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DIRECT INSTRUCTION OF SUBJECT-MATTER CONTENT AND
COGNITIVE SKILLS ASSOCIATED WITH THE OHIO FOURTH-GRADE
PROFICIENCY TEST

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree of Doctor of Philosophy in the Graduate
School of The Ohio State University

By

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****

The Ohio State University
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ABSTRACT

Since its introduction in 1990, the Ohio Proficiency Test has had a growing influence on Ohio elementary and secondary schools. The state of Ohio currently conducts proficiency testing in grades four, six, nine, and twelve. Test results have considerable bearing on curriculum development, lesson design, student promotion, graduation eligibility, and school district performance ratings.

The emphasis placed on the Ohio Proficiency Test has special implications for school districts characterized by low property wealth, high unemployment, weak economic development, low personal income, and minimal levels of formal education in the adult population. School districts that match this profile are commonly among those with poor scores on the Ohio Proficiency Test. Such districts are in particular need of a practical approach to improving student performance on this test.

The literature that addresses teaching and learning suggests that effective instruction includes two dimensions. The first dimension is knowledge. Within a domain of learning, students with a solid base of prior knowledge in that domain consistently demonstrate superior testing performance. The second dimension is cognitive skills. Studies of direct instruction on cognitive skills have proven that student thought processes can be shaped and directed.

This study tested an instructional model that features the subject-matter content and cognitive skills associated with the Ohio Fourth-grade Proficiency Tests in reading and citizenship. The hypothesis tested in this study is that students
whose teachers use the instructional model for teaching cognitive skills and subject-matter content will demonstrate higher performance on the reading and citizenship portions of the Ohio Proficiency Test than equivalent students whose teachers do not use the model.

School districts that met the low-performance profile on the Ohio Proficiency Test were identified to serve as treatment and control groups. Students and teachers from control school districts did not use the instructional model. Students and teachers in the treatment school district employed the instructional model from mid-January until mid-March. All the students took the Ohio Proficiency Test in mid-March. Analysis of Ohio Proficiency Test scores was accomplished through a one-way analysis of covariance using third-grade Ohio Proficiency Based Assessment scores as the covariate. The results of the statistical analysis showed no statistically-significant difference between the mean scores of the treatment and control groups used in this study.

Several factors affected the outcome. First, the Ohio Proficiency Test does not include a strong knowledge component. As a result, the important effects of prior knowledge were not a significant part of the instructional model. Second, teachers of students in the treatment group received minimal pre-instruction training. Third, studies about effective school change suggest that more extended use of these methods, by a broader range of teachers, over a larger amount of time, might provide the systemic change necessary to meet the demands of the Ohio Proficiency Test.
Dedicated to my parents.
They would have been proud of me.
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My wife Beth, and my sons Joshua, Benjamin, and Andrew, are the most important part of my life. Nevertheless, they willingly accepted the separation that was a necessary part of this academic pursuit. Their love made it all possible.
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CHAPTER 1

INTRODUCTION

"The primary missions of educational institutions, from elementary to graduate and professional schools, are to impart knowledge and to teach cognitive skills" (Frederiksen, 1984, p. 363).

In 1987, the Ohio legislature passed Substitute House Bill 231, mandating that beginning in the 1993-94 school year, Ohio students must demonstrate proficiency on statewide tests in reading, writing, mathematics, and citizenship prior to receiving a diploma. The law required the State Board of Education to formulate and prescribe standards to create a state standardized and proficiency test program. The initial version of the Ohio Proficiency Test was first administered to Ohio ninth graders in the fall of 1990. In 1995, a second level of tests was added for fourth graders. A year later, science was added to the subjects tested by the Ohio Proficiency Test and the tests were implemented for students in grades six and twelve.

Each level of the Ohio Proficiency Test is actually five different tests. Since 1996, Ohio public school students have annually been administered tests in reading, writing, citizenship, mathematics, and science, at four grade levels - four, six, nine, and twelve. The fourth, sixth, and twelfth-grade tests are given each year during the third week of March. The fourth and sixth grade tests are diagnostic tests; the twelfth-grade test has a bearing on the awarding of honors diplomas. The first time that students take the ninth grade test is during the spring of their eighth-grade year. Thereafter, the ninth grade test is given in October and then again in March. Once they enter high school, students have two opportunities per year to re-take the portions of the ninth-grade test that they did not pass
on previous attempts. Passing all parts of the ninth-grade test is a requirement for high school graduation.

**Context of the Problem**

Performance on the Ohio Proficiency Test is an important factor in the academic program of individual students, and has considerable influence on the structure of the curriculum and the instructional priorities of schools and school districts. The Ohio Proficiency Test affects individual students because students cannot graduate from high school without passing all five parts of the ninth-grade test. Beginning in the 2000-2001 school year, promotion to fifth grade will be dependent on a student’s performance on the reading portion of the fourth-grade test.

School and school district performance on the Ohio Proficiency Test is reported to the public in terms of percent of students passing each portion of the test, as well as percent of students passing all five parts of the test. These scores have become the standard by which schools and school districts are judged. In addition to publishing passing percentages in the newspaper, the Ohio Department of Education also issues District Report Cards. These annual report cards rate every school in the state according to four categories: *Effective, Continuous Improvement, Academic Watch,* or *Academic Emergency.* The rating has been determined on an 18-point scale, 16 of which are Ohio Proficiency Test scores.

Student performance on the Ohio Proficiency Test varies from school district to school district. Some school districts, often those associated with low family income, high unemployment, and below average adult educational levels, have been unsuccessful in preparing their students to meet the minimum proficiency expectations of the Ohio Department of Education. School districts that meet from six to nine of the 18 performance standards established by the Ohio General Assembly are rated as Academic Watch districts.
School districts that meet five or fewer of those standards are rated as Academic Emergency districts. Because the Ohio Proficiency Test figures so prominently in these determinations, school leaders in Academic Watch and Academic Emergency districts are in particular need of a teaching strategies and instructional models that will help them to meet the performance objectives of the Ohio Proficiency Test.

*Skills and Knowledge*

The performance objectives of the Ohio Proficiency Tests are referred to as *outcomes*. These outcomes are drawn from the Ohio Model Courses of Study, and as with most courses of study, the Ohio Model Courses of Study are essentially skill-based. A study of state standards conducted by Finn, Petrilli, & Vanourek (1998) confirms this tendency toward skills rather than content in state curriculum standards. This study states, "Standards essentially clarify what students are expected to *know* and be able to *do* at various points in their academic careers. Accordingly, all of our authors looked for the specific *knowledge* and *skills* that the states want students to master. Unfortunately, in the majority of cases, they found standards that emphasize skills and minimize knowledge" [emphasis theirs] (p. 7).

The outcomes described in the Ohio Proficiency Test reflect the emphasis on skills, and the corresponding de-emphasis on knowledge, that characterize the Ohio Model Courses of Study. The effect is a lack of clarity in regard to subject-matter content. Ebel (1977), for example, listed these drawbacks among the disadvantages to standardized test objectives: "Standardized tests are ambiguous and promote guesswork; standardized test questions are superficial and trivial; and standardized test questions do not require a real understanding of the subjects." A first step in devising a teaching strategy to attack these ambiguities could be to clearly identify the subject-matter content that students need as
background knowledge for the Ohio Proficiency Test, and then to provide systematic, direct
instruction on that content. Presently, such subject-matter content is not well-defined.
Teachers need more direction about the subject-matter content that is within the domain of
the Ohio Proficiency Test.

Frederiksen (1984) offers another way to look at the need for content clarity. In
discussing problem solving, Frederiksen identifies two basic types of problems. The first
type, which he calls a “well-structured problem,” is a problem about which the domain of
knowledge is specific, the information needed is at hand, and the problem is clearly stated.

