noted that although reading and writing are content-driven, that is, one must read and write about something, they are teachable in isolation. If one can teach reading and writing and ask students to generalize those skills across domains, one can teach thinking skills in isolation and ask students to generalize those skills across domains (Paul, 1990). Indeed, Norris (1992) stated that "to challenge generalizability is to challenge what many educators take to be one of the fundamental justifications for schooling- that the habits of mind and methods of thinking fostered by schooling transcend the specific content, much of which becomes obsolete" (p. 4).

Sternberg (1994) identified the "combinational" approach, as the most effective approach in teaching critical thinking and the one that can integrate the features of both content and skills. Lipman (1991) noted that content-specific programs are too embedded to permit transfer and that content-free programs are too isolated to permit it. Nickerson (1994) observed that even if thinking strategies are embedded in content, "students do appear to require, at least, an effort aimed explicitly at that objective... it is clear that neither the development of thoughtful attitudes not enhancement of the ability to think is a necessary consequence of the teaching of content" (p. 46). Beyer (1987) noted that "Lessons that keep the focus on the subject matter so obscure the nature of the thinking processes involved... that most students fail to understand or learn these processes... A more effective approach is to make thinking itself the major substance of learning" (p. 6).

Research on Thinking Skills Programs. Thinking strategies are rarely taught explicitly when embedded in content, and even when they occur, "it rarely involves the type of complete explanations, explicit modeling, and monitored progress that are necessary" (Borkowski, Carr, Rellinger, & Pressley, 1990, p. 80). According to a review of thinking skills programs, programs that are devoid of content, such as the Structure of the Intellect (SOI) thinking program derived from the Structure of the Intellect definition, show significantly limited effectiveness data in raising critical thinking scores (Idol, Jones & Mayer, 1991). A meta-analysis of 20 studies that directly taught critical thinking skills, 19 of which were doctoral dissertations, found that while all interventions were successful, those that focused exclusively on the internal process of logic and propositions had an effect size of .03 standard deviations, while those which taught critical thinking through an examination of external content and information had an effect size of .55 standard deviations (Bangert-Drowns & Bankert, 1990).

Deemed to be a success, Feurstein's Instrumental Enrichment model (Feurstein et al, 1980) emphasized critical thinking skills by asking students to examine component parts of a problem in order to make a decision. In a study of 548 students using the model, they found that students' IQ scores were able to improve significantly by an average of three points; a statistically significant, but hardly practical increase. The moderate effect on IQ scores was also noted by DeBono (1973) in his CoRT program. A study of 425 7th grade students using the DeBono model found that with instruction in his "lateral thinking" process that promotes problem-solving, IQ scores improved significantly by four points. Lipman's (1987) Philosophy for Children program also found small increases in IQ scores; however, Lipman's program's most noted effect was an improvement by 66% in reading and 36% in math.

This link between academic subjects and critical thinking abilities has been found in other studies as well. Perkins, Faraday and Bushey (1991) found that in a study of over 300 students, those who were explicitly taught thinking skills in conjunction with writing skills were able to improve their written performance by as much as 700% when compared to a control group who only received writing instruction. Similarly, a study of 110 sixth grade students in a program that infused explicit elements of reasoning into the reading and writing of persuasive pieces found that the thinking processes of analysis and synthesis of new ideas was transferred to the writing of persuasive pieces (Crowhurst, 1991). Linking critical thinking to a content area while directly teaching the thinking skills improves both the understanding of the content as well as the application of the thinking skills.

Teacher Training Issues

There are significant teacher training issues present in the development of a curriculum designed to teach critical thinking. A study by Paul (1995) examined teachers' grading of two essays written by students in a state-wide reasoning assessment. One essay was well-written in respect to creativity and mechanics, but poorly reasoned; while the other was poorly written, but well-reasoned in terms of analysis, stated criteria, and data presented. When scored by persons trained in reasoning components, the well-reasoned article received an average score of 5.4 out of 8 points on the reasoning component, while the poorly-reasoned one received an average score of 3.9. The study found that of 81 untrained teachers, 40 teachers give high marks in reasoning to the well-written, but poorly-reasoned article, while only 18 gave high marks to the well-reasoned piece. Unfortunately, teachers are often guided by "flair and sparkle" (Paul, 1995, p. 170) in their grading practices rather than by the rationality and thinking abilities exhibited by students.

In addition, many teachers resist the teaching of thinking skills for several reasons, including: (1) the issue of public accountability in which discrete information at each grade level is to be tested and the fact that thinking skills are rarely so easily assessed and measured (Paul, 1995), (2) students tend to prefer the drill and practice method, since it requires less cognitive effort on their part (Levine, 1988), and (3) classroom order is easier to maintain under a typical curriculum, since students are not challenging each other, or their teacher (Levine, 1988).

Thus, teachers need significant training in the components and hallmarks of strong reasoning. Teacher training without follow-up support appears to have little impact on teacher behavior (Guskey, 1984), and the content and curriculum provided is key to the support that is provided to teachers (Avery, 1999). Putnam and Borko (2000) have noted that in order for teachers to learn new ways of teaching, they must do so within their own teaching context, through social interactions with other teachers, and with the use of specific tools that are designed to facilitate such teacher thought. "Inservice that is content-focused and embeds pedagogy within the relevant discipline is more effective than training that teaches skills independent of subject matter" (Avery, 1999, p. 32).

Implications of this Strand of Research

One of the most significant implications from this research is the need to explicitly teach students critical thinking skills so that they can evaluate the results of their own thinking processes. The literature shows that American students' achievement has remained consistently low in comparison to other countries (USDOE/OERI, 1999b), and that these trends are not improving over time (USDOE/OERI, 1998). Because improved critical thinking is connected to improved achievement (Lipman, 1991; Paul, 1995), critical thinking must be explicitly taught.

The second major implication is that these critical thinking skills must be taught within the context of a discipline area. One must, indeed, think about something, much like one must read and write about something (Paul, 1995), and that "something", or content matter, forms the substance of schools. It is only through content disciplines that skills are demonstrated (Gardner, 1999), and because improvement in student performance is at the heart of educational reform, critical thinking provides a powerful organization for improvement in content areas.

Thirdly, the implications of decisions must be evaluated. Because one does not actually observe thought, but only the results of thought (Smith, 1990), it is necessary to link the thinking process with the results of decisions or actions that are taken. Critical thinking is an act that is directly connected to the events surrounding it. It is therefore directly linked not only to content, but also to the consequences of what occurs as a result of a decision or behavior.

Finally, teachers themselves must be trained in the same manner in which they are expected to teach critical thinking skills. Most theoreticians have called for a reconstruction of the curriculum in which the emphasis is not on the didactic teaching process in which knowledge is provided to students, but one in which knowledge is to be constructed by students in a framework of their own meaning (Ormrod, 2000; Pogrow, 1998). Teachers themselves must be trained to recognize strong reasoning, extend their evaluation beyond the mechanical elements of a content area, and to explicitly teach specific skills that are embedded in content. Finally, it must be recognized that such a process takes time (Fullan, 1991). Teachers must receive not only initial training, but follow-up in the form of 1) administrative support and expectations, and 2) content curriculum that lends itself to the implementation of the desired skills. It is this role of content that leads to the next strand of research that focuses on the use of critical thinking in persuasive writing.

Strand Two-- Persuasive Writing

The purpose of the majority of our daily communication is persuasive in nature (Cheney, 1996). Persuasion is "designed to influence the attitudes, beliefs, values, or actions of others" (Cheney, 1996, p. 119). The structure of persuasive writing, that of stating an opinion, presenting reasons for that opinion, defending the reasons through the presentation of conflictual perspectives, and finally, a summing up of the argumentative process, forces one to think critically throughout the process (Stay, 1996; Burkhalter, 1995; Inch & Warnick, 1998). In that sense, persuasive writing is more difficult than narrative writing. Given the same amount of time, students will write shorter persuasive pieces than narrative pieces (Burkhatler, 1995); and when given a greater amount of time, the degree of persuasiveness does not improve (Kean, 1984), indicating the need for a deeper level of critical thinking for enhancement of argument. In addition, as opposed to narrative writing, students are required to write in a manner that differs from their normal mode of speaking. They must anticipate the arguments of their audience and counter them with credible reasons, without actually allowing the voice of the audience to intercede (Burkhalter, 1993). Boyd (1995) referred to this dynamic of process and content as the "logic of content" connected to the "logic of structure" (p. 55). According to Burkhalter (1993), the organizational structure of persuasive writing forces one to think in concepts because of the need to draw connections between ideas. Stay (1996) also noted that argumentative writing is designed to draw connections between isolated facts in order to evoke a particular perspective, and that reasoning and judgment are heavily involved in this process.

Link Between Critical Thinking and Persuasive Writing

Persuasive writing has often been a vehicle for the teaching of critical thinking. "The connection between critical thinking and persuasive writing is based on the fact that the skills needed for persuasive writing are a subset of those involved in critical thinking" (Burkhalter, 1993, p. 9). The teaching of critical thinking traditionally has been pursued by using the methods of persuasion (VanEemeren, Grootendorst, & Henkemans, 1996), and Paul (1990) refers to "weak-sense" and "strong-sense" critical thinking as functions of the deepening of levels in argumentation.

Perhaps the most valid method of assessing critical thinking is through a persuasive writing task. A study that examined the relationship of students' persuasive writing abilities and critical thinking found a moderate correlation between the holistic scores on a persuasive writing task and their ability to use higher-order thinking processes (Wallace, 1992). Beyer (1987) claims that essays in which students are asked to construct an argument are perhaps the most effective means of directly assessing students' thinking processes. These essays "will produce better assessment of student proficiency in thinking skills than most current practices" (p. 236). In a study of informal reasoning, Perkins, Farady, and Bushey (1991) asked students to take a stance on an issue and write a persuasive piece about it.

In addition, persuasive abilities are not impacted by a student's ability in the mechanics of writing. Scardamalia, Bereiter and Goelman's (1982) found that writing quality is rarely affected by mechanical abilities. Conner (1990) also found that the quality of student writing mechanics were not related to the quality of their persuasive pieces, while McCutcheon and Perfetti (1982) note that differences in writing ability is directly linked to differences in students' metacogntive search strategies, rather than mechanical issues. A study of 60 gifted students and

60 average students found that gifted children outperformed average students in terms of vocabulary sophistication and quality of writing, but not necessarily in terms of sentence complexity or mechanics (Yates, Berninger, & Abbott, 1995). In fact, 50% of the gifted students, and only 10% of the average students met the relative criteria for specific learning disabilities because their performance in mechanics was at a significantly lower level when compared to the content of their writing. The authors concluded that "the advanced high level writing skills... do not necessarily indicate similarly advanced low-level writing skills (p. 146).

The process of formulating reasons, analyzing the credibility of the reasons and synthesizing them into message mutually defines critical thinking and persuasive writing (Burkhalter, 1995; Inch & Warnick, 1998). "Perhaps the most all-inclusive act of critical thinking is that of argumentation" (Beyer, 1987, p. 34). Scardamalia and Bereiter (1986) noted that expressive writing has little need for goal-related planning and problem-solving, since it relies on previous knowledge, without the need to construct new concepts or heuristics. In contrast, persuasive writing relies on students' creating new concepts, ideas, and knowledge through analysis, synthesis, and evaluation of arguments (Boyd, 1995; Knudson, 1992; Inch & Warnick, 1998). In order to effectively plan persuasive pieces, students must have a clearly established goal for writing (Scardamalia & Bereiter, 1986). These goals must be explicitly understood by the student so that the goal can be "consulted, altered, and decomposed" (Scardamalia & Bereiter, 1986, p. 789) during the writing process. In a study that examined eight eleventh grade students' approaches to writing by having them verbalize while completing different writing tasks, Newell (1986) found that persuasive writing provided the most opportunity for exploration of issues and critical examination of issues. He also added that writing itself can act as an instructional tool in order to develop specific thinking skills.

Evaluating Critical Thinking Through Persuasive Writing. Research on the assessment of persuasive writing further links it to a manifestation of critical thinking. A comparison of 150 pieces of persuasive writing through the International Association for the Evaluation of Educational Achievement (IAEEA) sought to determine the factors that affected the judgment of raters using holistic scoring procedures (Conner, 1990). She found that there were four primary variables that accounted for the quality of holistic scores received by students. The first of these included the score received through a Toulmin (1958) analysis in which persuasive pieces were evaluated for their introduction, quality of data, the degree to which the data were elaborated and the conclusions that students made. This measure alone explained 48% of the variance of the holistic scores. "The level of reasoning, as measured by the Toulmin analysis, was a powerful predictor of writing quality, even more so than the length of an essay "(Conner, 1990, p. 83). Three other factors were also found to be critical, including the word count of the piece, the credibility of the appeals that students used, and the degree of abstractions that the student employed. Thus, persuasive pieces that effectively employ aspects of reasoning such as statement of perspectives, recognition of alternative perspectives, use of data, use of concepts to link the data, delineation of implications, and conclusions are more powerful pieces of writing (Stay, 1996). These aspects are elements in numerous models of critical thinking, including Paul's (1985) model; thereby directly linking persuasive writing with critical thinking.

Teaching Persuasive Writing

The need to write persuasively is so ingrained in our society that Knudson (1992) has said that "one of the genres which is essential for full participation in society is argumentation and persuasion" (p. 3). The need to teach persuasive writing is evident through national test scores. In the 1998 National Assessment of Educational Progress (NAEP) report

(USDOE/OERI, 1999a), it was found that only 5% of the writing samples elicited from students were persuasive in nature. The majority of writings were narrative and informational. Of the 5% that were persuasive, less than 5% of these received a score of moderate or above. As late as 1985, Clark, Willihngenz and O'Dell stated "We know of no attempts to date to instruct children in persuasive communication" (p. 332). In the intervening decades, it has been rare for systematic instruction specifically geared to the teaching of persuasive writing to occur, with some notable exceptions. The poor results of the 1996 NAEP data reflect the inattention to teaching persuasive writing found in American classrooms reported by teachers across the country (USDOE/OERI, 1998). However, the National Education Goals Panel (Grissmer & Flanagan, 1998) cites the efforts of states such as Texas, with its state-mandated Texas Assessment of Academic Study (TAAS); and North Carolina with its End of Grade (EOG) tests as primary catalysts for improving the achievement of writing in those states. Each of those states provides students with a persuasive writing prompt, among others, in order to evaluate student writing skills. Such state tests have encouraged the development of persuasive writing curriculum at various grade levels.

Because persuasive writing relies on a high degree of structure through analysis and hierarchical thinking, it poses a particularly difficult stumbling block for inexperienced writers. It is not a narrative and must assume an audience without the process of turn-taking and dialogue (Burkhalter, 1993). "Writing is not merely knowledge and skills added to oral language competency. It involves a 'radical conversion' from a language system with a partner to a system that operates autonomously" (Scardamalia & Bereiter, 1986, p. 783). Persuasive writers must anticipate and answer the nature of the arguments that the other side may pose without the ability to include their voice (Inch & Warnick, 1998).

Novice writers, in particular, face a challenge in transcending not only the schema of writing in general, but applying their broad understanding of writing to a particularly difficult genre of writing. The process of critical thinking becomes integrally connected to this transference. A study of fourth grade students found that although students were beginning to differentiate characteristics of persuasive writing, their level of sophistication ranged from the regulated structure of persuasion to the higher levels of reasoning (Erftmier, 1985). As O'Conner (1961) reminded us, the writer "makes his statements by selection... he selects every word for a reason, every detail for a reason... and arranges them in a certain time-sequence for a reason (p. 75). This facile use of thinking processes distinguishes novice writers from expert writers (Howard, 1987).

Developmental Components. Critical thinking expressed through persuasive writing appears to require a certain level of thought. However, how that level is defined and whether it can be impacted remains a subject of intense debate.

> If Piaget is correct in his claim that pre-formal operational children cannot improve on a task requiring formal-operational thinking, then schools would be wasting their time trying to teach persuasive writing in the elementary grades... If, on the other hand, Vygotsky's view that learning precedes development is correct, then it would seem to follow that the sooner the seeds of these cognitive processes are planted... the sooner they can begin to flower (Burkhalter, 1995, p. 193).

As students age, their ability to write persuasively does appear to improve (Burkhalter, 1995; Knudson, 1992; Pellegrini, Galda, & Rubin, 1984). Differences emerge between younger and older students, not necessarily in terms of their choices of words, or the skill in which they select the words, but in their definition of the writing goal, or what they think they are supposed

to be doing (Hayes, 1991). Once a goal has been clearly established, students are then able to generate ideas to accomplish that goal. Whereas 70% of younger writers generated their ideas directly from the stated goal, 60% of older writers were able to create more ideas upon elaboration of their original concepts (Flower & Hayes, 1981). A study of first, third, and fifth grade students found that students' persuasive messages get longer, more varied, and more complex with age (Pellegrini, Galda & Rubin, 1984). Knudson (1992) also found that older students were more likely to use negative sanctions, embellish their reasons, and add a degree of compromise than younger students. Burkhalter (1995) found that younger students had more difficulty elaborating their reasons than did older students, and Atkins (1983) found that older students had more of a sense of "audience" than did younger students.

However, despite initial age differences, "we do not know to what extent the learning of persuasion and argumentation depends upon the maturation of the child's development of logical thinking and formal reasoning" (Knudson, 1992, p. 3). A study that attempted to correlate a student's score on the Inventory of Piaget's Developmental Tasks (IPDT) with persuasive writing ability found no such correlation (Ranieri, 1983). Recent work has found that students who have the opportunity to engage in an activity and receive modeling and feedback surpass students who outperformed them at the outset (Bransford & Schwartz, 1999). This role of instruction appears critical in allowing students to perform in ways that are more typical of older students. "Children with restricted and concrete, rather than psychologically-oriented construct systems" benefited most in a study of the impact of instruction upon students' persuasive writing abilities (Clark, Willihnganz, & O'Dell, 1985).

Studies that have examined the results of instruction in teaching persuasive writing process with younger students have been mixed (Burkhalter, 1993; Knudson, 1992; Clark, Willihnganz, & O'Dell, 1985; VanTassel-Baska, Johnson, Hughes & Boyce, 1996). A study that attempted to instruct second, fourth and sixth grade students with a sense of audience (Atkins, 1983) found that instruction had no effect and hypothesized that the development of an external perspective was a developmental issue. Another study of third, fourth and fifth graders found that instruction in persuasive writing had no effect on the degree of elaboration used, but that the Piagetian developmental level of the student did impact on the degree to which the student could improve (Poulson, 1997). The study stated that "concrete operational children do not benefit from persuasive instruction, and that...{it} is inappropriate to administer standardized assessments of persuasive writing to these grade levels" (p. vi).

However, the nature of the instruction itself appears to be critical. Using an adapted Toulmin measure (1958), Burkhalter (1995) found that both fourth and sixth grade students significantly improved in their use of opinion statements, data, and elaboration with instruction, although older students performed better than younger students, especially in the area of elaboration. Instruction was also found to significantly improve fourth grade gifted students' ability to state opinions, increase data, and use elaboration (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996). Similarly, a study that involved 18 students with learning disabilities found that with week-long interactive dialogues to plan and revise their work, students were able to improve their persuasive writing in terms of clarity and cogency over the course of a year (Wong et al, 1996). In contrast, Clark, Willihnganz, and O'Dell (1985) found that even brief, or less than 10 hours of instruction, had significant impact on fourth grade students' tendency to use compromise in their writing, a strategy more likely to be favored by older students (Knudson,

1992). In addition, a study of 100 sixth grade students found that with instruction, the ability to write persuasively improved significantly, and the thinking processes of analysis and synthesis of new ideas was transferred between reading and writing (Crowhurst, 1991). Finally, a study of fourth and sixth grade students also found that students who were taught to elaborate their goals for writing were better able to bolster their persuasive appeals and effectiveness, although older students did better than younger students (MacArthur & Ferretti, 1997).

Teacher Training Issues. Teachers play a critical role in the development of students' persuasive writing abilities. "Unless specific education is provided, one should not expect students to gain insight into the concept of argumentation, let alone skills in distinguishing complex argumentation" (vanEemeren, Grootendorst, & Henkemans, 1996, p. 310).

Teacher training needs to provide teachers with structured systems of persuasion. In order to teach a subject well, teachers themselves need to have an in-depth knowledge of the subject matter to then promote such learning in their own students (Darling-Hammond, 1999). Because goal formation of writing is the critical component to skilled writing (Flower & Hayes, 1990), teachers must learn how to encourage students to structure their own persuasive pieces. The interaction of the teacher in a student's writing process appears to help, yet is the result of the teacher's executive thinking processes, not the student's (Scardamalia & Bereiter, 1986). Teachers should be sharing with students what the writing strategy is, how the strategy should be learned, how to use the strategy, when and where to use the strategy, and how to evaluate the strategy (Paris & Winograd, 1990). They need to model for students the thinking process, allowing their students to be active participants in the thinking process, and finally, fading from their role in the learning process (Collins, Brown, & Newman, 1989). Such a dance of instruction leads to what Dickson (1995) called the "distanced/personal classroom" or where

learning "links teacher learning with student learning, integrates the personal with the academic, associates the subjective with the objective and combines the intellectual with the emotional" (p. 26).

Implications of this Strand of Research

While critical thinking is necessary for achievement in many curriculum areas, the area of persuasive writing shows much promise as a vehicle for instruction in critical thinking. Persuasive writing, through its form and content, requires that students manipulate data and personal opinions in such a way that they are, in the words of Paul (1990) "taking charge of the construction of thinking, guiding the construction of thinking according to standards, and assessing the effectiveness of the thinking" (p. 21) in order to construct a persuasive piece. When students take charge of their thinking in the development of a persuasive writing piece, they must formulate the structure of persuasion; when they guide the construction, they must determine what reasons and data to use; and finally, when they assess the effectiveness of their thinking, they must determine the overall persuasiveness of a piece. Thus, evaluation of persuasive writing is directly linked to the evaluation of critical thinking.

Another implication of this strand of research is associated with the teaching of persuasive writing. While persuasive writing appears to be developmental in nature, such that students acquire skills as they age, there is significant evidence that students of varying ages can learn persuasive writing skills with explicit instruction, as long as the instruction is geared for their level (Burkhalter, 1995). This impacts the teacher who must integrate "developmentally appropriate practice" with skills that are above the students' demonstrated level of proficiency. The teachers' role of providing modeling and feedback becomes critical to student success, and teacher training components must address this process explicitly.

Strand Three- Curriculum Development and Implementation for Gifted Learners

A recent survey of the 50 states and their definitions of the term "gifted" identified numerous similarities, including the issues of (a) advanced intellectual functioning, (b) advanced academic functioning, and creative ability (Stephens & Karnes, 2000). These state definitions are similar to the definition found at the federal level. In 1994, with the release of the U.S. Department of Education report National Excellence: A Case for Developing America's Talent, a new definition evolved at the federal level, reflecting current knowledge and philosophies regarding high ability students:

> Children and youth with outstanding talent perform or show the potential for performing at remarkably high levels of accomplishment when compared with others of their age, experience, or environment. These children and youth exhibit high performance capability in intellectual, creative, and/or artistic areas, possess an unusual leadership capacity, or excel in specific academic fields. They require services or activities not ordinarily provided by the schools. Outstanding talents are present in children and youth from all cultural groups, across all economic strata, and in all areas of human endeavor (p. 26).

However, identifying such students becomes difficult in the face of such a wide definition. Seven states refer to explicit scores on standardized tests (Stephens & Karnes, 2000). However, the majority of states depend on student performance and demonstrated cognitive characteristics for identification and programming purposes (Stephens & Karnes, 2000).

Characteristics of Gifted Students

The majority of these cognitive characteristics tend to become organized into three primary themes for curriculum creation and implementation. These include the clusters of (a) precocity, (b) intensity, and (c) complexity (VanTassel-Baska, 1996). Gifted children are better able to handle abstract concepts and perform at higher levels in reading and writing at an earlier age than their peers (Gallagher & Gallagher, 1994). While not all gifted students are talented in all academic areas, there are certain verbal characteristics that many gifted students exhibit, and this study examined those characteristics of students highly able in language arts. These students often grasp the system of language quickly, speaking earlier and sometimes reading earlier than other children (Perleth, Lehwalk & Browder, 1993). They tend to develop most sophisticated linguistic systems, speaking in more complex sentences and using a higher vocabulary than other students (Perleth, Lehwald, & Browder, 1993). Gifted students' memories are faster and better able to access information and schema than other students (Sternberg & Davidson, 1985). They often grasp cognitive and metacognitive strategies without having been directly taught the skills (Borkowski, Carr, Rellinger, & Pressley, 1990; Schunk & Swartz, 1993).

Thinking Characteristics of Gifted Students. Gifted students demonstrate superior levels of metacognitive strategies when compared to their age peers (Borkowski, Carr, Rellinger, & Pressley, 1990). However, there is even some evidence to indicate that gifted students may not reason better than their age peers (Perkins, 1986; Woodrum & Savage, 1989). Perkins (1986) found that IQ scores correlate with bolstering persuasiveness through the volume of reasons provided, but there was no correlation with the elaborateness of their arguments, indicating that gifted students are more facile at creating reasons, but are as limited as average students in developing these reasons to conclusively provide data for them. Woodrum and

Savage (1989) found that there were no differences between gifted students and students with learning disabilities on measures of deductive reasoning, although there were significant differences in other characteristics of thinking, such as metacognition and use of schema. In an intervention study in which problem-solving strategies were taught to 102 gifted students, average students, and lower-ability students through either Creative Problem-Solving or computer-assisted instruction strategies, both groups benefited from instruction when compared to a comparison group. However, there were no differences between ability groups, nor between the two different strategies, in the improvements of productive thinking, original thinking, or forecasting (Nichols, 1993).

Similarly, a study (Swanson, Christie, & Rubadeau, 1993) that compared gifted students, average students, students with learning disabilities and students with mental retardation, found that when IQ was not considered a factor, gifted students outperformed their age peers in terms of analogical reasoning and metacognition. However, when IQ was controlled, gifted students' analogy task scores were lower than the other ability groups. Thus, researchers concluded that the knowledge of strategies is more important in predicting reasoning performance than general IQ. This link between knowledge of strategies and ability to think critically is reinforced by Garcia and Pintrich's (1992) findings that critical thinking was more closely related to metacognitive awareness than level of motivation, particularly in the area of language arts.

Writing Characteristics of Verbally Talented Students. In his study of prodigies, David Feldman (1986) wrote, "Writing is not a domain where prodigious achievement occurs" (p. 44). He determined that the field of writing itself did not provide numerous strategies for instruction and that much of writing is based on experience, rather than a facility in thinking processes. However, the Portland Gifted Child Project (DeHann & Havighurst, 1957) framed

their determination of writing ability by an examination of students' work and evaluating their originality of ideas, paragraph organization, and maintenance of a point of view, among other components. Piirto (1992) identified 16 characteristics of children who had demonstrated marked performance in writing at an early age, including an advanced sense of structure and syntax. This advanced use of structure and the more developed levels of abstraction allow students gifted in writing to be considered more "expert" in their use of writing than their age peers (Dickson, 1995).

This strength in writing is related to the fact that strong writers "will work through a task at an abstract level before working through it concretely" (Scardamalia & Bereiter, 1986, p. 798). They are able to convert writing goals to a series of subgoals and plan according to each step of the subgoal. It is a process that is largely unconscious (Lally & LaBrant, 1951), but relies on the use of long-term memory stores (Pressley & Afflerbach, 1995). Both novice and expert writers use memory heuristics and associative connections for idea generation and the subsequent written product (Scardamalia & Bereiter, 1986); however, expert writers rely more heavily on heuristics and many of their ideas are generated through the planning and elaboration stages (Flower & Hayes, 1981). They are able to think of more ideas and discard more judiciously than novice writers.

Persuasive writing itself calls for skills in which gifted students tend to excel. In a study comparing the degree of elaboration between gifted students and other students on various writing tasks (Reed, 1984), average students elaborated the most in descriptive essays, whereas gifted students elaborated the most in persuasive essays. Perkins (1981) also found that gifted students provided more reasons than other students in persuasive essays.

Curriculum Needs

Despite gifted students' ability to learn at faster rates than other students, it does not negate the necessity of including thinking skills in their education, in conjunction with high level content and concepts. Too often, gifted education has over-emphasized the learning of thinking skills to the exclusion of content and situations in which gifted students can transfer their thinking skills (Maker & Nielsen, 1995; VanTassel-Baska, 1995). Even as early as 1960, Margaret Mead emphasized the role of content in her statement that "the gifted child needs scope, material on which his imagination can feed, and opportunities to exercise it" (p. 500).

A recent review of curriculum models (VanTassel-Baska & Brown, in press) found that gifted education has traditionally fallen into two competing philosophical orientations. The first emphasizes the acceleration of content for the highly gifted who score in the top 1-3% on standardized tests (Stanley, 1998); while the second emphasizes compacting of material and enrichment through projects by focusing on a larger group of students who have the ability to achieve above the level of typical classroom instruction (Renzulli, 1978). However, while each emphasizes different strategies, neither completely meets the need of curriculum developers who need (a) a framework for curriculum design, (b) transferability of the model between academic subjects, (c) application across all grade levels, (d) applicability across all grouping and placement settings, and (e) the inclusion of differentiated features for students who are gifted and talented (VanTassel-Baska & Brown, in press). VanTassel-Baska and Brown (in press) identified 15 criteria for the evaluation of curriculum for gifted and talented students, and evaluated the major curriculum models used in gifted education. The Integrated Curriculum Model (ICM) met 12 of the 15 criteria, establishing it as a significant model for curriculum

developers. In addition, the model has been implemented with the development of curriculum in language arts, science and social studies, and evaluated through numerous studies.

Integrated Curriculum Model. According to VanTassel-Baska, (1996), "a dearth of attention has been given to the relationship of talent development to well-conceived and developed curriculum that is responsive to students talented in particular areas" (p. 10). As a result, extensive and effective curriculum for high ability learners in the areas of language arts (VanTassel-Baska, Johnson, Hughes, & Boyce, 1996), science (VanTassel-Baska, et al, 1998) and social studies (Avery, 1999) has been developed, oriented around the Integrated Curriculum Model. This curriculum model is developed around three primary dimensions (VanTassel-Baska, 1996).

1. An emphasis on advanced content that connects the model to the disciplines through a diagnostic-prescriptive approach.
2. The provision of higher order thinking process and products that honor the generic thinking skills, as well as content-specific processes, such as scientific inquiry.
3. A focus on concepts, issues and themes that are real-world oriented and applied in a systematic manner so that students gain deep understandings of ideas and content.

This integration of content, processes, products, and concepts is contrasted to the more traditional concept of "interdisciplinary instruction" that emphasizes the "integration of content by blending disciplines" (Gavelek, Raphael, Biondo, & Wang, 1999, p. 5). Thus, this model extends curriculum development beyond an emphasis on content alone, to an integration of process-oriented skills in conjunction with specific areas of content.

This model has been researched extensively using quasi-experimental designs in three different academic areas of language arts, science, and social studies. In language arts, gifted students in grades four through six exposed to the language arts unit Autobiographies: Personal Odysseys of Change demonstrated significant growth in literature analysis, persuasive writing, and grammatical competency when compared to other students of similar ability (VanTassel-Baska, Johnson, Hughes & Boyce, 1996); in the area of science, 20-25 hours of instruction in the unit Acid, Acid Everywhere resulted in a significant increase in science process skills of gifted students in fourth through sixth grades (VanTassel-Baska et al, 1998); and in the area of social studies, 20 hours of instruction resulted in an increase in concept learning across all ability levels in students in grades two, four, and seven (Avery, 1999).

Learning Strategies. There is a conception that teaching a thinking skill to a student who has intuitively mastered it may actually hinder the student's performance (Idol, Jones & Mayer, 1991), since the student is then forced to consciously think about processes that have already been internalized to long-term memory; therefore, cluttering up the short-term memory. A study that compared the metacogntive strategies of gifted students, average students, students with learning disabilities and students with mental retardation found that only gifted students demonstrated no correlation between knowledge of metacognitive strategies and their reasoning abilities (Swanson, Christie, Rubadeau, 1993). All other groups did have strong correlations between the strategies and the demonstration of analogical reasoning.

However, instruction through specific learning strategies does appear to be beneficial in improving gifted students' ability to process information. Taba's (1966) specific strategies of concept development, interpretation of data, application of generalizations and conflict resolution have been found to be highly effective with gifted students (Maker & Nielson, 1995). A study

by Schunk and Swartz (1993) found that a group of fourth grade gifted students who were provided with a writing strategy goal plus feedback out-performed other gifted students who had not received the strategy. Similarly, VanTassel-Baska, Johnson, Hughes, & Boyce (1996) found that fourth grade gifted students were able to improve significantly in terms of persuasive writing when presented with direct instruction and specific learning strategies over other gifted students who had not received a curriculum designed to teach thinking skills imbedded in content. "Providing gifted students with a goal of learning a writing strategy and feedback on their progress raises achievement outcomes and transfer" (Schunk & Swartz, 1993, p. 229).

Teacher Training Issues.

Any teacher working with gifted students must have an understanding of how learner characteristics impact learning so that teachers can "shape lessons to connect with what students know and how they learn well" (Darling-Hammond, 1999, p. 225). Teachers working with gifted students in the area of writing need to have: (a) an understanding of the characteristics and needs of gifted students, (b) an understanding of the key issues and components of language arts, and (c) a deep understanding and consistent use of a particular model of writing instruction (VanTassel-Baska, 1996). In addition, teachers need time to reflect on their implementation of curriculum, and supportive administration who promotes learning for understanding (VanTassel-Baska, 1996). These recommendations are in line with the findings by Pogrow (1998) who found that teaching for understanding required a systemic adoption of sophisticated strategies and curriculum delivered in a sustained and intensive manner. Teacher training for teachers of gifted students in the area of writing must reflect this integration of content and process that has been differentiated to meet the needs of gifted students.

Implications of this Strand of Research

There are several significant implications from this strand of research. The first, and perhaps the most significant, is that writing curriculum for gifted students must be responsive to the needs of gifted students. This means that curriculum developed for gifted students must provide rapid pacing, a breadth of knowledge, and complexity within the curriculum (Maker & Nielson, 1995; VanTassel-Baska, 1998). The Integrated Curriculum Model (VanTassel-Baska, 1996) is one that integrates the needs of the gifted child with the elements of curriculum reform and formed the foundation for the curriculum unit that is employed in this study.

The second significant implication is that a curriculum that explicitly teaches the desired behavior and provides a structure for that behavior is appropriate for use with gifted students and results in improved performance. The use of a writing process model, such as the hamburger model, provides a structured activity for gifted students that has been found to be effective in improving gifted students' persuasive writing abilities.

Finally, this strand of research has significant implications for teacher training. Teachers of gifted students in the area of language arts must be familiar with the characteristics and needs of gifted students, as well as how those characteristics translate into improved practice in specific content areas. Teachers must have a deep understanding of content knowledge in order to be able to manipulate it through increased pacing, breadth and complexity, in order to meet the needs of gifted students.

Strand Four- Curriculum Development and Implementation for Students with Learning Disabilities

While the definition of learning disabilities is a complicated issue, the current federal definition, as stated in the 1997 Individuals with Disabilities Education Act (IDEA), is similar to the definition that has been used for the legal definition for the last 25 years. It states that:

> IN GENERAL: the term "specific learning disability" means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations (IDEA, 20 U.S.C., SS 1400 et seq., 1997).

In addition, the laws required three components when identifying a student with a learning disability, including: (1) a discrepancy between potential and actual achievement, (2) the exclusion of other factors, such as sensory impairment or cultural difference, and (3) a demonstrated need for special education services (Mercer, Jordan, Allsopp, & Mercer, 1996).

Characteristics of Students with Learning Disabilities

While a disability may be exhibited in conjunction with other factors, it is considered to be intrinsic (National Joint Committee on Learning Disabilities, 1994). Distinctions can be made between students who have learning disabilities and students who are low achievers because students with learning disabilities tend to score higher on aptitude tests and lower on achievement tests (Wong, 1996).

Although the definition of learning disabilities includes a wide variety of students exhibiting difficulties in specific academic areas, "no matter what characteristics manifest, however, students with learning disabilities often face challenges related to learning skills"

(Turnbull, Turbull, Shank & Leal, p. 126). These learning challenges include the skills of generalization, memory and metacognition (Turnbull, Turnbull, Shank, & Leal, 2000; Wong, 1996). "Because learning-disabled children are most often diagnosed after a period of failure, they often develop both metacognitive and motivational problems" (Borkowski, Carr, Rellinger, & Pressley, 1990, p. 67).

Thinking Characteristics of Students with Learning Disabilities. Students with learning disabilities tend to exhibit significant difficulties in monitoring their own thinking processes. Specifically, (1) knowing a large number of strategies for acquiring, storing and processing information, (2) understanding when to use particular strategies and why they are important, and (3) selecting and monitoring the use of such strategies tends to be a significant challenge (Turnbull, Turnbull, Shank & Leal, 2000). However, as Wong (1996) noted, "One should remember that students with learning disabilities do possess certain cognitive strategies, but their cognitive strategies tend to be inefficient or faulty" (p. 127). Reasons for these deficiencies may include: (1) neurological impairment that inhibits language retrieval (Turnbull, Turnbull, Shank & Leal, 2000), (2) past histories of failure that have eroded their sense of efficacy (Wong, 1996), (3) educational experiences that have provided them with too much structure (Wong, 1996), or (4) the effort required to learn such strategies (Borkowski, Carr, Rellinger, & Pressley, 1990).

Writing Characteristics of Students with Learning Disabilities. While students with learning disabilities tend to have less sophisticated metacognitive strategies for reading, they have significantly more deficient strategies in writing (Wong, 1996). Students with learning disabilities tend to perceive a good paper as one that is free from spelling mistakes (Wong et al, 1996), or one that has good handwriting (Harris & Graham, 2000). They tend to lack

understanding of (a) text structure, or genre, (b) the fact that the writing process involves goal setting, planning, idea generation and revision, (c) their own cognitive processes in writing, and (d) the areas in which they need assistance (Wong, 1996).

The view of writing as an act that requires integration of social, cognitive, and physical processes (Hayes, 1991) is particularly appropriate for students with learning disabilities, since "it focuses on processes, not products, and on support from an audience, rather than drilling isolated skills" (MacArthur & Schwartz, 1990, p. 35). "Process-oriented writing" is an attempt to integrate the instruction of thinking and writing so that students can move from novice writer to expert writers (Applebee, 1991).

Students with learning disabilities express many of the characteristics of novice writers when compared to other students of their same age (Levy & Rosenberg, 1990). Both novice and expert writers use memory heuristics and associative connections for idea generation and the subsequent written production (Scardamalia & Bereiter, 1986); however, expert writers rely more heavily on heuristics and many of their ideas are generated through the planning and elaboration processes (Scardamalia & Bereiter, 1986; Flower & Hayes, 1991). They are able to think of more ideas and discard more judiciously than novice writers. Thus, students with learning disabilities often have difficulty generating and planning written concepts.

The ability to juggle multiple planning tasks may be one explanation for why students with learning disabilities exhibit poor writing performance. Ashbaker and Swanson (1996) found that comprehension scores among students with learning disabilities are better predicted by their long-term memory, rather than their short-term memory. In contrast, reading comprehension scores of students without a learning disability were more accurately predicted by their short-term memory, indicating that "students with LD lack flexibility in coordinating

several types of memory stores, rather than an output problem from one particular store" (Ashbaker & Swanson, 1996, p. 211). The researchers further concluded that if students are provided with reading and writing strategies, that may "free up" some memory capacity, and students will be better able to read and recall information, reinforcing the concept of automaticity, or where "memory efficiency increases as cognitive processes become more and more automatic" (Perleth, Lehwald, & Browder, 1993, p. 293).

Expert writers often have the mechanics of writing, spelling, punctuation, etc. in long-term memory storage, so that the lower level procedures are automatized, and their immediate working memory can focus on the higher-order components of writing (Scardamalia & Bereiter, 1986). Indeed "the efficiency of the memory system is considered to be the main cause... in the inter-individual differences in the achievement of gifted, average, and retarded children" (Perleth, Lehwald, & Browder, 1993, p. 293). A study in which students with learning disabilities were provided computers and specific writing instruction geared to teach students how to use the editing and word processing functions, found that students were more likely to be eager to write and that their quality of writing was deemed to improve (MacArthur & Schwartz, 1990). However, Scardamalia, Bereiter, and Goelman (1982) have found that mechanical issues rarely affect the quality of students' writing. "There was nothing in the findings to suggest that the quality of children's compositions was adversely affected by the mechanical difficulties of writing" (p. 208). Connor (1990) also found that the quality of students' writing mechanics was not related to the quality of their persuasive pieces. McCutheon and Perfetti (1982) noted that developmental differences in writing ability are often linked to developmental differences in children's metacognitive search strategies, rather than to more simplistic elements of mechanics.

The role of reading ability is a critical one when examining persuasive writing abilities. MacArthur and Feretti (1997) found that when given direct instruction in elaboration of goals for writing purposes, students with learning disabilities did better than students without learning disabilities, regardless of reading levels. Literature-oriented, rather than skill-oriented instruction in persuasive writing also had no effect on student scores on persuasive writing tasks (Farmer, 1999). Hauser (1995) also did not find any relationship between student reading levels and their persuasiveness on persuasive writing tasks, although reading ability did play a factor in the types of sentences used and the specific use of information recall.

Curriculum Needs

Historically, instruction for students with learning disabilities has not included higher order thinking skills that they so desperately need (Levine, 1988; Sternberg, 1994; Allington, 1991), but rather has focused on facts, skills, and applications. "Our instructional efforts in the name of helping poor students are trapped in an archaic paradigm- that of reductionism" (Allington, 1991, p. 286). The conventional approach of teaching "remedial" skills includes the notion of small, explicit goals that "limits the level of knowledge and performance that can be conveyed to students" (Allington, 1991, p. 286). Allington (1991) noted that while a disability may originally be a small stumbling block to learning, by not exposing students to thinking strategies, teachers and educational systems are making the disability worse, not better, since students do not have opportunities to learn and develop schema and higher order thinking skills.