The second type of problem, which Frederiksen calls an “ill-structured problem”
includes none of these clarifying characteristics (p. 363). Within the subject areas, Ohio
Proficiency Test outcomes are not clearly linked to particular topics, and the required
content knowledge is not explicitly defined. Thus, Ohio Proficiency Test questions bear
some similarity to ill-structured problems. As Frederiksen points out, in order to answer
such questions, “a knowledge base would certainly be required, but since the nature of the
problems that any given individual might encounter may not be predictable, the content of
the knowledge base cannot be clearly specified” (p. 365). A first step toward preparing
students for the Ohio Proficiency Test could be to specify the knowledge base that is
required, and then build that knowledge base through direct instruction.

A second step in devising a teaching strategy for the Ohio Proficiency Test could be
to provide direct instruction on cognitive skills. The outcomes of the Ohio Proficiency
Tests currently provide no guidance about the best ways to develop the prescribed skills, or
how to establish those skills with increasing depth and durability as students progress
through school. Describing mental processes is not an easy task. Attempts to illustrate and
define desirable mental behavior often result in vague generalizations and strings of
adjectives linked together in such a way as to create an impressionistic image of a well-
educated, thoughtful student. As Munroe & Smith (1998) put it, “Far too many states cast their standards in terms that will likely leave curriculum developers, students, and teachers, scratching their heads as to just what is expected of them” (p. 6).

**Direct Instruction of Cognitive Skills**

A review of the literature shows that effective models for direct instruction on thought processes and learning strategies have been developed for the teaching of writing (Englert & Raphael, 1989; Scardamalia and Bereiter, 1985); mathematical problem-solving (Schoenfeld, 1983, 1985); student reasoning strategies (Collins, Brown, and Holum, 1991; King, 1990, 1994); reading comprehension (Alvermann, 1981; Paris, Cross, & Lipson, 1984; Raphael & Pearson, 1985), and physics problem-solving (Larkin & Reif, 1976). A second step in devising a teaching strategy for the Ohio Proficiency Test could be to adapt these models for the cognitive outcomes of this specific test.

**Statement of the Problem**

The purpose of this study is to improve student mastery of the cognitive skills and subject-matter content of the Ohio Proficiency Test. Specifically, this study tests an instructional model expressly designed for the Reading and Citizenship portions of the Ohio Proficiency Test. What subject-matter content must students learn? What cognitive skills must students demonstrate? Can content knowledge and cognitive skills be improved through direct instruction? Will use of the instructional model improve student scores on the Reading and Citizenship portions of the Ohio Proficiency Test?
Statement of the Hypothesis

The hypothesis to be tested in this study is that students whose teachers use the instructional model for teaching cognitive skills and subject-matter content will demonstrate higher performance on the Reading and Citizenship portions of the Ohio Proficiency Test than equivalent students whose teachers do not use the model.

The literature indicates that both cognitive skills and subject-matter knowledge are important. For example, studies that compare the thinking processes of experts with those of novices have concluded that experts have well-developed thinking strategies and that those strategies are supported by a thorough base of content knowledge. Collins, Brown, and Holum (1991) contend that schools have been relatively successful in organizing and conveying conceptual and factual knowledge, but that “too little attention is paid to the reasoning strategies that experts employ when they acquire knowledge or put it to work to solve complex or real-life tasks” (p. 6). But Collins, Brown, and Holum also recommend that teachers be certain to give attention to the development of content knowledge. Say the authors, “We should emphasize that much of an expert’s strategic knowledge depends on their knowledge of facts, concepts, and procedures” (p. 42).

It may be advisable, therefore, for schools to balance classroom time with instruction in both cognitive strategies and in subject-matter content. Recht and Leslie (1988) point out that, although strategy instruction makes a needed contribution to student learning, it is not enough to consider strategies without equal consideration of the subject’s knowledge base. Say Recht and Leslie, “In light of the importance of adequate prior knowledge, strategy instruction and the knowledge base should be equally considered in the design of instruction” (p. 19).

Hirsch (1996) calls the idea of direct instruction in problem-solving and learning strategies “a key subject of debate in the research community,” but warns that instruction
in procedural strategies and metacognitive techniques must not eclipse subject-matter study (p. 137). Hirsch uses the term “educational formalism” to describe instruction in cognitive skills without a corresponding emphasis on the transmission of knowledge (p. 14). He considers subject-matter knowledge to be an essential part of the educational process, without which, instruction in academic skills is a waste of time. Says Hirsch, “The idea that schools can inculcate abstract, generalized skills for thinking, accessing, and problem solving, and that these skills can be readily applied to the real world is, bluntly, a mirage. So also is the hope that a thinking skill in one domain can be readily and reliably transferred to other domains” (p. 143).

Hirsch believes that when schools balance their instruction in academic skills with solid subject-matter content, then young children who arrive at school with a very small vocabulary, and a correspondingly limited knowledge base, can be brought to an age-adequate level of performance (p. 146). He also contends, however, that young children who lack a solid base of content knowledge are often hindered by an unbalanced approach to instruction that emphasizes cognitive skills and neglects subject-matter content. Some of the potential problems highlighted by Hirsch are that instruction in academic skills 1) may interfere with the orderly development of adaptive problem-solving strategies; 2) may carry severe opportunity costs by usurping subject-matter instruction, and 3) may overload working memory and thus impair rather than help learning. According to Hirsch, “All of these potential drawbacks may have the most adverse effects on slow or disadvantaged students” (p. 139).

King (1994) indicates that accessing prior knowledge occurs infrequently in a naturally occurring spontaneous discussion (p. 356) and recommends the use of additional custom-designed questions that might promote connecting the new material to existing knowledge structures. These would be experience-based questions, explicitly relating the
lesson material to students’ prior knowledge and experience; that is, material learned in a previous lesson or their general knowledge of the world (p. 347). Based upon a teacher’s awareness of the students’ knowledge base, these questions would be intended go beyond the lesson by linking it to prior knowledge relevant to the lesson topic (p. 341).

Results of King’s study indicate that when children use questions that guide them to connect ideas within a lesson together or connect the lesson to their prior knowledge, they engage in complex knowledge construction that, in turn, enhances learning; and these learning effects are stronger for questions that connect to prior knowledge (King, 1994, p. 358).

Brown and Campione (1996) emphasize the importance of balancing instruction in thought processes with an equal emphasis on content knowledge. Say the authors, “We cannot overemphasize the importance of situating [their instructional model] within the context of discovering deep conceptual disciplinary-based content knowledge. The content tackled should be rigorous, demanding, and intellectually honest so that there is room for depth and tenacity of inquiry. The content should be sufficiently demanding to support, indeed require, sharing” (p. 319). The Brown and Campione model was developed as a thinking curriculum, but it is dependent upon the existence of a solid base of knowledge shared by the participants. As the authors point out, “The research-share-perform cycles of [our model] cannot be carried out in a vacuum. All rely on the fact that the participants are trying to understand deep disciplinary content. (p. 295). One cannot think critically, or otherwise, in a vacuum; food for thought is needed to nourish critical thinking and reflection” (p. 290).

Accordingly, an instructional model that reflects previously-developed methods for teaching cognitive skills has been combined with instruction on subject-matter content. The prescribed cognitive skills and subject-matter knowledge have been derived from the skill-
based outcomes and the subject content found in Ohio Proficiency Test Information Guides, and from an examination of test questions included in the Ohio Fourth-Grade Proficiency Test over the last three years. It is predicted that, following direct instruction in reading and citizenship, when tested on those portions of the Ohio Proficiency Test, the mean score of fourth-grade students who received the prescribed instruction would be higher than the mean score of equivalent fourth-grade students who took the same tests, but did not have the instructional treatment.

The instructional treatment in the control classrooms is at the discretion of the classroom teachers and supervisors in those districts. Preparation of students for the Ohio Proficiency Test in these districts may include the use of commercially-produced practice materials and tests, special tutoring and remediation for at-risk students, collection and analysis of Ohio Proficiency Test and OPBA data, and teacher-designed activities which are intended to reflect Ohio Proficiency Test outcomes.

Operational Definitions of the Variables

Subject-Matter Content is the subject of instruction (e.g., reading and citizenship) and the topics and sub-topics that are associated with those subjects.

Cognitive Skills are the mental processes and activities used in perceiving, remembering, thinking, and understanding, as well as the act of using those processes.

Direct Instruction is a process in which the teacher actively supports the learning process by presenting information, leading discussion, and devising and directing learning activities.

Direct Instruction in Cognitive Skills is a process that influences the thinking of students in specific ways, consistent with stated learning objectives.
*The Instructional Model* is a form of direct instruction that uses prompts for cueing and practicing specific cognitive skills within the context of relevant subject-matter content.

*The Comparison Model* is instruction as it would normally be given without the aid or guidance of a curriculum map or question prompts derived from Ohio Proficiency Test outcomes.

**Significance of the Study**

Paris, Cross, and Lipson (1984) expressed doubt about the correlation between instruction in cognitive strategies and scores on standardized tests. Although Paris et al. observed consistent and significant improvements in children’s reading awareness and use of strategies on tasks, they found no evidence of improvement on standardized tests of reading comprehension (p. 1250). They found standardized tests to be highly correlated with intelligence measures and relatively unrelated to specific curricula or particular experiences. They assert that standardized achievement tests in reading measure general aptitude or intelligence more than specific cognitive skills used to aid comprehension. Say the authors, “When we began [our] project we assumed that standardized reading tests can provide robust measures of comprehension skills and comparative data on achievement levels of students. We now believe that this is a misconception. We find it quite reasonable that the most sensitive tests of the treatment effect are the tasks that require strategies specifically included in the instruction” (p. 1249).

The instructional model used in this study creates a direct link between instruction and testing. When not employing a standardized test, teachers can construct their own assessment instruments, being careful to craft test questions and prompts that are associated with instruction. In the case of standardized testing, however, this relationship must be reversed. Because standardized assessment is outside of the control of individual teachers,
instruction must be carried out in a manner consistent with the objectives of the test. Teachers, in other words, must “teach to the test.”

Research shows that subject-matter knowledge is necessary for problem solving and critical thinking within a selected area of study. Research also suggests that instruction in cognitive skills can be effective when the teacher uses a model of direct instruction that is aimed at specific cognitive strategies (Brown & Campione, 1996; Collins, Brown, & Holum, 1991; King, 1990; Palinscar & Brown, 1984; Paris, Cross, & Lipson, 1984). However, these studies have not tested the effect of instruction in subject-matter content and cognitive skills associated with a specific, externally-created, standardized test such as the Ohio Proficiency Test. The development of a model for direct instruction in cognitive strategies and subject-matter content that is tied to a specific standardized test is an unexplored area of consideration. This study extends the research on direct instruction of cognitive skills and subject-matter content to a specific standardized test by targeting the outcomes of the reading and citizenship portions of the Ohio Proficiency Test.

The Ohio Proficiency Test exerts a major influence on both school districts and individual students in Ohio’s elementary and secondary school systems. Scores on this test are the basis for evaluating pupil performance and judging the competence of their teachers. Because Ohio places such a heavy emphasis on this single measure of student and teacher performance, it reasonably follows that a teaching strategy that improves performance on this test would be a useful and valued tool for teachers and school administrators in Ohio’s schools.
CHAPTER 2

LITERATURE REVIEW

A review of literature and selected research studies that will provide direction for this study are presented in this chapter. The review of literature has been organized into three sections, each of which will have a bearing on this study.

The first section details the rationale for using direct instruction. This section defines direct instruction and compares direct, teacher-controlled methods with pupil-directed discovery-learning methods. A review of the literature shows that in some cases, direct instruction is the most effective and efficient means for teaching subject-matter content and for instruction in cognitive skills. Direct instruction is particularly appropriate for this study because of its effectiveness with elementary students, low-ability students, and students with a limited base of subject-matter knowledge.

The second section examines the importance of subject-matter knowledge. This section includes four subsections: Knowledge Defined, in which three fundamental forms of knowledge are introduced; Knowledge Organized, that explains how the fundamental forms of knowledge combine to create mental structures called schemata, semantic knowledge, and scripts; Knowledge Applied, in which the action and interaction of mental structures is described; and Knowledge Acquired, that suggests that direct instruction in subject-matter content can help build mental structures, and should therefore be a component of the instructional model for this study.
The final section reviews existing models for direct instruction of cognitive skills. The outcomes of the Fourth-Grade Proficiency Test are largely skill-based; therefore, direct instruction in subject-matter content is necessary for meeting the demands of this test. Students must be taught how to focus their thoughts in ways consistent with Ohio Proficiency Test outcomes. A review of the literature reveals that several researchers have developed and applied models for direct instruction of cognitive skills. This section will describe the characteristics of these models and explain how such techniques have been adapted for application to the reading and citizenship portions of the Ohio Proficiency Test.

Direct Instruction

This study uses direct instruction of subject-matter content and cognitive skills as the basis for the prescribed instructional model. Direct instruction means that teachers are primarily responsible for introducing new material, devising student activities, and leading classroom discussion. Some members of the educational community are suspicious of teacher-controlled instruction, believing that students will learn more if they are set free to choose topics of interest and to discover the salient aspects of those topics for themselves. Information presented through teacher-controlled instruction is seen as passively received and unlikely to lead to productive knowledge, that is, to knowledge that facilitates deep understanding and problem solving. From this point of view, productive learning is fostered when an individual attempts to solve problems embedded in meaningful and relevant contexts, not by step-by-step construction of knowledge, or carefully structured activities designed to focus on specific cognitive skills.

However, Weinert and Helmke (1995) contend that self-organized learning and forms of low teacher-controlled instruction may lead to substantial conceptual deficits in students' knowledge, while under certain circumstances, teacher-controlled forms of
instruction can actually lead to active and successful learning (p. 136). Direct instruction is not always used for indoctrination or force-feeding of facts. As Weinert and Helmke (1995) point out, “It is important to recognize that direct instruction does not put knowledge in the heads of learners, but creates the conditions under which students will use their academic learning time fruitfully” (p. 139).

Weinert and Helmke (1995) contend that the solving of more complex problems and the processing of new information require a rich, well-organized, and well-structured knowledge system, but self-controlled learning may not be the best way to establish such a knowledge base. The absence of teacher-controlled direct instruction may fail to produce the kind of firmly-grounded knowledge system that students need, because non-directive approaches can lead to systematic knowledge-base deficits (p. 137).

One result of such knowledge deficits is that students are inclined to draw faulty conclusions about facts or procedures. Self-generated information is likely to be better remembered than passively encoded information, regardless of whether this information is right or wrong (Bransford et al., 1990). As Hirsch (1996) puts it, “Students discover all sorts of things, some of them irrelevant to the purposes at hand and some of them wrong” (p. 134). Brown & Van Lehn (1982) found that children sometimes tend to acquire consistent, stable, but incorrect procedures called “buggy algorithms,” and that they use misconceptions as the basis of their (false) understanding. “This means that self-generated errors cause more subsequent interferences than passively received wrong information” (Weinert and Helmke, p. 137).

In their review of literature on the relative effects of direct and indirect instruction, Weinert and Helmke (1995) concluded that, “Many studies - both in the classroom and in the laboratory under experimental conditions - have shown that instruction in which the teacher actively presents information to students and supports individual learning processes

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is more effective than instruction in which the teacher's only role is to provide those external conditions that make individual or social learning success possible" (Alexander, Rose, & Woodhead, 1992; Brophy, 1979; Rosenshine, 1979; Weinert, Schrader, & Helmke, 1989) (p. 138). Weinert and Helmke (1995) summarize their analysis of direct instruction by saying, "To the extent that knowledge acquisition and academic performance are the goals, teacher-controlled methods of students' active learning are superior - especially for younger students and in well-structured subject domains (p. 141).

According to Driscoll (1994), Ausubel (1961, 1963) characterized the differences between direct and indirect instruction by using the terms "reception" and "discovery" learning. Reception learning is equivalent to direct instruction because, as Ausubel (1961) put it, "the entire content of what is to be learned is presented to the learner in its final form" (p 16). Although discovery learning methods certainly have a place in instruction (e.g., in laboratories or everyday problem solving), Ausubel felt that such methods did not constitute an efficient primary means of transmitting the content of an academic discipline (Driscoll, 1994, p. 115).