More recently, there has been significant interest in focusing on the instruction of cognitive skills for students with learning disabilities. "Students who are most likely to benefit from cognitive instruction are lower aptitude students who would not acquire the skills under normal instructional methods" (Idol, Jones, & Mayer, 1991, p. 75). A study that examined the

effects of coaching upon the recall, reasoning, and explanation processes of students with learning disabilities found that the group with the most number of prompts improved the most in terms of the richness of their explanations and reasons (Sullivan, Mastropieri & Scruggs, 1995). The groups that were provided with (a) no explanation, and (b) only explanation with no prompting scored significantly lower in reasoning. Another study that taught persuasive writing skills to 38 adolescents with learning disabilities found that the students with learning disabilities outperformed their general education peers who had not received such instruction (Wong, Butler, Ficzere, & Kuperis, 1996). Similarly, after instruction in drawing diagrams to represent syllogistic reasoning, students with learning disabilities were able to answer questions in ways similar to that of gifted students (Grossen & Carnine, 1990). Intense work with three students with learning disabilities found that with instruction in a planning and reflection strategy, students shifted from a "retrieve and write" method, to a more organized and plan-oriented strategy of persuasive writing (De La Paz & Graham, 1996). Another study of 132 students, half of whom had learning disabilities, found that students with learning disabilities who were provided goal-setting instruction were able to write persuasive essays that more closely approximated the writing of students without disabilities who had not received such coaching (MacArthur & Peretti, 1997). However, the same study also found that students who did not have disabilities experienced more significant differences in growth than did students with learning disabilities, indicating that such strategies are appropriate for other groups of students as well.

Learning Strategies. Taba (1962) observed that transfer of thinking skills across domains is not automatic and must be specifically taught as well. Experimental work in memory has found that individuals may have a difficult time transferring schema to new problems, not

because of the problem or the structure of the critical thinking process, but because of the context and the content variables (Lockhart, 1992). "People may be able to retrieve and use knowledge when explicitly asked to do so, yet fail to spontaneously access it or use it" (Branford, Vye, Kinzer, & Risko, 1991, p. 387). This transfer of skills to new situations becomes a significant issue in the teaching of critical thinking.

Numerous effective strategies to allow students to have access to their strategies have included charts, Venn diagrams, mnemonics, and use of manipulatives (Smith, 1990; Levy & Rosenberg, 1990; Wong, 1996). These strategies help the student to remember information, generate and organize information, express their ideas, and edit for revision purposes. Thus, learning strategies can be defined as "a set of responses organized to solve a problem" (Swanson, 1993, p. 62).

Studies have found that with strategy instruction, students with learning disabilities perform as well, if not better than their peers. Extensive studies by the University of Kansas (Schumaker & Deshler, 1992) examined the results of direct strategy instruction with 104 adolescent students with learning disabilities. Academic results, as measured by standardized reading, writing and math tests, were found to improve in the specific academic area, and students were able to transfer the strategy to new content as well. In addition, students retained the writing strategy over time. Graham and Harris (1992) found that with strategy instruction, the essays of students with learning disabilities were equal to their peers in terms of schematic structure and quality. It is significant to note that strategy instruction not only affected the outcome, or the final written product of a student, but also affected the process by which a student writes. Students who received strategy instruction in writing spent more planning their

compositions (Graham, Harris, MacArthur, & Schwartz, 1991), and making substantive changes in the editing process (MacArthur, Schwartz, & Graham, 1991).

Contradictory studies have been conducted to evaluate the results of strategy instruction with non-disabled peers. A goal-oriented writing strategy was found to increase the persuasive abilities of 132 fourth and sixth graders, and average students improved to the same degree that students with learning disabilities improved (MacArthur & Perfetti, 1997). However, Wong and Jones (1982) trained adolescents in the use of a self-questioning strategy to improve reading comprehension. The reading comprehension of the students with learning disabilities improved, while the reading comprehension of students without disabilities actually decreased. Another study (Swanson, 1993) that used an elaborated sentence to promote recall of information found that students with learning disabilities declined in performance because the elaboration component overtaxed their processing; whereas gifted students, average students and students with mental retardation all improved. The Swanson, Christie, and Rubadeau (1993) study that compared the metacognition and analogical reasoning in gifted students, average students, students with learning disabilities and students with mental retardation concluded that the knowledge of strategies is more important in predicting reasoning performance than general IQ for students with learning disabilities.

However, Levine (1988) warned that cognitive instruction must be related to the higher-order thinking that it is trying to promote. Too often, learning strategies are taught as gimmicks and promote lower-level, specific information and "may be counter-productive in reinforcing rather than diminishing tendencies towards over-emphasis on mechanical learning" (p. 129). Truly effective strategy training programs, such as the ones at the University of Kansas

(Schumaker & Deshler, 1992) must include application of the strategy to "specific material, in a specific context, with a specific student" (Swanson, 1993, p. 87).

Direct Instruction. It is in this application of a strategy or an instructional process that direct instruction plays such a large role. According to Heward (2000):

> The Direction Instruction (DI) is the most carefully developed and thoroughly tested program for teaching reading, math, spelling, and thinking skills to children.... {D}eveloped at the University of Illinois in the 1960s...Research and development on the model continues today throughout the country. Two major rules underlie DI: (1) teach more in less time, and (2) control the details of the curriculum (p. 272).

Direct instruction occurs when "the steps of the strategies targeted for instruction are presented in a sequential fashion, generally determined through a task analysis" (Palinscar et al, 1993, p. 252). The teacher's dual role of providing instruction designed to promote the independence of student thinking along with direct-instruction scaffolding is noted by Borkowski Carr, Rellinger, and Pressley (1990). Lessons are scripted, questions are provided to the teacher by the curriculum and immediate feedback is provided to students (Heward, 2000). Characteristics of direct instruction include modeling, rehearsal, feedback and mastery tests (Wong, 1996).

Such instruction has been found to be highly effective among students with learning disabilities. The national Follow Through program evaluated the results of specific Direct Instruction curricula with more than 8,000 students in over 200 communities and found that of eight different instructional strategies, Direct Instruction was the most effective instructional strategy for increasing student scores in specific reading, math, and writing skills (Bock, Stebbins, & Proper, 1996). In addition, the effects of instruction are long-lasting. Students who

participated in DI through the third grade were more apt to graduate from high school, have lower drop out rates, and be accepted to college than a similar ability group (Darch, Gersten, & Taylor, 1987). In a recent series of monographs designed to highlight research-proven effective practices, the Council for Exceptional Children highlighted Direct Instruction as the most effective strategy found to increase the achievement of students with learning disabilities (Council for Exceptional Children, 1999).

However, direct instruction has been found not to be as effective for high ability students. In a study of 45 students, direct instruction was not as effective for high ability learners as was reciprocal teaching or collaborative problem-solving in the use of strategies for reading comprehension, although direct instruction was found to be effective for students with learning disabilities (Palinscar et al, 1993). In addition, while achievement in the components that were directly taught improved, other areas of comprehension and generalizability did not (Palinscar et al, 1993).

Hamburger Model of Writing. At the heart of the treatment to teach critical thinking through persuasive writing is the "hamburger model" of writing. Of unknown origin, the Hamburger model is used extensively in writing programs, from the elementary level to the college level. It is a model of writing referenced by the British Columbia's Ministry of Education (1998) as appropriate for students with learning disabilities, and is listed on Hawaii's State Department of Education's web site devoted to writing strategies (1999). As it is used in this curriculum, the hamburger model is correlated with Toulmin's (1958) argument model.

In the curriculum unit, Persuasion developed by the College of William and Mary (Center for Gifted Education, 1999b), the hamburger model forms the foundational approach for persuasive writing by arranging Toulmin's (1958) persuasive writing components into a graphic

organizer. The "Top bun" is the basic statement of opinion; the three "meat patties" constitute the reasons, and the "bottom bun" is the concluding statement. While this forms the essential components of persuasive writing, students receive instruction in how to add "lettuce" and "tomatoes" by adding statements that clarify who the writer is, and other elaborative details. Thus, the model incorporates both the structure of persuasive writing through the analogy to the formation of a hamburger, as well as the substance of persuasion by the analogy to those elements that make a hamburger tasty and original.

The hamburger model is very similar to numerous writing strategies developed by experts in special education, including the TOWER Paragraph Writing Strategy (Schumaker & Lyerla, 1991), the "Essay Writing Strategy" developed by Beatrice Wong and associates (Wong et al, 1996), the SLOW CaPS strategy developed by Levy and Rosenberg (1990), the "TREE" strategy of Harris and Graham (1992), and the "Star" graphic by Graves (1998). Each of these provide metacognitive prompts for students to write a lead sentence or paragraph, provide three details and end with a concluding or summary sentence.

Skills/Process-Orientation of Writing. The debate between the process-oriented writing instruction, and skill-focused orientation is similar to the debate of instruction in critical thinking. Certainly, process-oriented writing instruction emphasizes the development of writers through meaningful tasks and immersion in writing (Edelsky, Altwerger & Flores, 1991; Raphael & Boyd, 1997). Nichols (1993) writes that it is "through the acquisition of process skills... that individuals are able to cope with the problems they face in the present world" (p.1). Such an argument is similar to the arguments that advocate the development of critical thinking skills through immersion and deep understanding of content (McPeck, 1990).

Such an emphasis on the process-orientation of writing has been found inadequate for students with learning disabilities (Harris & Graham, 1996). Because the hamburger model, as linked to Paul's Critical Thinking Model, is explicit and provides direct structures for specific components of persuasive writing, it is similar to the Self-Regulated Strategy Development (SRSD) writing strategies devised by Harris and Graham (1992). Both of these strategies are process-oriented, while providing direct instruction in explicit, content-focused, skills. The SRSD strategies focus strongly on the provision of self-monitoring questions in the areas of goal-setting, instructions and monitoring (Harris & Graham, 2000), all critical steps in the writing process. While Harris and Graham advocate a shift towards a process-oriented approach to writing, they recognize the need to "develop strategies, skills and mechanics in the context of meaningful activities" (Harris & Graham, 2000, p. 6). They note that for students with learning disabilities, intensive, additional and directed instruction is needed in order for students to make gains similar to average-performing peers.

The hamburger model in conjunction with the Wheel of Critical Thinking, adapted from Paul's model (Center for Gifted Education, 1999a) provides such a balance of process and skills. The emphasis on critical thinking provides a need for students to seek meaning and to delve deeper into content through reasoning and analysis. However, the Hamburger Model provides a structure for specific skills that are used in persuasive writing; namely, the formulation of an introduction, the structure of a conclusion, and the production of numerous data points. Linking the two provides a meaning-oriented focus for the specific skills of persuasive writing.

Teacher Training Issues

Levine (1988) noted that the improvement of students' thinking skills, requires "careful and continuous mediation by teachers and other adults" (p. 118). This critical role of the teacher is noted by Paris and Winograd (1990) who observed that "Procedural facilitation is particularly helpful when task demands exceed the current levels of students' ability" (p. 38). Often, the teacher plays a role through scaffolding questioning strategies, in which the teacher provides enough support so that the students can achieve goals that are above their unassisted efforts (Paris & Winograd, 1990), a strategy that is in direct accordance with Vygotksy's notion of the "zone of proximal development" (Ormrod, 2000). Levy and Rosenberg (1990) noted that changing students' thinking strategies is "most effective when the teacher anticipates precisely what changes are needed or teaches students rules by which they can successfully decide what must be done" (p. 23). Teachers must be familiar with the specific strategies to be taught, and must present them in such a way that student responses are rapid, and feedback is immediate.

Implications of this Strand of Research

Students with learning disabilities are identified by their very lack of achievement in a particular academic area. The definition followed by most states requires that students have average to above average intelligence with a discrepancy between aptitude and achievement. Often, these academic weaknesses demonstrate themselves not only in performance, but also in methods of solution, or the processes of thinking that are involved in the production of academic performance. Such processing difficulties are not indicative of absent processes, but inefficient or inappropriate use of strategies.

For the purposes of this study, students with learning disabilities were defined as those students with deficits in the area of written language, typically measured by scores on a standardized achievement test. Students with learning disabilities in written language demonstrate significant weaknesses not only in their output, but also in the manner in which they approach writing. Because students with learning disabilities demonstrate significant weaknesses in metacognitive strategies, their writing production and writing strategies are immature and delayed. However, it is important to note that while reading ability is related to writing ability, direct instruction in specific writing skills have had no relationship to reading levels (MacArthur and Feretti, 1997), while other studies have found that reading ability does not have an impact on the persuasiveness of an argument (Hauser, 1995).

The need for further research in interventions in specific genres of writing has been cited (Wong, 1996). Any genre-specific research would have to include the dual components of strategy instruction and direct instruction, since the combination of both are the most powerful interventions found to be effective for students with learning disabilities (Swanson, Hoskyn, & Lee, 1999). Direct instruction is more a "bottom-up" approach, that emphasizes specific skills, while learning strategies is more of a "top-down" approach that emphasizes the acquisition and use of specific thinking strategies (Swanson, Hoskyn, & Lee, 1999). The two often occur mixed in instruction, since both require oral communication between teacher and student.

It is this interaction between teacher and student that requires the training of teachers in the specific strategies that they are expected to be used with students. Teachers must provide modeling, feedback and supportive environments for such instruction to occur. In addition, teachers must be aware of the individual differences and learning patterns of students with learning disabilities in order to adapt their instruction in a timely and appropriate manner.

Overall Summary

American students' scores on most measures of academic achievement, particularly in writing, have remained essentially unchanged in the last 12 years (USDOE/OERI, 1998). Such consistency of scores, in conjunction with the poor scores when compared to foreign students, suggests an on-going crisis in American education. Such a crisis has not gone unnoticed, and many educators, most notably through the standards-based reform movement, have emphasized higher academic standards and the need to teach students to think critically across a number of academic domains. In response to this need, this study examined the results of a persuasive writing curriculum that integrated a particular critical thinking model, and the consequential results on gifted students, average students, and students with learning disabilities.

In any study of critical thinking, it is necessary to (1) delineate the definition of the process, (2) apply the thinking process to a body of content, and (3) determine the role that individual student differences play in the instruction of the process (Kennedy, Fisher & Ennis, 1991). Thus, this review of literature examined four primary strands of research in order to provide the background for this study. These strands included (1) critical thinking, (2) persuasive writing as a demonstration of critical thinking, (3) characteristics and curriculum strategies for gifted students and students with learning disabilities.

It is an interesting conundrum in the study of thinking that one cannot access the direct processes of higher mental processes; one can only see the products of the thinking processes (Smith, 1990). While medical tests and technology have made it possible to examine neural interactions and brain activity, there is not a completely accurate correlation between the medical findings and the results that are observed from the products of the thinking processes (West, 1991; Ericsson & Hastie, 1994; Clark, 1994). Therefore, in order to determine and evaluate

these results of critical thinking, there must be a definition of critical thinking that frames the evaluation process.

The definition used in this study is the definition put forth by Paul (1990; 1995). Paul (1990;1995) distinguishes critical thinking from other forms of thinking due to its intentional nature in which a thinker imposes standards upon the process and the products of thought. This reasoning is a process that involves specific skills and requires certain habits of mind from the individual involved. In order for students to monitor their own thinking processes and determine appropriate standards of thought, instruction is necessary and critical to the outcome. In order for this instruction to occur, a specific curriculum must be developed that directly imbues an area of content with the skills and components of critical thinking.

If critical thinking is to occur, it must be imbedded in specific content. Language arts is an appropriate vehicle because, "{t}ypically, language arts is defined as instruction in speaking, listening, reading, writing, and critical thinking" (Amsler & Stotko, 1996, p. 194). Persuasive writing, in particular, provides an excellent vehicle for the instruction and consequential evaluation of thought because of its structure and its reliance on independent thought from the writer. As a means of evaluation of critical thinking, persuasive writing integrates specific skills of thinking through its very structure of argument. The quality of reasons provides insight into the standards imposed upon the writing and the degree to which the writer was engaged in critical thinking. Instruction in persuasive writing provides a means of instruction in critical thinking as the individual writer is provided specific skills and practice in the process of writing and thinking.

It is these individual differences found in students that determine the appropriateness of different instructional techniques. Gifted students need a curriculum that is rapidly paced and complex, with a wide breadth of knowledge provided. In contrast, curriculum for students with learning disabilities is most effective when it provides direct instruction with metacognitive learning strategies (Swanson, Hoskyn & Lee, 1999). Because none of these curricular needs contradict each other, it is possible to develop a curriculum that teaches a content area in a complex manner, through direct instruction and the provision of metacognitive strategies. The curriculum Persuasion developed by the College of William and Mary (1999b) and adapted by the researcher, provides these components through the use of the "hamburger model", or a metacognitive learning strategy that assists students in writing persuasive essays.

For all ability levels, instruction in thinking skills must begin early and continue through the course of a student's schooling. "The various cognitive skills and strategies are not learned once and for all at a particular grade or time" (Beyer, 1987, p. 7). In addition, students of all ability levels must have exposure to thinking strategies and specific instruction. Both gifted students and students with learning disabilities appear to benefit from such cognitive instruction and there is a need for curriculum to be developed that specifically and directly teaches such thinking skills.

Implications for Practice

Three factors often associated with teachers' ability to teach a particular subject matter include their knowledge of a subject matter, their skill in implementing a particular strategy within that subject area, and their attitude toward the students involved in the teaching process (Freeman, 1989b). While this study does not examine all aspects of teacher knowledge, skills, and attitudes, they do play a critical role in the success of curriculum implementation. Therefore,

these teacher characteristics were examined in the light of curriculum implementation in specific terms of critical thinking, persuasive writing and individual differences.

Critical thinking is significantly lacking in our society and yet, teachers so often resist the demonstration of critical thinking, interpreting such student behaviors as "argumentative" or "problematic behavior" (Paul, 1995; Levine, 1988). Teachers not only need to recognize such behaviors as positive elements, but also to promote and encourage such acts of thinking. Thus, any curriculum that promotes critical thinking must develop teachers' critical thinking abilities in addition to students'. It must provide training for teachers so that they can recognize appropriate behaviors and provide prompts and opportunities for critical thinking to occur. Teachers must be able to recognize the process of critical thinking within a content area. The provision of a model of critical thinking that is explicitly taught is a necessary element so that teachers can recognize and promote critical thinking (VanTassel-Baska, 1996).

If students are to demonstrate analytical skills and transform language into persuasion through the process of critical thinking, teachers must model and exemplify this process. Teachers must link thinking skills of students to production of written work, and persuasive writing is an excellent tool for achieving such thought. With the advent of state testing, several states, most notably Texas and Connecticut, (USDOE/OERI, 1999c) have included persuasive writing in their state level assessment process in efforts to achieve this marriage of thought and structure. If we are to expect students to master such a process, teachers must receive training that reflects the integration of critical thinking into content.

It has been reported that most teachers tie a student's academic success to one of four factors, that includes: ability, luck, effort and task difficulty (Murray, 1996a). However, beyond the facility to recognize and describe ability differences, skills often taught in gifted education

and special education training, teachers need explicit information on how those psychological and intellectual characteristics affect teacher actions and the nature of curriculum and instruction (Murray, 1996b). One of the issues with teacher training is that much of the research is "concern{ed} with the variables that influence training, rather than the nature of the disability that necessitates the need for such training" (Swanson, 1993, p. 62). Without the knowledge of what individual differences are constituted among students and how they translate into student behaviors in the classroom, teaching training is a moot point. Thus, it is necessary that information regarding student performance in the classroom be provided to teachers in order to improve teacher training methods and courses.

No study has been found that has directly compared the growth of gifted students with students with learning disabilities when provided high level critical thinking instruction. Indeed, only two studies were found that directly compared instructional effects on gifted students compared with students with learning disabilities. The first found that gifted students were better able than average students and students with learning disabilities to provide an explanation for a mathematical procedure (Fuchs et. al, 1996), possibly indicating a higher ability to critically examine a task, analyze it, and communicate through a synthesis of information. The second found that direct instructional strategies were more beneficial to students with learning disabilities than for high ability students (Palinscar et al, 1993). It remains unclear from these studies, however, what effect a curriculum that is designed to simultaneously teach critical thinking skills through the use of learning strategies and direct instruction would have on different groups of students. "Abilities merely enable a certain level of achievement without promoting it" (Perkins, 1990, p. 423).

While it is known that differences of ability and achievement exist among groups of students, and that teaching critical thinking and persuasive writing tend to have positive effects on students, it is not known what initial differences in critical thinking exist between gifted students, average students, and students with learning disabilities, nor what differential effects curriculum that is focused on the direct instruction on critical thinking skills may have on these different groups of students.

CHAPTER THREE

Methodology

While numerous studies have found that thinking can be improved through instruction (Bailey, 1979; Bangert-Drowns & Bankert, 1990; Nickerson, 1984; Lipman, 1991), "{t}he remaining task, and it is a large one, is the refinement of our understanding of what aspects of thinking can be learned, by whom, under what conditions, in what settings, and using what methods" (Lipman, 1991, p. 15). The emphasis of this study was on examining the impact of a curriculum innovation on students of three different ability and achievement levels. The research focused on the instructional results of a specific critical thinking model imbedded in the content area of persuasive writing, and taught to gifted students, average students, and students with learning disabilities at fourth and fifth grades in elementary schools in an urban community.

Conceptual Framework

The conceptual framework for understanding critical thinking was based on the work of Richard Paul. Paul (1990, 1995) developed a critical thinking model in which specific elements of reasoning and habits of mind were delineated. Paul's model was selected because it is a general model of thinking that can be imbedded in specific content; it exemplifies a theoretical middle ground between content specificity of thinking and general thinking that can be taught in an isolated manner and expected to be transferred across all content areas. This model also reflects a middle ground between the delineation of specific skills that are teachable, and the concept that critical thinking is a disposition within the individual that must be instigated. His model also incorporates an ethical component so the implications of one's actions are determined and the effectiveness of the thinking is determined by the need to improve the human condition.

Paul's model incorporates eight components of critical thinking in a non-hierarchical manner and provides a guideline for the application of critical thinking to any content area (Paul, 1995).

Persuasive writing provides an appropriate vehicle for both the demonstration and instruction of critical thinking (vanEemeren, Grootendorst, & Henkemans, 1996). Because of the nature of persuasive writing, in which an opinion is stated, reasons provided, an elaboration of the reasons given, and a summary statement, or conclusion made, the thinking process is a subset of the skills necessary for critical thinking (Burkhalter, 1993). Toulmin's (1958) measure of persuasive writing requires a demonstration of critical thinking for measurement purposes (Inch & Warnick, 1998).

When content is presented to students, there must be some accommodation for the characteristics and individual differences between students (Kennedy, Fisher, & Ennis, 1991). While acceleration and enrichment of content have been found to be effective methods of differentiation for gifted students in order to meet their needs for advanced and more complex materials (Maker & Nielsen, 1995; VanTassel-Baska, 1997), direct instruction and learning strategies have been found to be effective modifications for students with learning disabilities (Swanson, Hoskyn & Lee, 1999). Several studies have been conducted that examined the results of persuasive writing curriculum designed for either gifted students or students with learning disabilities, and a few studies have been conducted that examined initial differences in critical thinking and writing between gifted students and students with learning disabilities (Perkins, Farady, & Bushey, 1991; Swanson, Christie, & Rubadeau, 1993; Yates, Berninger & Abbot, 1995). However, no studies were found that compared the results of a curriculum that taught critical thinking through persuasive writing to gifted students, average students, and students with learning disabilities.

Research Questions and Instruments

The purpose of this study was to examine the quantitative and qualitative differences in critical thinking that were exhibited between gifted students, average students and students with learning disabilities on pre, midpoint and post test measures of persuasive writing after being provided 20 hours of instruction in persuasive writing that integrates Paul's (1995) model of critical thinking. The instruments used to measure each question are described below, and psychometric data on each instrument is provided later in this chapter.

Specifically, this research addressed four questions:

1. Are there significant differences in critical thinking abilities among fourth and fifth grade gifted students, average students, and students with learning disabilities as measured by performance on an initial persuasive writing task?
2. Are there differential rates of growth in critical thinking abilities between fourth and fifth grade gifted students, average students, and students with learning disabilities, as measured by performance on a persuasive writing task, when presented with a minimum of 20 hours of direct instruction in the reasoning elements of persuasive writing and when compared to a group of students of similar abilities?

For these two questions, critical thinking ability was measured by a performance-based persuasive writing task administered to students on a pre-test, mid-point test, and post-test. The scores were derived from an adapted form of Toulmin's (1958) persuasive writing measure that had been previously used in other studies (Burkhalter, 1995; VanTassel-Baska, Johnson, Hughes & Boyce, 1996). Inter-group differences for Research Question #1 were determined using the scores from the pre-test, while intra-and inter-group differences for Research Question #2 were determined using the scores on the pre-, mid-, and post-test scores. Initial scores and changes

over time of the experimental group were compared to similar achievement groups who did not receive instruction from the curriculum.

3. To what extent are there differences between gifted students, average students, and students with learning disabilities in the opinion stances selected, the delineation of audience, and the types of reasons chosen?

For this question, student response content was analyzed directly. The first type of response was the determination of a positive or a negative opinion stance held by the student; the second examined the audience to whom the persuasive message was intended; and the third was determined by a categorical analysis of the types of reasons that emerged from student responses. Initial inter-group differences were determined by comparisons of initial reasons of the different achievement groups, while intra-and inter-group differences were also analyzed through changes over the time of the treatment in three dimensions.

4. To what extent did teachers exhibit behaviors facilitative of student growth?

While teacher behaviors are complex and varied, the emphasis of this study was not on teacher effectiveness, but rather on teacher implementation of curriculum. Thus, teacher behaviors were evaluated through three primary approaches: (a) a description of the administrative components of teacher implementation, such as scheduling and classroom lesson requirements, (b) the direct observation of teachers who were involved in the experimental portion of the study, using the Teacher Observation Checklist, and (c) an analysis of teacher comments from teacher logs.

Research Design

These research questions were investigated using a combined research design paradigm (Creswell, 1994) in which quantitative and qualitative components complement each other to present a fuller picture of the curriculum implementation. The model for this research is the "dominant-less dominant" design in which the quantitative paradigm presents a priori hypotheses. Qualitative information is presented in order to "better understand a concept being tested or explored" (Creswell, 1994, p. 177). Quantitative data are often used to determine effectiveness of curriculum interventions (Swanson, Hoskyn, & Lee, 1999), and the use of quantitative data allows comparisons with other research findings. The use of qualitative data allows the subtleties of the context to be established, and a richer analysis of the results of the study may be determined (Shulman, 1997). In addition, themes and trends may emerge in both student data and teacher implementation data that cannot be fully examined using a quantitative measure.

Quantitative data were employed in five aspects of the study: 1) to assess pre-post score differences on persuasive writing tasks, 2) to assess teacher use of strategies on an observation scale, 3) to record frequencies of positive and negative student opinions, 4) to report percentages of focus directed towards a particular audience, and 5) to report percentages of types of reasons used. Qualitative components were employed in three areas of the study: 1) the thematic analysis of student responses to determine types and categories of reasons, 2) the thematic analysis of teacher responses in the teacher logs, and 3) a description of the different approaches to curriculum implementation. Multiple methods of data collection is recommended as a means of reducing possible bias and to provide a variety of perspectives (Patton, 1990).

Using a quasi-experimental design that assumes cause- and-effect relationships (Gall, Borg, & Gall, 1996) between non-randomized, intact, non-equivalent groups (Cook & Campbell, 1973), students were administered a pre- and post- measure of persuasive writing. In addition, in order to determine critical moments of change, students were given a mid-point measure. Finally, teachers' rating on observation checklists were analyzed in relation to student growth between the pre-test and the post-test measure. Details of the analysis of the data are contained in the data analysis section of this chapter.

Sample

Site Selection

The study was conducted with teachers and students from ten school buildings in a mid-sized urban school division in the southeastern United States. The school division had approximately 24,000 students, was 42% White and 39% African- American, and 38% of the students were on free or reduced lunch. The school division contained 35 elementary schools, ten of which participated in the study in some manner. Random assignment of either classrooms or students was not possible. The study examined the results of instruction on students with different achievement levels, some of whom shared the same classrooms. Therefore, although individual teachers volunteered for the study and signed volunteer sheets, analysis was conducted at the individual student level in order to determine changes due to achievement differences.

A description of the study was provided to the administrators in the division. Criteria for selection of the site included teacher willingness to implement the unit, complete 20 hours of instruction, provide the researcher with copies of tests, willingness to be observed, administrative support for these curricular changes, and the presence of gifted students or students with learning

disabilities in their language arts class. In addition, teachers needed to have taught for a minimum of two years. Four administrators volunteered for the study and expressed an interest in being experimental sites. These four schools and seventeen teachers: seven at the fourth grade level, seven at the fifth grade level, and three mixed grade classrooms, elected to implement the unit as an entire grade level. One teacher elected to serve as a comparison group without implementing the unit.

In order to obtain additional comparison groups, specific administrators and teachers were encouraged to volunteer. Criteria for comparison teachers included: teacher willingness to incorporate the student measures into their regular curriculum assessment, provide the researcher with copies of tests, administrative support for this assessment, and the presence of gifted students or students with learning disabilities in the language arts class. In addition, teachers needed to have taught for a minimum of two years. Ten teachers volunteered to serve as the comparison group, while seven teachers declined. It was not perceived that undue pressure was placed on comparison group teachers, since many of them were familiar with the study and had been told that they would receive a copy of the intervention unit after their participation.

All gifted students and average students had their language arts program implemented in general education classrooms. Gifted students were clustered with average students in groups of 5-10 gifted students in the classroom. Of the twelve teachers of gifted students, four had completed gifted education endorsement, while the other eight had completed at least one graduate level class in gifted education. All students with learning disabilities were served in special education settings for language arts. Of the seven special education teachers, four had completed special education endorsement, while the other three had at least one graduate class in special education.

Student Selection

Students were selected for the study according to their placement in intact classrooms that were participating in the study and their labeling by the school division. "Average students" were designated as such by the fact that they were not labeled as either gifted or as being in special education by the school division. "Gifted students" were identified as gifted by the division using information from aptitude and achievement tests. The gifted students selected for this study all scored above the 75th percentile on a nationally-normed achievement test in the area of language arts and above the 80th percentile on a nationally-normed aptitude measure. "Students with learning disabilities" were identified by the school division because of the discrepancy between their aptitude and achievement scores. All students with learning disabilities in the study scored within the normal range, or within one and a half standard deviations on an aptitude test, and below the 30th percentile on the language arts section of a nationally-normed achievement test.

The project itself involved the adaptation of a language arts curriculum previously developed by the College of William and Mary to include specific strategies appropriate for students with learning disabilities, piloting the adapted curriculum, and implementation within the school division. The lessons were aligned with both the state's standards for language arts and the division's language arts requirements, and were based on the Integrated Curriculum Model (VanTassel-Baska, 1996) for high ability learners with specific direct instruction and strategy instruction techniques incorporated into the lessons.

The Director of Counseling and Testing, acting as the Head of the Division's Human Subjects Committee, granted permission for research in the division. Additionally, the curriculum leader in language arts, the principals, and the individual teachers in both the

experimental and comparison groups signed consent forms explaining the parameters of the study and their right to withdraw at any time without penalty. These forms contained language prescribed by the Human Subjects Review process at the College of William and Mary.

Sample Description

Student Data

A total of 389 students in 25 classrooms, or 246 students in 15 classrooms in the experimental group, and 143 students in 10 classrooms in the comparison group, participated in the study. There were 253 average students, with 171 in the experimental group, and 82 in the comparison group; 67 gifted students, 34 of whom participated in the experimental group and 33 of whom participated in the comparison group; and 69 students with learning disabilities, 41 of whom participated in the experimental group and 28 in the comparison group. Random assignment of students to classrooms or treatment groups was not possible. Table 2 shows the total sample sizes, including the distribution within the three achievement groups.

Table 2

Total sample and group sizes

	Experimental	Comparison	Total
Total in sample	246	143	389
Average	171	82	253
Gifted	34	33	67
LD	41	28	69

Racial, gender, socio-economic, achievement and aptitude data, and the analyses of the differences found between the experimental, comparison, and achievement groups are contained in Chapter Four.

Teacher Data

All teachers volunteered for the study, and random assignment of teachers to students was not possible. Seventeen teachers originally volunteered to participate in the experimental group. Of these 17, two did not complete the study. One teacher cited difficulty implementing the curriculum with her students, while the second one cited a lack of time to complete the curriculum because of state testing issues. All of the ten comparison teachers who volunteered for the study provided complete data. There were a total of 25 classrooms participating in the study, 15 of whom were in the experimental group, ten of whom participated as the comparison group. There were seven fourth grade classes, twelve fifth grade classes and six classes that were a combination of fourth and fifth grade students. There were eleven classrooms of gifted students who were clustered together in groups of 4-8 students, seven self-contained special education classrooms, and four classrooms with no gifted nor special education students. The sample of teachers was comprised of six men and nineteen women. Table 3 describes the experimental and comparison classrooms by grade level, type of classroom, and gender of teacher.

Table 3

Classroom Descriptions

	Exp.		Comp.		Total	
Variable	Number	Percent	Number	Percent	Number	Percent
Grade Level						
4	5	33.3	3	30	8	28
5	7	46.7	4	40	11	44
Mixed	3	20.0	3	30	6	28
Type of classroom						
Gifted Cluster	7	46.6	5	50	12	48
Special Education	4	26.7	3	30	7	28
Regular	4	26.7	2	20	6	24
Gender of teacher						
Male	4	26.6	2	20	6	24
Female	11	73.3	8	80	19	76
Total	15	100	10	100	25	100

Teacher Demographics.. The mean age of the experimental group was 36.38 (SD=6.79) and the mean age of the comparison group was 36.9 (SD=11.74). In terms of level of education by the teachers, 56% of the teachers had Bachelor's degrees and 44% had Master's. In order to participate in the study, teachers of gifted and special education students had to have at least one graduate-level course in the field. Of the twelve teachers with backgrounds in gifted education, 33% had completed endorsements in gifted education, while 66% of them had taken at least one

graduate level class in gifted education. Ten of these teachers were teachers of gifted students, and of them 40% had completed their endorsements, while the other 60% had completed at least one graduate level class. Of the seven special education teachers, 57% had their endorsement in special education, while 43% had taken at least one graduate level class. All of the teachers had over two years of teaching experience, but 44% of had ten or more years of teaching experience. Appendix F contains tables reflecting these teacher demographics.

Statement of Bias for Qualitative Research Purposes

The researcher was the Gifted Education Coordinator in the school division, although she did not have supervisory capacity over the teachers in either the comparison or experimental groups. However, she was known by the teachers involved, and had presented at three different staff development opportunities previously. She has teaching endorsements and has taught in both special education and gifted education, and has co-authored an article that focused on the development of persuasive writing in gifted students. This school division was selected because of the researcher's familiarity with the language arts curriculum, the availability to implement curricular change, and the convenient access to the sample of both students and teachers.

Description of the Intervention

The dependent variable that comprised the intervention was the introduction of eight curriculum lessons in language arts that emphasized critical thinking through persuasive writing. The curriculum was based on the Integrated Curriculum Model (VanTassel-Baska, 1996), integrated direct instruction methods and applied the specific learning strategy of the Hamburger Writing Model. Staff development to enhance teachers' ability to deliver the lessons was also implemented. Key components of the curriculum and the staff development process are described below:

Curriculum Intervention

The curricular intervention consisted of a minimum of 20 hours of instruction in persuasive writing from a curriculum unit entitled Hamburgers, Wheels and Perspectives, adapted from the unit Persuasion (Center for Gifted Education, 1999b). The intervention consisted of three aspects: (a) pre-, mid-point, and post-tests administered by the teacher within the classroom setting, (b) a minimum of eight lessons, for a minimum of 20 hours of instruction, delivered by the classroom teachers, and (c) direct instruction strategies in the use of the Paul Reasoning Model, and the "Hamburger" writing model. Selected lessons from the curriculum unit may be found in Appendix L.

The pre-, mid-point, and post-tests consisted of a literature prompt in the form of a poem in which students were asked to respond to the poem and write a persuasive paragraph arguing for the use of that poem for all students at their grade level. The prompts were preceded by an hour of classroom discussion in which students were asked to analyze the poem and to determine meanings of specific phrases. Instructional time was spent examining the role of change in the poem, the consequences of the author's particular choice of vocabulary, the author's purpose for writing the poem, and students' personal reactions to the poem.

The intervention curriculum consisted of at least 20 hours of instruction, or eight specific, 2-3 hour-long lessons, from the unit Hamburgers, Wheels, and Persuasion, which was adapted from the Center for Gifted Education's unit Persuasion (1999b). The entire unit consisted of 15 lessons, eight of which constituted the treatment intervention. The other seven lessons constituted a research strand that was optional. Details of the lessons are described below.

Lessons One, Two, and Three were required for treatment purposes. Lesson One was taken directly from the Center for Gifted Education's Autobiographies unit (1999a), because of the examplars that were available for scoring purposes. This lesson included the analysis of the first poetry prompt. Lesson Two was directly taken from the Persuasion unit, although some additional questions and activities were added. Lesson Two introduced the use of the persuasive writing model of instruction, namely the Hamburger Model of Writing. Lesson Three was written by the researcher and introduced Paul's Wheel of Reasoning (Center for Gifted Education, 1999b). Lessons Four-Seven were directly copied from the Persuasion unit, although more specific questions and activities were added. However, nothing was removed. Lesson Four, which was optional, but implemented by all experimental teachers, placed the use of persuasion in a real-world, historical context, and asked students to analyze Martin Luther King's "I Have a Dream" speech for persuasive elements. Lesson Five, which was optional, asked teachers and students to begin a research project, in which students analyzed issues and made recommendations through persuasive products. Thus, Lessons 1-5 provided an introduction to all of the models of instruction that the unit focused on. Lesson Six, a required lesson, included the analysis of the second poetry prompt, and the mid-point measure.

The rest of the unit provided further practice in each of the components of the models. Lesson Seven, an optional lesson, advanced the instruction in the research model, teaching students to take notes and to consider various points of view. Required lessons Eight- Ten were written by the researcher and used Stay's (1996) elements of persuasive writing. These lessons focused on the specific elements of the Hamburger Model and their corresponding elements of Paul's Reasoning Model. Lesson Eight developed students' ability to write an opinion statement by stating the purpose, goal, and point of view of their opinion; Lesson Nine focused on the use

of data and the process of elaborating the data through inferences and assumptions; and Lesson Ten emphasized the use and structure of conclusions through the use of implications and consequences. Optional lessons Eleven through Fourteen developed the research project further, emphasizing the use of persuasive speeches and debates regarding the students' issues. Finally, Lesson Fifteen, or the final two hours of instruction, included analysis of the final poetry prompt and the post-test measure. Table 4 outlines the entire unit, delineating between the mandated treatment lessons and the optional lessons. Appendix L provides samples of the lessons.

Table 4

Lessons in Curriculum Unit, by Requirement, Element of Instruction, and Activity

#	Required or Optional	Element of Instruction	Activity
1	Required	Pre-Assessment	Analysis of "Autobiographia Literaria" poem
2	Required	Hamburger model	Arrangment of jumbled paragraphs
3	Required	Critical Thinking Model	Analysis of newspaper articles
4	Optional	Emotion of Persuasion	Analysis of "I Have a Dream" speech
5	Optional	Research Model	Beginning of research paper
6	Required	Mid-point Assessment	Analysis of "The Road not Taken"
7	Optional	Taking Notes	Note-taking process and analysis of point of view
8	Required	Claims	Establishing criteria for opinion statements
9	Required	Data and Elaboration	Types of reasons; Connecting the reason to the claim
10	Required	Conclusions	Criteria for conclusions Rubrics for persuasive papers
11	Optional	Persuasive Speaking	Sharing of Research Proposals and Research
12	Optional	Practice Speeches	Evaluating Persuasive Speeches
13	Optional	Debates	Structure of a Debate
14	Optional	Research Presentation	Presentation of Persuasive Research Paper
15	Required	Post-Assessment	Analysis of "Where the Rainbow Ends"

Each lesson provided teachers with a teaching objective for the lesson, and a correspondence was made to a state-mandated learning standard. Materials were specified and provided for the teachers, unless they were of an easily-obtainable nature, such as colored pencils or a videotape of Martin Luther King's March on Washington. Student activities were delineated with specific questions for the teacher to ask the students. In some lessons, such as the lessons where the Hamburger Model and Paul's Wheel of Reasoning were initially introduced, specific wording was provided for directions and explanations. Directions to the teachers provided content information and grouping strategies were suggested. Handouts for the student activities were provided, and homework was specified.

Direct instruction strategies included explicit instruction in the use of Paul's Reasoning Model; the Hamburger Writing Model; and their links to specific elements of persuasive writing, including the Toulmin method of scoring. The lessons that described the introduction and practice of these aspects were scripted, provided prompting questions, and involved numerous opportunities for student response. The pacing was quick, and each component of each model was specifically addressed in the instruction. In addition, Paul's Reasoning Model and the Hamburger Writing Model were specific instructional strategies presented to students that framed the metacognitive components of thinking and writing.

Modifications. The curriculum emphasized the process of critical thinking through the content of persuasive writing. In order to provide accommodations for individual differences in students that may have been required through a student's IEP or 504 plan, teachers were encouraged to make necessary modifications without changing the essence of the treatment. Acceptable modifications were described in the directions at the beginning of the unit. These suggested that the teacher read the material to students when appropriate, so that reading

disabilities did not impact the outcome of the writing process. Teachers were also encouraged to provide physical handwriting assistance for students if handwriting skills would be a detriment. They were encouraged to use computers and other assistive devices, if necessary. Teachers were also discouraged from emphasizing mechanics, such as grammar and punctuation, but were told to emphasize the writing process and the structure of the writing. Modifications were also specified so teachers could respond to the nature of their classrooms. While grouping situations were suggested, teachers were told that they could change the method of grouping to reflect the dynamics of their own classroom. Finally, many activities required the reading and analysis of current newspaper articles. Teachers were encouraged to provide their own articles that would be meaningful and of interest to their students.