The instructional model that serves as the treatment condition in this study uses direct teacher involvement in the choice of subject-matter content, in the choice and provision for learning resources, and in supplementing those resources with lecture. The teachers are also responsible for guiding classroom discussion and structuring the form and content of peer discussion groups.

This study has potential to improve student performance in elementary schools with low socio-economic indicators. Students in such school districts are ideal candidates for direct instruction because direct instruction seems to be most critical for young or inexperienced learners. The younger the students, the less expertise they possess in a particular domain, and the more that learning is self-controlled, the greater the probability
that students’ methods of generalizing will be faulty and that they won’t consciously test their generalizations (Weinert and Helmke, p. 137).

Doyle (1983) agrees that direct instruction in cognitive processes and knowledge structures is probably more appropriate than indirect methods for teaching novices, low ability students, and pupils in the early elementary grades (p. 177). The best method of instruction is therefore determined to a large degree by the amount of background knowledge that a student possesses. According to Doyle, rote learning of inherently meaningful material will typically happen when a student does not have sufficient background or time to construct a semantic representation of the information (p. 164).

Woolfolk (1995) supports the position that young, inexperienced students need the most direct support and structure in the classroom. Citing Rosenshine & Stevens (1986) and Tobias (1982), Woolfolk points out that many methods can be successful when students are knowledgeable about a particular subject, but when students have little prior knowledge, the method makes a difference. Woolfolk writes, “The less students know, the more they need instructional and emotional support, probably in the form of improved materials, help in focusing and sustaining attention, systematic feedback, and explicit teaching or direct instruction, recognition for gains, and encouragement” (p. 468).

Subject-Matter Knowledge

Knowledge Defined

Knowledge can be defined in many different ways. People have knowledge of how to read, spell, and construct sentences. They may know how to start a car and drive it down the road, how to order food at a fast-food restaurant, or how to interpret a football game. At the same time, people possess knowledge about specific occurrences and circumstances. For example, people may have knowledge about important historic events and their dates,
the order of the planets in the solar system, the names of the lines and spaces on a staff of
music, or the answers to addition or multiplication tables. People also have knowledge
about how to accomplish certain tasks such as how to multiply two-digit numbers, how to
program a VCR, or how to paint a room. Finally, people acquire knowledge about
procedures and protocols. Knowing when to apply one procedure and when to apply
another is a way to measure this kind of knowledge. For example, before a painter can
paint, he must know whether the surface to be painted first requires preparation or repair.

Psychologists have created terms that identify various forms of knowledge and that
distinguish one form from another. Three of the most common forms are declarative,
procedural, and conditional knowledge (Ashcraft, 1994; Paris, Cross, & Lipson, 1994;
knowledge is propositional, and refers to “knowing that,” while procedural knowledge
refers to “knowing how” to perform various actions, such as skimming or summarizing a
text (p. 1240). Ashcraft (1994) distinguishes between declarative and procedural
knowledge by saying, “According to this dichotomy, basic facts and conceptual knowledge
are stored in a declarative long-term memory system, whereas knowledge of how to do
something is part of one’s procedural knowledge base (p. 77). Conditional knowledge
involves knowing the rationale for using a particular strategy (Paris, Cross, & Lipson, 1994,
p. 1240).

Knowledge of historical events and their dates, or the knowledge of multiplication
facts are examples of declarative knowledge. Examples of procedural knowledge might
include the proper approach to setting up a mathematical problem, or an effective method for
refinishing furniture. When a painter determines that he must scrape a surface before he
paints it, he is using conditional knowledge.
These various kinds of knowledge interact and overlap. They do not exist separately and independently, but develop and work together to form concepts and mental models of the learner's environment. As knowledge increases, so does the learner's ability to capture and accurately understand new information. Woolfolk (1995) points out that experts in a particular field have a wealth of domain-specific declarative, procedural, and conditional knowledge that applies specifically to their area of expertise. Says Woolfolk, "[Experts] not only have declarative knowledge (facts and verbal information), they also have at their command considerable procedural knowledge, an understanding of how to perform various cognitive activities. And they know when and why to apply their understandings; that is, they have conditional knowledge, so they can manipulate their declarative and procedural knowledge to solve problems" (p. 242).

Knowledge Organized

Schemata  The combination and interaction of declarative, procedural, and conditional knowledge creates mental models that are referred to as schemata. According to Woolfolk (1995) a schema is "a pattern or guide for understanding an event, a concept, or a skill" (p. 251). Doyle (1983) defines a schema as "a relatively abstract representation of objects, episodes, actions, or situations that contain slots or variables into which specific instances can be fit in a particular context" (p. 167). Ashcraft (1994) says that schemata are sometimes represented as "a stored framework or body of knowledge about some topic" (p. 314).

Driscoll (1994) points out that readers use schemata to comprehend what is read, especially when trying to understand specialized literature such as scientific or technical articles. Different areas of specialization require that the reader be familiar with the content
that is associated with that area. As a result, it is necessary for a reader to develop different schemata for various literature genre - newspaper stories, detective fiction, etc..

In all cases, cognitive theory assumes that comprehension and memory are facilitated when learners both know and can access a relevant schema. It is also safe to assume that, when readers undertake a subject entirely new to them, they must acquire a new text schema before comprehension of the content will occur readily (Driscoll, 1994, p. 149). Because schemata have been shown to have a significant effect on reading comprehension, Hirsch (1987) asks the questions, “What sorts of schemata must people acquire to be really literate? And how can these particular schemata be made efficient enough to create good readers?” (p. 57). One purpose of this study is to address these questions as they relate to the Ohio Proficiency Test. What sorts of schemata must students acquire, and how can these schemata be made efficient for application to the reading and citizenship portions of that test?

Hirsch (1987) reasons that if comprehension depends upon shared associations, then in order for readers to integrate phrases into comprehensible meanings, they must already possess specific, quickly available schemata. Hirsch expresses skepticism toward the belief that schools can teach reading, writing, and critical thinking as all-purpose general skills applicable to novel problems. Says Hirsch, “All cognitive skills depend on procedural and substantive schemata that are highly specific to the task at hand. Once the relative knowledge has been acquired, the skill follows. Experts perform better than novices not because they have more powerful and better oiled intellectual machinery, but because they have more relevant and quickly available information” (pp. 60, 61). According to Hirsch, knowing such information is “the decisive skill of reading” (p. 112).
Semantic Knowledge  Closely related to schema is the concept of semantic knowledge. Semantic knowledge may be thought of as a composition of many different schemata. The more elaborate and diverse a person’s schemata, the more that person can make accurate associations when confronting new information. According to Ashcraft (1994) semantic knowledge contains a person’s general world knowledge, including knowledge of language (p. 76). Doyle (1983) underscores the importance of semantic knowledge saying, “From this perspective, the task of learning to read means learning to construct semantic representations of passages” (p. 167).

Semantic memory is conceived to be an all-purpose, permanent repository of generic information, and is usually quite similar across individuals. This is why one person’s concept of a robin is largely the same as another’s, and the same as anyone else’s in the culture and society that they share. Much of what occurs in the classroom is an attempt to build semantic knowledge (Driscoll, 1994). As students learn about the content in one area of study, they automatically draw on their knowledge of related information. Their level of understanding is in this way related to their level of semantic knowledge.

Collins & Quillian (1972) viewed semantic memory as being nodes in a network. In other words, the structure of semantic memory was said to be an interrelated set of concepts, or interrelated body of knowledge. Each concept in the network is represented as a node, a point or location in the semantic space. Furthermore, concept nodes are linked together by pathways, directional associations between concepts. This entire collection - nodes connected to other nodes by pathways - is the network (p. 258).

According to Ashcraft, the major process that operates on this knowledge network is “spreading activation,” the mental activity of accessing and retrieving information from the network (Ashcraft, 1994, p. 259). Says Ashcraft, “A key feature of activation is that it spreads through the network. Each of these simple connections records an elementary fact
or proposition, a relationship between two concepts” (p. 259). In one particularly apt description, “the search continually widens like a harmless spreading plague” (Collins & Quillian, 1972, p. 326).