Comparison Group Curriculum. The comparison group received curriculum that was developed by the school division in response to state standards. Over the two-year time span of the research, the division was in the process of refining their language arts curriculum because of state-required standards, resulting in a certain amount of changes in the delivery of language arts instruction. However, despite the changes over the two years in instructional components, the scope and sequence of content remained constant. At the fourth and fifth grade levels, persuasive writing and purpose of writing, as articulated in the school division's scope and sequence of the state standards of learning, were emphases during the months of January and February, or the same time frame as the experimental group was receiving the treatment. Thus, students in the comparison group were also receiving persuasive writing instruction. The standard division curriculum typically emphasized the components of persuasive writing, without the use of a specific model. It also emphasized the connection of reading to writing in an integrated approach and included specific components of mechanics and spelling. The

writing process, or the process of drafting, revising, and editing, was strongly emphasized. There was no specific instruction in critical thinking, and teachers were not provided with scripted lessons, specific strategies, or metacognitive prompts for students. Any literature used was material from the fourth and fifth grade reading basals. The state standards of learning that describe the requirement for persuasive writing are contained in Appendix M.

Staff Development

The staff development model was based on an understanding of what is needed to support teachers in curriculum implementation (Sparks, 1995). Specifically, staff development examined the aspects of teacher knowledge of persuasive writing, their use of critical thinking skills, and their delivery to students with different learning needs. Staff development was accomplished through four methods of: (a) initial training in the use of the lessons, (b) teacher-to-teacher support, (c) administrative support in the implementation of the units, and (d) connections to on-going division staff development.

The initial teacher training occurred in two two-hour training sessions in small groups of no more than five teachers at a time. An overview of the project, Paul's Critical Thinking Model, and the Hamburger Writing Model were presented. Finally, an instructional lesson modeled. Staff development materials may be found in Appendix G.

Teacher-to-teacher interactions in both formal and informal ways were also developed. Teachers had access to e-mail discussions of the unit and were encouraged to ask each other questions via an on-line discussion. In addition, teachers at the same school participated in grade-level discussions regarding the implementation of the units. The administrators at the experimental sites provided additional planning time and teachers shared materials and resources regarding the units.

Administrative support was also provided. The school-level administrators provided time and resources for the implementation of the units. Administrators were also familiar with the units. Three of the four sites shared the initial training with the teachers, and at the fourth site, the administrator met with the researcher and received an overview of the unit. The administrators discussed the implementation of the units with the teachers in grade-level meetings and in informal observations. In addition to school-level support, the researcher was on-site at least four times during the semester to record observations and to answer questions. The researcher provided demonstration lessons and resources to teachers who requested such assistance and provided feedback to the teachers through the use of teacher observations.

Finally, specific components from the unit were integrated into on-going division staff development. The language arts department, the gifted education department, and the special education department focused on specific components within the curriculum units. Specifically, the language arts department at the time of the research was undergoing significant changes in the staff development process in order to implement new state standards. Thus, all language arts staff development efforts were focused on developing effective writing models. At the conclusion of this research, the division adopted the Hamburger Writing Model incorporated within the units as the model of choice for writing and began system-wide staff development. In addition, the gifted education and special education staff development efforts were focused on the development of academic skills with modifications for special populations. Thus, teachers receiving gifted education training during this time received instruction in critical thinking models; while teachers involved in special education staff development received direct instruction strategies and specific learning strategies. While comparison group teachers had exposure to the division-level staff development efforts, they did not receive the specific strategy

instruction, nor were they provided the teacher-to-teacher or administrator support aimed at the implementation of these units. Efforts were made to ensure that teachers involved in the experimental portion of the units received articulated and comprehensive staff development on all levels in order to fully implement the units.

Treatment Integrity

Treatment integrity refers to the extent to which an intervention is implemented as intended (Gresham, 1989). While in a naturalistic setting, "perfect fidelity is unrealistic" (Halle, 1998, p. 295), the following steps were taken to ensure appropriate treatment integrity:

1) Teachers were informed of the necessity of following the required lessons. Of the possible 15 lessons in the total unit, eight were designated as the treatment variable. Teachers had the option of completing the additional lessons, but the eight core treatment lessons were not optional. Issues such as required time for each lesson, use of the treatment lessons vs. the entire unit, and teacher affective issues were addressed prior to intervention. Thus, the treatment was specifically and operationally defined, using verbal, physical, spatial and temporal components (Gresham & Gansle, 1993).
2) Procedures and protocols were established prior to intervention. The processes of completing teacher logs, ensuring student confidentiality, and gathering student data were established prior to intervention. In addition, a description of acceptable modifications for students with disabilities was addressed prior to intervention (Gresham & Gensle, 1993).

3) Teacher questions and teacher activities were scripted within the lessons. Teachers were asked to ask specific questions that were documented in each lesson, thus reducing teacher variability in implementation. In addition, student forms and handouts for the lessons were provided to teachers as supplements to the activities (Gresham, 1989).
4) Teachers were asked to complete teacher logs after each lesson in an effort to document any changes and amendments. Such a self-report process for assessing treatment integrity allows a comparison to observational data (Gresham & Gensle, 1993).
5) Each teacher was observed formally at least once for a minimum of 45 minutes. However, each teacher was visited at least four times during the intervention, often informally and unannounced. Such formal and informal contact provides on-going support and documentation of treatment (Gresham, 1989).
6) Email communication and clarifying information was given to teachers at least twice during the implementation. Teachers were included in a "listserve" discussion group, in which questions could be asked and answered by the whole group.
7) Principals also checked in on teachers and the process and protocols were clearly communicated to them.
8) Although not part of the study, student products from activities in lessons other than testing measures were gathered, thus ensuring that activities were completed.

Instrumentation

Four instruments were used to answer the questions raised in the study. Copies of the instruments are included in Appendices B, C, D and E. A description of each instrument and its pertinent psychometric properties are described below.

Persuasive Writing Tests

The critical thinking/persuasive writing measure in the study is a performance-based; pre, mid-point, and post-test writing measure developed by the Center for Gifted Education at the College of William and Mary. The instrument was used with students in both the experimental and comparison groups. The measure provides a prompt in the form of a poem, and then asks the student "Do you think that the poem _____ should be read by all students in your grade? Write a paragraph to answer the question. State your opinion, include three reasons for your opinion, and write a conclusion to your paragraph". Thus, the prompt provides clear, understandable directions so that students are informed of the task and the expectations. The scoring rubric is a slight variation of one used by Burkhalter (1993), who in turn derived it from Toulmin's (1958) Persuasive Reasoning model. Reliability has been provided in earlier studies that used the measures (VanTassel-Baska, Johnson, Hughes & Boyce, 1996). Test-retest scores with gifted students as the population were not significant, using an alpha level of .05, $\underline{F}$ (1.62) = -1.71, $p \leq .093$, while coefficients of stability were determined to be moderate, using Pearson's correlation coefficient of .43, $p \leq .001$. In addition, for this study, inter-rater reliability was judged to be .88, using two trained scorers who were unaware of the student group assignments. This is similar to the results found in Conner's (1990) study, in which inter-rater reliability was .77.

Validity of the rubric was established in two ways. The measure has been used in other seminal persuasive writing studies, notably Burkhalter (1993) and Conner (1990). Both of these studies cite the strong relationship between the scoring rubric and Toulmin's (1958) argument development process. In addition to validity of the measure as a means of evaluating persuasive writing, content validity of the instruments as a measure of critical thinking was provided by Dr. Linda Elder, President of the Foundation for Critical Thinking, and an associate of Dr. Richard Paul, the author of Paul's Critical Thinking Model. Although she critiques the lack of request for opposing viewpoints in the prompt, Dr. Elder (personal communication, April 3, 1998) states that the "critical thinking theory is being well-used in your work" (p.1), and that the "presentation is far superior to what I normally see elementary school teachers doing to develop critical thinking abilities" (p. 3).

Teacher Observation Scale

This instrument was developed by the Center for Gifted Education and has been used for five years as a means of teacher evaluation in their Saturday and Summer Enrichment Program. The Observation Scale evaluates the behaviors of teachers that are designed to foster talent development and the promotion of critical thinking abilities. Only teachers in the experimental group were observed in order to judge the treatment fidelity of the implementation. The researcher scripted the observations, with particular attention focused on teacher statements and behaviors. From these scripted notes, specific elements were noted in 15 areas, including the use of advanced content and selection of questions, and an evaluation made of the quality of the component, with a score of 1 indicating behavior not present and a score of 5 indicating that the teacher performed the behavior to an excellent level. Although no psychometric data had been established for this instrument at the time of use, it did form the essential foundation for a later

instrument that was found to have sound reliability and content validity (Avery, 1999). Content validity was established through multiple expert reviews in the field of gifted education who found that the components of the instrument that formed the same components of the later instrument were appropriate for talent development purposes.

Teacher Self-Report Log

This instrument asked teachers to reflect on their experiences teaching each lesson of the curriculum. It asked teachers to detail changes, omissions, and reactions to the curriculum. Teachers were provided ample space for reflection purposes, and they were encouraged to reflect about the implementation of the curriculum. A copy of the log can be found in Appendix E.

Teacher Demographic Questionnaire

This short instrument contained questions regarding the demographic characteristics of the teachers involved in the study. It included items such as highest level of education, number of years teaching, number of years teaching at this grade level, year hired into the division, age at time of the research and gender. The form was piloted with graduate students and has been used in other research as well (Avery, 1999). A copy of the survey can be found in Appendix F.

Data Analysis Procedures

Research Questions One and Two

The first and second research questions involved an analysis of student performance on the persuasive writing measures. Scores were obtained through the use of a scoring rubric adapted by the Center for Gifted Education at the College of William and Mary, and based upon scoring protocols devised by Toulmin (1958). The purpose for the selection of this rubric is two-fold: (1) scoring that uses the same criteria as employed by the Center for Gifted Education allows for a direct comparison of results of this study with previous studies, and (2) Toulmin's

scoring rubrics are considered very valid in the literature and are among the most cited in the field of persuasive writing (Kneupper, 1978; McCann, 1989; Lauer, Montague, Lunsford, & Emig, 1985). Toulmin's protocols have been validated through comparisons with students' holistic scores on international assessments of persuasive writing (Connor, 1990) and reflect student growth when instruction in persuasive writing has occurred (Burkhalter, 1993). Reliability measures from other studies include inter-rater reliability of .80 (VanTassel-Baska, Johnson, Hughes & Boyce, 1986).

The persuasive writing protocols consisted of examining four aspects of persuasive writing: (1) the quality of the claim or opinion statement, (2), the "data", or reasons provided, (3) the "warrant" or the justification for these claims, and (4) a concluding statement. Students received a score from 0-6 in each of the categories, with the exception of the conclusion statement, in which a student could only receive up to two points. In addition, a total score, or the sum of the four component scores was determined, for a total of 20 points possible. Thus, students received five scores-- one in each of the component sections and a total score. The scoring rubric may be found in Appendix C. Student responses were scored by two trained evaluators, external to the study, and unaware of student characteristics or achievement levels. The evaluators had received training in the use of the rubric, and an inter-rater reliability of .88 was established in this study.

Students were identified as members of one of three achievement groups- either average, gifted, or having a learning disability. Means of the scores in each of the five areas were determined and the means of each group were compared. In order to determine initial critical thinking differences between achievement groups in Research Question One, an Analysis of Co-variance (ANCOVA) was run on the total sample, including both experimental and comparison

groups, to determine inter-ability group differences. ANCOVAS were also run between (a) the experimental and comparison groups, (b) the different socio-economic groups, and (c) the students in Year 1 and Year 2 to determine any initial differences between these groups. According to Gall, Borg, & Gall, (1996), ANCOVA is the most appropriate statistical method to determine truly significant differences between dissimilar groups, since it accounts for possible initial differences that may exist due to other factors. In the cases where the variances of the scores were unequal, an equal number of scores from each group were randomly selected in order to compare the groups.

In order to answer the second question, two statistical measures were used. Repeated Measures Analysis of Co-Variance, which treated time as an independent variable, was used to compare the results of the experimental group with that of the comparison group. In addition, repeated measures analysis of co-variance was used to compare the results of the different achievement groups within the experimental group. This procedure is appropriate for a model that measures two factors with repeated measures on one factor, and is "one of the most pervasive designs" (Girden, 1992, p. 41). The use of ANCOVA "is an alternative approach to handling data of pretest-posttest designs...{It} renders the gain score analysis more powerful... and results in a more powerful test" (Girden, 1992, p. 58), because it "reduces bias due to the covariate in studies where the researcher must work with intact groups" (Elashoff, 1969). It reduces the variance and error that may occur in the comparison of nonequivalent groups (Cook & Campbell, 1973). This model was selected because it reflects changes in scores related to time as well as interaction effects related to group membership.

Research Question Three

The third research question was addressed through an analysis of the different types of reasons provided by students. Using a "dominant-less dominant" model of mixed design (Creswell, 1994), the data were analyzed using both quantitative and qualitative information in a sequential triangulation manner, with the quantitative paradigm being the most dominant. Thus, the student responses were analyzed using thematic analysis (Miles & Huberman, 1994; Patton, 1990), coded, and then quantified. A Level Three analysis was not conducted, because the quanitative paradigm took precedence. Thus, while qualitative analysis provided richness to the analysis, the fundamental question was answered through quantitative analysis. For this reason, a Level Three qualitative analysis was not conducted (Miles & Huberman, 1994).

Because of the diverse ways that "types of reasons" can be addressed, three primary groups of reasons were analyzed: (1) the positive and negative opinion stances of students, (2) the audience to whom the argument was addressed, and (3) the type of reason given.

Positive and Negative Responses. In their persuasive essays, students were required to take a stance. In order to determine if the stances were influenced by writing ability, student responses on each measure were scored, indicating if the opinion was positive or negative. To determine initial differences, chi-squares were run, because of the categorical nature of the answers. In order to determine if students changed their responses over time, a McNemer test was run, determining if the proportion of initial responses remained equal, or if different achievement groups were more likely to change their opinions. A McNemer test was selected because it would consider time as a factor and indicate significant changes in student responses from measure to measure by comparing the percentages of positive responses on the first measure to the percentages of positive responses on the second measure.

Audience Delineation. In their arguments, students are required to present reasons. Because the inclusion of perspectives of an external audience has been reported to be a developmental component of writing (Atkins, 1983; Burkhalter, 1993), determining if there are differences between the achievement groups in the audience delineation can provide insight into the development of students as writers. Four audience perspectives were determined: (a) the first person "I" in which a student wrote exclusively from their own perspective, (b) "it", or a direct reference to the poem, (c) an external "you" or a dialogue between writer and reader, and (d) the theoretical "they", or third person perspective of the reader. Because students provided multiple reasons, it would be possible for students to address reasons to multiple audiences. However, some students provided more reasons than others. In order to determine the weight that would be given to a particular point of view, the percentage of the total perspectives was established. Thus, if a student provided only one reason that incorporated the "I" perspective, they would have 100% of their arguments using the "I" perspective. If a student provided three reasons, one of which incorporated the "I" reason, they would have 33% of their arguments using the "I" voice. The second student gave less weight to the "I" perspective than did the first student, despite the fact that each had one reason that used an "I" perspective. The audience perspective was determined for each reason and the percentage of total arguments derived.

In order to determine initial differences between achievement groups of students in their use of audience perspectives, an Analysis of Co-variance (ANCOVA) was run on the total sample, including both experimental and comparison groups, to determine inter-ability group differences. Again, according to Gall, Borg, & Gall (1996), ANCOVA is the most appropriate statistical method to determine significant differences between dissimilar groups, because of the accounting for other factors. In the cases where the variances of the scores were unequal

(Elashoff, 1969), an equal number of scores from each group were randomly selected in order to compare the groups.

In order to answer the question of changes over time, Repeated Measures Analysis of Co-Variance, which treated time as an independent variable, was used to compare the results of the different achievement groups within the experimental group. This procedure was selected because it reflects changes in scores related to time as well as interaction effects related to group membership (Grinder, 1992).

Categories of Reasons. Finally, the different reasons used by students were categorized. Three different methods of categorical determination were used. The first included categories of argument types determined by Lauer, Montague Lunsford, and Emig (1985) which included (a) appeals to rational decision-making, (b) emotional aspects, and (c) the use of audience values. The second level of analysis examined the types of reasons proposed by Stay (1996) of (a) data derived from personal experience, (b) authority opinions, (c) facts, and (d) narratives of other perspectives. Initially, these two types were the only ones considered. However, after coding and analysis, the evaluators and the researcher did not feel that these groups provided adequate insight into the different reasons proposed by students in this particular context. These two types were not responsive enough to the needs of the research question, and did not discriminate adequately. Thus, the evaluators and the researcher decided to analyze the reasons through inductive analysis, as defined by Miles and Huberman (1994)

In this process of inductive analysis, using the clustering strategy suggested by Miles and Huberman (1994), the evaluators and the researcher examined the responses for "patterns, themes, and categories of analysis" (Patton, 1990, p. 390). Evaluators made notes of different types of reasons, evaluated a number of responses in light of the hypothesized categories and

looked for emerging trends. When some responses did not fit any of the categories, the structure of the categories was re-analyzed, and either the name of the old category was re-evaluated, or a new category was determined. Hypotheses were evaluated and tested, while outlier responses were evaluated in terms of their appropriateness of fit and other more careful discriminations made (Miles & Huberman, 1994). The validity of the categories for the measures was determined with the assistance of three outside persons familiar with the prompt, specifically, two teachers from the experimental classes and a person who had experience scoring the tests from other studies. This triangulation of perspective occurred in order to verify the completeness of these categories. Once the categories were determined, the researcher and the evaluators categorized other responses to determine appropriateness of the fit of the categories. The inter-rater reliability of the new categories was a .96, indicating that while not completely perfect, the descriptors were clear, and the vast majority of answers could be analyzed using these categories. The cluster analysis is contained in Appendix H. The results of the evaluator-constructed analyses are shared in Chapter Four.

In order to determine if initial differences exist among the three groups in their types of responses, student responses were then evaluated to determine what category each reason was. The responses were then provided a code and a percentage determined. Because students provided multiple reasons, it would be possible for students to have different types of reasons within their complete response. However, some students provided more reasons than others. In order to determine the weight that would be given to a particular type of reason, the percentage of that reason given as compared to the total number of reasons was established.

In order to determine initial differences between groups of students in their use of categories of reasons, an Analysis of Co-variance (ANCOVA) was run on the total sample, including both experimental and comparison groups, to determine inter-ability group differences. In the cases where the variances of the scores were unequal, an equal number of scores from each group were randomly selected in order to compare the groups. In order to answer the question of changes over time, Repeated Measures Analysis of Co-Variance, which treated time as an independent variable, was used to compare the results of the different groups within the experimental group. This procedure was selected because it reflects changes in scores related to time as well as interaction effects related to group membership.

Research Question Four

Research question four examined teacher implementation of the curriculum unit within the classroom and its effect on student performance. Analysis of the data was first conducted through a simultaneous triangulation process, using both quantitative means and qualitative observations to answer the question at the same time (Creswell, 1994). However, information from the qualitative analysis then led to a sequential triangulation process, using quantitative data. Thus, information achieved through quantitative and qualitative sources answered the question, although the dominant paradigm was that of quantitative research.

Statistically, Question Four was analyzed in two different ways. The first used step-wise regression to predict the post-test score, using the pre-test score and the scores received by teachers on 14 different competency areas. The second analysis used step-wise regression to predict the degree of growth of a student. Because of possible post-test differences due to achievement differences between the students, the degree of improvement was determined by the difference between the pre- and post-measures. A step-wise regression analysis was run to

determine if there was a significant relationship between the teacher behaviors and the degree of improvement in the students. Step-wise regression was determined as the most appropriate method of analysis because the results are data-driven, rather than theory-driven (Weichel, personal communication, 2000), and step-wise regression would determine what factors were the most significant in predicting student post-test scores, and student growth.

The researcher also evaluated three pieces of implementation documentation for analysis purposes, including (a) description of the administrative factors influencing implementation of the unit, such as scheduling, (b) researcher observations of teachers, and (c) teacher log notes. The documentation was analyzed for the purpose of describing the implementation strategies used by teachers in order to ensure treatment fidelity.

Administrative factors that might influence implementation of the unit were described through observation and from teacher and administrator comments and lesson plans. In addition, the timing of student products served to give an idea of the timing of the unit. A matrix was established that examined themes found in teacher observations and the administrative issues (Miles & Huberman, 1994). The researcher observed the teachers formally at least once for 45 minutes, although the researcher visited each classroom at least four times. This frequent visitation allowed the researcher to reduce biases present in the information that might be "stemming from researcher effects on the site" (Miles & Huberman, 1994, p. 266). However, it must be acknowledged that the researcher was an administrator in the school division, and the impact of an administrator, even one that is not directly responsible for evaluation purposes, might impact observation results. The researcher validated the results of the observations by discussing the results with the teachers directly after the observation and asking them to verify perceptions about what was observed. An effort was made also to combat bias that "stemmed

from the effects of the site on the researcher" (Miles & Huberman, 1994, p. 266) by verifying impressions and gathering information about the teachers from the school-level administrator, recognizing that the school principal may have bias regarding the teachers as well. These efforts to reduce bias also serve to increase validity efforts.

Teacher log responses were initially analyzed, using a coding system of implementation strategies. In addition, themes from teacher observations were elicited. As particular strategies emerged from the data, these were coded, and the notes re-evaluated to determine the appropriateness of this interpretation. Conceptual categories of teacher comments were determined, using cluster analysis (Miles & Huberman, 1994). In addition, implementation issues were identified, using a matrix that examined the relationship of the type of classroom to the type of teacher comments that were made and the administrative aspects of implementation (Miles & Huberman, 1994). Qualitative analysis was conducted only the second level because of the nature of the research design. The analysis, organizing, and arranging of the data was an on-going process, with the researcher reviewing the field notes and looking for trends in the teacher comments and field notes.

Time Frame for the Study

The study occurred during the second semester of two consecutive years. Initial testing of the students occurred during January or February with post-testing occurring sometime in March or April. The pre-test measures were administered before any implementation of the curriculum and the post-test measures administered at the conclusion of instruction. Because of the different ways in which teachers actually implemented the curriculum within the structure of their classroom, the actual ending date of the 20 hours of instruction varied. Classroom observations occurred between January and March. The timing of these observations can be

found in Appendix I. Because of the difficulties in determining site locations, and the need to have instruction occur at the same time that the comparison classrooms were receiving instruction in persuasive writing, the experimental classrooms gathered data the second semester of school in both years. Comparison classroom data were also gathered during the second semester, beginning at the end of January and continuing through April. Analyses of co-variance (ANCOVAs) were run to determine if there were any significant differences in student performance between the two years.

Confidentiality and Other Ethical Concerns

Teachers and administrators in both the research and comparison groups were required to complete consent forms that included ethical safeguards. Teacher and administrator participation was voluntary and teachers were informed that they had the right to withdraw at any time. Teachers were also informed that performance or observations of their classrooms would not impact on any evaluation methods used by the school division. Teachers were provided a letter to send to parents, informing them of the nature of the curriculum, but individual parent permissions were not sought since the curriculum replaced students' regular writing curriculum and the results were not reported on a classroom or individual student level, but through group descriptors. The comparison group teachers integrated the measures into their regular curriculum. All student measures were used by both experimental and comparison teachers as part of their normal student assessment. Student grades were determined by each teacher, not the researcher. The school division approved the research design to allow for the collection and use of data gathered by teachers and the researcher.

Confidential student information for group descriptive purposes, such as IQ and achievement data, was gathered by the teacher, or a representative of the teacher, using a checklist of requested information. Students were assigned a number by the teachers, and all information, both confidential and student products, was gathered and anonymously given to the researcher in the form of numbers, not individual names. Numbers did not correspond to any identifying information of the child and all data was recorded using these numbers. Teachers and school-level administrators were provided with statistical information regarding the performance of their classes, but individual student performance was kept confidential by the researcher. In addition, individual teacher data on the observations, checklists, and logs was kept confidential by the researcher and shared only with the respective teacher. Instead of using codes, teachers' names have been changed on all records and descriptions in the study.

Finally, the name of the school division has remained confidential to honor the request of the school division. The location of the division is provided in only general terms and highly specific demographic information is not provided.

Limitations and Delimitations

Limitations

The limiting factors in this study included the issues of volunteerism, sample size, the inability to randomly assign students to either experimental or comparison groups, the implementation of the study over a two-year time period, and the inability to control for certain teacher variables. Although administrators in the division were invited to participate, only 10 school administrators expressed interest. Of these schools, only four volunteered to implement the curriculum. From the four schools, 17 teachers chose to begin the implementation of the curriculum and only 15 teachers completed the curriculum. Thus, it was not possible to randomly

assign students to the experimental or the comparison groups. However, it should be noted that the lack of randomization of students has not played a significant factor in the results of intervention studies conducted with students with learning disabilities (Swanson, Hoskyn, & Lee, 1999). Of the experimental and comparison classrooms, the large majority of students were average students, resulting in an unequal sample size. Although all experimental teachers had similar training in the unit implementation and had been teaching for at least two years, other variables such as common attitudes, similar educational backgrounds or expertise were unable to be controlled.

It is also acknowledged that grouping patterns could not play a role in the interpretation of results. Because students were grouped according to their achievement level, all gifted students received language arts instruction in a cluster-group arrangement in which four or five gifted students were placed together in a general education classroom and taught by a teacher who was either endorsed, or seeking gifted endorsement. Students with learning disabilities were in self-contained special education settings and received language arts instruction from special education teachers. Average students were either in the same classroom as gifted students or in classrooms with no gifted students. The inability to control for grouping patterns limits the generalizability of these results.

Delimiting Factors

There are five delimiting factors that the researcher has employed in this study. The primary factor is the nature of the materials selected for use by teachers. Critical thinking as demonstrated through persuasive writing was taught through 20 hours of instruction of an amended curriculum unit originally developed by the Center for Gifted Education at The College of William and Mary in Virginia (Center for Gifted Education, 1999b). A second factor is that

critical thinking was examined only through the exhibition of persuasive writing. Although critical thinking is demonstrated in numerous behaviors, only the student performance on persuasive writing tasks was explored in this study. Thirdly, the sample for the study was limited to fourth and fifth grade students, ranging in age from 9 to 11. Fourthly, while it is acknowledged that it is statistically preferable to analyze the data using classroom mean scores rather than individual student scores (Swanson, Hoskyn, & Lee, 1999), such a process of using group means would rob the study of the potential differences found between students of different abilities with scores that are significantly different from the mean (Putnam & Borko, 2000). Because classrooms were mixed in achievement levels, the mean of the classroom would not adequately reflect the individual differences of the students. Finally, the results were studied deliberately in terms of specific achievement groups. The population selected were (a) average students with no specific strengths or weaknesses, (b) students with learning disabilities in language and (c) students with high ability and achievement in language. It is acknowledged that there are numerous ways to classify students. Achievement grouping is but one way, and studying the research questions from this perspective will affect the interpretation of these results.

CHAPTER FOUR

Results

The advent of state writing requirements and national standards has significantly renewed interest in the development of writing abilities among all students. In addition, the ability to critically examine issues has taken on significance in a world that is ever-changing through technology. This study investigated the effects that a curriculum designed to teach critical thinking through persuasive writing had on average students, gifted students, and students with learning disabilities. The research questions examined were:

1) Are there significant and/or important differences in critical thinking abilities among fourth and fifth grade gifted students, average students, and students with learning disabilities as measured by performance on a persuasive writing task?
2) Are there differential rates of growth in critical thinking abilities between fourth and fifth grade gifted students, average students, and students with learning disabilities, as measured by performance on a persuasive writing task, when presented with a minimum of 20 hours of direct instruction in the reasoning elements of persuasive writing and when compared to a comparison group of students of similar abilities?
3) To what extent are there differences between gifted students, average students, and students with learning disabilities in the opinion stances selected, the delineation of audience, and the types of reasons chosen?
4) To what extent did teachers exhibit behaviors facilitative of student growth?

In addition, analyses of the experimental, comparison and labeled groups were conducted to determine any initial differences between the groups.

Experimental and Comparison Group Differences

In order to determine if the experimental and comparison groups were similar in their compositions, analyses were conducted to determine if certain racial, gender, school socio-economic levels, or the timing of the tests were misrepresented in each group. In addition, a comparison of the means of the aptitude and achievement data are provided. Table 5 shows the actual counts of each achievement group on several different variables and the percentages of each achievement group, while Table 6 describes the means and standard deviations of the ability and achievement measures. Missing data account for any discrepancies between the sample sizes and the data.

Table 5

Descriptive Characteristics of Experimental and Comparison Groups

	Experimental		Comparison	
Source	No.	Pct.	No.	Pct.
Racial Data				
American Indian	1	.5	0	0
Asian- American	4	1.8	4	3.9
African- American.	100	45.0	42	41.2
Hispanic- American.	2	.9	3	2.9
White	115	51.8	53	52.0
SES of School				
High (< 25% on free or reduced lunch)	75	30.5	30	21.9
Medium (25-50% on free and reduced lunch)	61	24.8	31	22.6
Low (> 50% on free or reduced lunch)	110	44.7	76	55.5
Gender				
Male	93	46.3	59	48.0
Female	108	53.7	64	52.0
Timing of tests				
Semester 1	209	85	6	4.2
Semester 2	37	15	137	95.8

Achievement and aptitude data were collected by the teachers in the study. Aptitude measures were collected, with the primary tests reported including the Otis-Lennon, the

Wechsler Intelligence Scale for Children (WISC), and the Cognitive Ability Test (Cogat). The primary test scores used to determine achievement levels were the Iowa Test of Basic Skills (ITBS) and the Stanford Achievement Test. Because of the diversity of measures that were used, scores are reported only in terms of percentiles, rather than standard scores, since many data in student records did not provide standard scores, but only provided percentiles. When only standard scores were provided, percentiles were determined, using the appropriate test's conversion charts. Missing data account for the fact that the groups do not add up to the totals of the sample. Table 6 provides the means and standard deviations of each group.

Table 6

Aptitude and Achievement Data for Experimental and Comparison Group

	Experimental (N=153)		Comparison (N=90)	
Source	Mean	SD	Mean	SD
Aptitude (Verbal)	64.66	27.86	64.82	27.88
Achievement- Language	59.64	27.26	59.33	28.76

Comparison of Experimental and Comparison Groups

Several analyses were run in order to determine if there were significant differences between the experimental and comparison groups on key demographic dimensions. A chi square analysis (Pearson X^2) was used for the variables of gender, race, school socio-economic level, and the timing of the test. An Analysis of Variance (ANOVA) was used for the variables of aptitude and achievement. With an alpha set at .05, there were no significant differences between the experimental and comparison groups on any of the factors, including racial, gender

makeup, the socio-economic level of the schools the students were in, aptitude and achievement data, with the exception of the timing of the assessment. Table 7 demonstrates these differences.

Table 7

Statistical Analysis of Experimental and Comparison Group Variables

Variable	Test Statistic	significance	
Race	X^2 (4, N=324) = 3.856	.426	
School SES Level	X^2 (2, N=389) = 4.638	.098	
Gender	X^2 (1, N=324) = .088	.766	
Timing of Tests	X^2 (1, N=389) = 256.201	.000	***
Aptitude	Anova (1, N=243) = .001	.975	
Achievement	Anova (1, N=243) = .014	.906	

*** $p \leq .001$

Achievement Group Differences

In order to determine if the achievement groups were similar in their compositions, analyses were conducted to determine if certain racial, gender, school socio-economic levels, or the timing of the tests were misrepresented in each achievement group. In addition, a comparison of the means of the aptitude and achievement data are provided. Table 8 shows the actual counts of each achievement group on the different variables and the percentages of each achievement group, while Table 9 describes the means and standard deviations of the ability and achievement measures. Missing data accounts for numbers not adding up to the sample totals.

Table 8

Descriptive Characteristics of Achievement Groups

	Average		Gifted		LD	
Source	No.	Pct.	No.	Pct.	No.	Pct.
Racial Data	0	0	0	0	0	0
Am. Indian	1	.4	0	0	0	0
Asian- Am.	8	3.5	0	0	0	0
African- Am.	119	52.4	8	19.0	15	27.3
Hispanic- Am.	4	1.8	1	2.4	0	0
White	95	41.9	33	78.6	55	72.7
SES of School						
High	70	28.8	36	52.2	40	56.3
Medium	108	44.4	26	37.7	30	42.3
Low	65	26.7	7	10.1	1	1.4
Gender						
Male	87	43.1	25	43.9	40	61.5
Female	115	56.9	32	56.1	25	38.5
Timing of tests						
Semester 1	160	65.8	23	33.3	26	54.6
Semester 2	83	34.2	46	66.7	45	45.4
Total	243	100	59	100	71	100

Table 9

Aptitude and Achievement Data for Achievement Groups

	Average (N=74)		Gifted (N=47)		LD (N=49)	
Source	Mean	SD	Mean	SD	Mean	SD
Aptitude (Verbal)	57.49	26.16	82.83	18.52	40.38	28.54
Achievement- Language	64.03	22.70	78.77	15.40	23.20	20.23

Comparison of Achievement Groups

Several analyses were run in order to determine if there were significant differences between the achievement groups on key demographic dimensions. A chi square analysis (Pearson X^2) was used for the variables of gender, race, school socio-economic level, and the timing of the test. An Analysis of Variance (ANOVA) was used for the variables of aptitude and achievement. With an alpha set at .05, there were significant differences between the achievement groups on all of the factors. Using an alpha level of .05, Table 10 demonstrates the significant differences that were found between the achievement groups in terms of racial, gender makeup, the socio-economic level of the schools the students were in, the timing of the intervention, aptitude and achievement data.

Table 10

Statistical Analysis of Achievement Group Variables

Variable	Test Statistic	significance	
Race	X^2 (8, N=324) = 32.891	.000	***
School SES Level	X^2 (4, N=324) = 34.225	.000	***
Gender	X^2 (2, N=324) = 6.994	.030	*
Timing of Tests	X^2 (2, N=324) = 34.238	.000	***
Aptitude	Anova (2, N=170) = 23.403	.000	***
Achievement	Anova (2, N=170) = 63.724	.000	***

* = $p \leq .05$, *** = $p \leq .001$

These differences are not surprising. As has been found in numerous other studies (Ford, 1995; U.S. Department of Education, 1994a) white students and students from higher SES levels were over-represented among the gifted population. Males and females were equally represented in the gifted population, a finding that is in accordance with other studies that find an equal number of males and females in elementary schools (Gallagher & Gallagher, 1997; Maccoby & Jacklin, 1974), a statistic that often changes in middle school (Kerr, 1994).

Males were over-represented among students with learning disabilities, a finding that is in accordance with national trends in which males are significantly over-represented in all categories of disability, including learning disabilities (U.S. Department of Education, 1994b). Surprisingly, whites and students in schools of higher SES were also over-represented among students with learning disabilities in this study; a finding in contrast to research that finds that minorities and people from lower SES levels are over-represented in all areas of disability, including the area of learning disabilities (U.S. Department of Education, 1994b). However, this

study occurred in a school division that has a high percentage of minority students and there may have been a greater awareness of, and the ability to work with, issues faced by minority students and students from low socio-economic backgrounds.

Finally, because aptitude and achievement are the hallmarks in gifted identification, and lowered achievement is the identifying factor in learning disabilities, it would be expected that there would be significant differences between the groups in achievement and aptitude.

Although the experimental and comparison groups were similar in their composition, the achievement groups were not. Research Question One addressed this issue through the use of an Analysis of Co-variance (ANCOVA) to determine the impact of the factors of experimental or comparison group designation, race, gender, timing of test, socio-economic level of the school, or achievement level, may have played in any initial test differences. In addition, because of the discrepant numbers between the experimental and comparison groups, and in order to ensure equal proportions between the achievement groups when direct comparisons were made, 82 average students and 28 students with learning disabilities in the experimental group were randomly selected, using a random number chart. Similarly, when the variances of the groups were significantly different in a comparison, equal-sized samples of 26 gifted, average, and students with learning disabilities were randomly selected.

Research Question One

The first research question asked if there were initial significant and/or important differences in persuasive writing abilities among fourth and fifth grade gifted students, average students, and students with learning disabilities. In order to determine if any factors other than group identification were significant in possible initial differences in the scores, Analyses of Co-variance (ANCOVAs) were conducted on the mean Pre-test Writing Total Scores. Factors analyzed included: (1) whether the students were in the experimental or comparison group, (2) the group identification of the student, (3) the socio-economic level of the school the students attended, (4) the semester in which the student participated in the study, (5) the gender of the student, and (6) the race of the student. Tables 11-16 presents the means and standard deviations of the various factors on the pre-test. The means reflect a total score possible of 20.

Table 11

Pre-test Writing Totals by Comparison/Experimental Group

	N	Mean	SD
Comparison	127	9.13	3.11
Experimental	228	8.76	3.11

Table 12

Pre-test Writing Totals by Achievement Group

Ability	N	Mean	SD
Average	223	8.90	2.77
Gifted	67	10.51	3.80
Learning Disabled	65	7.23	2.57

Table 13

Pre-test Writing Totals by School Socio-economic Level

School Socio-economic Level	N	Mean	SD
High SES	126	9.81	2.99
Average SES	161	8.87	3.09
Low SES	70	7.26	2.71

Table 14

Pre-test Writing Totals by Year of Assessment

Year of Assessment	N	Mean	SD
Year 1	195	8.64	2.90
Year 2	160	9.21	3.34

Table 15

Pre-test Writing Totals by Gender

Gender	N	Mean	SD
Male	139	8.88	3.09
Female	161	9.13	3.10

Table 16

Pre-test Writing Totals by Race

Race	N	Mean	SD
American Indian	1	6	-
Asian –American	8	8.50	2.07
African-American	129	8.23	2.88
Hispanic-American	5	9.20	4.15
White	162	9.21	3.17

ANCOVAs were run to determine initial differences between the different groups, and to control for possible differences between the groups. With an alpha level of .05, significant differences on the pre-test were found between (1) the different achievement levels, and (2) the socio-economic level of the school. There were no significant differences on the pre-test between the different races, genders, year of the assessment, or experimental or comparison groups. Because there were no initial differences in pre-test scores between the other variables, including the timing of the intervention, all resultant tables collapse these variables and do not split out information. Table 17 presents the differences found in the pre-tests between the different groups. Thus, all resultant analyses to determine the impact of writing ability level on the rate of growth controlled for differences that might be due to SES levels through the statistical procedure of Analysis of Co-variance (ANCOVA).

Table 17

Analyses of Co-Variance Comparing the Means of the Pre-Test Writing Total Scores

Source	df	F	p	
Group- Exp. Or Comparison	1	.009	.925	
Label	2	24.145	.000	***
Time	1	.042	.838	
SES	2	14.863	.000	***
Race	4	1.626	.168	
Gender	1	.191	.886	
Error	211	(6.569)		

*** = $p \leq .001$; Note: Values enclosed in parentheses represent mean square errors.

Summary of Research Question One Findings

In response to Research Question One that focused on possible differences between achievement groups, there were significant differences prior to instruction. On a pre-test of persuasive writing, gifted students scored significantly higher than average students who scored significantly higher than students with learning disabilities.

Research Question Two

The second research question sought to determine whether there were differential rates of growth in persuasive writing abilities among fourth and fifth grade gifted students, average students, and students with learning disabilities who were taught the reasoning elements of persuasive writing in a minimum of 20 hours of instruction over seven weeks. In addition, there was a need to determine if there was a differential rate of growth between the experimental and comparison groups. In order to determine if there was a difference in the rates of change between (1) the comparison group and the experimental group, and (2) the different achievement groups within the experimental group on the pre-tests, midpoint tests and post-tests, two Repeated Measures analysis of co-variance (ANCOVA) were conducted, controlling for the effect of the school's socio-economic level. Table 18 describes the sample sizes, means and standard deviations of the test scores over time.

Table 18

Descriptive Measures of Total Writing Scores of Achievement Groups in Experimental and Comparison Groups

	Average			Gifted			LD		
Source	Mean	SD	N	Mean	SD	N	Mean	SD	N
Pre-test									
Experimental	8.87	2.84	133	11.38	3.43	26	6.88	2.84	34
Comparison	9.41	2.68	64	9.66	4.16	35	8.19	2.09	29
Midpoint									
Experimental	10.57	3.32	133	13.46	3.08	26	8.94	2.92	34
Comparison	8.79	2.47	68	10.47	3.82	34	9.00	2.64	28
Post-test									
Experimental	12.26	3.48	133	14.31	2.75	26	9.65	2.67	34
Comparison	8.32	3.04	68	9.35	3.74	31	8.95	2.50	29

The writing scores were analyzed using a multi-variate Repeated Measures of ANCOVA to examine time effects and interactions. Levene's Test of Equality of Error Variances was run to check for violations of the corresponding assumptions. These tests came out as non-significant, supporting appropriate use of the procedure. Using an alpha level of .05, there were significant differences between the experimental and comparison groups on both the scores at the different testing points, and in the rate of growth between the testing points. This means that the experimental group made significantly more gains over time than did the comparison group, but that there were no differences in the degree of improvement overall based on achievement level.

The effect sizes for average students was found to be 1.296; for gifted students, it was 1.326; and for students with learning disabilities, it was .28. Table 19 shows these statistical differences.

Table 19

Multi-Variate Repeated Measures of Analysis of Co-variance Comparing the Means of the Pre-test, the Midpoint Test, and the Post-Test Total Scores for the Total Sample.

Source	df	F	p	
	Between subjects			
Experimental/ Control	1	39.974	.000	***
Label	2	39.444	.000	***
Error	301	(14.873)		
	Within subjects			
Time	2	1.522	.219	
Time X Exp/comp group	2	30.546	.000	***
Time X Label	4	.336	.854	
Error (tests)	602	(4.850)		

*** $p \leq .001$

Figures 1 and 2 demonstrate these differences in scores between the experimental and comparison groups on each time series of the measures.

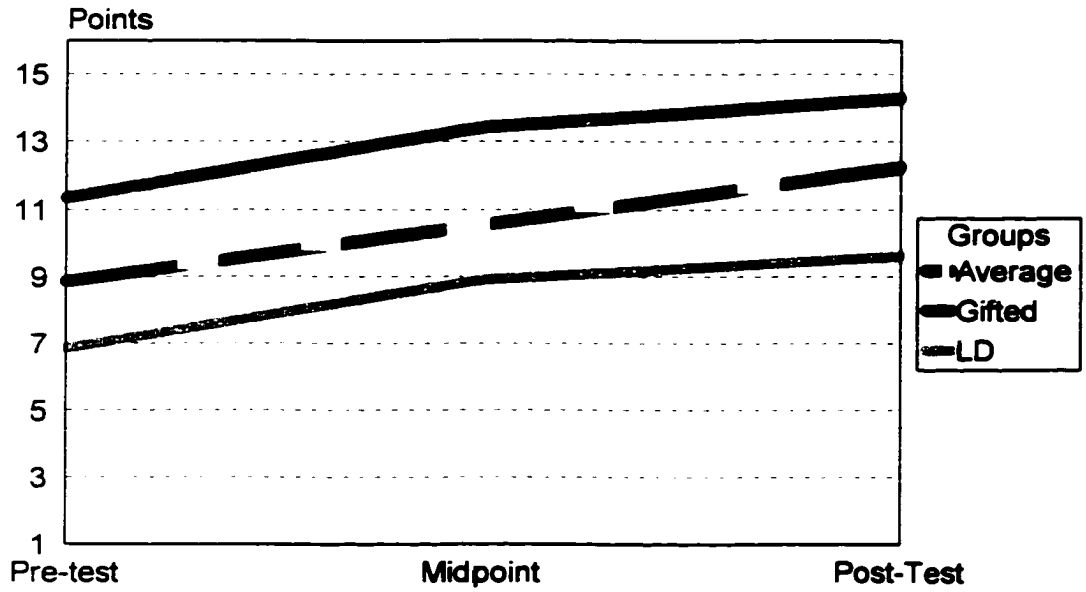

Figure 1 Mean Total writing scores of the Experimental group

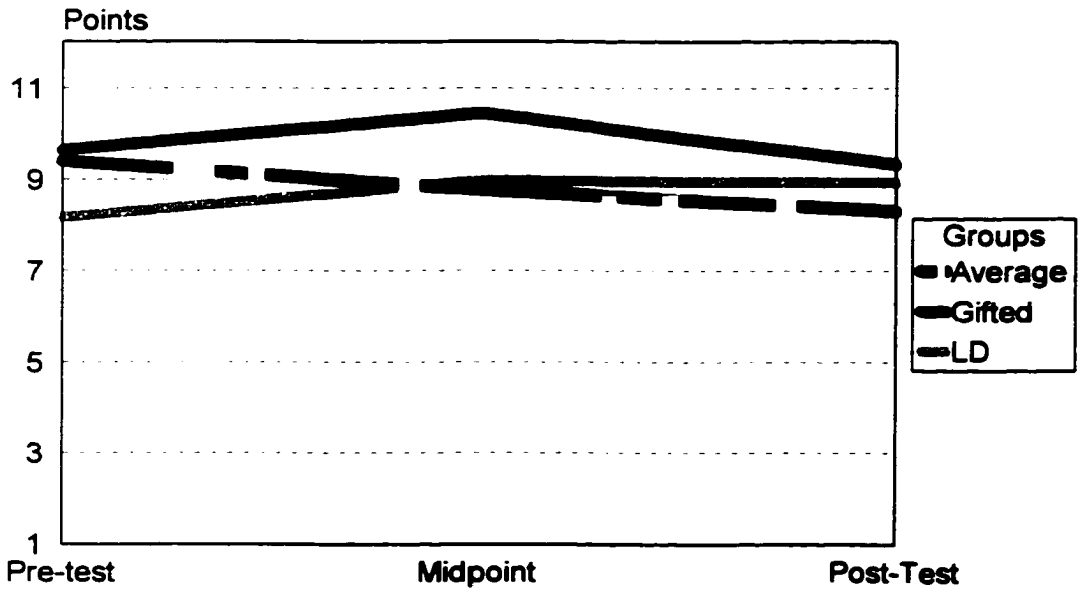

Figure 2 Mean Total Writing Scores of the Comparison group

In order to examine the role that the label played in the rate of change in the experimental group, multi-variate Repeated ANCOVAs were run on the experimental group only. As can be seen in Table 20, students in the experimental group significantly improved their writing scores from their pre-tests, and there were significant differences between the achievement groups' scores. When looking at the differences between the achievement groups; gifted, average and learning-disabled students all improved significantly on the measure. Average students in the experimental group began with a mean pre-test score of 8.87 and ended with a mean post-test score of 12.26; Gifted students began with a mean pre-test score of 11.38 and ended with a mean post-test score of 14.31; and students with learning disabilities began with a mean pre-test score of 6.88 and ended with a mean post-test score of 9.65; a score that is as high as the gifted students who were in the comparison group. Average students improved an average of 3.39 points; gifted students improved an average of 2.93 points, while students with learning disabilities improved an average of 2.77 points. Thus, while there were significant differences in the group scores over time, there were no significant differences between the rate of improvement among the groups.

Table 20

Multi-Variate Repeated Measures of Analysis of Co-variance Comparing the Means of the Pre-test, the Midpoint Test, and the Post-Test Total Scores for the Experimental Group.

Source	df	F	p	Effect Size
	Between subjects			
Label	2	19.584	.000	***
Error	301	(14.873)		
	Within subjects			
Time	2	3.057	.048	*
Time X Label	4	.1.008	.403	
Error (tests)	376	(5.008)		

* $p \leq .05$, *** $p \leq .001$

Writing Score Components

Because the experimental group significantly exhibited more growth between pre- and post-tests than the comparison group, and because the achievement level did not affect the overall impact of the units, further analyses were conducted on the experimental group to determine if there were any differences due to achievement levels in the various components of persuasive writing, including: (1) the statement of opinion, (2) the use of data, (3) the elaboration of the data, and (4) the conclusion. Due to statistically significant differences in the variances of the groups, as determined by Levene's Test of Equality of Error Variances, equal sample sizes of 26 students from the different achievement groups were evaluated for the Opinion, Data, and Conclusion scores. The total experimental group was evaluated in the analysis of the Elaboration scores, since there were no differences in the variances.

Opinion Scores. The opinion score was determined by the clarity of the opinion statement made by the student. There were a total of six points possible for Opinion scores. Table 21 describes the means and standard deviations of the opinion scores of the different achievement groups in the experimental group.

Table 21

Descriptive Measures of Opinion Scores by Experimental Achievement Groups

	Average			Gifted			LD		
Source	Mean	SD	N	Mean	SD	N	Mean	SD	N
Pre-test Opinion	4.29	1.74	26	5.15	1.16	26	3.24	2.05	26
Mid- Opinion	4.45	1.39	26	5.62	1.27	26	4.41	1.88	26
Post-test Opinion	5.14	1.52	26	5.85	.54	26	4.59	1.49	26

Repeated Measures ANCOVAs were run to determine if there were any significant differences between the achievement groups in their use of opinion statements. As can be seen in Table 22, there was a significant difference between the groups on their use of opinion scores; gifted students had the highest mean score for opinions at all testing points, while students with learning disabilities had the lowest. Although the entire group did not significantly improve their scores over time, there was a difference in the manner in which each achievement group improved over time. Students with learning disabilities made a marked improvement between their pre-test scores and their midpoint test scores, while average students made stronger gains between their mid-point test scores and their post-test scores. Gifted students, in contrast, made only a slight overall increase. A graph of the changes in the opinion scores, as seen in Figure 3, demonstrates the differences in the Opinion scores between the achievement groups.

Table 22

Repeated Measures Analysis of Co-variance of Opinion Scores of Experimental Group

Source	df	F	p	
	Between subjects			
Label	2	6.8	.001	***
Error	188	(1.407)		
	Within subjects			
Time	1	.991	.372	
Time X Label	4	2.431	.047	*
Error (tests)	376	(1.639)		

* p≤ .05, *** p≤ .001, Note: Values enclosed in parentheses represent mean square errors.

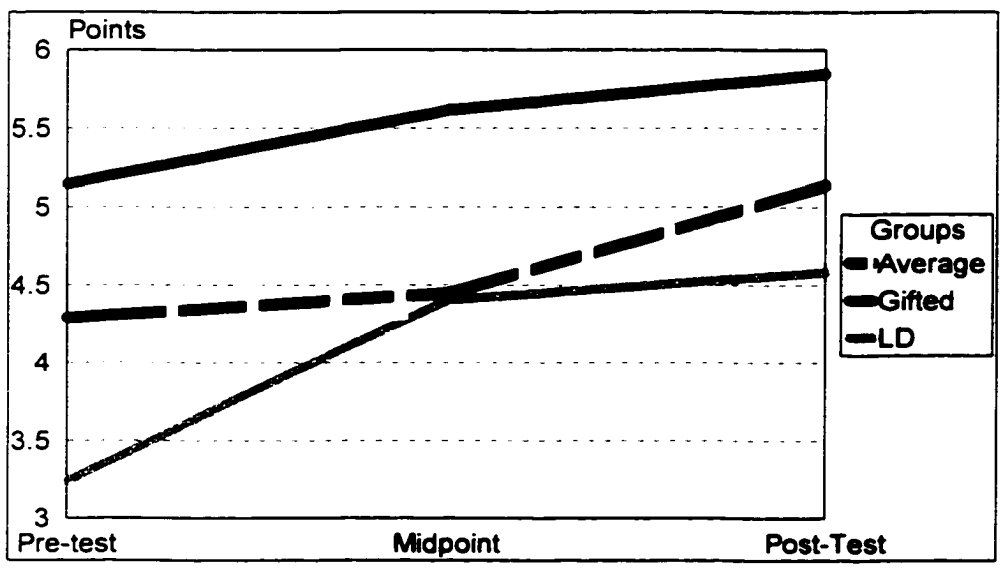

Figure 3 Mean Opinion Scores of the Experimental Group on the Pre-, Midpoint, and Post-tests.

Data Scores. Data scores were determined based upon the number of reasons and the quality of those reasons provided by a student. There were a total of 6 points possible for data points. Table 23 lists the sample sizes, means, and standard deviations of the Data Writing Scores.

Table 23

Descriptive Measures of Data Scores of Experimental Achievement Groups

	Average			Gifted			LD		
Source	Mean	SD	N	Mean	SD	N	Mean	SD	N
Pre-test Data	2.54	1.07	26	3.38	1.36	26	2.08	.69	26
Midpoint Data	2.69	1.38	26	3.15	1.16	26	2.31	.93	26
Post-test Data	3.23	1.50	26	3.69	1.57	26	2.62	1.10	26

Repeated Measures ANCOVAs were run to determine if there were any significant differences between the achievement groups in their use of data statements. As can be observed from Table 24, there are significant differences between test scores based on achievement groups; gifted students scored higher than average students who scored higher than students with learning disabilities. In addition, there were significant changes between the testing points in the rate of growth. All groups exhibited significantly improved performance between the pre-test and the post-test. There were no significant differences between the groups on their rates of improvement, although gifted students exhibited a slight drop in the use of data between the pre-test and the mid-point test. A graph of the changes in Data mean scores, as seen in Figure 4, demonstrates a relatively slight parallel increase in the use of data for average students and students with learning disabilities, with the drop at the mid-point test for gifted students.

Table 24

Repeated Measures Analysis of Co-variance of Data Scores of Experimental Group

Source	df	F	p	
	Between subjects			
Label	2	10.908	.000	***
Error (tests)	188	(1.602)		
	Within Subjects			
Time	1	6.866	.001	***
Time X Label	4	1.107	.353	
Error (tests)	376	(1.075)		

*** $p \leq .001$, Note: Values enclosed in parentheses represent mean square errors.

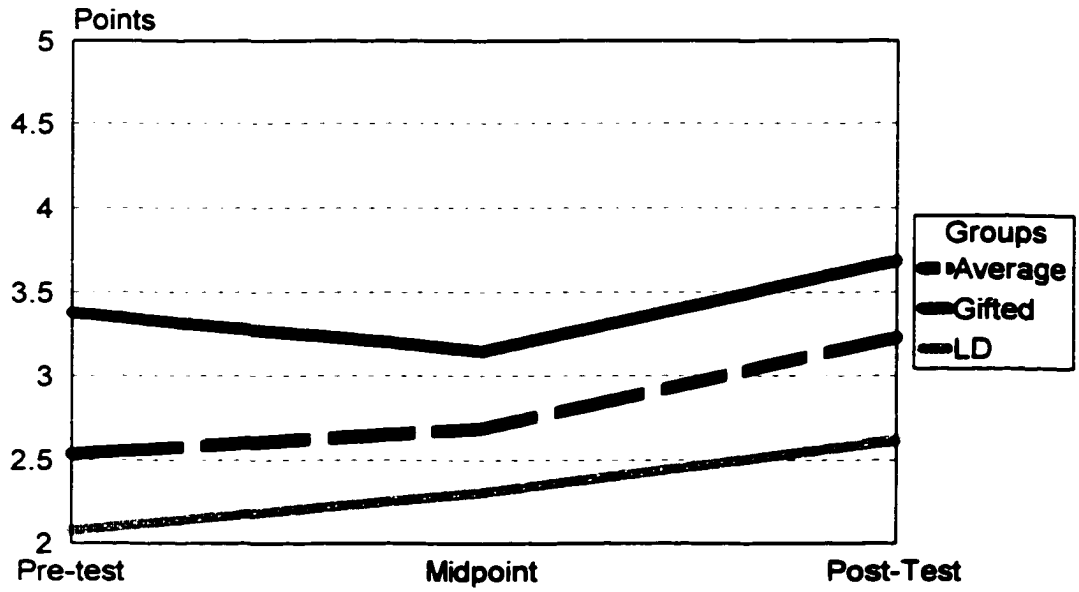

Figure 4 Mean Data Scores of the Experimental Group on the Pre-, Midpoint, and Post-tests.

Elaboration Scores. Elaboration scores were determined by a student's use of explanation or a strong connection of the reason to the opinion. There were a total of six points that students could obtain in elaboration. Table 25 lists the sample sizes, means, and standard deviations of the Elaboration Writing Scores of the different groups.

Table 25

Descriptive Measures of Elaboration Scores by Experimental Achievement Groups

	Average			Gifted			LD		
Source	Mean	SD	N	Mean	SD	N	Mean	SD	N
Pre- Elaboration	1.14	1.31	133	1.69	1.46	26	.88	1.32	34
Mid- Elaboration	1.79	1.50	133	2.69	1.59	26	.94	1.32	34
Post-Elaboration	2.66	1.66	133	3.08	1.81	26	1.12	1.32	34

Repeated Measures ANCOVAs were run to determine if there were any significant differences between the achievement groups in their use of elaboration. As can be seen in Table 26, there were significant differences between the groups on the use of elaboration; gifted students scored higher at each testing point than average students who scored higher than students with learning disabilities. There were significant differences between the achievement groups on their increased use of elaboration over time. Gifted students exhibited their most marked increase in scores between the pre-test and the midpoint-test, while average students exhibited the most increase between the mid-point and the post-test. In contrast, students with learning disabilities remained static in their use of elaboration. A graph of the Elaboration scores, as seen in Figure 5, demonstrates these results.

Table 26

Repeated Measures Analysis of Co-variance of Elaboration Scores of Experimental Group

Source	df	F	p	
	Between subjects			
Label	2	13.234	.000	***
Error	188	(2.725)		
	Within subjects			
Time	1	2.519	.082	
Time X Label	4	2.883	.023	*
Error (tests)	378	(1.756)		

* p≤ .05, *** p≤ .001; Note: Values enclosed in parentheses represent mean square errors.

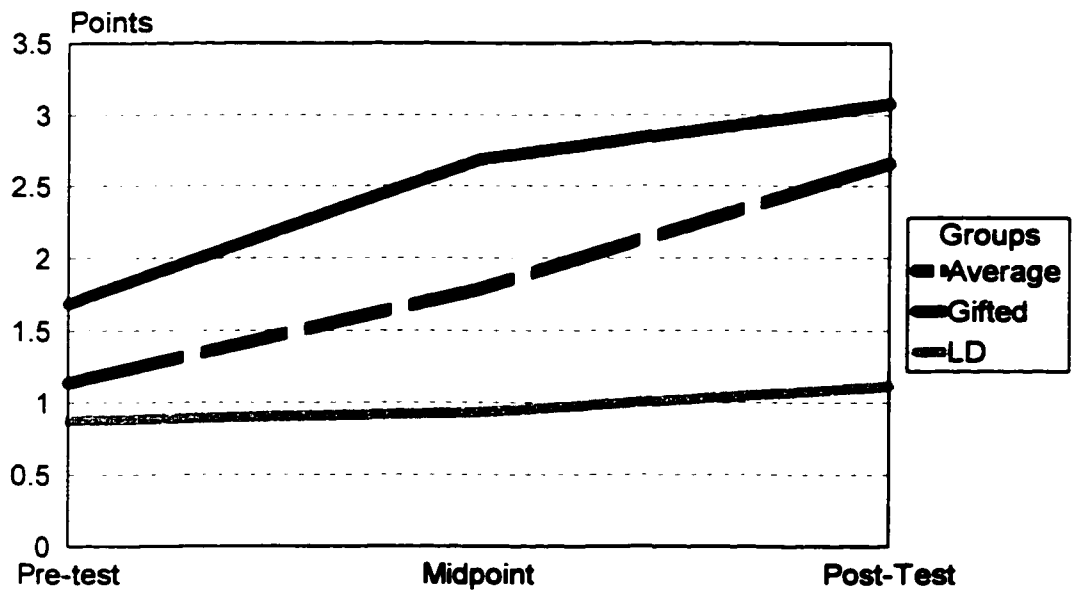

Figure 5 Mean Elaboration Scores on the Pre-, Midpoint, and Post-tests.

Conclusion Scores. Conclusion scores were determined by a student's use of a concluding statement to summarize the paragraph. There were two points possible that students could obtain for the conclusion score. Table 27 lists the sample sizes, means, and standard deviations of the Conclusion Scores.

Table 27

Descriptive Measures of Conclusion Scores by Experimental Achievement Groups

	Average			Gifted			LD		
Source	Mean	SD	N	Mean	SD	N	Mean	SD	N
Pre- Conclusion	.95	1.00	26	1.62	.80	26	.71	.97	26
Mid- Conclusion	1.47	.80	26	1.92	.39	26	1.24	.99	26
Post- Conclusion	1.38	.97	26	1.92	.39	26	1.35	.95	26

Repeated Measures ANCOVAs were run to determine if there were any significant differences between the achievement groups in their use of elaboration. As can be seen in Table 28, there were significant differences between the mean scores of the achievement groups; gifted students scored higher than average students who scored higher than students with learning disabilities at all testing points. Average students experienced a slight drop in their use of conclusions between the midpoint test and the post-test, but all groups improved between the pre-test and the mid-point test, and there was a significant increase between testing points. However, there were no significant differences in the rate at which student scores changed. All groups, statistically, changed in a parallel fashion. Figure 6 demonstrates the increases among achievement groups and the resultant flattening of the increase between the midpoint tests and the post-tests on the Conclusion scores.

Table 28

Repeated Measures Analysis of Co-variance of Conclusion Scores of Experimental Group

Source	df	F	p	
	Between subjects			
Label	2	8.090	.000	***
Error	188	(1.267)		
	Within subjects			
Time	1	1.870	.016	*
Time X Label	4	.572	..649	
Error (tests)	376	(.583)		

* $p \leq .05$, *** $p \leq .001$; Note: Values enclosed in parentheses represent mean square errors.

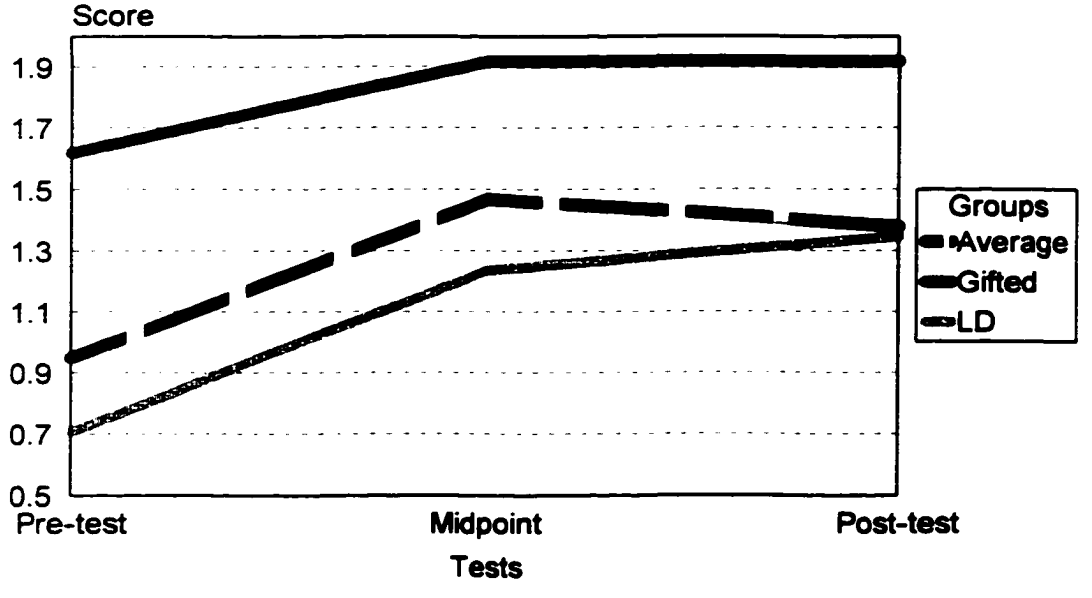

Figure 6 Mean Conclusion Scores of the Experimental Group

Individual Group Changes

While there were no differences in rates of growth on any of components of the writing scores between the achievement groups, t-tests were run for each group to determine where each group experienced their most significant growth-- between the pre-test and mid-point test, or between the mid-point test and the post-test.

Average students experienced their most significant growth in their use of opinion statements between the mid-point and the post-test. They experienced their most significant use of data between the pre-test and the mid-point test, although the difference between their mid-point and post-test scores approached significance. Average students' use of elaboration was significantly improved between each of the tests; and their use of conclusion statements also improved significantly between the pre-test and the mid-point test.

Gifted students experienced their largest increase in their use of opinion statements between the pre-test and the mid-point test, although none of the changes were significant. They experienced their largest increase in their use of data between the mid-point test and post-test; although, again, none of the changes were significant. Gifted students' use of elaboration was significantly improved between the pre-test and the mid-point test; and their use of conclusion statements also improved significantly between the pre-test and the mid-point test.

Students with learning disabilities experienced their most significant growth in their use of opinion statements between the pre-test and the mid-point test. They experienced their most significant use of data between the pre-test and the mid-point test, although none of the changes were significant. Students' with learning disabilities use of elaboration never approached statistical significance; while their use of conclusion statements improved significantly between

the pre-test and the mid-point test. Table 29 describes the mean differences between each of the tests, while Table 30 details the t-test values and significance of the differences.

Table 29

Mean Differences and Standard Deviations between Measures

	Average N = 144		Gifted N = 27		LD N = 35	
	Mean Difference	SD	Mean Difference	SD	Mean Difference	SD
Pre-opinion-Midpoint opinion	.21	1.83	.44	1.69	1.20	2.34
Midpoint opinion-Post-opinion	.66	1.76	.22	1.28	.11	1.82
Pre-Data-Midpoint Data	.36	1.45	.15	1.75	.29	.99
Midpoint Data-Post-Data	.23	1.47	.59	1.74	.22	1.13
Pre-Elaboration-Mid-point Elaboration	.53	1.89	1.04	1.95	.11	1.75
Midpoint Elaboration-Post-Elaboration	.90	1.76	.37	1.92	.22	1.81
Pre-Conclusion-Midpoint Conclusion	.53	1.06	.3	.72	.51	1.31
Midpoint Conclusion-Post-Conclusion	.04	1.02	.07	.68	.11	1.51

Table 30

T-test results for Achievement Group Writing Components

	Average		Gifted		LD	
	t-value	p	t-value	p	t-value	p
Pre-opinion- Midpoint opinion	1.368	.174	1.363	.185	3.039	.005
Midpoint opinion-Post-opinion	4.477	.000	.901	.376	.361	.720
Pre-Data-Midpoint Data	2.986	.003	.440	.663	1.712	.096
Midpoint Data-Post-Data	1.826	.070	1.772	.088	1.160	.254
Pre-Elaboration-Mid-point Elaboration	3.347	.001	2.762	.010	.387	.701
Midpoint Elaboration-Post-Elaboration	6.104	.000	1.000	.327	.726	.473
Pre-Conclusion-Midpoint Conclusion	5.990	.000	2.126	.043	2.315	.027
Midpoint Conclusion-Post-Conclusion	.492	.624	.570	.574	.572	.571

Summary of Research Question Two Findings

After instruction in critical thinking and persuasive writing, all experimental group students improved significantly when compared to the comparison group. All achievement groups improved to the same degree, but not in the same way, nor at the same time. When examining the separate components that contributed to the total writing score, the different achievement groups exhibited different patterns of growth.

Students with learning disabilities improved more significantly in the use of opinion statements than did average or gifted students. They made their most significant gains between the pre-test and mid-point test, while average students made their most significant gains between the midpoint measure and the post-test. Gifted students did not significantly gain between any of the measures.

All students improved their use of data to the same extent, regardless of writing ability level. However, average students and students with learning disabilities made their most significant gains between the pre-test and the mid-point test, while gifted students made their most significant gains between the midpoint test and the post-test.

In the examination of elaboration, students with learning disabilities did not improve between any of the measures. Average students made significant gains between all of the measures, while gifted students made the most gain between the pre-test and the midpoint measure.

There were no significant increases by any achievement group in the use of conclusions, although the range of scores possibly was constricted by ceiling effect. All three groups gained between the pre-test and the mid-point test, while none of them improved between the midpoint and post tests.

Research Question Three

Research Question Three sought to determine whether there were initial differences in reasoning on a persuasive writing task among fourth and fifth grade gifted students, average students, and students with learning disabilities prior to intervention, and if students changed these aspects as a result of instruction. These aspects were defined as differences in terms of (1) positive and negative opinion stances, (2) audience delineation of the writer, and (3) the types of reasons provided.

Positive and Negative Opinion Stances

Because students had to argue either for or against the use of the poem for all students in their grade, they had to take either a positive or negative position. An opinion statement makes it clear that the writer understands the need to take a particular stance and the necessity of defending that particular stance (vanEemeren, Grootendorst, & Henkemans, 1996). A positive position would argue for the use of the poem for all students at a grade level, while a negative response would argue against the use of the poem for all students at a grade level. An analysis was conducted to determine if there were any differences between groups on their preference for positive or negative choices, in order to determine if there was a difference in the scores received for different opinions. Table 31 details the actual numbers of positive and negative responses.

Table 31

Descriptive Counts of Positive and Negative Arguments by Achievement Groups

	Average		Gifted		LD	
Test	No.	Pct.	No.	Pct.	No.	Pct.
Pre-test						
Negative Arguments	29	18.4	8	25.0	11	31.4
Positive Arguments	129	81.6	24	75.0	24	68.6
Midpoint						
Negative Arguments	58	38.4	10	34.5	17	45.9
Positive Arguments	93	61.6	19	65.5	20	54.1
Post-Test						
Negative Arguments	19	12.1	6	18.8	10	25.6
Positive Arguments	138	87.9	26	81.2	29	74.4

Pearson Chi-square analysis was run to determine if there were any significant differences between the achievement groups on their selection of opinion stances. As can be seen in Table 32 there were no significant differences among groups in the use of positive or negative arguments for any test.

Table 32

Pearson Chi-Square Values of Differences in Opinion Stances by Achievement Groups

Source	df	Chi-square Value	p
Pre-test	2	3.217	.200
Midpoint	2	1.017	.601
Post-test	2	4.738	.094

In order to determine if students changed their opinions across testing times, a McNemer test determined the stability of responses over time, or the impact that instruction or the poem had on the students' decision to argue for the use of the poem for all students. Thus, as Table 33 demonstrates, although there were no significant differences between the achievement groups, average students were much more likely to change their opinions on all tests, whereas gifted students were unlikely to change their opinions at all. Students with learning disabilities were more likely to change their opinions only between the mid-point and the post-test.

Table 33

McNemer Tests to Determine Stability of Opinion Stances of Achievement Groups

	Significance of Change		
Test	Average	Gifted	Learning Disability
Pretest- Midpoint	.000 ***	.754	.581
Midpoint-Posttest	.000 ***	.508	.022 *
Pretest-Post-test	.043 *	.754	.388

* $p \leq .05$, *** $p \leq .001$

In addition, an analysis was conducted to determine if there were any differences in the scores received when students selected either a positive or a negative argument. Table 34 describes the mean score and standard deviation of each opinion.

Table 34

Descriptive Data of the Scores received when Positive or Negative Arguments made

	Negative Argument			Positive Argument		
Source	Mean	SD	N	Mean	SD	N
Pre-test	9.29	3.26	48	8.73	2.96	177
Midpoint	11.15	3.46	85	10.38	3.12	132
Post-test	12.40	3.81	35	11.82	3.44	91

T-tests were run to determine if the difference in the means between the positive opinions and negative opinion stances at any testing point was significant. As can be seen in Table 35, there are no significant differences between the mean writing scores received when students selected either a positive or a negative opinion stance.

Table 35

T-Tests of the Mean Scores of Positive and Negative Arguments

Source	df	Value	p
Pre-test	1	1.281	.259
Midpoint	1	2.927	.089
Post-test	1	.808	.370

Audience Delineation

In addition to examining the opinion stances, the perspective of the argument, or "audience" used by the students in formulating their arguments was examined. The audience delineation included: (a) the first person, or the use of "I" as the main perspective of a reason, (b) the second person voice in which the reason was directed at "you", (c) the third person in which the argument discusses other people, or "they", and finally (d) a focus on the author or material within the poem.

While the unit never addressed the issue of writing to a particular audience, and teachers did not specify which "voice" to use, students' responses widely ranged, often within the same paragraph. A student might use a reason that discussed the poem, then use a reason that addressed itself to "you" and then end with a personal comment that refered to "I". The use of perspectives was examined through the consistency of voice across their total argument. Thus, the student with only one reason, and that one in the voice of "I", would have 100% of their argument using that voice. A student with three reasons, only one of which used the "I" voice, would have 33% of their argument devoted to that perspective. This analysis allows an insight into determining both the use and the consistency of voice between groups, and if any of these differences were mediated through instruction in persuasive writing.

While a student may use a particular voice, it does not indicate how much of their argument uses that particular voice, or the degree of consistent voice within a paragraph. A student may write consistently using one perspective, or they may switch perspectives frequently throughout their paragraph. Each use of audience was evaluated in terms of its percentage of the total argument presented by each student. For example, if a student used the first person voice 100% of the time, they would have 100 for their first person percentage and 0 for each of the

other voices. Table 36 examined the sample sizes, the means and the standard deviations of the use of audience.

Table 36

Descriptive Measures of the Percentages of Audience used by Achievement Groups

	Average			Gifted			LD		
Source	Mean	SD	N	Mean	SD	N	Mean	SD	N
First Person									
Pre-test	15.02	49.12	131	6.44	11.93	25	8.03	13.73	34
Midpoint	10.64	20.52	131	9.88	21.41	25	18.06	28.76	34
Post-test	13.32	26.21	131	13.12	19.69	25	18.79	24.51	34
Second Person									
Pre-test	11.91	26.18	131	15.60	22.51	25	10.97	21.72	34
Midpoint	12.18	26.63	131	13.40	26.58	25	4.15	11.96	34
Post-test	7.03	17.88	131	7.04	19.60	25	5.12	12.91	34
Third Person									
Pre-test	48.22	58.09	131	19.68	24.33	25	25.32	30.82	34
Midpoint	33.32	37.95	131	25.28	31.00	25	26.88	34.71	34
Post-test	40.30	40.53	131	24.44	34.29	25	33.97	41.19	34
"The author" or "The Poem"									
Pre-test	34.44	54.25	131	58.00	28.85	25	49.85	38.65	34
Midpoint	42.77	37.52	131	69.56	94.97	25	44.74	37.68	34
Post-test	38.82	36.36	131	55.04	38.21	25	32.97	39.10	34

When examining the weight that different groups gave to the delineation of the audience, two questions emerge: (1) Are there any significant differences between the achievement groups in the audience used by the different groups? (2) If so, are these differences changed as a result of instruction?

As exhibited in Table 37, the consistency of perspectives varied across groups in the use of (1) the third person "They" and (2) the use of the "author" or the "poem". Average students were more likely than students with learning disabilities to use a greater percentage of their arguments referring to "they", while gifted students used "they" the least as the basis of their arguments. However, gifted students were more likely than students with learning disabilities who were more likely than average students to have a higher percentage of their argument refer to "the author" or the "poem".

When looking at changes over time, there were no significant differences over time. Students did not change their selection of audience across testing times, and there were no differences across the testing times among the groups. The "voice" a student chose for the pre-test appeared to remain rather constant.

Table 37

Repeated Measures ANCOVA of the Mean Audience Percentages

Source	Audience	df	F	sig.	
	Between Subjects				
Label	First person- "I"	2	.230	.795	
	Second Person- "You"	2	.881	.416	
	Third Person- "They"	2	5.816	.004	**
	"The Author" or "The Poem"	2	5.695	.004	**
	Error (tests)	374	(820.693)		
	Within Subjects				
Time	First person- "I"	2	.068	.934	
	Second Person- "You"	2	.111	.895	
	Third Person- "They"	2	1.756	.174	
	"The Author" or "The Poem"	2	2.645	.072	
Time X Label	First person- "I"	4	1.266	.283	
	Second Person- "You"	4	.441	.779	
	Third Person- "They"	4	1.360	.247	
	"The Author" or "The Poem"	4	1.169	.324	

** $p \leq .01$; Note: Values enclosed in parentheses represent mean square errors.

Types of Reasons

A theme analysis was undertaken to examine the types of reasons that were suggested by students and create categories of reasons cited. Using Miles and Huberman's (1994) process of cluster analysis and meaning derivation through matrices, and as described in Chapter Three, regular themes were determined. In order to determine internal and external homogeneity through feedback (Patton, 1990), the researcher discussed the possible categories with both the trained scorers and several of the teachers involved. As a result of these discussions, categories were amended and new ones suggested. Upon scoring subsequent student works, inter-rater reliability for the five newly-suggested categories was .96.

Using these categories, persuasive reasons fell into one of five categories, including (1) possible academic impacts, (2) the condition, or evaluation of the poem, (3) fairness and justice issues, (4) a restatement of the poem, and (5) the moral, or "lesson" of the poem. "Possible impacts" dealt with students' perception of what would happen as a result of using the poem with all students. The emphasis was on the future and results within the students that would occur as a result of reading the poem. "The condition/evaluation of the poem" was determined by a student's evaluative response to the nature of the poem. "Fairness and justice issues" dealt not with the nature of the poem, but the act of requiring all students to read the poem. Positive responses tended to indicate that if the student writing the paragraph had to do this task, all students would have to. Negative responses tended to emphasize freedom of choice, where the student or the teacher had the right to select the works that they wished to study. "Restatement" occurred when the student either directly quoted from the poem, or where the student restated the words of the poem in a very literal sense, without connecting the poem to the reader. Finally, the "lesson" of the poem occurred when the writer connected the message of the poem to the reader

and the implications from the poem were drawn. Table 38 summarizes the categories and actual student examples of the types of reasons that were given for each category. Appendix H demonstrates the process of thematic clustering.

Table 38

Types of reasons derived from the data and examples

Type	Student Examples
Future Impacts	A. The poem could improve our writing.
	B. The poem will teach us about poetry.
	C. Students need to learn and this could teach them.
Condition/Evaluation of the poem	A. The poem has a nice rhyme scheme.
	B. It is a stupid poem.
	C. I liked the poem
Fairness Issues	A. Everyone else should have to read this.
	B. Teacher should get to pick what they want.
	C. Kids shouldn't have to read anything they don't want to.
Restatement of Poem	A. The poem is about a kid who hides from everyone.
	B. The poem is about music and that's a good thing to study.
	C. Robert Frost goes for a walk in the woods.
Concern with Moral of the Poem	A. People should get along with each other.
	B. We need to make good choices.
	C. People shouldn't hide and be mean to others.

While the unit never addressed the issue of writing perspectives for different audiences, it did emphasize the need for "logical" and valid reasons, and the need to reinforce answers using the text. Students' response types widely ranged, often within the same paragraph. A student might discuss a personal opinion of the poem, then use a reason that addresses the moral of the poem, and then end with a restatement of the poem. Each type of reason was evaluated in terms of its percentage of the total argument presented by each student. For example, a student who used the reasons "It was stupid, it was boring and it was too short", would have 100% for the "Condition of the poem" type of reason and 0% for each of the other types. A student with three reasons, only one of which discussed possible impacts, would have 33% of their argument devoted to that reason. These analyses allowed an insight into determining what differences there were between achievement groups' use of particular reasons and the weight that each group ascribed to each reason, and if any of these differences were mediated through instruction in reasoning through persuasive writing.

Table 39 describes the means and standard deviations of the percentages of the use of the type of argument.

Table 39

Descriptive Measures of the Percentages of Arguments Types used by Different Groups

		Average			Gifted			LD		
Type	Measure	Mean	SD	N	Mean	SD	N	Mean	SD	N
Impacts	Pre-test	55.37	39.40	132	50.64	32.81	25	31.94	35.89	34
	Midpoint	43.86	38.76	132	31.60	31.76	25	39.83	36.47	34
	Post-test	36.27	38.65	132	29.04	30.18	25	26.35	31.70	34
Condition	Pre-test	29.83	52.24	132	27.56	30.36	25	43.24	37.79	34
	Midpoint	37.34	36.27	132	38.44	32.60	25	45.41	33.17	34
	Post-test	17.05	26.38	132	29.00	31.31	25	32.71	33.89	34
Justice	Pre-test	3.72	16.57	132	1.32	6.60	25	7.57	22.88	35
	Midpoint	2.70	12.05	132	5.28	18.27	25	7.11	21.81	35
	Post-test	.63	5.20	132	5.28	15.60	25	7.60	21.11	35
Restatement	Pre-test	8.42	19.40	132	12.96	18.76	25	6.66	20.68	35
	Midpoint	7.48	20.00	132	6.28	18.65	25	4.26	12.29	35
	Post-test	8.92	20.11	132	4.32	12.50	25	8.51	18.13	35
Moral	Pre-test	5.65	18.48	131	7.32	21.41	25	3.91	17.90	34
	Midpoint	7.62	21.85	131	18.12	31.15	25	6.35	20.08	34
	Post-test	36.36	37.50	131	28.76	38.39	25	15.18	31.07	34

When examining the weight that different groups give to the types of reasons, three questions emerge: (1) Are there any significant differences between the achievement groups in the variety of reasons used by the different groups? (2) Are these differences changed as a result of

instruction? and (3) Do different groups change the variety of their reasons after instruction? Repeated Measures ANCOVAs, controlling for school SES levels, were run to determine any differences between achievement groups and any changes over time.

There were significant initial differences between groups on three of the five types of reasons. Average students were more likely to use possible impacts as a stronger component of their argument than were gifted students or students with learning disabilities. Students with learning disabilities were more likely than average students or gifted students to have a greater percentage of their argument describe the nature of the poem as a reason. Students with learning disabilities were also more likely than average students or gifted students to have a greater percentage of their argument use "justice" as a reason.

These differences remained between all thee tests, with the exception of the use of the "moral". There was an interaction effect between the times of the testing and the writing ability level of the student in the percentages of the use of the moral of the poem as an argument. Although there were no initial significant differences between the groups, average students were more likely to increase their use of the moral of the poem as a larger percentage of their argument for the post-test than were gifted students or students with learning disabilities.

These results are displayed in Table 40, while Figure 7 shows the differences between the groups in their use of a moral over time.

Table 40

Repeated Measures ANCOVA of the Types of Reasons Percentages

Source	Audience	df	F	sig.	
	Between Subjects				
Label	Possible Academic Impacts	2	5.824	.004	**
	Nature of the Poem	2	3.530	.031	*
	Fairness/Justice	2	3.300	.039	*
	Restatement	2	.643	.527	
	Moral/ Lesson	2	2.804	.063	
	Error	186	(1786.029)		
	Within Subjects				
Time	Possible Academic Impacts	2	2.345	.097	
	Nature of the Poem	2	2.363	.096	
	Fairness/Justice	2	1.212	.299	
	Restatement	2	1.845	.159	
	Moral/ Lesson	2	1.224	.295	
Time X Label	Possible Academic Impacts	4	.575	.681	
	Nature of the Poem	4	.722	.578	
	Fairness/Justice	4	.668	.615	
	Restatement	4	.849	.495	
	Moral/ Lesson	4	3.661	.006	**
	Error	370	(614.078)		

* $p \leq .05$, ** $p \leq .01$; Note: Values enclosed in parentheses represent mean square errors.