Scripts  The elements of declarative and procedural knowledge build schema, which in turn combine to form semantic understanding, creating scripts. Ashcraft (1994) defines a script as “the large-scale semantic and episodic knowledge structures that accumulate in memory and guide our interpretation and comprehension of daily experience.” According to Ashcraft, a mental script is a general knowledge structure about ordinary events and situations. In other words, a script is a mental representation of “what is supposed to happen in a particular circumstance” (p. 343). For example, whenever a reader encounters a story, elements of the story trigger, activate, or prime the appropriate script. As a consequence of this, all subsequent events in the story (or events in a real-world experience) are interpreted with reference to the script that is activated in memory (p. 344). “Thus,” says Ashcraft, “comprehension should suffer to the degree that a learner’s current experience mismatches his or her script (p. 346). A rather strong prediction from script theory then is that people’s recall of a story will be influenced not merely by the details that were mentioned, but also by the events and details that were inferred based on scripted knowledge” (Ashcraft, p. 348).

Ashcraft (1994) uses the term “integrative memory tendency” to describe the interaction of existing knowledge with new information. Whether it be considered schemata, semantic memory, or scripts, we use what we already know to understand new information. New experiences become part of our elaborated knowledge structures and continue to assist later cycles of mental processing (p. 326). As Woolfolk (1995) says, “People learn best when they have a good base of knowledge in the area they are studying.
With many well-elaborated schemas and scripts to guide them, new material makes more sense, and there are many possible networks for connecting new information with old” (p. 266).

Knowledge is organized in the mind in such a way that when one topic is considered, it automatically primes a number of other related topics. These associated topics help bring meaning and perspective to the information being considered. Ashcraft (1994) suggests that human concepts are like hooks or nodes in a network from which many different properties hang. The properties hanging from a node are not likely to be all equally accessible; some properties are more important than others, and so may be reached more easily or quickly. Thus, one concept would be a set of interrelationships among other concepts. Says Ashcraft, “Everything is defined in terms of everything else - like a dictionary” (p. 254).

Constructivism  What the learner brings to a learning situation in the form of knowledge, schema, and semantic understanding, determines how new information will be integrated with existing concepts. Because the learner constructs new knowledge based on the integration of new information with previously established understanding, the process is referred to as constructivism.

Mayer (1996) says that the constructivist interpretation of thinking involves an active search for understanding in which incoming experience is reorganized and integrated with existing knowledge (p. 156). Says Mayer, “Currently, the central tenet of the constructivist metaphor is that humans are knowledge constructors” (p. 151). Brown and Campione (1996) refer to constructivism as a “cognitive revolution.” This revolutionary perspective on learning credits learners as active constructors, rather than passive recipients of knowledge (p. 289).
Doyle (1983) explains constructivism by saying, "Modern cognitive psychology has had a major impact on knowledge about the process involved in comprehending texts. A central premise of cognitive science is that comprehension is a constructive process" (p. 166). Anderson et al. (1995) adds, "Currently, the heart of a contemporary psychological perspective is an image of learners as active and social constructors of meaning, and an image of learning as an act of construction through social interaction in many contexts" (p. 145).

King (1994) adds, "Contemporary constructivist theories of learning maintain that when individuals encounter new information, they use their own prior knowledge and personal experience to help them make sense of that new material. During this meaning-making process, individuals may draw inferences about new information, take a new perspective on some aspect of their existing knowledge, elaborate the new material by adding details, and generate relationships between the new material and information already in memory. Each of these procedures helps individuals reformulate the new information or restructure their existing knowledge and thereby achieve deeper understanding" (p. 339).

The constructive mental activity that learners bring to bear when confronted with new information is further explained by psychologists through the concepts of data-driven and conceptually-driven mental processes. Ashcraft (1994) defines data-driven processing as "using only the features and clues in the stimulus, the data in the environment, to identify a pattern" (p. 75). In other words, when a learner cannot access relevant semantic knowledge, he must derive his understanding based solely on the information given. Conceptually-driven processing, on the other hand, is guided by means of the level of knowledge stored in memory. In this circumstance, the learner's existing knowledge helps to modify or clarify the new information. Modern cognitive theory considers much of
learning to be a conceptually-driven process. That is, mental processing is triggered or assisted by internal events, by knowledge the learner already possesses.

Knowledge Applied.

The preceding review of research in cognitive psychology suggests that what a student brings into the classroom in the form of prior knowledge determines to a large extent what that student will take away after instruction. Such studies have revealed that learning is an active process in which the learner organizes and interprets new information based upon preestablished concepts. These concepts are laid down through the learner's personal experiences and prior instruction. Some of that instruction and experience is gathered in informal settings through interaction with family, friends, and other acquaintances within the home and the community. Some of the learner's concepts are a result of personal conclusions based upon what the learner reads, hears, and observes. It is within the school experience, however, that significant formal instruction in subject-matter content affects a learner's knowledge of the world.

Even the simplest acts of human comprehension require vast amounts of knowledge. Ashcraft (1994) points to this stored knowledge as the essential difference between human intelligence and the artificial intelligence of a computer. The difference is in the amount of background knowledge that humans apply to learning situations. Ashcraft says, "For computers to understand, answer questions, or paraphrase, they need to have this kind of knowledge base. It [isn't] enough to have dictionary definitions of words. Computers need to have extensive knowledge of the world in order to understand even simple sentences. This is often referred to as tacit knowledge, the implied but not stated knowledge that is necessary to understand what is stated or mentioned" (p. 255).
Thus, it seems appropriate to consider instruction in subject-matter content as an important element in the teaching and learning process. This sort of instruction is particularly vital to schools where the students do not readily acquire subject-matter knowledge through the informal setting of the home or community. Pearson and Johnson (1978) contend that a large number of studies show an association between income, socio-economic status, and academic achievement. These authors regard comprehension as a "direct function of prior knowledge," and attribute students whose parents help them understand and interact with the world as having an advantage in learning to read (p. 18).

Knowledge acquired prior to schooling or outside of class interacts with the knowledge taught in school and contributes to both original learning and retention (Semb & Ellis, 1994, p. 259). Driscoll (1994) claims that children who perform poorly in school relative to their classmates often have different cognitive structures owing to the differences in their life experiences and prior learning. This means that some learning tasks are likely to exceed the cognitive readiness of these children. What should be done about it? According to Driscoll, the basic principles underlying appropriate teaching strategies are essentially the same, regardless of who the learners are. Because students must be able to access appropriate background knowledge before they can begin to interact with a given domain of learning, it is necessary for the teacher to first ascertain the cognitive structures of her learners, and then teach accordingly in order to extend that structure to desired limits (Driscoll, p. 125).

Driscoll (1994) says that research on the process of problem solving has shown that when learners lack relevant prior knowledge, they may be forced to use general problem solving strategies rather than specific, schema-based ones. This leads to inefficient, often unsuccessful solutions to problems (p. 152). Alexander, Kulikowich and Schulze (1994) refer to the important role of prior knowledge as a "generalization [that] has been
repeatedly supported in the research on cognition and instruction conducted during the past 2 decades” (p. 314). This generalization states that what individuals already know (i.e., prior knowledge) exerts a powerful influence on what they will come to know.

The research emphasizes that children’s learning must be viewed as transforming significant understanding that they already have, rather than as simple acquisitions written on blank slates (Greeno, Collins, & Resnick, 1997). Prior knowledge is so highly regarded as a decisive factor in a student’s ability to learn new information that Greeno et al. say that a child’s “understanding in the domain of concepts of a subject matter provides a more important guide for the organization of curricula and teaching than does the stage they have reached in developing their general operational abilities in reasoning.” Furthermore, the authors suggest that schools may be guilty of over-emphasizing the development of cognitive skills isolated from knowledge in a specific domain of learning (p. 18).