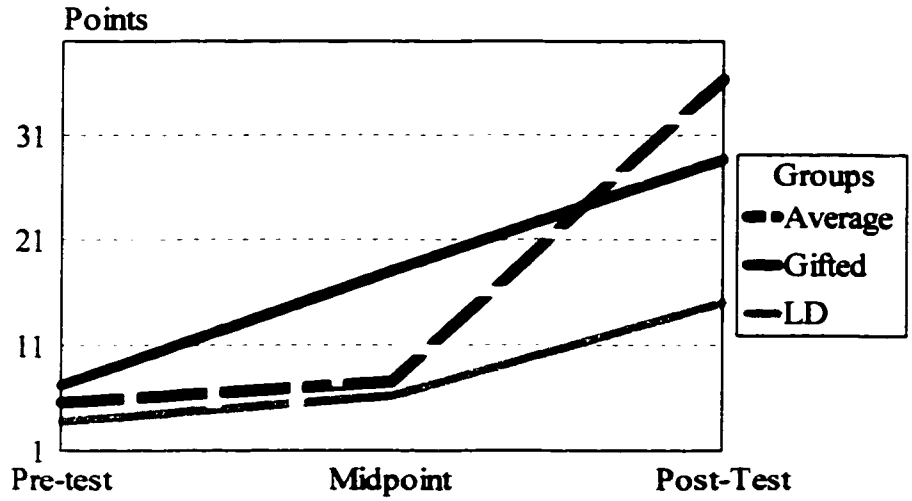

Figure 7 Percentage of argument using the moral of the poem as a reason

Summary of Research Question Three Findings

When examining the differences in the reasons among the three groups, three aspects were examined, including the positive or negative opinion stance taken by the students, the audience perspective that was delineated, and the type of reason that was used.

In the examination of opinion stances, there were no significant differences between achievement groups on the opinion stance taken on any of the testing times. In addition, the score received for the writing was not related to the opinion stance taken by a student. Thus, stronger writers weren't more likely to have a positive or negative opinion than weaker writers. However, average students were the most likely to change their opinion stances between all of the testing times. Students with learning disabilities were likely to change their opinion only between the mid-point and post-test, while gifted students didn't significantly change their opinions between any of the tests.

In the examination of audience perspective, average students were more likely than students with learning disabilities to use a greater percentage of their arguments referring to "they", while gifted students used "they" the least as the basis of their arguments. In contrast, gifted students were more likely than students with learning disabilities who were more likely

than average students to have a higher percentage of their argument refer to "the author" or the "poem". Students did not change their selection of audience across testing times, and there were no differences across the testing times among the groups. The "voice" a student chose for the pre-test would remain fairly constant through post-testing.

When examining the types of reasons selected by the different groups of students, five themes emerged in the types of reasons, including: (1) the specification of possible future impacts, (2) evaluative comments regarding the condition of the poem, (3) "fairness" issues, (4) a restatement of the poem, and (5) implications in terms of a moral or a lesson to be learned.

Of these types that were specified, average students were more likely to use possible impacts as a stronger component of their argument than were gifted students or students with learning disabilities. Such use of impacts did not change across achievement levels over time. Students with learning disabilities were more likely than average students or gifted students to have a greater percentage of their argument describe the condition of the poem as a reason. Such use of evaluative comments did not change across achievement levels over time. Students with learning disabilities were also more likely than average students or gifted students to have a greater percentage of their argument use "justice" as a reason. Such use of fairness issues did not change across achievement levels over time. None of the achievement groups were more likely to use restatement of the poem as a reason, nor were there any significant changes in the use of restatement over time. However, there was an interaction effect between the times of the testing and the writing level of the student in the percentages of usage of the moral of the poem as an argument. Although there were no initial significant differences between the groups, average students were more likely to increase their of use the moral of the poem as a larger percentage of their argument for the post-test than were gifted students or students with learning disabilities.

Research Question Four

Research Question Four sought to describe teacher behaviors that were facilitative of student growth. Data were collected through classroom observations, use of the Teacher Observation Scale, and logs kept by the teachers that described their responses and changes to the lessons. Scores on the Teacher Observation Scale were quantified and a regression done between the scores and the degree of improvement by the students. Thematic analyses were conducted on the teacher log notes.

Data for the study were collected over a two-year time period from 25 different teachers. Fifteen teachers were in the experimental group, while ten teachers were in the comparison group. All teachers participating volunteered for the study. All teachers in the experimental group were given a copy of the unit, a two-hour initial training in the use of the models, support via frequent electronic communication, and a minimum of two follow-up contacts and observations. Teachers in the comparison groups were given neither training nor materials, nor were they observed. Teachers gave all students in both the experimental and comparison groups the initial pre-test, the mid-point test 2-3 weeks later, and the post-test 2-3 weeks after that. Teachers implementing the unit replaced their regular writing curriculum with the unit of study for a minimum of seven weeks. Teachers were asked to teach eight key lessons, with each lesson to be taught over a period of two hours. In addition, there were an optional seven lessons that the teacher could choose to implement.

In order to determine treatment fidelity, and to verify teacher implementation of the units as stated in their lesson logs, the researcher had contact for a minimum of two hours in each experimental classroom. Appendix I details these observations. The researcher also gave feedback to the teacher immediately after the lesson, which consisted of verbal suggestions and

data from the observations. In some cases, the researcher followed up the observation with an email in which specific strengths and ideas were further developed. Individual teacher scores on the Teacher Observation Scale were not shared with administrators so as not to impact division evaluation efforts.

Comparison of Experimental and Comparison Teachers

Several analyses were run to determine if there were significant differences between the experimental and comparison teachers on key demographic variables. The details of the demographics are contained in Chapter Three. A chi square analysis (Pearson X^2) was used for the variables of gender, grade taught, education degree, and endorsements in special education and gifted education. A t-test was used for the variables of age and years of teaching experience. As seen in Table 41, and with an alpha set at .05, no significant differences were found between the groups on any of these analyses.

Table 41

Statistical Analysis of Teacher Variables

Variable	Test Statistic	significance
Gender	X^2 (1, N=25) = .146	.702
Age	t-test (4.167)= .502	.821
Grade	X^2 (2, N=25) = 1.326	.515
Educational Degree	X^2 (4, N=25) = 3.241	.518
Gifted Education Endorsement	X^2 (2, N=25) = .200	.905
Special Education Endorsement	X^2 (2, N=25) = 2.344	.310
Years of teaching experience	t-test (2.160)= .048	.829

Administrative Issues

Although training and researcher directions were consistent, the units were implemented by the teachers in the experimental group in a variety of ways. Six teachers received permission from their principals to teach the unit for a longer period of time. Four of them spent significant time extending the unit, using the lessons from the larger unit; two of them would teach a lesson, develop another lesson of their own, take the unit somewhere else, and come back to another lesson. Eight others stated that while they included some of the optional lessons, they did not select all of them because they felt their students were not capable of completing the additional lessons; and seven others merely taught only what was proscribed for the treatment. Nine teachers taught the unit every day; four others taught it every other day; and still two others taught it infrequently. Eleven teachers spent 45 minutes a day teaching the unit; while four others spent up to two hours a day on it. Nine teachers completed the unit in four or five weeks; four took about eight weeks, while two others took almost an entire semester. Four teachers had extensive contact with the researcher, asking questions and clarifying issues; two others were heard from only during observations. Seven teachers kept careful documentation of the changes they made in the lessons; three made infrequent comments, and five never completed a teacher worksheet. Four teachers taught primarily language arts; the other ten teachers taught all subjects to the same students. Although all teachers had principals who were interested in the study, thirteen teachers had very strong principal support, as determined by a principal who knew the material, read the unit, provided extra support, and informally observed in the classrooms, while four teachers had less obvious principal support. Three schools and a total of eleven teachers adopted the unit as an entire grade level and worked in a team together to plan, solve problems and share materials; two other teachers completed the unit independently from their

grade level team; and two other teachers involved in the study, despite working with grade levels who had adopted the unit, dropped out, citing the level of difficulty and the time involved in teaching the unit.

Teacher Observations

The researcher formally observed each teacher at least once during the course of the unit and often twice. At each observation, the researcher (a) recorded comments between the teacher and the students and (b) evaluated the teacher, using the Teacher Observation Scale designed by the Center for Gifted Education. The Teacher Observation Scale consists of 14 competency areas in which a teacher is evaluated from 1 to 5, with 1 being low or weak, and 5 being high or strong. The content on the observation form was shared with the teacher, strengths and weaknesses noted, and suggestions for improvement were made. The content of the specific observation forms was not shared with principals or administration, in accordance with the promise given to teachers that the observation would in no way affect the school division's evaluation process. Thus, individual teacher scores are not shared, but overall effects are determined.

Teachers were observed in fourteen different areas of competency. Table 42 demonstrates these competencies, and actual examples of observed teacher behaviors are included.

Table 42

Teacher Competencies and Observed Behaviors

Competency	Observed Teacher Behaviors
1. The use of advanced content and materials	▪ The use of a newspaper article about the cloning of sheep ▪ Integration of surveys and graphs in a presentation ▪ Use of a speaker from the Department of Transportation to discuss an issue mentioned in the unit. ▪ Linking the unit to issues of access to the Internet
2. Well-planned curriculum	▪ Connection of censorship activities about school uniforms that had been conducted previously. ▪ Culminating project by a presentation to the cafeteria manager
3. Varied teaching strategies	▪ Discussion of newspaper article, use of overhead projector and group activity in a 45 minute period
4. Varied grouping strategies	▪ Whole group discussion of point of view leads to partners working together to convince parents to take them to the movies.

5. Questions to promote creative responses	▪ "What are some ways to present our information to the cafeteria manager?"
6. Questions to promote critical thinking	▪ "Which one is the best essay? Why?" ▪ "What point of view is this article written from?" ▪ "What is the cafeteria manager interested in? What is her point of view?
7. Questions that encourage metacognition	▪ "Did we hear any concept words? What concepts could you include?" ▪ Discussion of "trigger words" to use in writing ▪ "What comes next?"
8. Problem-finding and problem-solving behaviors.	▪ "Think about things that you've had to decide. What did you decide to do this weekend? What did you have to think about?"
9. Encouragement of independent thought	▪ "What do you think?" ▪ "What should we ask on our survey?"
10. Positive affective classroom climate	▪ "OK, you have my complete attention" ▪ Rapid-fire answers from students and students leaning forward in their seats ▪ All but one student responds to a question ▪

11. Synthesizing student information and modifying instruction.	• "Are there any consequences as a result of this article? (no student answers) "Is there anything that could happen as a result of someone reading this?
12. Classroom management.	• Student who is misbehaving goes to timeout for five minutes • Classroom point system on board that establishes a goal of going to a movie. • Rewarding students with Girl Scout cookies for finishing their work.
13. Suggestions for extension activities	• Suggestion that students document how many times they hear someone ask for something on television in one day.
14. Use of multiple resources	• Drawing relationship of perspective to a "Just Say No" article previously read • Bringing in food from the cafeteria to present an issue • Showing a movie about Martin Luther King before showing his "I Have a Dream" speech.

In a 45-minute observation, a teacher would get a "1" if the researcher felt the behavior should be there, but wasn't. A "2" would indicate a very weak presence of the behavior; a "3" would indicate a moderate presence of the behavior; a "4" would indicate a strong indicator of the behavior, and a "5" would indicate an excellent demonstration of the behavior. In observations of the teachers, the majority scored quite high on the competencies. Table 43 details the means and standard deviations of the observed competencies of all teachers.

Table 43

Means and Standard Deviations of Teacher Competencies N= 15

Competency	Mean	SD
The use of advanced content and materials	4.27	.69
Well-planned curriculum	4.18	.62
Varied teaching strategies	3.83	.91
Varied grouping strategies	3.37	1.24
Questions to promote creative responses	3.77	1.25
Questions to promote critical thinking	4.02	.89
Questions that encourage metacognition	3.33	1.30
Problem-finding and problem-solving behaviors.	3.69	1.08
Encouragement of independent thought	4.14	1.05
Positive affective classroom climate	3.87	1.06
Synthesizing student information and modifying instruction.	3.76	.93
Classroom management.	4.37	.48
Suggestions for extension activities	3.66	.93
Use of multiple resources	4.33	.73

In an analysis of differences between teachers based on teacher training, there were no significant differences found in the use of any of the behaviors between teachers with no training, or teachers trained in gifted education or special education ($p \leq .05$).

In order to predict the impact of the teacher behaviors on the effects of the unit, two sets of analyses were conducted. In order to predict post-test scores, a step-wise regression was conducted, using the pre-test score and the scores received by teachers on the 14 different

competency areas. The second level of analysis used step-wise regression to predict the amount of growth of a student. Because of possible post-test differences due to achievement differences between the students, the degree of improvement was determined by the difference between the pre- and post-measures. A step-wise regression analysis was run to determine if there was a significant relationship between the teacher behaviors and the degree of improvement in the students.

Two areas of teacher behaviors appeared to impact student scores. A teacher's use of critical thinking questions was a positive factor in predicting students' post-test scores, even more so than the pre-test score. In terms of examining student growth, a teacher's classroom management was negatively related to the degree of positive growth in students between the pre-test and post-test. Table 44 describes the results of the step-wise regression, while Appendix N describes the correlational relationships between the other variables.

Table 44

Su Stepwise Regression Analyses for Variables Predicting Student Scores and Growth

Predicted measure	Variable	B	SE B	B	
Post-test Scores	Critical thinking questions	.787	.262	.310	**
Growth between pre-test and post-test	Classroom Management	-2.487	.760	-.336	**

* $p \leq .05$, ** $p \leq .01$

Note: $R^2 = .096$ for Post-test prediction

$R^2 = 113$ for Growth prediction

Teacher Comments

All of the teachers in the experimental group were asked to complete a Teacher Log at the end of every lesson in the unit. The researcher specifically asked the teachers to detail the changes they made to the lesson from how it was written. However, all of the teachers cited lack of time and did not complete all of the logs. No one completed a log for every lesson, but eight teachers completed at least two of the ten possible logs, seven of whom completed six logs.

Analysis and interpretation of the logs was conducted using qualitative analysis. According to Miles and Huberman (1994), qualitative analysis is the process of searching and arranging data such as notes and other materials in such a way that conclusions can be drawn and shared. The analysis was conducted at the first and second levels only because of the nature of the research design as described in Chapter Three. The teacher comments covered a wide range of topics, but they focused on the interaction between the student, the material, and the teacher ease of facilitating such interactions. A matrix of the teacher log themes may be found in Appendix J. Rather than using codes, teacher names have been changed in order to retain the personalization element inherent in the logs.

Close study of the comments revealed several themes that emerged, including: (a) details of the changes made to the individual lessons, (b) student frustrations, (c) teacher frustration, and (d) student growth.

Changes. Most of the teacher comments related to ways that they made some of the directions more specific and explained some of the material in greater depth. Both Mrs. Crespini and Mr. Adams, general education teachers clarified Pauls' Research Wheel and changed the wording of the questions. Upon review of their changes, the differences in interpretation did not appear significant. Mrs. Smythe, a special education teacher, noted that she had to explain to her

students what an express line was and that she discussed the concept of credibility in greater depth. Mr. Newsome, a general education teacher noted that he "went back to reteach" Lesson Nine.

Many of the lessons, particularly the introductory ones, extended for significant amounts of time, a fact that the teachers commented on frequently. Lesson One took at least two days for the teachers, as noted by Mr. Rathsome and Mrs. Crespini, general education teachers. Mrs. Mendoza, a gifted education teacher, noted that "I split it into two parts... This was a natural break in the lesson". Mrs. Crespini, a gifted cluster teacher, and Mr. Newsome, and Mr. Adams, general education teachers, all took three days to teach Lesson Two. Mrs. Smythe also required the students to go over Lesson Two twice, stating that they "need hands on/practice", since she had to "had to explain what the express line was in a grocery store", while Mrs. Stevenson, a gifted cluster teacher, noted that "I did this twice. Once we worked through the questions together. Then, they picked their own article and did it individually."

Time was cited as the reason that small deletions were made, particularly in the area of homework. Mrs. Victoria stated that "We didn't have time to do item #11 of the lesson." Time was also cited by Mrs. Crespini who said that "Due to time limitations and preparation for... [state standard] testing, I felt the [optional] long-term assignment would not be appropriate at this time." Despite his intention of implementing all aspects of the unit, Mr. Newsome "skipped this {optional lesson 7} because of the level of reading material. I did not think it was appropriate." He also "did not assign the long-term project because of time constraints."

Despite the time constraints, many of the teachers, particularly the gifted cluster teachers, added variations to the presentation of the material. Mrs. Victoria, a gifted cluster teacher, "started with a review of the author's purpose and an explanation of why we were doing some of

these lessons. Mrs. Stevenson, a gifted cluster teacher, discussed the "values and ethics of papers such as the National Enquirer". Mrs. Stevenson also required her students to write their own "I Have a Dream" speech, and "turned the Research Model into a rubric with each area being worth 5 points". Some of the teachers related the unit to aspects of curriculum that they had already covered. Mrs. Stevenson remarked that "We had already done animal reports on the usual bases (sic)... and turned it into an issue for each animal." Mrs. Smythe connected the use of emotions as data as "words that describe (adjectives!)."

Finally, all of the teachers provided their students with newspaper articles, rather than requiring the students to find their own. Mrs. Victoria, a gifted cluster teacher noted that "Many of our students' families don't receive the newspaper, so the assignment wouldn't have been completed." This provision of material was also demonstrated by Mrs. Smythe, a special education teacher, who had her students "watch a video entitled 'My Friend Martin' (for background)" so that her students would have some level of understanding of Martin Luther King Jr. before a lesson that dealt with the persuasive nature of his speech.

Slight modifications, like providing background information, were often made in response to individual student characteristics, particularly in the areas of materials, reading for students, providing additional practice, and grouping strategies. Mrs. Smythe, a special education teacher, "made overheads and used different color Vis-à-vis pens for visual discrimination." Mrs. Stevenson, a gifted cluster teacher, also used "colored pencils to identify the parts of the persuasive essay". Mrs. Smythe also numbered each of the sections of the Hamburger Model, made an overhead of the poem, provided written prompts, and read the material aloud. Mr. Newsome, a general education teacher, noting the reading difficulties of his students when confronted when a newspaper article "read most of it to students". Teachers also provided the

students with additional practice opportunities. Mrs. Stevenson, a gifted cluster teacher, noted that they did Lesson Three twice. Mrs. Smythe, a special education teacher, "had students write their own paragraphs". Finally, teachers also made slight variations in the groupings suggested in the unit. Mrs. Smythe, a special education teacher, "paired stronger students with weaker students". Mr. Adams, a general education teacher, let a group of students work together to complete a homework assignment.

While there were numerous personalized modifications made, there were also consistent patterns of implementation and treatment fidelity. Mrs. Smythe commented that "We read and discussed 'I still have a dream'- lots of talking and sharing." Mrs. Victoria noted her use of the questions that were written in the unit, noting that "nearly 100% of the class wanted to answer each question." Specific content was also adhered to. Mrs. Smythe noted that the students "reviewed the Wheel parts" and "discussed Handout 9A" in Lesson Three, while Mrs. Stevenson's class "discussed how the Research Model fit in with Paul's Wheel of Reasoning" in Lesson Ten. Mrs. Victoria, conscious of time, noted "We didn't get to item 11 of the lesson", indicating that she had covered through Item Ten. Mrs. Crespini, also struggling with time for a lesson "divided it between #4 and #5", and even remarked for three different lessons "No changes." Mrs. Mendoza stated succinctly for several lessons that "I made no changes or substitutions".

Student Frustrations. Teachers were very concerned with the level of frustration their students evidenced. Mrs. Crespini, a general education teacher, simply stated after one lesson "The whole class struggled". Several teachers noted the affective decline of their students after particularly difficult content. Mrs. Stevenson, a gifted cluster teacher, noted that "When they first read the poem, they had the "deer in the headlights' look", a difficulty also noted by Mrs.

Crespini, a general education teacher, who observed that "The students had much difficulty with the poem. It appeared to frustrate them". Mrs. Smythe, a special education teacher, noted that the concept of "inference was difficult for them to understand". Mrs. Victoria observed in Lesson Seven that "The students had difficulty understanding the concept of censorship and appeared uninterested in the discussion"; an observation she noticed before in Lesson Three, when "The children were reluctant to participate today. Only a handful were raising their hands." Discussion was also a challenge for Mrs. Stevenson, a gifted cluster teacher, who observed that "Our discussion was not stimulating whatsoever. I think we'll come back to this lesson".

Teachers were also concerned about the impact of their students' struggle on student performance. Mrs. Crespini, a general education teacher, felt that "The students had much difficulty with the poem. I feel this impacted the writing piece of the assessment because many students were not successful with the analysis of the poem"; while Mrs. Smythe, a special education teacher, observed that "The students did not understand the essays clearly, so the discussion that followed was not very effective."

As a result of the student struggles, teachers questioned the use of the curriculum with all of their students. Many of them observed the differential impacts the curriculum had on students of different abilities. Mrs. Victoria, a gifted cluster teacher, gathered data and noted that "Only 3 of the 6 groups were successful in putting the sentences in the correct order." She also noted that "Only one student interpreted the "road" as a path in life. The rest of the class interpreted it literally". Mrs. Smythe, a special education teacher, observed the differential impacts based on writing ability of her students and noted that "Stronger students were able to complete this assessment with minimal prompts. Weaker students needed several prompts and reminders and

ideas! Very frustrating for them!" However, Mrs. Stevenson, a gifted cluster teacher, noted that although there were significant differences between her students, all of them were gaining. "Once again, the 'men were separated from the boys', but all of my students were capable at varied levels." Such differences were evident from the beginning to Mrs. Mendoza, a gifted cluster teacher, who noted that "Even on the first lesson, I could see some students getting a handle on things."

Teacher Frustrations. Students were not the only ones experiencing frustration in the units. Teachers themselves expressed frustration with several components. Several of the comments dealt with specific elements of the unit. Mr. Newsome, a general education teacher, noted that "I think an answer sheet for Handout 8A would have been helpful. It could help us explain how to come about the right answer." Mrs. Victoria, a gifted cluster teacher, commented that "The picture is too small and not clear enough for a thorough analysis." She went to the library and got a better copy of the picture. Mrs. Mendoza, a gifted cluster teacher, expressed frustration with the wording in the unit, stating that "The directions for this unit were not specific enough. More explanation in the lesson plans would have been helpful. Also, some of the explanations were hard to understand"; she also expressed frustration with Paul's Critical Thinking model "The Reasoning Wheel is hard for students to understand, and I had difficulty explaining it. A simpler model and explanation would be good." Mrs. Crespini, a general education teacher, also expressed frustration with Paul's Reasoning Wheel and "tried to simplify the wheel as much as possible."

Student reactions to some of the lessons were difficult for teachers to manage. Mrs. Victoria, a gifted cluster teacher, noted that "The questioning part of the lesson following the reading of the poem was very time consuming, since nearly 100% of the class wanted to answer

each question." She also observed that her students "were very distracted by the colored pencils. They were more concerned with the color than with the actual exercise."

Finally, teachers themselves noted their own learning process involved in teaching the unit. Mr. Newsome in particular, a general education teacher, remarked that "The lesson [Lesson Eight] seemed very disconnected. It took me until the next lesson to see how it fit together. Then after I figured it out, I went back to reteach it." He also noted that by Lesson Nine, "This is where everything started to fall into place. It was here that I wished that I gone ahead and done the long term assignment." Mrs. Stevenson, a gifted cluster teacher, remarked that "When I reviewed the lesson in preparation to teach it, I thought that you must be crazy!... So, I went for it, and boy did they surprise me!" She also noted her own growth by observing that a particular lesson "was as helpful to me as it was to my class."

Student Growth. This observation of student growth and teacher affect was a consistent theme after the first couple of lessons. In a comment that links teacher affect with student performance, Mrs. Victoria, a gifted cluster teacher, stated that "We enjoyed the jumbled paragraph" and Mrs. Crespini, a general education teacher, noted that Lesson Four was "a fun lesson." Using a "smiley face", Mrs. Smythe wrote in large letters "They understand!" Mrs. Stevenson, a gifted cluster teacher, reiterated the link between student performance and teacher affect in her comment of "They actually understood this [Types of Data] and credibility! I was surprised!" Mrs. Smythe, a special education teacher, also used exclamation points for Lesson Nine in her simple statement of "They understood!" Mrs. Victoria, also a gifted cluster teacher, noted that "Once we identified the different types of data, it was fairly easy to distinguish between them... This stimulated a rather intense discussion".

The aspect of student discussion was a significant element in teacher comments, particularly in gifted cluster classrooms. Mrs. Victoria, a gifted cluster teacher, noted that "They became more actively engaged with the issue of school uniforms." She stated that "the students were very interested in discussing the issues. They were also curious about the meaning of many of the words, and it took a long time to discuss it." Mrs. Stevenson, a gifted cluster teacher, also said "We had quite a lot of discussion on decided which conclusion on 10-2 was the best". She also noted that the "I have a Dream" speech "really stretched their thinking, and brought out some very interesting conversations". However, Mrs. Smythe, a special education teacher, also noted that her students "talked about freedom" and the issues of "color of skin vs. character."

Teachers also expressed surprise at the level their students were able to reach with challenging content. Mrs. Stevenson noted that "I was surprised at how well the students did on a difficult article (about Elizabeth Dole running for President)"; while Mrs. Smythe observed that studying the structure of the Martin Luther King Jr. speech "really 'stretched' their thinking and brought out some very interesting conversations. The kids are now writing their own "I have a Dream" speeches and they're excellent!" The observation of student struggle was exemplified in Mrs. Stevenson's comment of "After hearing it read several times, and then discussing it, that [lost] look disappeared and they were starting to find real meaning in the poem." She also noted that linking the persuasive writing project to a previous activity, the students "learned so much more than they did with their 'generic' reports."

Many teachers observed the improvement of student skills in the specific components of reasoning and persuasiveness, using the very language of reasoning and persuasion they had been teaching. Mrs. Victoria, a gifted cluster teacher, noted that "They did an excellent job of identifying the figurative language, sentence patterns, and imitative language patterns in the

speech." Mr. Newsome, a general education teacher, stated that "Hearing the sides of issue [sic] from a different viewpoint helped students understand why people say what they do." Mrs. Stevenson, a gifted education teacher, observed that "They are getting better at writing persuasively. They are trying to look at all things from different points of view and from all angles"; she also noted that "They also made a good list of characteristics of a good conclusion." Mrs. Rathsome, a general education teacher, noted that students could easily see what the persuasion was in each handout".

Finally, teachers noted an overall improvement in students' writing performance. Mrs. Mendoza, a gifted cluster teacher, noted that "Several students were very successful in the homework assignment." Mr. Newsome, a general education teacher, noted at the midpoint assessment that "Students did much better that pre. ☺", and after the final assessment, that "Much improvement was made."

Teacher Implementation Impacts

All of the teachers reported that they completed all of the required eight lessons, and the optional Lesson #4. Although teachers made some changes to the unit in terms of modifications for students and further developed some content, most of the changes were relatively minor. However, the major area of discrepancy was not in the implementation of the unit, but in the timing of the intervention. It was determined through observation and through teacher logs that teachers differed significantly in their schedule of implementation of the treatment unit. See Appendix K for the implementation chart. As a result, analyses were conducted to determine if the different schedules of implementation impacted on student performance. The teachers were categorized into three groups that described the schedule for implementation of the intervention. The first group, which included two special education classes, two gifted education classrooms,

and five general education classrooms taught only the intervention lessons, taught them every day for at least 45 minutes, and stayed within a range of 20-25 hours of instruction, for an implementation over one month. The second group included a gifted cluster classroom and one special education classroom taught only the intervention lessons, stayed within a range of 20-25 hours of instruction, but had numerous interruptions and delays between lessons, extending the unit over three months. The third group, which included one gifted cluster classroom, one special education classroom and one general education classroom significantly extended the unit, teaching many of the optional lessons and incorporating the large research project. They taught the unit every day for approximately two months. The means and standard deviations of the different groups are shown in Table 45.

Table 45

Means and Standard Deviations of Curriculum Time Implementation Groups

	Every day N = 118		Infrequently N = 27		Extended N = 48	
Source	Mean	SD	Mean	SD	Mean	SD
Pre-test	8.93	2.79	9.26	4.23	8.46	3.38
Midpoint	10.90	3.21	10.96	3.86	9.96	3.90
Post-test	12.22	3.58	11.48	3.79	12.04	3.16

A Repeated Measures ANCOVA, controlling for student achievement level and SES level, was run to determine the differences among the three levels of implementation. As seen in Table 46, there were no significant differences in the beginning between any of the classrooms. There was a significant change over time and all groups improved between the three measures.

However, over the course of the implementation, an interaction effect was noted with time being treated as a variable. Thus, teachers who taught the unit on an infrequent basis had a lower rate of improvement than teachers who implemented the intervention every day and teachers who extended the unit.

Table 46

Multi-Variate Repeated Measures of Analysis of Co-variance Comparing the Means of the Scores Received by the Levels of Implementation.

Source	df	F	p	
	Between subjects			
Schedule	2	1.616	.202	
Error	188	(18.215)		
	Within subjects			
Time	2	22.177	.000	***
Time X Schedule	2	2.346	.050	*
Error (tests)	376	(4.995)		

* $p \leq .05$

*** $p \leq .001$

Summary of Research Question Four Findings

Teacher behaviors appeared to influence student learning. Using scores received from the Teacher Observation Scale, the teacher's use of critical thinking questions predicted a student's post-test score even more than the students' pre-test score. A strong sense of classroom management was negatively related to student growth, as defined by the difference between the pre-test and the post-test score.

Teachers implemented the curriculum in a wide variety of ways, adding material and changing the assignments. They tended to connect the material to content they had already taught in class and added particular steps that they felt would be appropriate for their students. They also added material and further clarification of content. Teachers did tend to adhere to the general outline of the lessons, using most of the content, and asking the questions from the unit. Because there were optional lessons, many teachers chose not to implement those particular activities, citing lack of time and student understanding.

Teachers expressed significant student and teacher struggle with the units. They observed the differential impacts the units had on different achievement levels of students and questioned the use of the units with lower achieving students. However, they often expressed surprise at the results of the students and the participation that students evidenced in the discussions. Towards the conclusion of the unit, teacher language began to change as they began to report student progress in terms of specific critical thinking and persuasive writing skills.

The timing of teacher implementation affected the performance of students. While there were no initial differences between teachers, those who implemented the 20 hours of the intervention over a period of time as long as 16 weeks with multiple breaks and other activities had a significantly lower rate of growth than teachers who (a) implemented only the 20 hours of

the intervention over four to five weeks, and (b) teachers who extended the unit by including the research model and who taught the unit over seven to eight weeks.

Overall Research Findings

The research findings for this study were grouped into three primary categories. The first category dealt with student scores on a series of persuasive writing measures; the second with the types of reasons selected by different groups of students; while the third dealt with teacher behavior regarding the implementation of the curriculum.

Findings related to writing scores of the different achievement groups and changes over time:

1) There were significant differences between the achievement groups initially on the pre-tests of persuasive writing, with gifted students out-performing average students who out-performed students with learning disabilities. There were no differences between the experimental or comparison groups in terms of initial scores.
2) After instruction in critical thinking and persuasive writing, all the experimental group students improved significantly when compared to the comparison group. All writing ability groups improved to the same degree, but not in the same way.
3) Students with learning disabilities improved more significantly in the use of opinion statements than did average or gifted students. Students with learning disabilities made their most significant gains between the pre-test and the midpoint, while average students made their most significant gains between the midpoint test and the post-test.
4) Over the implementation period, all students improved their use of data to the same degree, regardless of writing ability level. However, average students made

significant gains between all the tests; gifted students made their most significant gain between the midpoint and the post-test, while students with learning disabilities made their most significant gain between the pre-test and the midpoint test.

5) Students with learning disabilities did not improve in the component of elaboration to the same extent that average and gifted students did. Average students improved their use of elaboration significantly between all measures, while gifted students only improved significantly between the pre-test and the midpoint test. Students with learning disabilities never made any significant improvements in elaboration.
6) There were no significant increases by any achievement group in the use of conclusions over the course of the intervention. All groups improved significantly between the pre-test and the midpoint measure, but no group improved between the midpoint and the post-test. However, the range of scores possible could have been constricted.

Findings related to types of reasons selected by the different achievement groups and the changes over time:

1) There were no significant differences between achievement groups on the opinion stance taken on any of the testing times.
2) Average students were the most likely to change their opinion stances between all of the testing times. Students with learning disabilities were likely to change their opinion only between the mid-point and post-test, while gifted students didn't significantly change their opinions between any of the tests.

3) The score received for the writing was not related to the opinion stance taken by a student. Thus, stronger writers weren't more likely to have a positive or negative opinion than weaker writers.
4) Average students were more likely than students with learning disabilities to use a greater percentage of their arguments referring to "they", while gifted students used "they" the least as the basis of their arguments.
5) Gifted students were more likely than students with learning disabilities who were more likely than average students to have a higher percentage of their argument refer to "the author" or the "poem".
6) Students did not change their selection of audience across testing times, and there were no differences across the testing times among the groups. The "voice" a student chose for the pre-test would remain statistically constant.
7) Average students were more likely to use possible impacts as a stronger component of their argument than were gifted students or students with learning disabilities. Such use of impacts did not change across achievement levels over time.
8) Students with learning disabilities were more likely than average students or gifted students to have a greater percentage of their argument describe the condition of the poem as a reason. Such use of evaluative comments did not change across achievement levels over time.
9) Students with learning disabilities were more likely than average students or gifted students to have a greater percentage of their argument use "justice" as a reason. Such use of fairness issues did not change across achievement levels over time.

10) There is a lack of any significant differences in the percentages of the use of the restatement of the poem as a reason between the achievement levels, or any significant changes over time.

11) There was an interaction effect between the times of the testing and the writing ability level of the student in the percentages of the use of the moral of the poem as an argument. Although there were no initial significant differences between the groups, average students were more likely to increase their of use the moral of the poem as a larger percentage of their argument for the post-test than were gifted students or students with learning disabilities.

Findings related to teacher behavior:

1) Teachers' use of critical thinking questions predicted students' post-test scores even more than the score a student received on the pre-test.
2) Conversely, a strong style of classroom management was negatively related to the improvement of student scores, as defined by the difference between the pre-test and post-test scores.
3) Teachers made modifications to the curriculum through the use of more explicit directions and instruction, inclusion of additional materials, their own creative desires, changes related to specific student needs, and omissions of minor elements of the curriculum because of time constraints.
4) Teachers observed significant student struggle and frustrations. They expressed concern with lowered student performance based on student frustration.
5) Teachers also expressed concern with the increased differential performance observed between students of different abilities. Because of the degree of struggle evidenced

by all students, it was interpreted that the material was inappropriate for students of diverse abilities.

6) Teachers themselves observed significant struggle within themselves in the implementation of the curriculum. Many of them had to re-teach or work through lessons in order to achieve the level of teaching they desired.
7) Teachers noted, often with a strong sense of surprise, the level of understanding reached by their students, particularly in the latter half of the unit. In particular, the level and quantity of discussion by the students was noted by teachers.
8) Teacher comments began to reflect the language of critical thinking and persuasive writing as students began to develop in specific components.
9) Teachers who taught the intervention lessons with greater breaks and over a greater amount of time had a lower rate of improvement than teachers who taught the lessons over a continuous time period and those teachers who significantly extended the unit through optional lessons over a greater period of time.

The next chapter discusses the inferences of these findings and draws some conclusions regarding them. Implications for practice and further research are also suggested.

CHAPTER FIVE

Discussion, Conclusions, and Implications

This study examined the effects of a language arts unit that was designed to teach critical thinking through persuasive writing to average students, gifted students, and students with learning disabilities. Because of (a) the national pressure on schools to teach writing to students, (b) the need for students to critically examine issues and information, (c) the increased use of inclusion, in which all students are exposed to the same material with different modifications, and (d) the need to promote challenging curriculum for all students, it becomes necessary to understand the effects that a high-level persuasive writing unit designed to enhance critical thinking can have on students of different writing ability levels and the necessity to understand how students of different abilities learn different aspects of writing.

Positioning the Study in the Literature

This study was designed to add to the current literature in both gifted education and special education in three significant ways. First, the literature base is replete with studies that compare gifted students to average students, and others that compare students with learning disabilities to average students, but there is a paucity of studies that compare all three groups on the same measure. This study examined the differences of gifted students, students with learning disabilities and average students on a measure of critical thinking and persuasive writing to determine differences at three points in time- before, during, and after a curriculum intervention. These differences are critical to understand in the development of curriculum and strategies tailored to different student needs.

Secondly, this study compared the impact of a curriculum intervention with students of three different achievement levels. Because schools are increasingly serving both gifted students and students with learning disabilities in the regular classroom, and national and state standards are expected to apply to all students, it is critical to know the impact that the same curriculum has upon different students. Each field of exceptionality advocates for specific types of curriculum modifications and interventions based on differences in learning ability. Gifted educators and special educators have both called for materials and strategies that are appropriate for the needs of their students. This study provided insight into the differential outcomes that can be expected when students of different abilities are exposed to a curriculum that integrates the methods and strategies from different fields. Specifically, the academic impacts on different students was determined when the strategies often employed in gifted education, such as instruction in critical thinking and use of complex materials, are taught in a manner that incorporates strategies often recommended in special education, such as direct instruction and the use of a specific learning strategy.

Finally, this study provided insight into the process that teachers use for incorporation of, and their reactions to, curriculum that is challenging for all students. Through multiple data sources of direct observation through a pre-structured form, teacher logs, and discussion of administrative components, insight was gleaned regarding teacher attitudes and their resultant implementation of curriculum and its impact on a diversity of students.

While this study contributed to the body of knowledge in these three ways, it also led to the need for further research in some specific areas. This need for further research is addressed later in this chapter.

Discussion of Results

This study was composed of four key questions that examined the impact of a 20-hour persuasive writing curriculum intervention on students of different achievement levels:

1. Are there significant and/or important differences in critical thinking abilities among fourth and fifth grade gifted students, average students, and students with learning disabilities as measured by performance on a persuasive writing task?
2. Are there differential rates of growth in critical thinking abilities between fourth and fifth grade gifted students, average students, and students with learning disabilities, as measured by performance on a persuasive writing task, when presented with a minimum of 20 hours of direct instruction in the reasoning elements of persuasive writing and when compared to a comparison group of students of similar abilities?
3. To what extent are there differences between gifted students, average students, and students with learning disabilities in the opinion stances selected, the delineation of audience, and the types of reasons chosen?
4. To what extent did teachers exhibit behaviors facilitative of student growth?

Research Question One- Initial Differences

The first research question examined the issue of initial differences between achievement groups on a persuasive writing task. Reflective of other learning differences (Fuchs, et al, 1996), when socio-economic differences were controlled for, gifted students performed better than average students who performed better than students with learning disabilities on all persuasive writing measures. Gifted students were more clear in their opinion statements, used more data in their argument, elaborated more on their reasons, and were more apt to use a conclusion, than were average students who were more able than students with learning disabilities. Since

persuasive writing is a process of making critical thinking explicit (Boyd, 1995), gifted students were better able to organize their thoughts in a coherent and logical manner through a stronger use of opinion statements, more data that was better elaborated, and a stronger use of conclusions. Students with learning disabilities demonstrated the least control of writing structure, persuasiveness, and critical thinking.

Research Question Two - Changes in Performance

The second research question examined the impacts of a curriculum unit had on different achievement groups on a persuasive writing task when contrasted to a comparison group. While there were initial differences between the achievement groups on the pre-assessment for writing, all achievement groups in the experimental group significantly outperformed the comparison group in their writing abilities after instruction in Paul's Critical Thinking Model and use of the hamburger writing model. Students in each experimental group also improved significantly in their writing abilities between the pre-test and the post-test. Thus, students not only significantly improved in relation to a comparison group of equal-ability students; they also improved over their own scores.

Most interestingly, while all students improved between the pre- and post-tests, there were no differences in the rates of improvement on the total writing scores between the achievement groups. Although gifted students typically learn faster and at a great rate than average students (Gallagher & Gallagher, 1994) and students with learning disabilities often learn at a slower rate (Wong, 1996), no group learned at a faster or slower rate when compared to each other, yet all groups demonstrated similar improvement.

However, although the unit had a significant effect on the persuasive writing abilities of the different groups, it did not impact each group in the same way, as indicated on the sub-scores.

Gifted Students. Gifted students made a small gain in their scores on opinion statements between the pre-test and the mid-point test, only to flatten out between the mid-point test and the post-test. This same trend is noted on gifted students' use of conclusions in which there is a more moderate gain between the pre-test and the mid-point test with a flattening between the mid-point and post-tests. Such flattening on both measures is almost certainly a result of a "ceiling effect", since the post-test mean for gifted students was 5.85 out of a possible 6 points for opinion statements and 1.92 out of a possible 2 points for the conclusions.

In their use of data, gifted students demonstrated a slight drop in their use of data between the pre-test and the mid-point test, only to increase their use of data on the post-test. Of the areas possible, gifted students demonstrated the least improvement in their use of data, increasing only .31 points between pre-test and post-test scores. However, they increased their use of elaboration significantly between the pre-test and the mid-point test, with a gain of one point, and slightly flattened out between the mid-point test and the post-test, with a smaller gain of .39. Such results are reflective of the developing process of writing, as students elaborate more and responses get more complex with age (Pellegrini, Galda & Rubin, 1984).

Persuasive writing is a "juggling" of the many components of the writing task (Burkhalter, 1993; Stay, 1996). Gifted students quickly mastered the basic structure of persuasive writing through use of strong opinion statements and use of concluding statements. In their manipulation of reasoning, they appeared to focus initially on the goal of elaborating their responses, to the detriment of their use of data. By the post-test, they were able to return to

their initial level of data production, while maintaining and slightly increasing their use of elaboration. As students age, their ability to manipulate the components of persuasive writing improves (Knudson, 1992; Pellegrini, Galda, & Rubin, 1984). Such awkward manipulation of the various components of persuasive writing by gifted students does not yet reflect an "expert" level of writing, but one that is more advanced than the efforts of their peers.

Average Students. Average students generally demonstrated a consistent level of improvement in all areas of persuasive writing. In their use of opinion statements, average students made their most significant gains between the midpoint test and the post-test. In contrast, they made the most significant gains between the pre-test and the midpoint tests. The lack of gain might be due to a "ceiling effect", since they had a post-test mean of 1.46. There simply was not a lot of room to grow. However, in their use of data and elaboration, average students demonstrated an increase of .54 and .87 respectively, between the mid-point and the post-test, as opposed to more modest increases of .15 and .65 between the pre-tests and the mid-point tests. Since students were exposed to models of writing and thinking in the first half of the unit and then practiced such models in the latter half, the results could speak to the need for average students' use of practice in specific models in order to demonstrate improved performance . Continued practice in a skill has certainly been found effective to improve the performance of many students (Swanson, Hoskyn & Lee, 1999).

Although they did not demonstrate mastery at all levels, and their performance was consistently lower than gifted students, average students' level of achievement on all aspects was consistent and demonstrated a more mature manipulation of the writing task demands than students with learning disabilities.

Students with Learning Disabilities. Students with learning disabilities also significantly improved their writing skills across the three tests. The mean post-test score for students with learning disabilities was similar to the performance of gifted students in the comparison group. In their use of opinion and conclusion statements, students with learning disabilities significantly improved between the pre-test and the midpoint tests by 1.23 and .54 points respectively. Such an improvement speaks to the ability of the student with learning disabilities to improve once they are provided with a model and a "formula" for writing (Schumaker & Deschler, 1992; Harris, & Graham, 2000; Clark, Willihnganz & O'Dell, 1985). It is more disheartening to find that students with learning disabilities demonstrated an increase of only .31 on the use of opinion statements and .12 increase in the use of conclusions between the mid-point and post-tests. While there was a significant ceiling effect present for average and gifted students, students with learning disabilities had a mean score of 4.69 out of 6 possible points for the use of opinions and 1.31 out of 2 points possible in the use of conclusions. While a ceiling effect may have occurred to a limited degree, the amount of improvement possible indicated that the increased practice had little effect on students with learning disabilities, especially when compared to the strong growth possible after initial exposure. Students with learning disabilities either mastered the formulation of persuasive writing structural components after initial exposure, or they did not master it and continued to use inappropriate writing strategies even with practice opportunities.

Students with learning disabilities also consistently improved their use of data between the pre-test and the post-test with a gain of .54 points. Because students with learning disabilities exhibit difficulties with the more mechanical processes of writing, it might be expected that they would not increase their quantity of reasons. However, in their use of elaboration, their

improvement was minimal between the pre-test and the post-test with an increase of only .24 points. Elaboration is a strategy that is less "formulaic" and requires a higher level of verbal ability and conceptualization (Scardamalia & Bereiter, 1986; Swanson, 1993). Their poor improvement in elaboration reflects Burkhalter's (1993) findings that older students outperformed younger students in the area of elaboration. Knudson (1992) also noted that older students were more inclined to elaborate than younger students, while Poulson (1992) hypothesized that this was because as students age, they become more able to work with abstract concepts. Increasing the number of reasons is a relatively more concrete process (Clark, Willihnganz, & O'Dell, 1985), since it involves increasing the number of times a given behavior, in this case, generation of reasons, occurs. Most students with learning disabilities generated one reason, and in order to increase their data scores, they had to generate more ideas in a similar manner. Elaboration, on the other hand, involves a set of behaviors that are new and less concrete to students. Thus, students with learning disabilities demonstrated growth through an increased performance in more concrete operational activities, but did not demonstrate growth in the area of elaboration, which might have required more abstract thinking.

Comparing Groups of Students. When comparing students of different abilities, interesting differences emerge. Although all students improved overall, the methods by which they improved differed. As an overall group, there were no significant improvements in the use of opinion statements. However, student with learning disabilities made their most significant improvement between the pre-test and the midpoint measure, while average students made their most significant increase between the midpoint and the post-test measures. Gifted students had a relatively flat level of improvement, probably due to ceiling effects, since their post-test mean score is 5.85 out of 6.

In contrast, in the area of conclusions, all students made significant gains between the pre-test and the post-test, with only minimal improvement between the midpoint assessment and the post-test. Again, all of the groups had a mean score over 1 and the top score possible was 2. The range was significantly constricted, possibly resulting in a ceiling effect (Gall, Borg, & Gall, 1996).

It can be argued that because gifted students have a higher level of metacognitive awareness (Borkowski, Carr, Rellinger, & Pressley, 1990), they might have been aware of the structure of opinion and conclusion statements, and instruction only minimally affected them. However, students with learning disabilities made steeper gains between the pre-tests and the mid-point tests in both the use of opinions and conclusions, indicating a possible initial lack of metacognitive awareness of structure, but the ability to implement a writing strategy once a model was presented to them (Swanson, 1993). As presented in the unit, statements of opinion and conclusion are fairly straightforward; that is, they follow a certain model and structure. For example, points were given for the use of the words "I think that...all students... grade...poem, in conclusion...". These words act as "trigger words" and allow a student to structure a paragraph with little creative thinking involved. As found again and again the literature, students with learning disabilities make significant gains when such structure is provided to them (Swanson, Hoskyn, & Lee, 1999). Such structure appeared less necessary for gifted students. However, while average students also improved in their use of conclusion statements between the pre-test and the mid-point test, they did not improve in their use of opinion statements then, but only between the midpoint and post-tests. It is in the examination of data and elaboration, that a more complete picture of the process of persuasive writing and students' manipulation of each step becomes clearer.

In the use of data in arguments, all students increased their use of data significantly between the pre-tests and the post-tests. Gifted students' lack of improvement on the use of data between the pre-test and the midpoint test might reflect Swanson, Christie's and Rubadeau's (1993) findings that the knowledge of strategies is more important than one's verbal ability in devising reasons. Gifted students' strong verbal ability is well-documented (Gallagher & Gallagher, 1994; Maker & Nielsen, 1996; VanTassel-Baska, 1996). When faced with a lack of a specific strategy for developing a variety of reasons, gifted students perhaps did not initially develop them. They might have initially manipulated factors that they were most comfortable with because of their strong verbal abilities, not by producing numerous solid, logical reasons, but by elaboration of the reasons they could find. Only after they improved in this area, and perhaps with continued practice, did gifted students improve in the area of increasing data.

This is reinforced by the dramatic gain in elaboration between the pre-test and the mid-point test made by gifted students, and the gain in data between the midpoint and post-test, while average students showed a relatively constant improvement in both the use of data and elaboration. In marked contrast, students with learning disabilities demonstrated very little improvement in their use of elaboration on any test. MacArthur and Ferretti (1997) found that with specific instruction in elaboration strategies, students with learning disabilities were better able to write elaborated sentences, a result also found by Harris & Graham (1992). Perhaps without specific strategies, such as specific wording or a specific model, students with learning disabilities were not able to elaborate upon the increased reasons they were able to provide. Thus, gifted students initially focused, not on the development of reasons, or the repetition of activities, but the more challenging task of elaboration. In contrast, students with learning

disabilities increased their use of data, but were unable to increase their use of the more demanding task of elaboration.

The argument can be made that, in the area of persuasive writing, gifted students are writing at a higher level than average students who are writing at a higher level than students with learning disabilities in their mastery of performance-based writing tasks. Gifted students may have already mastered the more concrete components of persuasive writing and had an initial grasp of the structural components of opinions and conclusions. However, when faced with competing task demands, gifted students may initially focused their energies on the improvement of the more challenging and advanced task of elaboration. In contrast, students with learning disabilities, who may not have had the metacognitive awareness of the structure of opinions and conclusions initially, simultaneously developed the more concrete components of structure with the increase of data generation, while ignoring the challenging process of elaboration. Average students manipulated all components of writing with less skill than gifted students, and with greater skill than students with learning disabilities, with significant improvement through practice.

This practice effect as a means of explaining student growth is a strong possibility. Average students made growth fairly consistently across all tests, possibly indicating a grasp of the models when initially presented and increased growth as a result of practice as well. Gifted students appeared to need less practice and made more of their most significant gains between the pre-test and the mid-point tests, perhaps indicating a more immediate grasp of the models and immediate application to their own writing. Students with learning disabilities made the most notable gains once a structure was provided to them, but their resultant increases were more moderate, reinforcing findings that students with more restricted systems of operations benefited

from exposure to specific model instruction and practice only slightly improved that performance (Clark, Willihnganz, & O'Dell, 1985), or perhaps that more intensive practice over a longer period of time was needed in order for more significant gains to occur (Harris & Graham, 2000; Wong, 1996).

Research Question Three - Differences in Opinions and Types of Reasons

The third research question examined the initial differences between the groups on the types of reasons they provided, and examined any impacts a curriculum unit had on the formation of different types of reasons. The first type of response was the determination of a positive or a negative opinion stance held by the student; the second examined the audience to whom the persuasive message was intended; and a third type of reason was determined by a categorical analysis of the themes that emerged from student responses. Inter-group differences were determined by comparisons of initial reasons of the different achievement groups, while intra-and inter-group differences were determined through any changes over time.

Positive and Negative Opinion Stances. The selection of an opinion stance is often predicated by the knowledge that one must defend that position (vanEemeren, Grootendorst, & Henkemans, 1996). Thus, students will select an opinion stance for which they know they can produce reasons. It is, therefore, most interesting that there is no difference among the three groups at any testing point on their selection of a positive or negative answer. One might assume, that because of their stronger reading skills, gifted students would understand the poems better than average students, who would understand the poems better than students with learning disabilities. Such levels of literature understanding might be assumed to be a factor in the decision of whether to persuade others to read the poem. However, such an assumption did not prove to be true. Gifted students, despite their higher reading levels, did not argue for or against

the poem at any greater rate than other students. Nor do students with learning disabilities, despite their lower reading levels, have a different opinion of the wisdom of using the poem. It is also interesting to note that the negative or positive response does not reflect a score that was received, indicating that the writing ability was independent of the students' desire for other students to read the poem.

Although there were no significant differences between groups, individual average students were more likely to change their opinions from test to test than were gifted students or students with learning disabilities. Students with learning disabilities were likely to change their opinions only between the mid-point and the post-test, while gifted students were unlikely to change their initial opinion at all. Gifted students were most likely to remain fast to their initial opinion stance and even after instruction and a new piece of literature as a stimulus, keep their opinions.

There are several explanations possible for this lack of change among the gifted population. First is the issue of task engagement. One study has noted that gifted students are more engaged when working with a persuasive writing task than other students, while students of lower ability are more engaged when working with narrative writing (Reed, 1984). Gifted students may have been consistently engaged between tests, whereas other students' level of engagement may have varied more significantly, affecting the opinion stances. Secondly, is the possibility of a greater degree of "stubbornness" or confidence in their own opinion by gifted students. Gifted students tend to have a higher opinion of their academic abilities than other students (Gallagher & Gallagher, 1994), and they may feel that their initial opinions were correct. Yet a third explanation, and one that is borne out by other data, is that gifted students based their opinion on their perception of the task demand, rather than their personal response to

the poem, and thus state their opinion using a more global perception of group needs rather than their individual desires. In contrast, students with learning disabilities may change their opinions only when their perception of the writing prompt changes. Such a conclusion is reinforced by the perspectives and types of reasons that were selected by the different achievement groups.

Audience Delineation. When comparing the delineation of the audience used by the different groups, there were no significant changes between the testing times, indicating that students balanced their arguments in the same way, and that instruction played a minimal role in altering the weight of a perspective given to each voice. This is reflective of Atkins' (1983) finding that older students were more likely to have a sense of "audience" than were younger students, and that instruction played very little role in the process of audience development.

Gifted students were the least likely to refer to the amorphous "they" as the focus of their arguments, while they were the most likely to refer to the "author" or an aspect of the poem to focus on for their form of argument. In contrast, average students were the most likely to refer to the amorphous "they" as the focus of their argument on all three tests. Average students were also the least likely to use the "author" or "the poem" as a significant weight for their argument on the pre-test and the mid-point tests, although they were slightly more likely than students with learning disabilities on the post-test. Students with learning disabilities were in between gifted students and average students in their use of "they" on all tests and in the weight they gave to "the author" or "the poem" on the pre-test and post-test. There were no differences between achievement groups in their use of "I" as a focus of their argument, nor were there any differences in their use of the audience as a direct "you".

This lack of difference in the use of "I" and "you" indicates that although gifted students produced a greater quantity of writing and produced it more fluently, they did not differ from students of other abilities in their ego-centric responses, nor did they differ from other students in their use of the more immature writing perspective of "you". As students age, they begin to be better able at writing to the hypothetical audience of "they", or third person (Scardamalia, Bereiter & Goelman, 1982). This would indicate that all students at this grade level have achieved a certain level of audience development, or recognition of the audience as a participant in the writing process.

However, the significant inverse difference between the average student's use of "they" and gifted students' use of "the poem" or the author" could indicate a difference in the sophistication of writing. Weak writers primarily indicate their own preferences or opinions without indicating the presence of an audience (McMahon & Raphael, 1997). Slightly more advanced writers understand that there is an audience for their writing, and they will appeal to that audience. However, even more sophisticated writers will focus their argument on an external "valid" source, rather than hypothesizing the needs or reactions of an audience, while the most sophisticated writers will integrate the external information with the needs of their audience (Carrick & Finsen, 1998). Gifted students' reliance on "the author" or "the poem" indicates a possible awareness of the need to draw conclusions from the material rather than drawing hypothetical needs of an audience, indicating a greater sophistication of writing level. In contrast, average students' significant use of "they" could indicate a lower-level awareness of the need to focus on the audience, rather than the higher-level need to draw conclusions from the poem itself and connect them to the audience (Carrick & Finsen, 1997; McMahon & Raphael, 1996).

Students with learning disabilities' delineation of audience was more similar to gifted students' selection of audience than to average students, since they were both likely to refer to the poem or the author, rather than "they". While it would appear that the use of text material as the focus of the argument would be a more sophisticated manipulation of the writing task (McMahon & Rapahel, 1996), it is in the examination of the types of reasons used that the a more complete picture of the differences between gifted students and students with learning disabilities emerges.

Types of Reasons. Gifted students and average students were initially much more likely to examine "possible impacts" as a reason than were students with learning disabilities. In contrast, students with learning disabilities were much more likely to cite "conditions of the poem" and "fairness" than average or gifted students. "Possible Impacts" is an extrapolation of the current situation, while both "condition of the poem" and "fairness" are static reflections, limited to one's situation and one's own reaction to the poem in the immediate sense. Such a position indicates a more immature level of writing and is one that does not reflect an awareness of the social implications of literature (McMahon & Raphael, 1997). Thus, gifted students and average students could be more likely to reflect on long-term implications as a reason than students with learning disabilities. Students with learning disabilities often demonstrate a lack of planning (Hallahan, Kauffman, & Lloyd, 1997), or an extrapolation of the current situation, and these results could reinforce those findings.

When examining changes in types of reasons over time, there were no significant changes in gifted students' percentages of use of reasons, other than a steady increase in the use of the moral of the poem between each of the assessments. The reason of "moral of the poem" was determined by students' connection of the meaning of the poem to change on an individual or

societal level. See Appendix H for the clustering of answers. The reasons that gifted students gave originally were relatively consistent across tests, with the exception of the moral of the poem. Instruction appeared to strengthen their use of a moral, but had little impact on the use of other reasons.

The possible reasons for the growth in moral reasons are numerous. Because gifted students were more likely to have avoided reasons such as "condition of the poem" and "justice", it is possible that the teachers used "higher" reasons of the moral or the implications of use as examples to follow. It is also possible that as gifted students were instructed in the elements of critical thought, they increased their use of moral reasons as a reflection of their heightened reasoning ability that incorporated a more ethical approach. Previous studies have found that gifted students are more likely to be aware of ethical choices and to perceive a higher level of moral choice (Silverman, 1992). Finally, it is also possible that instruction reinforced their initial choices of reasons and gifted students felt that their reasons met the criteria of clarity and reasonableness, while addressing the needs of their intended audience: the teacher. Gifted students may simply have been giving the teachers what they perceived the teachers wanted.

Average students, on the other hand, were much more likely to increase their use of the moral of the poem only between the mid-point test and the post-test, rather than consistently between the times of the tests. Average students were also more likely than other groups to reduce their use of "justice" or "fairness" as an issue. As instruction occurred, especially in the second half of the unit, and as they practiced the critical thinking elements of the unit, average students might have perceived the gap between the instructional level and their reasons, and more closely approximated gifted students' use of the moral as a reason. They also may have been influenced by input from the teachers and the practice effect of teacher input and instruction

was not evident until the latter portion of the curriculum. Again, students may have been giving the teachers what they wanted, but this was not realized until later on in the unit.

In contrast to the changes that average students exhibited, students with learning disabilities made no significant changes in the type of reason they chose. Again, instruction made little to no difference in the initial type of reason given by students with learning disabilities, in a pattern similar to the lack of changes in perspectives. This pattern is also reflective of the changes made in the structural parts of persuasive writing, where students with learning disabilities improved in those areas that are more concrete in performance, rather than those areas that are more abstract in nature. Changes in perspectives and reasons are very subtle elements that are less concrete in nature (Stay, 1996), and perhaps less subject to influence through specific instruction or strategies.

Integration of Opinions, Audience, and Reasons. In the earlier analysis of audience delineation, gifted students and students with learning disabilities both made more frequent references to the poem than did average students. However, gifted students referred to the poem as a source of a moral or as a source for possible implications, while students with learning disabilities referred to the poem as a source of personal reaction. This emphasis on personal reaction is reflective in the negative or positive responses that students with learning disabilities provided. Their opinions were perhaps much more likely to based on their personal responses to the poem, while gifted students' opinions were probably much more likely to be based on more global, ethical reasons, or reasons that they perceived that the teacher desired. While average students also shared some of the same reasons as gifted students, their audience perspective reflected more of a "they" outlook, in which they were considering the needs of an amorphous audience. Average students were more likely than students with learning disabilities to construct

possible implications for their audience, without directly referring to the poem. Gifted students, while considering the implications and needs of their audience through the use of morals and possible implications, could have combined these needs with the material from the poem by referring directly to the poem, a strategy that is reflective of more advanced writers (McMahon & Raphael, 1996; Stay, 1996).

Students with learning disabilities are often more impulsive than other students (Wong, 1996), and their responses reflect more of a self-centered approach, an approach similar to younger students' (Dickson, 1997), while gifted students considered more of a universal stance. Gifted students' writings often reveal a more global concern than other students' (Applebee, 1991; Gross, 1998), and this concern and recognition of others is revealed through their integration of moral reasons derived from the poem and their opinions that are based less on personal reactions than on the needs of the greater population.

Research Question Four- Teacher Implementation

The fourth research question described the behaviors of the teachers that were conducive to student growth. When examining the components of teacher actions on the Teacher Observation Scale that may have affected student performance, the one area that was significant in the prediction of the post-test score was teachers' use of critical thinking questions. The use of critical thinking questions was so important, that the teachers' use of such questions was a stronger predictor of post-test scores than the pre-test score. It is important to note that this component, as well as other elements, such as the use of creative questions and multiple resources, were elements that were built directly into the unit through scripted questions. All teachers were provided direct instructional components that were written directly into the unit and asked a series of scripted questions that encouraged critical thinking, creativity, and

metacognitive structuring. While some questions were provided, all of the teachers asked additional questions. Those that were more critical in nature and that exemplified aspects of the Reasoning Wheel were evaluated as higher. In the less-scripted areas of teacher follow-up on questions and encouraging students to question, teachers who were observed to exhibit these behaviors had higher student post-test scores.

An explanation for this could be that the ability to ask follow-up critical questions indicated a teacher's own grasp of critical thinking and their ability to translate that to the student level. Putnam and Borko (2000) have noted that in order for teachers to learn new ways of teaching, they must do so within their own teaching context, through social interactions with other teachers, and with the use of specific tools that are designed to facilitate such teacher thought. With the provision of the curriculum, the e-mail connections, and support from the researcher, many of the teachers noted in their log notes that they themselves were growing in their thinking processes. However, an alternative possibility might be that students of higher ability were asked higher level questions. Thus, the questions asked might not be reflective of the teacher's critical thinking abilities, but the teacher's perception of the students' critical thinking abilities. Further research will have to be conducted to determine the cause of this finding.

It is interesting to note that a strong sense of classroom management had a negative effect on student growth. This could be explained by a more authoritarian atmosphere in a classroom that, while it appears controlled, is often not an atmosphere that encourages students to think independently (Ormrod, 2000). Classroom management was determined through the use of clearly stated rules of behavioral expectations, and the observation of a system of classroom discipline control. However, the behavior descriptor did not discriminate between those teachers

who had excellent classroom management strategies in an atmosphere of open exchange that allowed students to flourish, and those who had a more strict, teacher-centered classroom. Those classrooms that were the most orderly may not have supported exchange of thought between students. Because the measure, and the lack of numerous observation points did not discriminate between types of teacher management, it might not be appropriate to state the classroom management, per se, stifled student growth. It is perhaps the type of classroom management that is related to student growth. Again, further research in this area is warranted.

The teachers' comments were perhaps the most clarifying in the process of understanding teacher implementation. Most of the teachers expressed significant frustration with the unit. Teacher observations of personal struggle reiterate Dickson's (1996) concept of the "Distance/Personal" classroom in which teachers themselves are active learners and respond to perceived student needs. Many of the teachers questioned the unit's effectiveness initially, since students did not immediately grasp the material. Teachers often base their own sense of effectiveness on students' mastery of material on a day-today basis (Kennedy, 1996), rather than small, incremental growth. However, by the end of the unit, teachers began to perceive a sense of overall growth, and they expressed surprise at the levels they perceived their students were reaching. Many teachers identified two components as negatives: 1) many teachers established a link between their students' ability to "master" the poem and their ability to write a persuasive piece, and 2) teachers perceived differential levels of student writing as a lack of appropriateness for all students.

Because all students did not "master" the material, teachers were critical of its effectiveness. Several teachers shared that their desire to discuss the poem before students wrote about it; teachers felt that their students' writing would be stronger as a result of discussion, when this was not necessarily the case. The level of understanding of a poem may change the types of reasons a student provides (Hauser, 1995), but it won't change their opinion of the poem, as evidenced by the lack of correspondence between the scores received and the students' opinions. The score a student received was based on the ability to construct an argument, not necessarily on an understanding of the poem. Understanding the source material can itself provide a reason, but it does not provide a deeper knowledge of persuasive structure, nor of reasoning ability (Hauser, 1995; MacArthur & Ferretti, 1997).

Teachers also questioned the efficacy of the unit because student results were so widely discrepant. Students with learning disabilities appeared to struggle significantly; gifted students less so. According to teachers, gifted students responded verbally with answers that were of a markedly higher level than the responses of their peers, while students with learning disabilities did not approach such levels. Thus, the perception of teachers suggests that the learning gaps between the students widened to even greater degrees. However, the results demonstrated that all students improved at an equal rate, but not receiving the same score. While students improved in different areas, all students improved in their writing abilities; yet equal scores may not infer equal growth, given differential starting point. What is perceived as a negative is, in fact, a positive. All students had the room within the curriculum to grow, without the curriculum ignoring those at lower levels.

However, it is significant to note that while teacher resistance appeared high, there was little teacher attrition, and teachers noted significant changes in their students at the conclusion of the unit. The majority of teachers indicated their desire to teach the unit again and implement the models into other components of their teaching. While the teachers consistently followed the lesson plans as written, many of them indicated interest in using the models in other contexts. Several teachers stated that they were using Paul's critical thinking model in their teaching of social studies, while others used the Hamburger writing model for other types of writing. Thus, self-perceived teacher learning became a significant element of the curriculum implementation.

Treatment Fidelity

Despite specific questions being written, resource provisions, and significant guidance given, every teacher individualized the unit, and every teacher responded to student responses in different ways. However, core treatment fidelity was fairly strong, as determined by teachers' implementation of all of the required lessons, use of almost all of the content from the unit, and the use of the questions written in the material. As Halle (1998) stated "The fact that small procedural variations produce similar outcomes may bode well for the effectiveness of these procedures" (p. 294). Small threats to treatment fidelity were observed in teachers' amendment of homework assignments, and not completing an activity.

The major threat to treatment fidelity occurred in the scheduling of instruction as some teachers taught the unit for four weeks, some spread it out over three months, while others implemented more than the required lessons. Although all schedules of implementation noted significant improvement in student writing, the most significant student progress was noted in (a) the classrooms in which the teachers extended the material, and (b) in the classrooms in which teachers presented the material every day for a month. Classrooms in which there were

numerous interruptions, other tasks, and other instructional material did not have as significant a gain. This finding strongly speaks to the need for consistency in curriculum implementation. While it has been noted that students with learning disabilities need instruction that is intense in nature (Harris & Graham, 2000; Swanson, Hoskyn & Lee, 1999), gifted students also need an educational experience that is coherent and implemented for "therapeutic" amounts of time (Gallagher, 2000).

Conclusions

The overall purpose of this study was to understand the effects that a particular writing unit that developed critical thinking through persuasive writing had on students of different achievement levels. Integrating all of the data, a model of differential responses to persuasive writing begins to emerge, in which less able writers, such as the students with learning disabilities, respond to a persuasive prompt on a relatively surface, ego-centric level, referring to the prompt as the stimulus. Opinions are more likely to be based on personal response, rather than perceived needs of an audience. More able writers, or average students, were possibly in the beginning phases of responding to a perceived audience and their perspectives, but they neglected the source material as a reference point. Gifted students demonstrated even more able writing as they recognized their audience, determined implications from their audience's point of view, and originated their argument from the source material—all actions that are indicative of older and more able writers (Dickson, 1997; Knudson, 1992; McMahon & Raphael, 1996; Scardamalia & Bereiter, 1982; Stay, 1996). Thus, gifted students connected the audience to the prompt through references and demonstrated a higher level of manipulation of persuasive writing.

Garcia and Pintrich (1992) stated that "Elaboration strategies are ... positively related to critical thinking" (p. 15). A parallel process of the development of critical thinking abilities also emerged. Learning-disabled students' increased use of structural aspects of writing demonstrated an improvement in Paul's component of critical thinking that involves the "taking control of their thinking". Their improved use of opinion statements and conclusions led to a clarification of their own purpose and the issue of the argument, while their increased use of data implied an increase in the need to provide information in their thinking process, but did not reflect a corresponding improvement in the other components of critical thinking. Average students were more advanced in the perspective-taking component of critical thinking, but were unable to integrate the need for specific data with those perspectives. Gifted students demonstrated the highest level of manipulation of the components of critical thinking. Their strength in opinion statements and conclusions demonstrated clarity of purpose in their arguments. Similarly, their use of the poem as a source for change on a moral level, rather than personal reactions, may have demonstrated a higher level of consideration of implications, even if those implications were limited only to pleasing their teacher. Finally, their strength in applying moral reasons implied a more developed consideration of others' perspectives.

Several potential instructional patterns emerged from this study, including the 1) lack of reasoning changes, although improvement in structured thinking among students with learning disabilities, 2) the differential effects of practice 3) the rapid grasp of concepts in gifted students, and 4) the personalization of the process of curriculum implementation by the teacher.

Students with learning disabilities exhibited their most significant growth in those aspects of persuasive writing that were more concrete and structured. Once they were exposed to such structure, they exhibited significant growth in those areas, to the point that their writing scores

were similar to gifted students who had not received such instruction. This finding confirms many other findings in the special education literature that demonstrate that with intensive instruction, students with learning disabilities can perform at a level to students who had not received such instruction (Clark, Willihnganz, & O'Dell, 1985; De la Paz & Graham, 1996; Harris & Graham, 2000; MacArthur & Ferretti, 1997; Niedelman, 1992).

However, students with learning disabilities did not demonstrate growth at all in more abstract areas such as elaboration and the inclusion of other's perspectives. They did not make significant changes from their initial reasons that originated from an ego-centric perspective. Thus, they may need more specific instruction in the components of reasoning that involve taking the perspectives of others and possible implications of actions. As Harris and Graham (2000) have noted, improving the thinking in students with learning disabilities takes specific, intensive instruction. There is conflicting evidence as to whether instruction in this more abstract skill would be effective. While MacArthur and Ferretti (1997) have found that instruction in elaboration strategies significantly improved students' with learning disabilities ability to elaborate, Poulson (1997) did not find that instructional strategies were effective. Additional research is possible in this area.

The role of practice appeared to be significant, particularly among average students. Average students exhibited significant growth in all aspects of persuasive writing, and began the inclusion of the perspectives of an audience in their writing abilities. However, their most significant growth routinely occurred after practice with the concepts and the models, indicating a critical need for this practice in order to develop. Average students may still need to develop in their abilities to incorporate references to data or source material in order to reinforce their reasons. It is unknown what effect additional practice would have for students with learning

disabilities or if more intensive, structured instruction would be required in order to promote additional growth.

In contrast, gifted students appeared to quickly master the more concrete aspects of persuasive writing that involved the structure of writing. Their scores quickly elevated and a ceiling effect was noted in the structural components of persuasive writing. Gifted students also began the more sophisticated aspect of writing for an audience, while integrating information from a data source. Such growth in their writing can be found in their increased scores of elaboration, and in their increased use of the moral of the poem as the source for reasoning. Their patterns of growth demonstrated an initial focus on elaboration and overall quality of reasons, with a lack of simultaneous improvement in quantity of reasons. This "plateau" of reasons possibly indicates the manipulation of multiple aspects of writing and the incremental development of writing. Gifted students appeared not to have mastered all elements of writing simultaneously, but to focus initially on elaboration. Once they achieved a higher level of elaboration, their attention could then shift to increasing the number of reasons. Thus, it would appear that students focus on one component of writing at a time, and through practice, are given opportunities to intertwine the various skills they have mastered. While such a manipulation of persuasive elements might not indicate an expert level of writing (Dickson, 1996); it does imply a more advanced level of writing progress than other students of their same age (Burkhalter, 1993; Clark, Willihnganz, & O'Dell, 1985; Farmer, 1999; Knudson, 1992)

Teacher behaviors were related to the degree of student success. A teacher's use of additional questions designed to elicit critical thinking played a stronger role in the outcome of a student's final score, than the original score a student received. It is not clear whether this question-asking is reflective of teacher understanding, or the teacher's perception of the student's

ability to respond to the questions. However, the presence of the questions themselves is an important factor. It is also not clear what role classroom management played. Although there was a negative relationship between perceived classroom management and student growth, the measure may not have discriminated between a well-managed, student-centered classroom, and a more didactic, teacher-oriented classroom.

In addition to their behavior, teachers related very personally to curriculum. They judged their own sense of teaching on the responses of the students and perceived student struggle as a negative component. They also were greatly concerned with the differential effects of the curriculum on the different achievement levels of students, perceiving that student struggle and less able mastery in content was a negative reflection of the efficacy of the curriculum. While the data demonstrated that all students improved, albeit in different ways, teachers experienced feelings of frustration and surprise at the lengthiness of the process. However, the language of teacher logs began to reflect greater usage of critical thinking terms and they began to discuss the nature of their students' improvement in specific terms.

Finally, the degree of implementation of a curriculum is important. Teachers who implemented the curriculum consistently, whether only the required 20 hours or the optional research project demonstrated higher levels of attainment than teachers who spread the curriculum out over time. The spreading out of the curriculum might have resulted in diffusing the impacts of the curriculum.

Implications for Practice

One implication of this study for practice is the need to teach all students high-level, challenging material. With high-level instruction in this study that integrated specific modifications, all students improved their abilities in critical thinking and persuasive writing.

Students demonstrated significant growth in the processes of structuring and organizing both their thinking and writing skills. The relationship between content-based activities and critical thinking activities is a strong one. If students are to improve in their ability to solve problems and structure their own thinking in clearer and more reasoned ways, they must be exposed to material that is challenging. The results of this study indicate that all students can benefit from instruction in critical thinking through persuasive writing, but that the results will be different for different types of students. A curriculum that teaches critical thinking is beneficial to students of all writing ability levels, although the results will be different for different students. Thus, a curriculum that "takes the top off" does not have to leave out the bottom as well.

While the results of this curriculum are positive, further instruction should be differentiated. Gifted students should be given specific instruction in devising strategies to reason and determine solid reasons, rather than using their verbal ability to elaborate on existing reasons. They should also be given instruction in combining aspects of writing into an integrated, cohesive whole. While they were ahead of their age peers in their writing and thinking abilities, they did not demonstrate significant sophistication of writing and critical thinking skills. Thus, even gifted students need material that provides the next level of development, rather than material that limits new learning. As has been extensively recommended in the literature (Maker & Nielsen, 1996; VanTassel-Baska, 1998), and evidenced in this study, gifted students need exposure to high level, challenging material, but do not need as much practice as other learners to master it.

Conversely, students with learning disabilities should be given instruction in how to elaborate and expand on their reasons. Similar to the results found in the Niedelman (1992) study, students with learning disabilities outperformed control group participants, but averaged

lower gains than their age peers. "Students with learning disabilities, if they are to learn and transfer higher order skills... are going to require more intensive instruction in all areas" (Niedleman, 1992, p. 154) and greater amounts of practice, an observation also noted by Harris and Graham (2000). Although direct instruction strategies and a specific learning strategy were incorporated into the curriculum, the results highlight uneven development in particular areas. A greater effort needs to be made in curriculum development to ensure that explicit instruction occurs and that learning strategies are applied systematically. Even when students of different abilities learn the same strategy, students with learning disabilities may still be deficit in terms of performance when compared to other students who were also taught the strategy. A meta-analysis of studies that compared interventions with average students and students with learning disabilities found that "LD students will require additional intervention to equate performance differences with their normal achieving counterparts" (Swanson, Hoskyn, & Lee, 1999, p. 246).

In contrast to the more specific areas of improvement noted with gifted students and students with learning disabilities, average students demonstrated consistent improvement in all components of writing and thinking. However, the biggest implication that emerged is that when compared to gifted students and students with learning disabilities, average students should be given ample opportunity to practice new skills, since the most noted improvement in all aspects occurred in the latter half of the unit after they had received significant practice. It should also be noted that the performance of average students, who represent the typical writing level of their age peers (Burkhalter, 1993), can be positively impacted by instruction in the higher-level processes of persuasive writing and critical thinking. Thus, curriculum written to develop the academic abilities of average students should provide a greater level of challenge than is typically provided—a need that is evident from the results of the NAEP data (USDOE/OERI,

1999a), and call that is heard clearly through the standards-based literature (McLaughlin & Shepard, 1995).

This need for a greater level of challenge has significant implications in the area of teacher training. Because the teacher sample was comprised of many teachers with specific training in either special education or gifted education, many have already received training in the characteristics of students who learn at different rates. Yet, it was disheartening to realize that when exposed to a curriculum that did, indeed, allow students to grow in different ways, teachers were initially uncomfortable with the results. Because students struggled with the material, teachers perceived that struggle as a problem with the curriculum, rather than as growth within the curriculum. It must be reinforced that equal post-test scores do not translate to equal gains within the curriculum. This aspect of "struggle with the curriculum" as a hallmark of student learning must be a component in teacher education.

All of these components have significant implications for curriculum development and staff development. Curriculum that is to develop the critical thinking abilities of all students must achieve the triple goals of providing high-level content that allows the more able students to continue to develop, while providing practice opportunities for less able students, and specific instruction and learning strategies for students with disabilities. The curriculum must also provide specific guidelines, instructional strategies, and teacher supports in order to accommodate teachers' needs for perceived student growth.

Staff development must provide support for high-level curriculum by providing experiences for teachers to learn models of thinking and instruction within the context of their own setting. Staff development should address the issue of struggle as a necessary component for student growth, similar to Piaget's state of disequilibrium (Ormrod, 2000). It is only by

requiring critical thinking that one can expect students to think critically in academic areas and produce desired positive outcome for students. However, because "much of teachers' knowledge is *event-structured* or *episodic*" (Putnam & Borko, 2000, p. 13), teachers must be provided experiences in which they observe student struggle and the resultant student and teacher growth in order to break down teacher resistance to high-level curriculum. Without such direct experiences with high level curriculum, little will change.

Implications for Research

If this study were to be extended, there are numerous additional areas that could be analyzed. Interviews with students would be an interesting component, as would additional observations of the experimental classrooms. As all studies do, this one leads to many further research questions. There are several primary areas that need further study in order to provide a broader picture of curriculum effects on different groups of students.

The first area includes the examination of the effects of the curriculum with a broader diversity of students. While gifted students and students with learning disabilities initially wrote and improved in different ways, what effect would a unit that teaches critical thinking have on gifted students with learning disabilities? Would they respond in ways more similar to gifted students or ways more similar to students with learning disabilities? In addition, would students with mental retardation benefit from instruction in critical thinking? Would this instructiona have a similar impact on students with talents and/or disabilitiles in other areas? Also, what role did socio-economic status of the students play in the outcomes? Would the results be the same if one examined the impacts of curriculum on students from different socio-economic levels rather than from different achievement levels?

The second area for further research involves a re-examination of the curriculum for persuasive writing. What effect would explicit instruction in the use of audience perspectives or elaboration strategies have on students? If students received more substantive feedback in the use of conclusions, would the rate of improvement be different between the different achievement groups? If opposing viewpoints were presented in the model of argument, as cited in the Center for Gifted Education's curriculum units at the middle school level, how would that impact the learning of students of different abilities? If students with learning disabilities were provided greater time and more intensive practice opportunities, would their performance become more similar to the other students? Finally, if students responded verbally instead of only in writing, would the results be the same?

Also, the issues of treatment fidelity and the structure of the lessons are of interest to researchers (Halle, 1998). Do all of the lessons need to be taught in order to achieve the same results? Is all of the staff development necessary to produce the same results? Because the lessons were part of a larger unit that was optional, would instruction in the entire unit have produced greater results? And finally, because teachers personalized the process of instruction, how much individualization is acceptable in order to still produce changes?

The third area for further research involves the generalizability of these results to other academic areas. Would instruction in critical thinking in other subject areas, such as science or social studies, reveal similar results, or are these results only a result of direct instruction in persuasive writing? Will students retain this growth? A longitudinal study that examines the impact of a curriculum over a greater amount of time would be useful.

The final area to consider for future research involves the direct examination of teacher attitudes and behaviors. Because only teachers in the experimental group were observed in this study, it would be interesting to determine what behavioral differences existed between teachers teaching the same content, but using different curricula. What teacher behaviors led to changes in students' ability to elaborate? Did teachers select their level of questioning based on their own level of understanding, or their perception of the student's capacity to respond to the question? The issue of classroom management certainly bears greater scrutiny. Do authoritarian vs. authoritative vs. student-centered methods of classroom management impact students' ability to think critically? Many teachers expressed initial discomfort with the curriculum and its methods of teaching. What effect would more teacher training and more use of the curriculum by the teachers have on teacher comfort levels? What effect did the role of support in terms of staff development, frequency of contacts, and observations, play in the effectiveness of the teacher? The answers to these and other questions would continue to refine our understanding of how to promote growth in critical thinking in all students, given the nature and extent of their individual differences.

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Appendix A
Comparison of Critical Thinking Theorists

Author	Structure of Thinking	Creative-Critical Thinking Link	Outcomes	Standards	Skills vs. Dispositions	Knowledge	Generalizability	Philosophy
Paul (1995)	Cyclical, in which "a creator evaluates and an evaluator creates " (p. 215), and in which "the process of leading to belief is more important than the belief" (p. 224)	"Criticality and creativity have an intimate relationship... all thinking that is properly called "excellent" combines these two dimensions (p. 316)	Critical habits of mind- leading to a critical society in which all are good citizens.	"Guiding the construction of the thinking according to the standards and assessing the effectiveness of the thinking according to the purpose, the criteria and the standards" (p. 21)	Series of skills, including determination of issues, conceptual analysis	"Genuine knowledge is inseparable from thinking minds... knowledge is produced by thought... and transformed by thought" (p. 540)	Should be imbedded in subject matter, but certain principles are global Students don't transfer because they "are not engaged in the construction of meaning in class" (p. 59)	Critical thinking is an ethical behavior; Critical thinking is "determining the differences between principles, perspectives, and facts.... all dimensions of moral reasoning" (p. 242)
Ennis (1992; 1990)	"Reasonable, reflective thinking ... deciding what to believe and do" (1990, p. 180)	Neutral	Decisions about what to do or believe	A skill by which a person decides by what means things are to be judged.	Interaction of skills and the disposition of the individual	Certain elements transcend subjects but are limited by the nature of the subjects	Mixed; "Simple transfer is unlikely" (1992, p. 26)	Directed towards a higher goal, but neutral on its own
Lipman (1991)	Combined with creative thinking to form "complex" thinking that is metacognitive- aims for resolutions	Separate, but used in conjunction with each other for problem-solving	Judgments	Judgments based upon criteria that are clearly specified	Orchestration of skills that lead to a greater whole	Critical Thinking is perceiving the relationships among knowledge	Sensitive to context, combinational approach	Critical Thinking judgments influenced by ethical considerations- but neutral on its own

Author	Structure of Thinking	Skills vs. Dispositions	Creative-Critical Thinking Link	Outcomes	Standards	Knowledge	Generalizability	Philosophy
Perkins (1995)	Integration of neurological, experiential, and reflective components. Thinking results in amplification, compensation and provides a distinct contribution	Analysis way of behaving combined with interactions of the individual and the context	Intertwined with each other, the outputs are different, but the process are the same, and defined by the context	Evaluation, Respect for complexity	Comparing items of thought against a defined standard	Interdependent-Impossible to separate one from the other	To a " modest degree" (p. 209). Implications for teaching-"Do everything you can" (p. 211).	Neutral-Thinking is defined by the definition of intelligence used, and some definitions include an ethical component.
McPeck (1990a; 1990b; 1981)	Defined by the disciplines-"There are simply too many types of thinking, manifest in diverse skills , to permit us to infer a single generalized ability" (1981, p. 104)	Subject-specific-"Critical thinking refers to a certain combination of ... dispositions, together with the appropriate knowledge and skills" (p. 42)	Separate, but integrally linked in outcomes-"The final product of each kind of thinking might be indistinguishable... but this does not render their meanings identical" (1990b, p. 6)	Connected to problem-solving within a field-"Productive of a more satisfactory solution to, or insight into, the problem at hand" (1990b, p. 7)	Subject-specific-"within different fields, different sorts of reasons can count as good reasons" (1990b, p. 28)	Indistinguish-able from critical thinking-"specific content, knowledge and information cannot be coherently demarcated from critical thinking" (1981, p. 64)	"Critical thinking can only be taught as part of a specific subject and never in isolation " (1990b, p. 71)	Ethics defined by context and the discipline-Critical thinking is a neutral concept

Author	*Structure of Thinking*	*Skills vs. Dispositions*	*Creative-Critical Thinking Link*	*Outcomes*	*Standards*	*Knowledge*	*Generalizability*	*Philosophy*
Smith (1990)	Critical thinking has no definitive difference- "They are only words; they do not represent a complexity in the brain" (p. 10)	"Critical thinking is an attitude, a frame of mind" (p. 104)	"The behaviors are the same, only the words are *different*" (p. 102).	Description of behavior- "The words... refer to what the person is *doing*" (p.3)	Arbitrary- "The high-standard criterion ... is a reflection of the attitudes of the time" (p. 74)	"A wrong or inappropriate conclusion is usually a consequence of not knowing enough in the first place" (p. 16).	"None of the list of skills is generalizable in any sense" (p. 97).	Differences of decisions are determined by different points of view, not due to ethical differences
Beyer (1987)	Critical thinking "operations are more complex that the microthinking skills,... but less complex than the Level I thinking skills" (p. 33)	"Critical thinking is a collection of specific operations that may be used singly, or in combination" (p. 33)	"Clearly, they are not the same" (p. 35)	Analysis and evaluation of an argument or statement.	Integral role in "determining credibility, detecting bias, distinguishing fact from value and relevant from irrelevant." (p. 60)	A component of thinking in that knowledge provides heuristics, specific pieces of information and attitudes that influence thinking	"Transfer of thinking skills ... is neither automatic nor natural" (p. 130). Can be done with appropriate instruction.	"This type of thinking... is objective and value-free, frequently resulting in judgments that are positive, affirmative and even laudatory" (p. 33)

Appendix B
Assessment Instruments

Pre-Assessment

Do you think that the poem "Autobiographia Literaria" should be read by all students in your grade?