Pearson and Johnson (1978) identify three distinct systems that children must master in order to learn to read. These are the phonological system (knowledge of sounds in the language), the syntactic system (the orderly arrangement of words in sentences), and the semantic system (knowledge of word meanings and relationships among words). Of the three systems, these authors identify the semantic system as most vital saying, “The closer the match between the syntactic and semantic information on a page of print and syntactic and semantic information in our heads, the greater the likelihood we will understand the text” (p. 12). In other words, “reading is easier when the reader can understand the message” (p 12). Driscoll (1994) also indicates that it is semantic understanding that most concerns educators, saying, “Generally, what is supposed to be learned in school, or indeed in any instructional situation, is semantic in nature” (p. 87).

The reason that semantic knowledge is so important is because it has such profound influence on the learner’s understanding of new information.
Pearson and Johnson (1978) believe that there is a relationship between skills in reading comprehension and general comprehension skills. They offer two principles about the association between reading comprehension and general thought processes. First, they contend that, "whatever influences general thinking or problem-solving ability also influences reading comprehension," and second, "there are few factors that influence reading comprehension but do not influence thinking or problem solving" (p. 9).

According to Paris et al., (1984), recent research on cognitive development and reading instruction demonstrates that young children, beginning learners, and poor readers can profit greatly from instruction that enhances the use of background knowledge, cognitive strategies, and metacognition. For example, Recht and Leslie (1988) conducted a study to determine whether prior knowledge or reading expertise had more effect on recall. Using baseball as the topic, these researchers found that readers with high prior knowledge of baseball were more able to sort sentences into categories of high, medium, and low importance that were like the sorting decisions of the experts than were readers with little knowledge of baseball (p. 19). Similar research on recall has been done with chess (De Groot, 1946), bridge (Charness, 1979), computer programming (Adelson, 1981), and electronics (Egan & Schwartz, 1979).

Hirsch (1987) points to the work of Bransford and Johnson (1972) as an example of how readers use relevant prior knowledge to form a model for sentence structure. Explains Hirsch, "[Bransford and his colleagues] used a passage written in language so general and vague that, in the absence of a context, it was difficult to construct a mental model from it. But if the passage was given a title that invoked relevant prior knowledge, subjects constructed a mental model that enabled them to understand and remember the sentences. The passage began:
The procedure is actually quite simple. First you arrange the items in different groups. Of course one pile may be sufficient depending on how much there is to do. If you have to go somewhere else do to lack of facilities that is the next step; otherwise you are pretty well set (p. 40).

Some subjects were given the title "Washing Clothes" before they read the passage, some were given it after, and some were not given it at all. Only the group who had been given the title before they started to read could recognize sentences from the passage. The title enabled them to integrate the sentences into a mental model that they constructed from prior knowledge about washing clothes (Hirsch, p. 40).

Instruction in subject-matter knowledge is sometimes portrayed as little more than creating a bank of facts, suitable for short-term recall, but readily forgotten and useless as a key to long-term understanding. Such a perspective is simplistic and understated. Woolfolk (1995) says that knowledge is the major individual difference that affects long-term memory. When students have more domain-specific declarative and procedural knowledge, they are better at learning and remembering material in that domain. Woolfolk offers the following example, "Think what it is like for you to read a very technical textbook in an area you know little about. Every line is difficult. You have to stop and look up words or turn back to read about concepts you don’t understand. It is hard to remember what you are reading because you are trying to understand and remember at the same time. But with a good basis of knowledge, learning and remembering become easier; the more you know, the easier it is to know more. This is true in part because having knowledge improves strategy use" (p. 264).

Background knowledge is so vital that Ausubel (1963), considered it to be a central tenant to his research on thinking and learning. Driscoll (1994) claims that Ausubel’s entire theory and research program were predicated on the premise that prior knowledge is the most significant determinant of what new learning will occur (Driscoll, 1994, p. 113).
Ausubel et al. (1978) developed a teaching procedure that is designed to facilitate this priming phenomenon. Ausubel proposed that teachers begin each lesson with an "advanced organizer." According to Ausubel, advanced organizers are "relevant and inclusive introductory materials, provided in advance of the learning materials, that serve to bridge the gap between what the learner already knows and what he needs to know before he can meaningfully learn the task at hand" (pp. 171-172). In other words, the advanced organizer activates the learner's organizational system in such a way as to bring all relevant information stored in mind to bear on the subject at hand. Obviously, learners must have necessary prior knowledge for the organizer to activate, and the organizer must draw explicit connections between old and new topics (Driscoll, 1994, pp. 127, 129).

Ausubel (1963) also proposed the notion of anchoring ideas. Anchoring ideas are the specific, relevant ideas in the learner's cognitive structure that provide the entry points for new information to be connected. They are what enable the learner to construct meaning from new information and experiences that are only potentially meaningful. Driscoll (1994) provides the following examples: "If you know nothing whatever about banks, to have someone talk about characteristics of checking accounts would be quite meaningless to you. You would have no anchor with which to connect the new information. Likewise, making sense of a sentence such as, "The notes were sour because the seams split," (Bransford, 1979), is difficult to understand without the anchoring idea, bagpipe" (Driscoll, 1994, p. 114).

Driscoll (1994) says that Ausubel (1963b) and Ausubel et al. (1978) emphasized readiness as a function of previously acquired subject matter knowledge. According to Driscoll, "If Ausubel had to reduce all of educational psychology to just one principle, [he] would say this: The most important single factor influencing learning is what the learner already knows. Ascertain this and teach him accordingly" (p. 124). According to Ausubel
et al. (1978), the cognitive organization of children differs mainly from that of adults in containing fewer abstract concepts, fewer higher-order abstractions, and more intuitive-nonverbal than abstract-verbal understandings of many propositions” (p. 140). Because children naturally begin without a broad base of subject-matter knowledge, they have a greater reliance during learning on concrete-empirical experience. One important aspect of early childhood education should therefore include exposure to the people, places, events, and ideas that characterize particular domains of study.

Knowledge Acquired

Tasks associated with subject-matter knowledge are recalling and recognizing instructional content, and responding orally or in writing. Cognitive skills involve tasks such as problem solving, concept identification, analysis, comprehension, rule using, diagnosis, prediction, explanation, and classification (Semb & Ellis, 1994, p. 267). At what point is the learner ready to begin wrestling with learning strategies and problem solving skills? The answer may be related most closely to the level of knowledge that the learner has about a given area of study.

Some critics view an emphasis on subject-matter knowledge as contradictory to the development of cognitive skills. Those who hold this view assume that time spent learning subject-matter content reduces the opportunities that students have to engage in critical thinking and problem solving activities. In a similar way, such critics attack direct instruction as a method that is limited to lower-level objectives, that it is based on traditional teaching methods that ignore innovative models, and that it discourages students’ independent thinking (Woolfolk, 1995 p. 470).

Such critics point out that learners are not empty vessels to be filled with content knowledge. The assumptions students make, their beliefs, and their experiences, shape what
each of them comes to know about the world. Different assumptions and different experiences lead to different knowledge. When students come to the classroom, they may already possess knowledge and beliefs about content to be learned. These preconceptions form a filter through which new information is processed and understood.

However, students must have a level of familiarity with subject-matter content before they can accurately engage in critical thought about that subject. Doyle (1983) maintains that domain-specific knowledge plays a central role in problem-solving and learning within a content area (p. 167). Says Doyle, “Studies suggest strongly that performance on academic work, especially in technical subject-matter areas, depends on domain-specific knowledge rather than general problem-solving strategies alone” (p. 168). Thus, one purpose of instruction in subject-matter content is to equip students with the background knowledge that is relevant and necessary for discussion and problem solving within the specific domains of study. Students may or may not have acquired some of this background information on their own outside the classroom, but such knowledge can not be assumed. In order to insure that certain essential background information is held in common, all students must be given an opportunity to explore that information. Content knowledge is not an end in itself, but rather a necessary component of the thinking and learning process within the identified subject areas.