Directions: Write a paragraph to answer the questions. State your opinion, include three reasons for your opinion and write a conclusion to your paragraph.

Mid-Point Assessment

Do you think that the poem "The Road Not Taken" should be read by all students in your grade?

Directions: Write a paragraph to answer the questions. State your opinion, include three reasons for your opinion and write a conclusion to your paragraph.

Post-Assessment

Do you think that the poem "The Rainbow's End" should be read by all students in your grade?

Directions: Write a paragraph to answer the questions. State your opinion, include three reasons for your opinion and write a conclusion to your paragraph.

Conclusion

0	No conclusion/ concluding sentence is provided
2	A conclusion/ concluding sentence is provided.

Appendix D

Teacher Observation Form

Instructor's Name_____ Course_____

Grade Level (s) _____# of Students _____Observer:_____

NA:not applicable 1:not present 2:needs improvement 3:moderate 4:effective 5:excellent

The Teacher of the Gifted:	NA	1	2	3	4	5
1. Employs the use of advanced content and materials						
2. Plans curriculum experiences well						
3. Uses varied teaching strategies						
4. Selects questions and conducts discussions that stimulate higher-order thinking						
5. Facilitates varied grouping strategies appropriately						
6. Models and encourages creative thinking						
7. Models and encourages critical thinking						
8. Models metacognitive processes						
9. Models and encourages problem finding and solution finding behaviors						
10. Allows and nurtures students to explore ideas independently						
11. Nurtures a postive affective classroom climate with an appreciation for individual differences						
12. Synthesizes student performance information and modifies instruction appropriately						
13. Facilitates classroom management						
14. Encourages, suggests or provides independent extension activities outside of class						
15. Uses multiple resources (field trips, speakers, aides, parents...)						

Brief description of Lesson Observed:

Teacher's Strengths:

Center for Gifted Education
Teacher Observation Form

No. of Minutes Observed: ____

Teacher's Name: _____ Date: _____
Course: _____ Grade Level(s): ____ Location: _____
Observer: _____ Number of students in class: ___

Observation Outline: **Please outline exactly what you are observing in the classroom in res to curriculum and instruction. Describe the instruction observed including the specific les the organization of the lesson, the texts and/or materials used, the methods use communicating the lesson, characteristics of the learning experience or any other observat and impressions which became the basis for completing the attached checklist:**

Appendix E

Teacher Log and Sample

Teacher Log

Lesson: _____

Comments, Changes, Substitutions, etc. etc.:

Teacher Log

Lesson: 6a

Comments, Changes, Substitutions, etc. etc.:

Midpoint Assessment

They are getting better at writing persuasively. They are trying to look at something from all parts of view and from all angles.

When they first read the poem, they had the "deer in the headlights" look. After hearing it read several times and then discussing it, that look disappeared and they were starting to find real meaning from the poem.

Appendix F

Teacher Demographics

Teacher Demographics Survey

Teacher Name: _____
Age of teacher in 1999: _____
Years of Teaching Experience: _____
Years of Teaching in Hampton _____
Years of Teaching at 4th grade _____
Highest level of Education received: (Please check
Bachelor's Degree _____
1-4 Additional graduate courses _____
5 additional graduate courses _____

MA/MS Degree _____
1-4 Additional graduate courses _____
5 additional graduate courses _____

Additional Endorsement in _____
Completed _____
Working on _____

Graduate courses in gifted education? Yes _____ No _____
Graduate courses in special education? Yes _____ No _____
Graduate courses in Writing? Yes _____ No _____

Table F1

Teacher Ages

	Exp.		Comp.		Total	
Age	No.	Pct.	No.	Pct.	No.	Pct.
29 or less	4	26.7	4	40	8	32
30-39	7	46.7	2	20	9	36
40-49	3	20.0	2	20	5	20
50 or more	1	6.6	2	20	3	12
Total	15	100.0	10	100	25	100

Table F2

Teacher Experience

	Exp.		Comp.		Total	
Experience	Number	Percent	Number	Percent	Number	Percent
Years of teaching experience						
2-5	5	33.3	5	50	10	40
5-10	3	20.0	1	10	4	16
More than 10	7	46.7	4	40	11	44
Total	15	100	10	100	25	100

Table F3

Teacher Education

	Exp.		Comp.		Total	
Education	No.	Pct.	No.	Pct.	No.	Pct.
BA/BS degree	7	46.7	7	70	14	56
1-4 additional grad. hours	2	13.3	4	40	6	24
5 + additional graduate hours	4	26.6	2	20	6	24
MA/MS degree	8	46.7	3	20	11	44
1-4 additional grad. hours	1	6.7	1	10	2	8
5 + additional graduate hours	0	0	0	0	0	0
Endorsement in special education	4	26.6	3	30	7	28
Completed	2	13.3	2	20	4	16
Working on	2	13.3	1	10	3	12
Endorsement in gifted education	7	46.7	5	50	12	48
Completed	2	13.3	2	20	4	16
Working on	5	33.3	3	30	8	32
Total	15	100	10	100	25	100

Appendix G

Staff Development Materials

A Critical Difference: Critical Thinking Differences between Gifted Students, Students with Learning Disabilities and Average Students

Question:
What are differences found between gifted students, students with learning disabilities, and average students when provided a 20 hour curriculum that teaches critical thinking and persuasive writing?

Methodology:
1. Pre-midpoint, and post tests, asking students to write a persuasive paragraph, defending their position that a particular piece of literature should/should not be included in the curriculum.
2. Comparison groups employed to determine effect of growth.
3. Grouping held constant (gifted students and students with learning disabilities are in cluster groups within the regular classroom
4. 25 students in each cell for a total of 150 students.

	Gifted Students	*Students with Learning Disabilities*	*Average Students*	*Total*
Experimental	25	25	25	75
Control	25	25	25	75
Total	50	50	50	150

Instrument
1. Language Arts unit integrating persuasive writing model (William and Mary's "Hamburger" Model of Persuasive Writing) with critical thinking model (Paul's Reasoning Model) through 20 hours of instruction
2. Pre, midpoint and post-tests asking students to state their opinion, cite three reasons and write a conclusion.

Analysis
1. ANCOVAs for pre, mid-point and post tests on each group, for intra and inter-group differences, using Toulmin's measure of persuasive writing.
2. Analyzing types of reasons used by each group at each level.

Rubrics
1. Toulmin's Scoring Rubric (as adapted by Burkhalter, 1993)
2. Reasons (Stay, 1996)
   - Facts
   - Opinions (expert and common understanding)
   - Personal experience
   - Narratives

(Lauer, Montague, Lunsford, and Emig, 1985)
   - Appeals to rational reasoning
   - Emotional aspects
   - Audiences' values

Findings
1. Gifted students do improve, as compared to other gifted students (VanTassel-Baska, Johnson, Hughes and Boyce, 1996).
2. In progress of finding out how other groups do in pre-post and as compared to each other. Data collection begins in January.

Handout 1A
"Autobiographia Literaria"

When I was a child
I played by myself in a
corner of the schoolyard
all alone

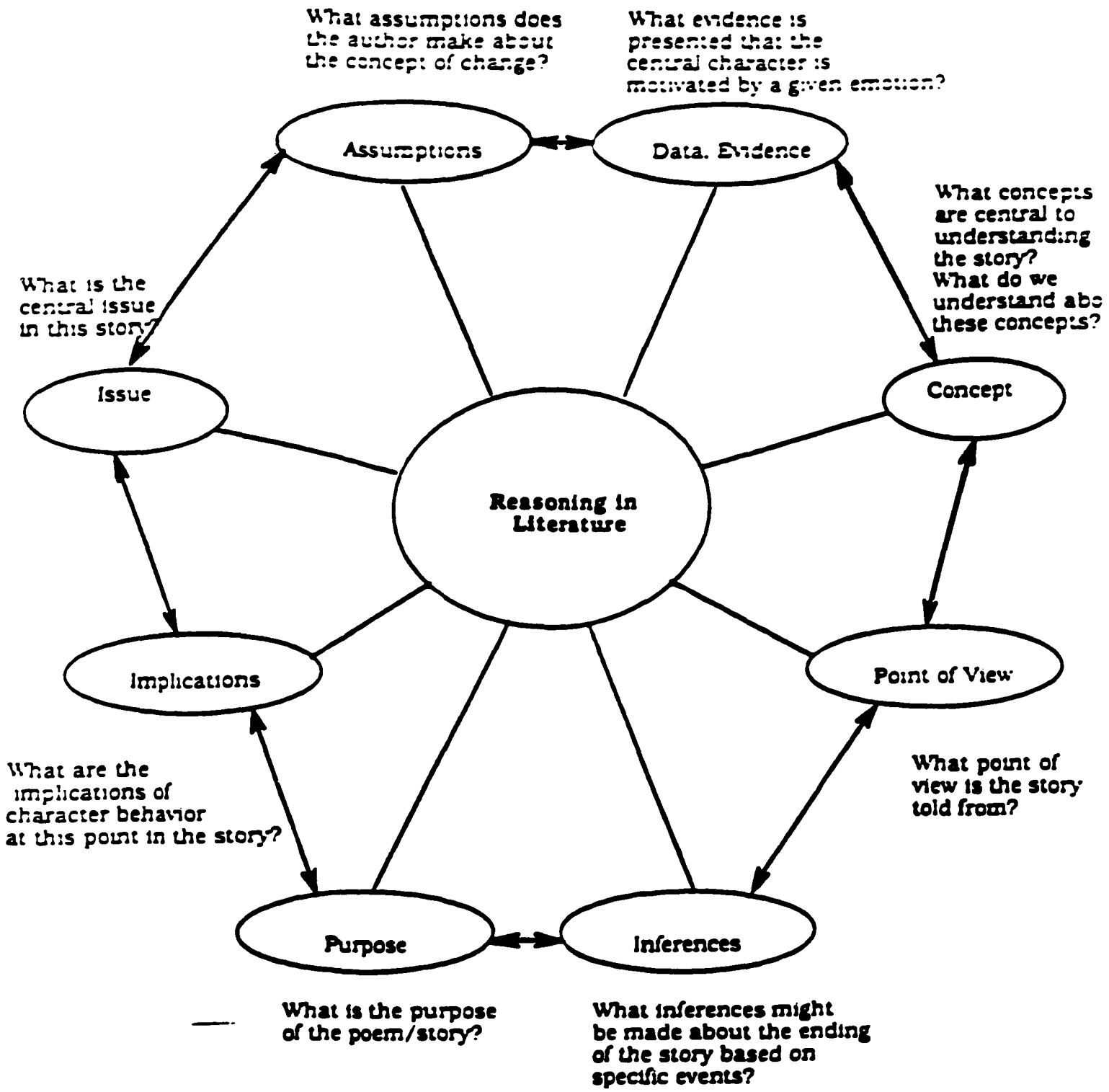
I hated dolls, and I
hated games, animals were
not friendly and birds
flew away.

If anyone was looking
for me I hid behind a
tree and cried out "I am
an orphan."

And here I am, the
center of all beauty!
writing these poems!
Imagine!

by Frank O'Hara

Wheel of Reasoning



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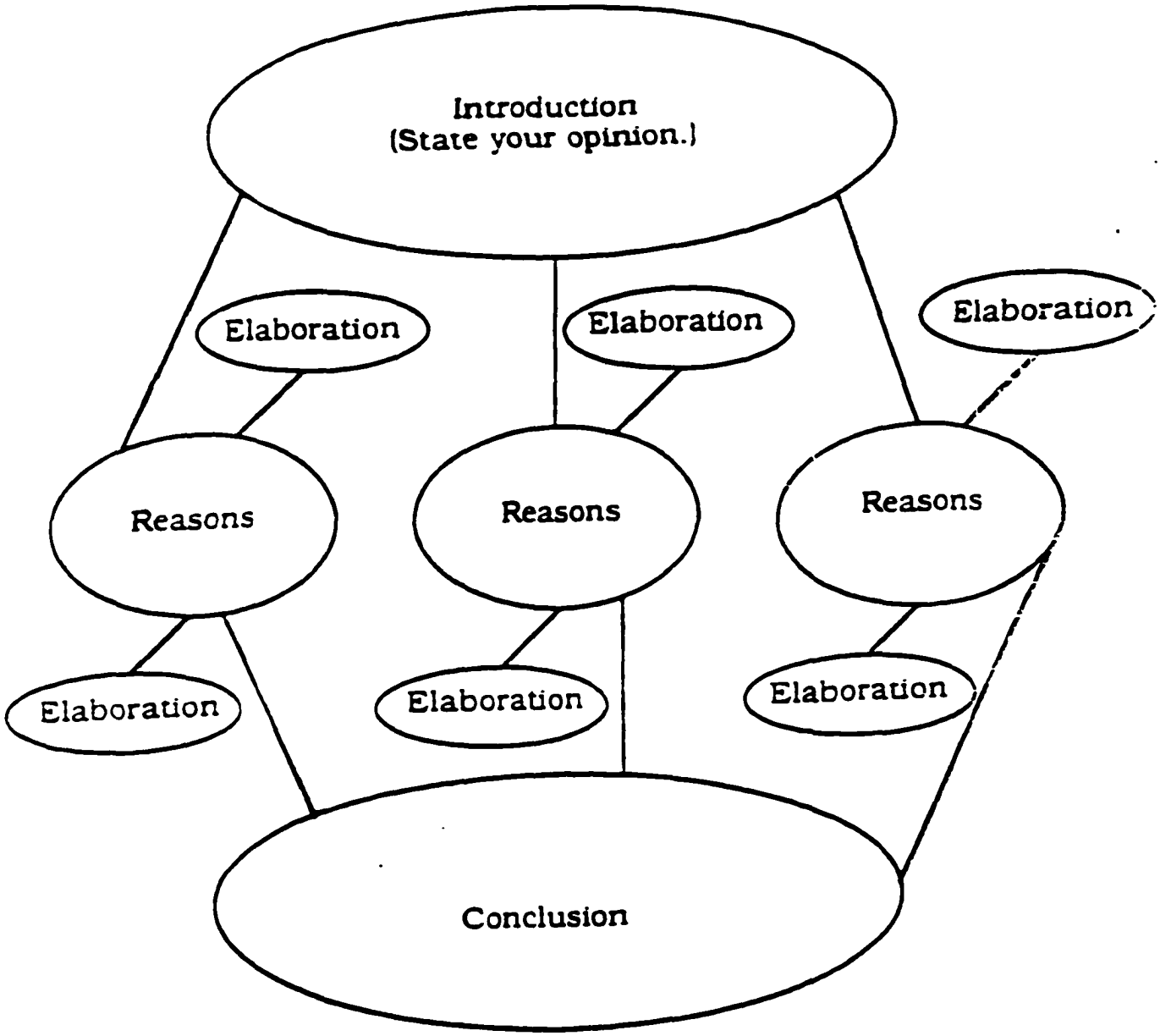
Hamburger Model for Persuasive Writing



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Task Demand

Do you think that the poem, 'Autobiographia Literaria' should be required reading for all students in your grade?
Write a paragraph to answer the question. State your opinion, include three reasons for your opinion, and write a conclusion to your paragraph.

Rubric for Scoring Persuasive Writing (Adapted from Nancy Burkhalter)

Claim (opinion)

Conclusions whose merits we are seeking to establish and assertations put forward for general acceptance

0 No clear position exists for the writer's assertion, preference, or view, and context does not help clarify it

2 Yes/No alone or writer's position is poorly formulated, but reader is reasonably sure what the paper is about because of context

4 A basic topic sentence exists.
(and the reader is reasonably sure what the paper is about on the strength of the topic sentence alone, regardless of context.)

6 A very clear, concise position is given as a topic sentence (The reader is very certain what the paper is about.) Must include details such as grade level, title of the reading, or refers to "the poem", "the story", etc.

Data

Support in the form of experiences, facts, statistics, or occurrences.

0 No data are offered that are relevant to the claim

2 Scant data (one or two pieces) are offered, but what data exist are usually relevant to claim. Irrelevant data are excluded.

4 Numerous pieces of data (minimum three) in support of the claim are offered. They are relevant, but not necessarily convincing or complete. The writer leaves much for the reader to infer from the data. The writer may offer data which are not complete enough to allow the reader to determine their significance.

6 Numerous pieces of data (minimum three) are complete and accurate was well as explicitly and convincingly connected to the claim.

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Warrant

Amplification or further explanation of data, relating it back to claim.

0	No warrant is offered
2	An attempt is made to elaborate at least one element of the data, but the reader is left to infer more.
4	More than one piece of data is explained, but the explanation is weak or lacks thoroughness. OR One piece of data is given and is well-explained.
6	The writer explains more than one piece of data in such a way that it is clear how they support the argument. At least one piece of data is convincing and complete.

Conclusion

0	No conclusion/ concluding sentence is provided
2	A conclusion/ concluding sentence is provided.

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Appendix H

Cluster Analysis of Student Responses

Reason from students- as written	Type of student	Level one analysis	Level two analysis
It's easy to read and its probably only at a sixth grade reading level. I mean half the class can probably understand	Gifted	Academic nature	Condition
It is good to anitate	Average	Academic nature	Condition
Fifth graders are looking for excitment in pomes and it is boring	Average	Audience	Condition
It is a good poem to read when you think your never going to get some where.	Gifted	Audience	Condition
It doesn't make sense	Average	Meaning	Condition
I don't understand it	Average	Meaning	Condition
The poem doesn't even make sense or ryhme.	Average	Meaning	Condition
The poem doesn't even ryim.	Average	Nature	Condition
It is an iducational poem	Gifted	Nature	Condition
It rhymes very very well	Gifted	Nature	Condition
The words sound perfect together	Gifted	Nature	Condition
I thik it can be wenederful for there ejeckaeshun	LD	Academic	Future impacts
I thik that thay would get a good graed	LD	Academic	Future impacts
Kids are not going to get the author's point of view because is does not make sense to them	Average	Audience	Future impacts
They're just going to throw it away	Average	Audience	Future impacts
People might not get what they are reading	Average	Audience	Future impacts
I think most students would not pay attention to it even if it was explained to them.	Average	Audience	Future impacts
Most fourth graders will not find it interesting	Gifted	Audience	Future impacts
Most 5th graders would want something more challenging to read	Gifted	Audience	Future impacts
It would change some people and the way they feel	Average	Change	Future impacts
If everyone reads this poem, we will have less killing and violence in this country	Gifted	Consequences	Future impacts
It would prople help ciids like me	LD	Helping	Future impacts
It cude help me in school and other cids to and maby parres.	LD	Helping	Future impacts

It is good litriture. It helps us understand poems better	Average	Helping	Future impacts
It could teach children to use words that have the same meaning like diverged or hence.	Average	Helping	Future impacts
People can learn how to express themselves in poems	Gifted	Helping	Future impacts
It could be a big influence to them	Gifted	Helping	Future impacts
It should give them an idea of what really good poetry sounds like.	Gifted	Helping	Future impacts
You can learn about stanzas Like how there formed and other things like that	Gifted	Helping	Future impacts
Som peprl doonet gitit	LD	Reactions	Future impacts
Some of the words some people might not know.	LD	Reactions	Future impacts
Some people are going to throw it away	Average	Reactions	Future impacts
Becaues you should bebors any boody to read.	LD	Fairness	Justice
Some kids don't like to read poems. Because people don't like to read it they should give it to people who like to read pomes.	Average	Fairness	Justice
Teachers should be able to pick what they want the class to read. Some kids like different things the teachers want to try to get a poem that interest the kids	Gifted	Fairness	Justice
I think that they don't havftto!	LD	Rebellion	Justice
Why should you have to understand it?	Average	Rebellion	Justice
If you read the first stanza and you don't like it you should not have to read it	Gifted	Rebellion	Justice
Doing good things can chage your life.	LD	Change	Moral
They may look on the inside of people and not of their color	Average	Change	Moral
It is telling you that it dose not matter if you are black or white, it matters that you are equal and some people do not like that and they need to believe that.	Average	Change	Moral
We need to stop judjing people by their skin color	Average	Change	Moral
It tells you how to be an author and how to experse your feelings.	Average	Change	Moral
It teaches kids not to make fun of other kids with problems	Gifted	Change	Moral
It can make children see what they can make their childhood out of	Gifted	Change	Moral
It tails how people should get along	LD	Moral	Moral

Kids need to anderstan that you dont always have to do what athor people do.	LD	Understanding	Moral
The poem is about making choices, but you really don't have to make that many choices in fifth grade.	Average	Understanding	Moral
The discrimination against blacks and whites is only a minner problem in America what we should be worried about is going to war.	Average	Understanding	Moral
It is a good poem for when your sad because it tells you that you can become anything you want to be	Gifted	Understanding	Moral
It helps students by telling them the road through life. It shows how the road has changed his life forever.	Average	Understanding	Moral
It is bring this is not thicing	LD	Emotional	Nature of the poem
It is not fun it is siley	LD	Emotional	Nature of the poem
The story sounds sad	LD	Emotional	Nature of the poem
Its one of those poem where its like someone's dream and its hard to understand.	Gifted	Emotional	Nature of the poem
The person who wrote it (the author) had some difficult words that I know most 5th graders can't understand.	Average	Language	Nature of the poem
It has words that I don't know. To find out what those words are you have to use context clues and that is good practice for SOL tests.	Gifted	Language	Nature of the poem
Books tell you more	Average	Poetry	Nature of the poem
It does not tell 5 gades about good or bad things. It should tell about drugs or don't do drugs.	Average	Content	Restatement
The person is the how children where back during there days	Average	History	Restatement
Kids should know how life was to Frank O'Hara	Average	History	Restatement
They are just talking about what happened millions of years ago and most people in American don't have time to bring up something so old.	Average	History	Restatement
It tells you what a person's life was like	Gifted	History	Restatement
After they read this poem they will get a feeling a very spicele feeling about white people and black people.	Average	Limited	Restatement
It is telling you that there is happiness at the	Average	Limited	Restatement

end of the rainbow where everybody is happy and there is no fighting			
The pome tells people about how there is no white team and there is no black team and how we can all get along	Average	Limited	Restatement
It tell you that "how it feels to hate yourself"	Average	Limited	Restatement
I think everyone should know what he/she had felt. Like when she/he wroght "If anyone was looking for me I hid behind a tree and cried out"	Gifted	Limited	Restatement
I don't think races should be parted	Gifted	Limited	Restatement
I like the poem because it talkek about muic.	LD	Literal	Restatement
There's going to be a place where the world can sing all kinds of songs	LD	Literal	Restatement
Because there are orphans out there and they might remember when they were sad	Average	Literal	Restatement
This person is telling you that now I'm different	Average	Literal	Restatement
What is the point besides there are two roads and he/she takes one of the roads. He/she's just saying one road is a good road and one is a bad road.	Average	Literal	Restatement
I like the poem. I thought the guy was sad but he only had a dellema to witch road he would take	Average	Literal	Restatement
They will read it and think "Soon we will all sing together"	Average	Literal	Restatement
You can think about people's feelings. Like: I hid behind a tree and cried out.	Average	Literal	Restatement
It expresses the feelings the writer had as a child	Gifted	Literal	Restatement
When she was a child she was lonely, but when she grew up it was different	Average	Literal	Restatement
If you're white or black, we can still sing together under the rainbow	Gifted	Literal	Restatement
It tells you about depression and lonliness.	Gifted	Literal	Restatement
Kids this age should know about orphans and what it feels like to be alone with no friends.	Average	Literal	Restatement
Robert Frost gives a lot of details about the roads, but doesn't state the most important facts.	Average	Literal	Restatement
The guy sounds like he hasn't had much of a life, and in my opion that's just because has not tried to make any friends so he just walks into the woods.	Average	Literal Emotional	Restatement

Appendix I
Teacher Observations

Teacher	Type of Classroom	Date	Lesson Observed	Activities observed
Mr. Adams	General Education	3/29/98	Lesson 3	• Going over a newspaper article about student violence • Asked a lot of follow-up questions about the wheel and the article • "What is the purpose of this article? {no student response} What is the author trying to do?" • Did an excellent job at distinguishing between issue and purpose • "The author assumes what about Jonesboro?" • "Do you think the author is a student? Why not?" • Question-and-answer teaching style the whole time
Mr. Albright	General Education	2/24/98	Lesson 3	• Presented an article on sheep cloning • Was very focused on the "emotions" of the newspaper article- "What kinds of emotions do you think the author felt?" • Teacher had difficulty thinking of an example of persuasion in real life • When student began explaining a commercial, teacher responded "See? You're giving information!" • Students
Mr. Newsome	General Education	3/29/98	Lesson 10	• Discussion of Rubrics (activities from lesson) • Questions from the lesson asked • Confusion about rubrics "Why would you only give 4 points to the first reason?" • Read students the description of points and then said "So, how many points?" Didn't further explain or follow-up questions • Teacher seems confused about scoring- kept re-reading the points without clarifying to students

Mrs. Boone	General Education	1/15/98	Lesson 5	• Discussion of the process of a persuasive paper and the construction of a survey • Did not use the unit example of censorship, but had the students come up with their own topic of "Should we change the broccoli recipe in the cafeteria?" • "Would you as a student have a good opportunity to do a survey? Why?" • "What should we ask?... What's the next question?... Why?" • "What are we going to do to present our information to the cafeteria manager?" • Teacher skipped some steps in the research model and did not connect it to the Reasoning Model.
Mrs. Boone-	General Education	1/8/98	Lesson 3	• Teacher reading questions straight from the lesson with no follow-up questions • Students reading article about ocean pollution (activity from the lesson) • Students apathetic • At request of teacher, researcher taught the Wheel of Reasoning with follow-up questions and explanations. Teacher closely observed and wrote notes in her lesson book.
Mrs. Crespini	General Education	3/3/98	Lesson 3	• Going over a newspaper article about the cloning of sheep- activities from the unit • Asking questions from the unit and significantly extending • Sharing materials with her grade level • "What's the overall purpose of the wheel?" *Teacher critically examining the Critical Thinking model* • Using past knowledge to extend questions- "What's similar to the promise piece?" • Related this article to the "Just Say No" article from the last lesson- "In the essays, the author assumed that we knew what drugs were. What does this author assume that we know?"

				• "What's the evidence that that the Dolly scientist uses to support his claims that de really did this?"
Mrs. Rathsome	General Education	3/3/98	Lesson 2	• Students working in group projects to convince their parents to take them to the movies (part of unit) • Statement from a student- "Now we have to come up with reasons. It's cool. Oops, now we have to elaborate on why it's cool." • Students presented their reasons to the whole class. • With a group, teacher asked "What was their central idea? What were their reasons?... Did they add the mustard and ketchup and pickles?" • Group 2- teacher stated "You listed your reasons, but you need to elaborate. Give me more." • "What point of view were they talking from?" *Although the lesson hadn't introduced Paul's Wheel yet, the teacher was preparing them for the next lesson.*
Mrs. Rathsome	General Education	3/29/98	Lesson 10	• Discussion of conclusions- used the handouts and questions from the unit. • Connecting all components of the Hamburger model with Paul's Reasoning Wheel • "What does the conclusion do?" • "What's the first part of the Hamburger Model?" • "What part of the Reasoning Wheel do you think fits best in the introduction?... Raise your hand if you think that the opinion begins in the Introduction? • Teacher did not go over the handout that specified Point of View and Issues as being in the Introduction • Did cover data, implications, and consequences in the Reasons, and Conclusion sections

Mr. Stanley	Gifted Education	1/27/98	Lesson 5	• Question and Answer style of teaching for 45 minutes • Discussed issue of Internet access in all rooms • Didn't connect Research model elements to critical thinking elements until the very end. • "Do you think that people who disagree with you might have some data? Who would win if you don't have any information other than your own opinion? • "Is that a fact or your own opinion?" • "What's a stakeholder?... Who decides what goes into libraries?... Why does the School Board care about libraries?"
Mrs. Medoza	Gifted Education	2/4/98	Lesson 3	• Using all of the questions from the unit • Students will be writing their own "Just say No" paragraph • Didn't stop to listen to student explanation • Lecture style for 50 minutes
Mrs. Stevenson	Gifted Education	1/16/99	Lesson 4	• Students reading "I Have a Dream" speech in a round-robin - activity from the lesson • Teacher asked questions from the lesson • "Any comments about what you've just read?" Student- "He spoke from the heart." Teacher- "What about the words?" • Related speech to former study of metaphors, similes and analogies • "What technique did he use to end this?" • Had students go through paragraph and underline sentences and phrases that would persuade them. • Had students get in small groups and share persuasive phrases to share with the whole class. Discussed emotional content of reasons

Mrs. Stevenson	Gifted Education	2/24/99	Lesson 10	• Students reading Hamburger paragraphs that they had written. • "Let's look at the characteristics of the conclusion? Was it clear? • Discussed "trigger words" in conclusions • Using worksheet in unit • Using questions in unit • Connecting paragraphs to science activity • "Do you think that we should restate all of those elaborations in the paragraph?
Mrs. Stokes	Gifted Education	1/27/98	Lesson 2	• Going over the Jumbled "Just say No" paragraph from the unit • Asking the questions from the unit and adding follow-up ones • "What does he think of drugs?" • "How many reasons does he give for his opinion? Let's count..." • "Which one is the best essay? Why?" • "What makes a good piece of persuasive writing? Why?"
Mrs. Victoria	Gifted Education	1/9/98	Lesson 3	• Going over a newspaper article on ocean pollution- a topic that had been discussed in their science class.- activity from the unit • Used the lesson questions • "What data does he give us?" • "What does he want us to do?" • Students involved and knowledgeable about background- All but one student participated
Mrs. Victoria	Gifted Education	1/22/98	Lesson 5	• Having students create and then read their issues aloud (homework activity from the unit) • What choices have you made? • Had students drawing pictures of their issues- "I would like you to illustrate a choice that you have already made" (not from the unit) • Students seemed confused about how to draw a decision • "We're going to use this drawing to write three paragraphs about your issue.

Mrs. Beadle	Special Education	2/23/99	Lesson 3	• Reading an article aloud about finding dinosaurs on farmland and then creating reasons to convince parents to let them go to the movies (activities from unit) • Asked questions from the lesson, and added more specific clarification type questions- "Look for the information in the article. What does he tell you for his reasons?" • "Let's clarify the difference between a beg, a promise, and a reason" • Little direct feedback given other than "Is that going to convince me?" • Questions were written and distributed
Mrs. Jones	Special Education	2/24/98	Lesson 10	• Teacher brought in her brother to talk about alternative transportation in their city. She was following up an activity in Lesson 10 and had had the students prepare questions to ask him. He talked for about 10 minutes about transportation issues, and then took questions from the students. Most of the questions were derived directly from Paul's Wheel of Reasoning-e.g. "What would be the purpose for building a rapid rail?... "What data do you have that a train would be better than a bus?" • The brother then filled in a Hamburger model on the board with his persuasive piece arguing that rapid rail system would be better than a bus system or expanding the freeway. Teacher reminded him to include who he was in the introduction.
Mrs. Jones	Special Education	2/24/98	Lesson 2	• Students writing their own persuasive paragraphs (activity in lesson) • Summarized difficulties that the class was facing- "As I'm walking around, I'm seeing the same problem. What should your conclusion do?" • Rewarding students who complete each section with Girl Scout cookies • Asked numerous questions to move students along- "Great! So what else did they do?"

Mrs. Lindberg	Special Education	3/28/99	Lesson 2	• Had students fill in a different graphic model of a hamburger, complete with lettuce and tomatoes, with sentences about the issue of "Should we build a new playground?" • Took students outside to examine the playground • "Looking at the slide, do you think that we need a new one?" • "Do you think it's worth the money to build a new jungle gym?" • Students working independently and teacher moving from one to the other as they completed their Hamburger models. • Teacher explained that she selected a component of Lesson Five so that they could have additional practice writing persuasive paragraphs with a more detailed graphic organizer and one that required direct writing on it.
Mrs. Smythe	Special Education	2/23/99	Lesson 2	• Evaluating student persuasive papers • "What tastes like peanut butter?" • "How could you combine these two sentences?" • "Tell me what you want to write about.... What's the first thing you're going to say?" • Kept giving a student who was a discipline problem "bargains"- "Write your second sentence, and then you can go and work on the computer for five minutes." He was told that he could cross off the section from the hamburger model when he had finished that sentence. Effective strategies- he completed his 5 sentences in 45 minutes, despite significant reluctance. • "Is this a reason or a detail? Good, give me another detail... Why would that help you?"

Mrs. Smythe	Special Education	2/28/99	Lesson 3	• Reading a newspaper article- the majority of the class period was spent explaining the content of the article. "What does custody mean?... Where is Jacob right now?... What does Grandma really want?" • Personalized the article and had kids act it out. • Wrote numbers from the article on the board- "Is this data, the issue, or the purpose?... How do you know?"

Appendix J

Analysis of Teacher Logs

Explanation of Codes

Code	*Explanation*
#	Lesson Number
Change	Teacher Changes to the unit
Addition	Things the teachers added to the units
Connected	How the teacher connected the unit to past learnings
Deletion	Things the teacher did not do, or took out from the unit
Fidelity	Data that indicates the teacher did implement the unit as stated
Modify	Data that indicates the teacher implemented the material, but made alterations
Content	The material to be taught
Materials	The materials to be used
Practice	Data that the teacher gave the students more practice than indicated in the unit
Reading	Data that the teacher read the material to the student
Teacher	Data that the teacher changed material according to the teacher needs
Grouping	Data that the teacher changed the grouping patterns suggested in the unit
Specificity	Data that the teacher explained material in a more specific manner than is stated in the unit.
Time	Statement from the teacher regarding use, or lack, or time
Frustrations	The teacher expressed information regarding student frustration
Affect	Where the teacher describes the affective environment of the classroom
Content	The teacher expresses an opinion about the specific content of the unit
Differential	Teacher notes the different impact on students of different achievement levels
Growth	The teacher notes student growth
Level	The teacher discusses student growth in terms of movement of levels
Discussion	The teacher notes the level of discussion in the classroom
Specific	The teacher discusses student responses in specific, critical thinking language
Teacher	The teacher makes a comment about his or her own reaction
Learning	The teacher notes where he or she has learned something
Management	The teacher notes the management of the classroom
Suggestion	The teacher provides a direct suggestion to the researcher

Matrix Analysis of Teacher Logs

Original Comment	Name	Type of teacher	Schedule of teaching	#	Level one analysis	Level two analysis
I started with a review of author's purpose and an explanation of why we were doing these lessons.	Victoria	Gifted cluster	Extended	1	Changes	Addition
I made sure they were appraised of the values and ethics of papers such as the National Enquirere	Stevenson	Gifted cluster	Infrequent	8	Changes	Addition
The kids are now writing their own "I have a dream" speeches and they're excellent	Stevenson	Gifted cluster	Infrequent	4	Changes	Addition
We turned the Research Model into a rubric with each area being worth 5 points.	Stevenson	Gifted cluster	Infrequent	5	Changes	Addition
Students need an intense study of the poem	Victoria	Gifted cluster	Extended	6	Changes	Addition
Watched video entitled "My Friend Martin" (for background) (cartoon with actual video)	Smythe	Special Education	Infrequent	4	Changes	Addition
We had already done animal reports on the usual bases... We used the research already collected and turned it into an issue for each animal.	Stevenson	Gifted cluster	Infrequent	5	Changes	Connected
EMOTIONS- words which describe (Adjective!)	Smythe	Special Education	Infrequent	4	Changes	Connected
Due to time limitations and preparation for {state mandated} testing, I felt the long term assignment would not be appropriate at this time.	Crespini	General Education	Every day	5	Changes	Deletion
Did not assign the long term project because of time constraints	Newsome	General Education	Every day	5	Changes	Deletion

Skipped because of reading material. I did not think it was appropriate.	Newsome	General Education	Every day	7	Changes	Deletion
We didn't have time to do item #11 of the lesson	Victoria	Gifted cluster	Extended	7	Changes	Deletion
I did not change the original lesson	Crespini	General Education	Every day	1	Changes	Fidelity
No changes	Crespini	General Education	Every day	4	Changes	Fidelity
No changes	Crespini	General Education	Every day	8	Changes	Fidelity
No changes	Crespini	General Education	Every day	9	Changes	Fidelity
No changes	Crespini	General Education	Every day	9	Changes	Fidelity
We discussed how the Research Model fit in with Paul's Wheel of Reasoning	Stevenson	Gifted cluster	Infrequent	5	Changes	Fidelity
I made no changes or substitutions. I have no suggestions for this lesson	Mendoza	Gifted cluster	Every day	1	Changes	Fidelity
I made no changes or substitutions for this lesson	Mendoza	Gifted cluster	Every day	2	Changes	Fidelity
Read and discussed "I still have a dream"	Smythe	Special Education	Infrequent	4	Changes	Fidelity
Reviewed wheel parts	Smythe	Special Education	Infrequent	3	Changes	Fidelity
Reviewed Handout 9-A	Smythe	Special Education	Infrequent		Changes	Fidelity
I provided the students with a copy of an article about ocean pollution for the homework exercise. Many of our students' families don't receive the newspaper, so the assignment wouldn't have been completed.	Victoria	Gifted cluster	Extended	3	Changes	Modify
Discussed article pertaining to grandparents raising	Smythe	Special Education	Infrequently	3	Changes	Modify-extension

children						
Instead of the group work given in lesson, I gave each group a current newspaper and let them complete the HW assignment in groups.	Adams	General Education	Every day	3	Changes	Modify-Group
Paired stronger students with weaker students	Smythe	Special Education	Infrequent	9	Changes	Modify-Group
The only change I made was to use colored pencils to identify the parts of the persuasive essay.	Stevenson	Gifted cluster	Infrequent	2	Changes	Modify-Materials
Had to modify/ create adapations (number model 1-11)	Smythe	Special Education	Infrequent	2	Changes	Modify-Materials
Made overhead of poem	Smythe	Special Education	Infrequent	15	Changes	Modify-Materials
Provided written prompts	Smythe	Special Education	Infrequent	15	Changes	Modify-Materials
Made overhead and used color vis-à-vis pens for visual discrimination	Smythe	Special Education	Infrequent	3	Changes	Modify-Materials
I did it 2x. Once we worked through the questions together. Then they picked their own article and did it individually.	Stevenson	Gifted cluster	Infrequent	3	Changes	Modify-Practice
Had students write their own paragraph	Smythe	Special Education	Infrequent	2	Changes	Modify-Practice
Read aloud sentences	Smythe	Special Education	Infrequent	9	Changes	Modify-Read
I read most of it to the students.	Newsome	General Education	Every day	4	Changes	Modify-Reading

One observation I made was that the answer key for the jumbled paragraph was all one paragraph. I felt that was confusing for the students since we are teaching a separate paragraph for each reason. I had them rewrite it in a form consistent with what we are teaching.	Crespini	General Education	Every day	2	Changes	Modify-Teacher
I tried to simplify the wheel as much as possible.	Crespini	General Education	Every day	3	Changes	Specificity
Reasoning Wheel should be rewritten in a way that children can better understand. I changed it a little. A copy is attached.	Adams	General Education	Every day	3	Changes	Specificity
Then, after I figured it out, I went back to reteach it.	Newsome	General Education	Every day	8	Changes	Specificity
Discussed credibility	Smythe	Special Education	Infrequent	9	Changes	Specificity
Had to explain what the express line was in a grocery store	Smythe	Special Education	Infrequent	9	Changes	Specify
I divided it between #4 and #5, making it a two day lesson.	Crespini	General Education	Every day	1	Changes	Time
I divided the second lesson between the introduction of the model and the jumbled paragraph model.	Crespini	General Education	Every day	2	Changes	Time
The next day (day 3 of this lesson) I reviewed and gave the homework assignment for this lesson.	Crespini	General Education	Every day	2	Changes	Time
I divided the lesson into 2 days.	Crespini	General Education	Every day	3	Changes	Time

I divided the lesson into two days between number 4 and 5.	Crespini	General Education	Every day	5	Changes	Time
The lesson took 2 days	Rathsome	General Education	Every day	1	Changes	Time
It took us 3 days though.	Newsome	General Education	Every day	4	Changes	Time
Very little use of Handout 9B- not enough time	Newsome	General Education	Every day	4	Changes	Time
It was not possible to summarize each paragraph in both handouts. I told the students to select one and summarize it using #3 of handout A.	Victoria	Gifted cluster	Extended	7	Changes	Time
We didn't get to Step 4 of the lesson, and will have to continue it tomorrow.	Victoria	Gifted cluster	Extended	6	Changes	Time
Due to the length of the reading, discussion and analysis, activity #2 (to continue the study of persuasive language) was not done, and neither was the homework assigned.	Victoria	Gifted cluster	Extended	4	Changes	Time
I had to stop the lesson after the writing pre-assessment. The second day we completed the persuasive writing portion of the lesson	Victoria	Gifted cluster	Extended	1	Changes	Time
I split it into two parts: 1) Preassessment 2) Analyze essays. This was a natural break in the lesson.	Mendoza	Gifted cluster	Every day	1	Changes	Time
Again, I took two days for this lesson.	Mendoza	Gifted cluster	Every day	2	Changes	Time

I assigned one essay to half of the class and the other essay to the other half so the lesson could be completed in one session.	Victoria	Gifted cluster	Extended	7	Changes	Time
The whole class struggled	Victoria	Gifted cluster	Extended	6	Frustrations	Affect
The students had much difficulty with the poem. It appeared to frustrate them.	Crespini	General Education	Every day	6	Frustrations	Content
The first article we analyzed {Sheep cloning} was difficult. Students did much better with the "Look Ma, No Gym" article.	Crespini	General Education	Every day	3	Frustrations	Content
The problem was that the students did not understand the essays clearly, so the discussion that followed was not very effective.	Victoria	Gifted cluster	Extended	7	Frustrations	Content
The summarizing activity was very difficult for them since they could not understand the vocabulary of what they were reading in the first place.	Victoria	Gifted cluster	Extended	7	Frustrations	Content
The students had difficulty understanding the concept of censorship and appeared uninterested in the discussion	Victoria	Gifted cluster	Extended	5	Frustrations	Content
When they made their own conclusions on Section B it was more difficult.	Stevenson	Gifted cluster	Infrequent	10	Frustrations	Content
Inference was difficult for them to understand	Smythe	Special Education	Infrequent	3	Frustrations	Content
Very difficult for students to understand	Smythe	Special Education	Infrequent	6	Frustrations	Content

Only one student interpreted the "road" as a path in life. The rest of the class interpreted it literally. Their persuasive paragraphs reflected this.	Victoria	Gifted cluster	Extended	6	Frustrations	Differential
Only two of the 6 groups used the strategy of identifying the components of the Hamburger model with colors with they worked on the jumbled paragraph.	Victoria	Gifted cluster	Extended	2	Frustrations	Differential
3 of the 6 groups were successful in putting the sentences in the correct order.	Victoria	Gifted cluster	Extended	2	Frustrations	Differential
It was a great conversation that we had and the truly gifted students grasped how to do this. Once again, the "men were separated from the boys" but all of my students were capable at varied levels.	Stevenson	Gifted cluster	Infrequent	7	Frustrations	Differential
Stronger students were able to complete this assessment with minimal prompts. Weaker students needed several prompts and reminders and ideas- very frustrating for them	Smythe	Special Education	Infrequent	15	Frustrations	Differential
The children were somewhat reluctant to participate today. Only a handful were raising their hands to discuss the article	Victoria	Gifted cluster	Extended	3	Frustrations	Discussion
Our discussion was not stimulating whatsoever. I think we'll come back to this lesson.	Stevenson	Gifted cluster	Infrequent	10	Frustrations	Discussion

They enjoyed drawing their pictures.	Newsome	General Education	Every day	6	Growth	Affect
The students really enjoyed this activity and were fairly successful	Mendoza	Gifted cluster	Every day	1	Growth	Affect
It was more interesting because of the different topics that were discussed.	Adams	General Education	Every day	3	Growth	Discussion
They became more actively engaged with the issue of school uniforms. It was difficult for them to drop the subject.	Victoria	Gifted cluster	Extended	5	Growth	Discussion
The lesson took 3 days to complete. The students were very interested in discussing the issues. They were also curious about the meaning of many of the words and it took a long time to discuss it.	Victoria	Gifted cluster	Extended	4	Growth	Discussion
The children were very curious and eager to be part of the program	Victoria	Gifted cluster	Extended	1	Growth	Discussion
The questioning portion of the lesson following the reading of the poem was very time consuming, since nearly 100% of the class wanted to answer each question.	Victoria	Gifted cluster	Extended	1	Growth	Discussion
We had quite a lot of discussion on deciding which conclusion on 10-2 was the best.	Stevenson	Gifted cluster	Infrequent	10	Growth	Discussion
It really "stretched" their thinking, and brought out some very interesting conversations.	Stevenson	Gifted cluster	Infrequent	4	Growth	Discussion
This stimulated a rather intense discussion.	Stevenson	Gifted cluster	Infrequent	9	Growth	Discussion
Students talked about freedom	Smythe	Special Education	Infrequent	4	Growth	Discussion

Color of skin vs. character	Smythe	Special Education	Infrequent	4	Growth	Discussion
This went well. Much improvement was made.	Newsome	General Education	Every day	15	Growth	Level
I feel this impacted the assessment because many students were not successful with the analysis of the poem	Crespini	General Education	Every day	6	Growth	Level
Students did much better than pre. ☺	Newsome	General Education	Every day	6	Growth	Level
Several students were very successful in the homework assignment	Mendoza	Gifted cluster	Every day	2	Growth	Level
The class did very well with this and learned so much more than they did with their "generic" reports	Stevenson	Gifted cluster	Infrequent	5	Growth	Level
When they first read the poem, they had the "deer in the headlights" look. After reading it several times and then discussing it, that look disappeared and they were starting to find real meaning in the poem.	Stevenson	Gifted cluster	Infrequent	6	Growth	Level
A few made mistakes and were easily able to see the flaw in their thinking.	Mendoza	Gifted cluster	Every day	2	Growth	Level
Even in the first lesson, I could see some students getting a handle on things.	Mendoza	Gifted cluster	Every day	1	Growth	Level
Students could easily see what the persuasion was in each handout	Rathsome	General Education	Every day	1	Growth	Specific
Having the sides of issue from a different viewpoint helped students understand why people say what they do	Newsome	General Education	Every day	5	Growth	Specific

They did an excellent job of identifying the figurative language, sentence patterns, and imitative language patterns in the speech.	Victoria	Gifted cluster	Extended	4	Growth	Specific
This lesson was great to help the kids see just how much they can and should use the info. from Paul's Wheel.	Stevenson	Gifted cluster	Infrequent	10	Growth	Specific
They found it easy to make comparisons between the Hamburger Model and Paul's Wheel of Reasoning.	Stevenson	Gifted cluster	Infrequent	10	Growth	Specific
Using our lists of characteristics was helpful	Stevenson	Gifted cluster	Infrequent	10	Growth	Specific
Once we identified the different types of data, it was fairly easy to distinguish between them.	Stevenson	Gifted cluster	Infrequent	9	Growth	Specific
They did pretty well on rewriting the examples to make them arguable.	Stevenson	Gifted cluster	Infrequent	9	Growth	Specific
I liked how they had to define terms in several different ways. This is going to be incredibly useful in their future writing	Stevenson	Gifted cluster	Infrequent	8	Growth	Specific
It really helped them look at writing from a different perspective	Stevenson	Gifted cluster	Infrequent	8	Growth	Specific
They are getting better at writing persuasively. They are trying to look at something from all points of view and from all angles.	Stevenson	Gifted cluster	Infrequent	6	Growth	Specific
They understood!	Smythe	Special Education	Infrequent	9	Growth	Specific

The first lesson appeared to go well.	Crespini	General Education	Every day	1	Teacher	Affect
Students seemed to enjoy the activities.	Crespini	General Education	Every day	1	Teacher	Affect
A fun lesson.	Newsome	General Education	Every day	4	Teacher	Affect
We enjoyed the jumbled paragraph.	Stevenson	Gifted cluster	Infrequent	2	Teacher	Affect
The lesson went well	Mendoza	Gifted cluster	Every day	1	Teacher	Affect
I think this lesson was hard to understand.	Newsome	General Education	Every day	5	Teacher	Learning
I think an answer sheet for Handout 8A would have been helpful. It could help us explain how to come about the correct answer.	Newsome	General Education	Every day	8	Teacher	Learning
This lesson seemed very disconnected. It took me until the next lesson to see how it fit together.	Newsome	General Education	Every day	8	Teacher	Learning
This is where everything started to fall into place.	Newsome	General Education	Every day	9	Teacher	Learning
It was here that I wished that I had gone and done the long term assignment.	Newsome	General Education	Every day	9	Teacher	Learning
In general, the directions for the unit were not specific enough. More explanation in the lesson plans would have been helpful. Also, some of the explanations in here were hard to understand.	Newsome	General Education	Every day	15	Teacher	Learning
It was helpful to me as it was to my class.	Stevenson	Gifted cluster	Infrequent	9	Teacher	Learning
This lesson helped to make Paul's Wheel even clearer and better defined.	Stevenson	Gifted cluster	Infrequent	8	Teacher	Learning

I loved this. I don't think the kids had ever heard the entire speech. I hadn't!	Stevenson	Gifted cluster	Infrequent	4	Teacher	Learning
This was a great activity! I was surprised at how well the students did on a difficult article (about Elizabeth Dole running for President)	Stevenson	Gifted cluster	Infrequent	3	Teacher	Learning
When I reviewed this lesson in preparation to teach it, I thought that you must be crazy! ☺ But I also know that we sometimes limit kids by what we think they can do. So I went for it and boy did they surprise me.	Stevenson	Gifted cluster	Infrequent	7	Teacher	Learning
The children were very distracted by the coloring pencils.	Victoria	Gifted cluster	Extended		Teacher	Management
Suggestion: The reasoning wheel is hard for students to understand and I had difficulty explaining it. A simpler model and explaination (sic) would be good.	Mendoza	Gifted cluster	Every day	3	Teacher	Suggestion
The picture is too small and not clear enough for a thorough analysis	Victoria	Gifted cluster	Extended	1	Teacher	Suggestion
This lesson should be divided into 2 sessions so that a proper discussion and understanding of each issue can be carried out.	Victoria	Gifted cluster	Extended	7	Teacher	Suggestion

Appendix K

Fidelity of Implementation

Symbol	Code
*	Required Lesson
X	Completed Lesson
O	Formal Observation
V	Visit by researcher
P	Student Products observed by Researcher
Type of Classrooms	
A	General Education
G	Gifted Cluster
S	Special Education

Teacher	Class	Length	Frequency	Lesson 1*	2 *	3 *	4 *	5	6 *
Mr. Albright	A	4 weeks	Every day	X, P	X	X, O	X		X, P
Mrs. Boone	A	7.5 weeks	Every day	X, P	X	X, O	X	X, O	X, P
Mr. Adams	A	5 weeks	Every day	X, P	X, V	X, O, L	X		X, P
Mrs. Rathsome	A	4 weeks	Every day	X, L, P	X, O	X	X, V		X, P
Mrs. Crespini	A	4 weeks	Every day	X, L, P	X, L	X, L, O	X, L	X, L, V	X, L, P
Mr. Newsome	A	5 weeks	Every day	X, P	X	X, V	X, L	L	X, L, P
Mrs. Victoria	A	7.5 weeks	Every day	X, L, P	X, L, V	X, L, O	X, L	X, L, O	X, L, P
Mr. Stanley	G	4 weeks	Every day	X, P	X	X, V	X	X, O	X, P
Mrs. Stevenson	G	16 weeks	Infrequently	X, P	X, L	X, L	X, L, O, P	X, L	X, L, P
Mrs. Medoza	G	5 weeks	Every day	X, L, P	X, L	X, O, L	X		X, P
Mrs. Stokes	G	8 weeks	Every day	X, P	X, O	X, V	X	X, V	X, P
Mrs. Beadle	S	4 weeks	Every day	X, P	X, L	X, O	X	X, O	X, P
Mrs. Lindbergh	S	4 weeks	Every day	X, P	X, O	X, P	X		X, P
Mrs. Smythe	S	12 weeks	Infrequently	X, P, V	X, L, O, P	X, L, O	X, L		X, P
Mrs. Jones	S	8 weeks	Every day	X, P	X, O	X, V	X	X, V	X, L, P

Teacher	7	8 *	9	10	11	12	13	14	15	Log
Mr. Albright		X, V	X	X					X, P	
Mrs. Boone	X	X, P	X	X				X , V	X, P	
Mr. Adams		X	X	X					X, P	L
Mrs. Rathsome		X	X	X, O					X, P	L
Mrs. Crespini		X, L	X, L	X, L					X, L, P	L
Mr. Newsome	L	X, L	X, L	X, O					X, L, P	L
Mrs. Victoria	X, L	X	X	X					X, P	L
Mr. Stanley		X	X	X					X, P	
Mrs. Stevenson	X, L	X, L	X, L, V	X, L, O					X, P	L
Mrs. Medoza		X	X	X					X, P	L
Mrs. Stokes		X	X	X				X, V	X, P	
Mrs. Beadle		X	X	X					X, P	
Mrs. Lindbergh		X	X	X, V					X, P	
Mrs. Smythe		X	X, L	X, V					X, L, P	L
Mrs. Jones		X	X	X, O				X, V	X, P	L

Appendix L

Lessons 1-3 from Intervention Curriculum Unit

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Lesson 1
Preassessment

Instructional Purpose

- To read and evaluate the meaning, mood, and/or feelings of a poem by group discussion
- To provide baseline information about students' persuasive writing abilities
- To introduce the concept of persuasive writing

Materials

1. "Autobiographia Literaria" (Handout 1A)
2. Persuasive writing preassessment (Handout 1B)
3. Scoring criteria for writing pre assessments
4. Persuasive Writing pieces (Handouts 1C-F)
5. Student Response Journals

Activities

Note to Teacher: Please send home the "Letter to Parents" with each student who is engaged in the unit at a point you are ready to begin the unit. Please adapt it to your own needs and time schedule.

1. Give students a copy of **"Autobiographia Literaria"** by Frank O'Hara (Handout 1A) to read. The poem can be read aloud by various members of the class, if so desired.

Questions to Ask

- *Why do you think that authors feel the need to write, often from an early age?*
- *Is writing an important act? Why or why not?*
- *People who write often love to read. What is the relationship between these two actions?*
- *What do we assume about the author? What gives us those ideas?*
- *What do you think the author means by "The center of all beauty"? Where is the author? What is poetry to him?*
- *What would an important idea of the poem be?*

2. The poem is included on page 31 of a poetry anthology for young people called *Talking to the Sun*, edited by Kenneth Koch and Kate Farrell (New York Metropolitan Museum of Art and Henry Holt, 1985). Accompanying this poem is a reproduction of a painting of a young man. Show the picture to the students.

Questions to Ask

- *What do you see in the picture? Name as many details as you can.*
- *Why do you think that the editors chose this picture to accompany the poem? In what ways is the boy in the picture like the narrator of the poem?*
- *How does the poem make you feel?*
- *What title would you give to this picture? What title would you give to the poem? Give two reasons from the poem or picture to support your idea.*

3. Hand out the persuasive writing preassessment (Handout 1B). Read the directions out loud and ask students to tell you what they are supposed to do.

4. Collect the preassessments, and discuss them.

Questions to Ask:

- *What did you think? Should the poem be included as part of the curriculum at 4th or 5th grade?*
- *What kinds of reasons did you give?*
- *What is a conclusion?*

5. Begin the persuasive writing section of the lesson. Make overheads and copies of the Persuasive Writing Pieces (Handouts 1C-F). Use the following questions to get students to identify what is good and what is not good about each.

Questions to Ask:

- *What is the opinion of the writer? Is it clearly stated?*
- *What does the writer say to convince you of his point of view?*
- *How many reasons does the writer give to support his point of view? Are you convinced by each? Why or why not?*
- *If you wrote a summary of each piece, what would it say?*

6. Have the students rank the samples in terms of quality. Probe the distinction between adequate and superior samples.

Questions to Ask:

- *What makes a "good" piece of persuasive writing? Why do you think a piece is bad? Is it only your opinion or do you think that there are some characteristics that make it a good piece or not?*

Homework: (Lesson One)

Ask students to identify a moment when they observe someone presenting an opinion or trying to convince someone else of something. In their **Response Journals**, ask them to answer the following questions: "Was the statement that you observed an effective one to convince someone? Why or why not? What made it effective or not effective?"

Extensions

1. Create a brief statement recalling an event from early childhood and how you felt about it. Illustrate your statement with some form of graphic art: Collage, painting, photograph, etc.

2. Create a photo/drawing montage of key aspects or events in your life. Annotate it with prose, poetry, or dramatic dialogue.

Handout 1A
"Autobiographia Literaria"

When I was a child
I played by myself in a
corner of the schoolyard
all alone

I hated dolls, and I
hated games, animals were
not friendly and birds
flew away.

If anyone was looking
for me I hid behind a
tree and cried out "I am
an orphan."

And here I am, the
center of all beauty!
writing these poems!
Imagine!

by Frank O'Hara

Handout 1B

Preassessment for Writing

Do you think that the poem "Autobiographia Literaria" should be required reading for all students in your grade?

Directions: Write a paragraph to answer the question. State your opinion, include three reasons for your opinion, and write a conclusion to your paragraph.

Lesson 2
Introduction to the Hamburger Model

◆◆

Instructional Purpose

- To introduce the Hamburger model of paragraph writing

Materials

1. Hamburger Model (Handout 2A)
2. Jumbled paragraph
3. Examples- copies for each student and overheads of the paragraphs

Activities

1. Share the Hamburger Model of Persuasive Writing with the students (Handout 2A).

Note to Teacher: This lesson is intended to give students practice on providing evidence to support a point of view (the meat of the paragraph). The details (elaboration) that may accompany the reasons may be thought of as the mustard, lettuce, etc. The opinion and conclusion pieces may be thought of as the bread that supports the reasons. Discuss how the model is simply a way to remember the parts of a persuasive paragraph.

2. Use Handouts 1E and F to show how the model looks in reality. Discuss how each piece is explored in the words.

3. Have various students read each piece aloud.

4. Ask students to identify the opinion, reasons, and conclusions.

Questions to Ask:

- *How does the top bun state an opinion? What words are "trigger" words that tell you that it's an opinion? What is the author's opinion?* Have students underline words that are part of the opinion, using one color.
- *What kinds of "Hamburger patties" or reasons are given? What words are trigger words for reasons?* Have students underline words that are part of the reasons, using another color.

- *Are there any examples of elaboration? Remember, elaborations connect the reason to the opinion.* Have students underline words that are part of the elaborations, using yet another color.
- *Is there a conclusion that summarizes the author's opinion? Are the words the exact same as the opinion? What are some words that tell you that it's a conclusion?* Have students underline words that are part of the conclusion, using a fourth color.

2. Give out the Jumbled Paragraph (Handout 2B) and ask students to work in small groups to rearrange the pieces, using the Hamburger model as a guide. Have a representative from each group share the group product. The rest of the class should provide feedback on the effectiveness of each paragraph.

Questions to Ask:

- *What clues did you use so that you could put the paragraph into the right order?*
- *Is there another way to arrange the paragraphs? Why is your way the best way?*

3. Highlight the features of the best paragraph. On a transparency of this paragraph, ask students to number the reasons and highlight the details (elaboration) of those reasons in colored pen.

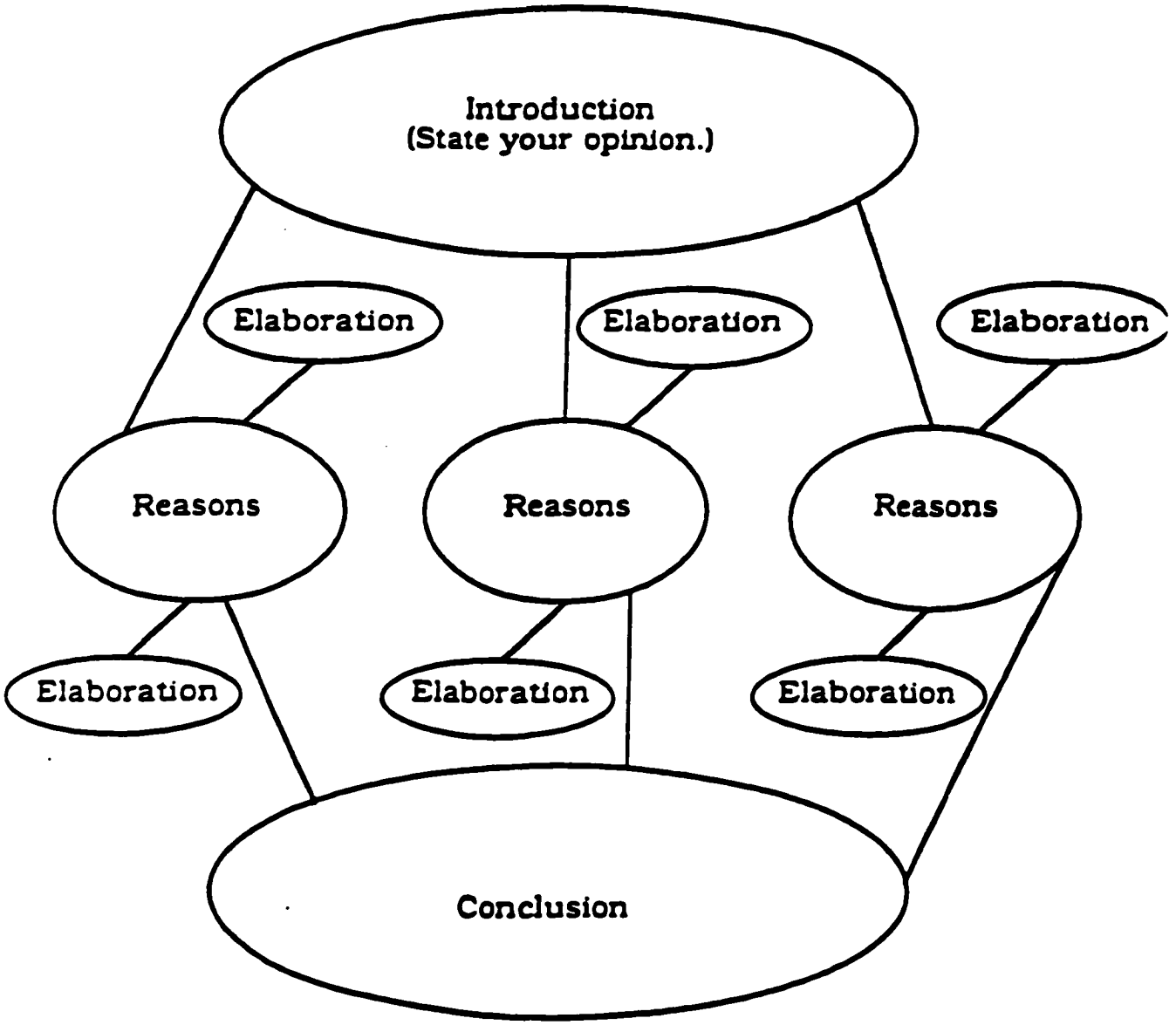
Homework: (Lesson Two)

- Take a point of view on whether uniforms should be required in your school and write a Hamburger paragraph defending your opinion. Have each child draw around the paragraph to show each part of the model.
- Have each child draw a hamburger to put on his/her desk- complete with labeling the various parts.

Extensions:

1. Construct a large picture of a hamburger for the bulletin board. Ask students to cut up copies of the persuasive writing pieces and place on the proper places on the bulletin board.
2. Provide laminated pieces of a hamburger to students. Have them place the pieces of the hamburger on their writing.

Hamburger Model for Persuasive Writing



Jumbled Paragraph
Letters vs. Phone Calls
Answer Key

In my opinion, letters are better than phone calls for the following three reasons. First, letters are more personal. No one reads a letter except for the person it's written to. Second, letters are more thoughtful. Letters show that the person writing the letter cares enough about the person receiving the letter that they have taken the time to write. Finally, you can say more in a letter. On the phone, people may forget to say something, but in a letter, they have time to think. As you can see, the above three reasons show why letters are better than phones.

Handout 2B
Jumbled Paragraph

Letters vs. Phone Calls

Finally, you can say more in a letter. First, letters are more personal. As you can see, the above three reasons show why letters are better than phones. No one reads a letter except for the person it's written to. Letters show that the person writing the letter cares enough about the person receiving the letter that they have taken the time to write. In my opinion, letters are better than phone calls for the following three reasons. Second, letters are more thoughtful. On the phone, people may forget to say something, but in a letter, they have time to think.

Lesson 3
Introduction to Paul's Critical Thinking Model

Instructional Purpose

- To introduce students to the model of critical thinking in an explicit manner

Materials

1. Overhead 3-1 Pauls' Reasoning Wheel
2. Copies of 3-1 Pauls' Reasoning Wheel
3. Current newspaper article that covers a controversial topic

Activities

Questions to Ask:

1. What are things do we make decisions about? What kinds of things do we think really hard about and what are things that we don't take a lot of time to think about?
2. Do we think the same way about deciding what to eat for dinner as we do when we're deciding what to be or who we're going to marry? What are the differences and similarities in these kinds of thinking?

1. Pass out copies of Paul's Reasoning Wheel

2. Explain to students that the wheel is a way of exercising the mind, and just as the body may need workout equipment to make it stronger, a model of thinking can act as way of making thinking stronger.

3. Define each section for students- carefully explaining the distinctions between each section. See Handout 3-2

4. Pass out copies of a newspaper article that covers a "hot" topic of the moment. Ex. Timothy McVeigh or some other controversial topic that gathers media attention

5. Ask students to read the article with you as you read it aloud.

Questions to Ask

1. *What was the author's purpose in writing this article?*
2. *What question or issue is the author dealing with in this particular article?*
3. *What data did the author give in this piece?*
4. *What does the author assume that you know about the issue?*
5. *What perspective is the author writing from? Are there any other perspectives? Does the author allow the voices of the other perspectives to emerge? What point of view is the author trying to convince you of? Is there any language or word choice that tells you that the author is operating out of a particular frame of reference?*
6. *What are the consequences of this article? What does the author want to bring about as a result of this article?*
7. *If you assume that the author is correct, what else must be true?*
8. *What concepts does the author use to make their point? What big ideas does the author use to convince people of the correctness of the points?*
9. *How can you use the wheel of reasoning in your own life? How might the analysis of this article help you in other areas?*

6. Ask students to create an oral argument as if they were trying to convince their parents to let them go the movies. In small groups of 2 to 3, the students will write reasons that should convince their parents to let them go.

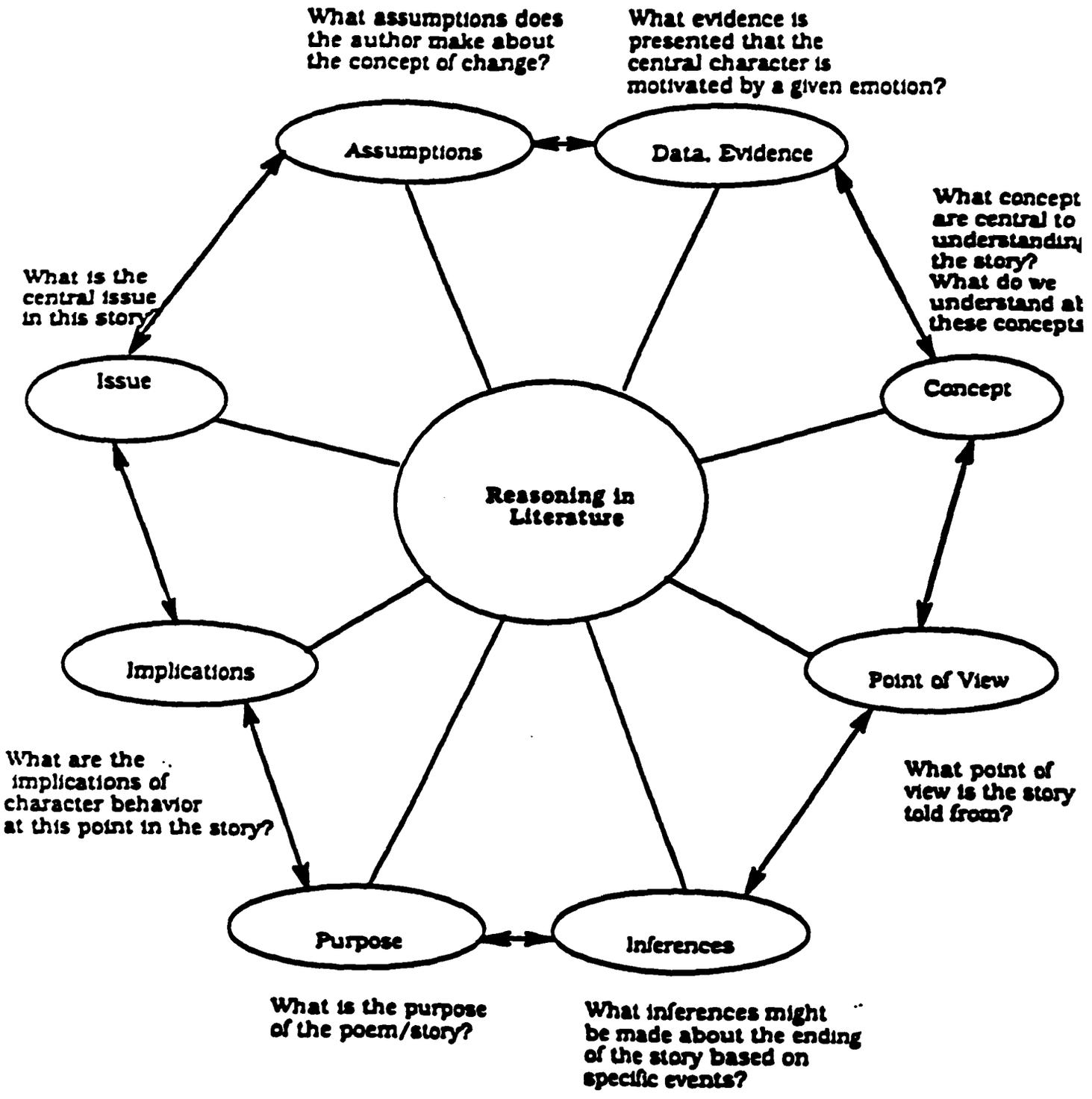
7. The small groups will present their arguments to the rest of the class. Using the Wheel of Reasoning, students will evaluate each other on different aspects of the arguments, determining if the arguments were well reasoned or not.

Homework: (Lesson Three)

Have the students find a newspaper article or an issue of debate in their lives and examine the issue, using the Wheel of Reasoning. Using the homework sheet 3-3, students should analyze the arguments and issue.

Extensions

Students will analyze a political speech and determine what aspects are strongest in the reasoning component and which aspects are the weakest.



Handout 3-2
Definitions of Critical Thinking Wheel Components

Purpose, Goal or End in View

Whenever we reason, we reason to some end, to achieve some objective, to satisfy some desire; to fulfill some need. One source of problems in student reasoning is traceable to defects at the level of goal, purpose, or end. If the goal is unrealistic, for example, or contradictory to other goals, if it is confused or muddled in some way, then the reasoning used to achieve it is problematic.

What is the purpose of a piece? Is the purpose clear? Is the purpose significant or trivial, or somewhere in between? Is it realistic?

Question at Issue or Problem to be Solved

Whenever we attempt to reason something out, there is at least one question at issue, at least one problem to be solved. One area of concern for assessing student reasoning, therefore, will be the formulation of the question to be answered or problem to be solved.

What is the question or issue that someone is trying to solve? Is the question an important one? Is it answerable? Are the requirements for answering the question clear?

Point of View of Frame of Reference

Whenever we reason, we must reason within some point of view or frame of reference. Any "defect" in that point of view or frame of reference is a possible source of problems in the reasoning. Points of view may reflect beliefs, cultural values, racial and gender perspectives, as well as individual characteristics. A point of view may be too narrow, too parochial, may be based on false or misleading analogies or metaphors, may contain contradictions, and so forth. Alternatively, it may be broad, flexible, fair, clearly stated and consistently adhered to.

What perspective is the author writing/ speaking from? What perspective is the audience responding from? What does the author assume about the perspective of the audience?

Data or Empirical Dimension of Reasoning

Whenever we reason, there is some "stuff" some phenomena about which we are reasoning. Any "defect" then, in the experiences, data, evidence, or raw material upon which a persons reasoning is based is a possible source of problems.

Is data furnished at all? Is the data relevant? Is the information adequate for achieving the author's purpose? Is it applied consistently or does the author distort if to fit his/her own point of view?

Conceptual Dimension of Reasoning

All reasoning uses some ideas or concepts and not others. These concepts can include the theories, principles, axioms and rules implicit in our reasoning. Persuasive pieces use concepts as "anchors" to make their points.

What concepts does a piece hinge upon? Are the concepts clear? Are the ideas and concepts relevant to the issue at hand, or are their principles slanted by their point of view?

Assumptions

All reasoning must begin somewhere, must take some things for granted. Any "defect"" in the assumptions or presuppositions with which the reasoning begins is a possible source of problems for students. Assessing skills of reasoning involves assessing their ability to recognize and articulate their assumptions.

What does the author assume that the audience knows about the issue? What assumptions does the author make in reporting or making a point? How clearly are the assumptions stated?

Implications and Consequences

No matter where we stop our reasoning, it will always have further implications and consequences. As reasoning develops, statements will logically be entailed by it. Each piece will have implications and consequences whose moral and ethical implications must be considered.

Has the author stated what implications are expected as a result of their thinking?

Inferences

Reasoning proceeds by steps in which we reasons as follows: Because this is so, that also is so". Strong reasoners must determine that if they determine one course of action to be true, what other course of actions must also be true?

Does the author state what else must be true if the main point set forth is true as well? How clearly are these inferences made? Are the inferences sound and justifiable?

Handout 3-3
Homework- Self-Analysis Sheet

1. What was the author's purpose in writing this article?

2. What question or issue is the author dealing with in this particular article?

3. What data did the author give in this piece?

4. What does the author assume that you know about the issue?

5. What perspective is the author writing from?

6. What does the author want to bring about as a result of this article?

7. If you assume that the author is correct, what else must be true?

8. What concepts does the author use to make their point? What big ideas does the author use to convince people of the correctness of the points?

Appendix M

State Standards of Learning Guiding Comparison Group Curriculum

English
Standards of Learning

Grade Four

The fourth-grade student will communicate orally in large- and small-group settings. Students will read classics and contemporary literature by a variety of authors. A significant percentage of reading material will relate to the study of math, science, and history and social science. The student will use text organizers, summarize information, and draw conclusions to demonstrate reading comprehension. Reading, writing, and reporting skills support an increased emphasis on content-area learning and on utilizing the resources of the media center, especially to locate and read primary sources of information (speeches and other historical documents) related to the study of Virginia. Students will plan, write, revise, and edit narratives and explanations. The student will routinely use information resources and word references while writing.

Oral Language

4.1 The student will use effective oral communication skills in a variety of settings.
- Present accurate directions to individuals and small groups.
- Contribute to group discussions.
- Seek the ideas and opinions of others.
- Begin to use evidence to support opinions.

4.2 The student will make and listen to oral presentations and reports.
- Use subject-related information and vocabulary.
- Listen to and record information.
- Organize information for clarity.

Reading/Literature

4.3 The student will read and learn the meanings of unfamiliar words.
- Use knowledge of word origins; synonyms, antonyms, and homonyms; and multiple meanings of words.
- Use word-reference materials including the glossary, dictionary, and thesaurus.

4.4 The student will read fiction and nonfiction, including biographies and historical fiction.
- Explain the author's purpose.
- Describe how the choice of language, setting, and information contributes to the author's purpose.
- Compare the use of fact and fantasy in historical fiction with other forms of literature.
- Explain how knowledge of the lives and experiences of individuals in history can relate to individuals who have similar goals or face similar challenges.

4.5 The student will demonstrate comprehension of a variety of literary forms.
- * Use text organizers such as type, headings, and graphics to predict and categorize information.
- * Formulate questions that might be answered in the selection.
- * Make inferences using information from texts.
- * Paraphrase content of selection, identifying important ideas and providing details for each important idea.
- * Describe relationship between content and previously learned concepts or skills.
- * Write about what is read.

4.6 The student will read a variety of poetry.
- * Describe the rhyme scheme (approximate, end, and internal).
- * Identify the sensory words used and their effect on the reader.
- * Write rhymed, unrhymed, and patterned poetry.

Writing

4.7 The student will write effective narratives and explanations.
- * Focus on one aspect of a topic.
- * Develop a plan for writing.
- * Organize writing to convey a central idea.
- * Write several related paragraphs on the same topic.
- * Utilize elements of style, including word choice, tone, voice, and sentence variation.
- * Edit final copies for grammar, capitalization, punctuation, and spelling.
- * Use available technology.

4.8 The student will edit final copies of writings.
- * Use subject-verb agreement.
- * Avoid double negatives.
- * Use pronoun "I" correctly in compound subjects.
- * Use commas in series, dates, and addresses.

Research

4.9 The student will use information resources to research a topic.
- * Construct questions about a topic.
- * Collect information, using the resources of the media center.
- * Evaluate and synthesize information for use in writing.
- * Use available technology.

The fifth-grade student will continue to increase communication skills used in learning activities and will use a variety of resources to prepare presentations. The student will plan, write, revise, and edit writings to describe, to entertain, and to explain. The student will continue to develop an appreciation for literature and build a storehouse of literary experiences and images through careful reading of selections from fiction, nonfiction, and poetry. Students will be introduced to documents and speeches that are important in the study of American history to 1877. The student also will read texts in all subjects and will derive information to answer questions, generate hypotheses, make inferences, support opinions, confirm predictions, and formulate conclusions.

Oral Language

5.1 The student will listen, draw conclusions, and share responses in subject-related group learning activities.
- * Participate in and contribute to discussions across content areas.
- * Organize information to present reports of group activities.
- * Summarize information gathered in group activities.

5.2 The student will use effective nonverbal communication skills.
- * Maintain eye contact with listeners.
- * Use gestures to support, accentuate, or dramatize verbal message.
- * Use facial expressions to support or dramatize verbal message.
- * Use posture appropriate for communication setting.

5.3 The student will make planned oral presentations.
- * Determine appropriate content for audience.
- * Organize content sequentially or around major ideas.
- * Summarize main points before or after presentation.
- * Incorporate visual aids to support the presentation.

Reading/Literature

5.4 The student will read and learn the meanings of unfamiliar words.
- * Use knowledge of root words, prefixes, and suffixes.
- * Use dictionary, glossary, thesaurus, and other word-reference materials.

5.5 The student will read a variety of literary forms, including fiction, nonfiction, and poetry.
- * Describe character development in fiction and poetry selections.
- * Describe the development of plot, and explain how conflicts are resolved.
- * Describe the characteristics of free verse, rhymed, and patterned poetry.
- * Describe how author's choice of vocabulary and style contribute to the quality and enjoyment of selections.

5.6 The student will demonstrate comprehension of a variety of literary forms.
- * Use text organizers such as type, headings, and graphics to predict and categorize information in informational texts.
- * Locate information to support opinions, predictions, and conclusions.
- * Identify cause-and-effect relationships.
- * Prioritize information according to purpose of reading.
- * Write about what is read.

Writing

5.7 The student will write for a variety of purposes to describe, to inform, to entertain, and to explain.
* Choose planning strategies for various writing purposes.
* Organize information.
* Use vocabulary effectively.
* Vary sentence structure.
* Revise writing for clarity.
* Edit final copies for grammar, capitalization, spelling, and punctuation, especially the use of possessives and quotation marks.

Research

5.8 The student will synthesize information from a variety of resources.
* Skim materials to develop a general overview of content or to locate specific information.
* Develop notes that include important concepts, paraphrases, summaries, and identification of information sources.
* Organize and record information on charts, maps, and graphs.
* Use available electronic databases to access information.
* Credit secondary reference sources.

Appendix N

Regression Excluded Variables Colinearity for Post-Total Prediction

Teacher Behavior	Beta In	t	Significance
Suggestions for extension activities	.026	.249	.804
Problem-finding and problem-solving behaviors.	.092	.383	.703
Encouragement of independent thought	.059	.361	.719
Positive affective classroom climate	-.001	-.012	.990
Synthesizing student information and modifying instruction.	-.041	-.287	.775
Classroom management.	-.075	-.652	.516
Use of multiple resources	-.024	-.161	.872
Well-planned curriculum	.012	.115	.909
The use of advanced content and materials	.098	.346	.731
Varied teaching strategies	-.046	-.386	.700
Varied grouping strategies	-.041	-.287	.775
Questions to promote creative responses	.012	.050	.960
Questions that encourage metacognition	.039	.050	.960
Pretotal Test score	.094	.901	.370

Predictor in the model- Questions to promote critical thinking

Regression Excluded Variables Colinearity for Growth Difference Prediction

Teacher Behavior	Beta In	t	Significance
Suggestions for extension activities	-.122	-.910	.365
Problem-finding and problem-solving behaviors.	-.031	-.247	.806
Encouragement of independent thought	.021	.185	.854
Positive affective classroom climate	-.024	-.229	.820
Synthesizing student information and modifying instruction.	-.170	-1.463	.147
Use of multiple resources	-.093	-.853	.396
Well-planned curriculum	.094	.910	.365
The use of advanced content and materials	-.062	-.476	.635
Varied teaching strategies	-.171	-1.584	.117
Varied grouping strategies	-.170	-1.463	.147
Questions to promote creative responses	-.135	-1.001	.320
Questions to promote critical thinking	-.040	-.347	.730
Questions that encourage metacognition	-.064	-.528	.599

Predictor in the model- Classroom management