Doyle (1983) goes on to say, “Accomplishing academic tasks is not solely a matter of general cognitive processes. Especially in the upper grades, students need domain-specific knowledge in a discipline to do academic work” (p. 178). Instruction in subject matter content is not undertaken solely for the purpose of filling young minds with facts. It is undertaken because students need facts and concepts in order to understand the perspectives of those who are well-acquainted with a given field of study. Students who are conversant in a domain of study are more capable of forming logical conclusions or
conducting reflective analysis. As Bruner (1966) says, "To instruct someone in [the] disciplines is not a matter of getting him to commit results to mind. Rather, it is to teach him to participate in the process that makes possible the establishment of knowledge. We teach a subject not to produce living libraries on that subject, but rather to get a student to think mathematically for himself, to consider matters as an historian does, to take part in the process of knowledge-getting" (p. 72).

When children are trained primarily in learning strategies and problem-solving skills to the exclusion of subject matter knowledge, they are left on their own to fill important knowledge gaps. While there are advantages to so-called "discovery learning," children without adequate background knowledge in a subject area should not be left to guess about which information is important, and which information is not. Says Driscoll (1994), "Their information gathering lacks connectivity and organization and, as a result, their ability to solve problems is deficient. By contrast, those who demonstrated a connectionist approach were systematic and organized in collecting information that would help solve the problem" (Driscoll, p. 214). Bruner adds, "Discovery, like surprise, favors the well-prepared mind" (Bruner, 1961, p. 22). In order to solve any problem, learners must determine what variables are relevant, what information should be sought about those variables, and, when the information is obtained, what should be done with it. In large measure, doing this easily depends on prior knowledge of a range of phenomena, or in Bruner's (1961) words, sheer "knowing the stuff" (p. 22).

As teachers attempt to move their students through the stages of learning from novice to expert, it appears that a solid base of subject-matter knowledge is a necessary component of instruction. Woolfolk (1995) says, "If students don't have the essential prior knowledge (schemas, skills, etc.), the load on working memory will be too great. In order to compose a poem in a foreign language, for example, you must know some of the
vocabulary and grammar of that language, and you must have some understanding of poetry forms. To learn the vocabulary, grammar, and forms as you also try to compose the poem would be too much” (p. 269, 270).

Recht and Leslie (1988) reported that a review of reading research indicates that prior knowledge of a topic increases the amount of information that adults (Chiesi, Spilich, & Voss, 1979; Steffensen, Joag-Dev, & Anderson, 1979) and children (Pearson, Hansen, & Gordon, 1979; Taft & Leslie, 1985) recall from text on that topic (Recht & Leslie, 1988, p. 18). Such research has led Hirsch (1987) to the conclusion that schools should do a better job of identifying and transmitting subject-matter knowledge to their students. As an example, Hirsch draws attention to the work of Omanson, Warren, and Trabasso (1978) who discovered that differences in reading ability between five-year-olds and eight-year-olds are caused primarily by the older children’s possessing more knowledge, not by differences in their memory capacities, reasoning abilities, or control of eye movements.

Hirsch cites similar work by Pearson, Hanson, and Gordon (1979) that shows that, among seven-year-olds who score the same on reading and IQ tests, those who have greater knowledge relevant to the text at hand show superior reading skills. Says Hirsch, “In one experiment, equally talented second-graders were tested to find out how much they knew about spiders. Those who knew a little about them were much better readers of a story involving spiders than were the other children even though the story contained no special concepts or difficult words. One might be tempted to say that these results are predictable and obvious. Nevertheless, educators have not acknowledged or acted on the implications of such results” (Hirsch, p. 48).

This study will attempt to act on the implications of such research by emphasizing subject-matter content as a necessary component of the teaching and learning process. The relevant subject matter content is described in the content maps provided to the treatment
groups. These content maps, specific to the reading and citizenship portions of the Ohio Proficiency Test, will serve as the basis for direct instruction by teachers, and for classroom discussion between and among students and their teachers.

**Cognitive Skills**

Nuthall and Alton-Lee (1990) point out that what takes place in the classroom in the form of lecture or activity is only indirectly related to the learning processes that take place in the minds of the students. The goal of direct instruction in cognitive strategies is partly to insure that what the teacher intends to be happening in students' minds, is in fact happening. As Nuthall and Alton Lee put it, "The observed activities and behaviors are the visible and interpersonal means by which teachers and pupils cross the gap between each other's consciousness and engage each other's thinking and learning processes (p. 565).

For young children and beginning learners, other people often provide both metacognitive knowledge and direction. Teachers typically tell children about the task and provide sufficient guidance so that they can complete it. Paris et al., (1984) credit the success of training programs such as those by Palinscar and Brown (1984) and Day (1980) for students' adopting the roles and cognitive activities of teachers (p. 1241).

The second part of the instructional model prescribed in this study is direct instruction in cognitive skills. This direct instruction is accomplished primarily through the use of structured questions that are derived from the outcomes of the reading and citizenship portions of the Ohio Fourth-Grade Proficiency Test. A review of the literature shows that use of such structured questions has proven to be useful in strengthening students' cognitive skills (Brown & Campione, 1996; Collins, Brown, & Holom, 1991; Day, 1980; King, 1990, 1994; Lewis & Mayer, 1987; Palinscar and Brown, 1984: Paris, Cross, & Lipson, 1994: Schuder, 1993).
Structured questions have been used to focus and direct large and small-group discussion in the classroom. Woolfolk (1995) points out that group discussion is in some ways similar to recitation. The teacher may pose questions, listen to student answers, react, and probe for more information. But in a group discussion, the teacher does not have an exclusive or dominant role. Students ask questions, answer each other’s questions, and respond to each other’s answers. One of the disadvantages to student-led discussions is that they are often unpredictable and may digress into topics that are unrelated or irrelevant to the topic of study. In addition, some members of the group may be unsure of how to participate, and may be too embarrassed to risk offering their opinions or questions (p. 489).

The use of structured questions serves to guide student conversation and insures that they do not drift off topic or lose focus on stated learning objectives. Structured questions provide direction for student groups and help to minimize the problems associated with student-led discussions. Students and teachers alike are trained to use these questions as prompts to student thinking, and as the basis for the kinds of responses students make in the classroom. Structured questions provide guidance, keeping students on topic, and clarifying expectations about their participation. The following studies have employed structured questions similar to those prepared for use in this study:

Reciprocal Teaching

Palinscar and Brown (1984) selected four cognitive skills that could be engaged in by novice learners and then provided direct instruction on the selected skills. Students were trained in the skills of summarizing, questioning, clarifying, and predicting. Palinscar and Brown indicate that in the absence of such training, students cannot adequately summarize a typical fifth-grade academic text until well into their high school years. The need for
explicit instruction in comprehension-enhancing activities is particularly acute in the slow-
learning student. Academically delayed, remedial readers may not have mastered this ability
by the time they reach junior college (p. 121).

Their procedure, named reciprocal teaching by the researchers, required the teacher
and students to take turns leading a dialogue concerning sections of a given text. Teachers
and students generated questions, summaries, and predictions, and clarified misleading or
complex sections of the text. Initially, the teacher assumed responsibility for modeling both
questions and answers. Over time, as students became more proficient at these activities,
more responsibility was vested in students and in student-led groups. According to the
authors, in the initial stages, half of the questions produced by the students were judged as
non-questions or as needing clarification; however, by the end of the sessions, unclear
questions had dropped out and were replaced with questions focusing on the main idea of
each text segment (p. 125).

For example, during the first half of training, students made the following attempts
at generating summaries:

Student Summary: “It’s about the coral snake. It’s about how
long the coral snake is and the western coral snake. And the next,
they’re harmful, except for fangs are too short to go through heaving
clothes or shoes.” (Teacher Summary: “This paragraph describes
the physical characteristics of the common and western coral
snakes.”)

Student Summary: “It’s about like the full-grown spider, when
it wants to travel it has to use all eight legs and the much younger
ones have to use posts, bushes, and fence posts, and posts, and leaf
stems. And it tells you like when the wind blows how the young
spiders hold on to their streamers.” (Teacher Summary: “This
paragraph describes two methods by which spiders travel from one
location to another.”) (p. 136)

By the second half of their training sessions, student summaries were much more
like those being modeled by their teachers:
As a result of the training they received on the specific skills of summarizing, questioning, clarifying, and predicting, students who participated in this study responded by performing more like their adult models and becoming better able to take their turn as discussion leaders and role models. State the authors, “Main idea questions and summaries came to predominate, inventions in their own words replaced verbatim selections from the text, and incomplete, unclear, and detailed responses dropped out” (p. 156).

**Question Stems**

King (1990) developed a model that featured the use of question stems designed to prime student thinking. The question stems in King’s study are based on the application, analysis, and evaluation levels of Bloom’s taxonomy of thinking (p. 667). These stems were used in conjunction with a reciprocal peer-questioning procedure. According to King, the question stems were intended “to structure group discussions so as to encourage elaborated responses (and thereby discourages low-level elaboration responses), to control the effectiveness of peer responses, and to reduce the possibility of no response” (p. 681).

King (1990) credits the use of question stems with leading students to think at a higher level of analysis, and in a mindset consistent with the stated learning objectives. Questions generated by the stems forced the students to think about the material in specific ways, depending on the form of the stem. Says King, “It should be noted that it is not the reciprocal peer-questioning and responding procedure per se that accounts for the effects obtained, it was the question stems that actually elicited the high level of thinking observed.
in these groups. Thus, the question stems not only affect the quality of questions asked but also improve the quality of responses given, and, in doing so, influence the cognitive processing of the explainer" (p. 681). King (1990) concluded that the question stems “seem to provide the guidance that students apparently need to generate effective questions in a consistent manner” (p. 680). The most important finding was that memory of facts was greatly improved when students answered “why” questions about the pieces of information (p. 113). King states that this model is an appropriate one for use in teacher-led expository lessons in elementary classrooms (p. 683).

One advantage to the use of question stems was that the students were forced into a deeper analysis of the text. According to King (1990), without the guidance of the stems, students tend to ask more recall-type questions (p. 680). In addition to high-level elaborative responses, students who employed the question stems were less inclined toward interaction found to be detrimental to learning, and the achievement of the guided questioners was superior to that of students who did not use the stems (p. 680).

The reciprocal peer questioning is consistent with Palinscar and Brown’s (1984) model of reciprocal teaching. At one time students use the question stems to elicit responses from their peers or teacher, and at another time those roles are reversed.

Guided Cooperative Questioning

King (1994) developed a similar model of instruction based on a cognitive strategy known as guided cooperative questioning. In guided cooperative questioning, students use a set of thought-provoking question stems such as “What are the strengths and weaknesses of...?” “What would happen if...?” and “Why is...important?” to generate their own specific questions on the material being studied. Then in small groups or pairs they pose their questions to each other and answer each others’ questions (p. 340).
Results of King’s (1994) studies showed that students using guided cooperative questioning “performed better on comprehension of the material than did comparison students who simply discussed the material, used unguided cooperative questioning, used cooperative questioning with less-elaborated stems, or used similar questions generated by other students” (p. 340).

The format of the questions helps the learners to generate specific kinds of questions and prompts them to think about and discuss the material in specific ways, such as comparing and contrasting, inferring cause and effect, noting strengths and weaknesses, evaluating ideas, explaining, and justifying. The result, according to King (1994), is that during discussion the learners tend to make the same kinds of connections among ideas (King, 1994, p. 340).

Results of this study indicate that when children use questions that guide them to connect ideas together within a lesson or connect the lesson to their prior knowledge, they engage in complex knowledge construction which, in turn, enhances learning; and these learning effects are stronger for questions that connect to prior knowledge (King, 1994, p. 358).

Informed Strategies for Learning

Paris, Cross, and Lipson (1984) designed a project to increase children’s metacognition and use of reading strategies. Their instructional program was designed to teach children how, when, and why to use various comprehension strategies so that they could become self-directed, independent readers (p. 1241). Say the authors, “Our comprehension instruction was designed to stimulate greater awareness of declarative, procedural, and conditional knowledge while also teaching children how to evaluate, plan, and regulate their own comprehension in strategic ways. For this reason we labeled it
Informed Strategies for Learning (ISL)” (p. 1241). ISL provides conceptual information about reading strategies directly and explicitly to children in the classroom as an adjunct to their regular reading curriculum (p. 1242). The model is based in part on instructional strategies identified by Brown, Palinscar, and Armbruster (1984). Those strategies are: understanding the purpose of reading, activating relevant background knowledge, allocating attention to main ideas, critical evaluation, monitoring comprehension, and drawing inferences. ISL included all of these strategies plus others.

As with Palinscar and Brown’s (1984) study on reciprocal teaching, one critical feature of ISL is group discussion. According to Paris et al., class participation is essential because it “makes thinking public.” In other words, teachers and students share their views of texts, levels of meaning, strategies, problems, and attitudes about reading (p. 1250).

Problem Representation in Mathematics

Lewis and Mayer (1987) and Lewis (1989) developed models for teaching problem representation in mathematics. The premise for their studies was that incorrect word problems may be accounted for by students’ “performing correct arithmetic computations on incorrect representations of the problem” (p. 364). Lewis and Mayer hypothesized that “the problem solver comes to the problem-solving task with a set of schemata or preferences for the form of assignment and relation statements in compare problems. When the form of the relational sentence actually presents conflicts with the problem solver’s schema, the solver must rearrange the presented information - a process that may lead to representational errors” (p. 370). Their models were designed to eliminate these representational errors by providing students with a cognitive model for problem representation.
Students Achieving Independent Learning

Schuder (1993) developed a model titled *Students Achieving Independent Learning* (SAIL). The centerpiece of SAIL is explicit instruction in learning strategies (p. 196). The learning strategies in Schuder’s model were embedded in the traditional organization of reading/listening instruction. Says Schuder, “We hoped to get, for the first time, genuine instruction in processes that stimulate and foster comprehension and other covert cognitive processes while students are in the act of constructing and evaluating interpretations of text” (Schuder, p. 188).

Summarizing Text

Day (1980) taught community college students how to summarize text. She concluded that “explicit training in strategies for accomplishing a task coupled with routines to oversee the successful application of those strategies is clearly the best approach” (p. 1240).

Guided Discussions and Directional Questions

Pearson and Johnson (1978) contend that reading comprehension can be taught directly through modeling of comprehension processes by teachers, through the use of guided discussions that feature important comprehension strategies, and through directional questions that focus student thinking toward desirable thought processes (p. 4).

Cognitive Apprenticeship

Collins, Brown, and Holum (1991) designed their *Cognitive Apprenticeship* model in a manner similar to Palinscar and Brown’s (1984) study using reciprocal teaching. The basic method of reciprocal teaching is to model and coach students in four strategic skills:
formulating questions based on the text, summarizing the text, making predictions about what will come next, and clarifying difficulties within the text. It is called reciprocal teaching because the teacher and students take turns playing the role of teacher. The Cognitive Apprentice model takes a slightly different approach emphasizing instruction in four dimensions of the learning environment: content, method, sequence, and sociology (p. 42).

For each of the four dimensions, Collins et al., have developed a number of specific prompts, designed to aid students in their planning. These prompts, which are similar to the suggestions made by the teacher in reciprocal teaching, suggest specific lines of thinking for students to follow (p. 38).

Fostering Communities of Learners

Brown and Campione (1996) developed a model of direct instruction in thought processes that they call Fostering Communities of Learners (FCL). The model was developed for inner city elementary schools, and is designed to promote the critical thinking and reflection skills such as reading, writing, argumentation, technological sophistication, and so forth.

Brown and Campione (1996) suggest that instruction in content knowledge should support diversity, that is, it should afford students with multiple talents and learning styles. In order to accomplish this, the authors recommend the use of many and varied teaching tools and resources. Say the authors, “We provide materials that demand reading, from children’s books and magazines all the way up to college textbooks, field guides, National Geographic, and encyclopedias. Most students can find some text that they can read. Similarly, we provide non-textual materials such as videos, CD-ROMs, and illustrations” (p. 313).
In order to equip students with the requisite knowledge base, Brown and Campione (1996) designed “benchmark lessons.” These lessons focus on the subject-matter knowledge that the students must have in order to engage in higher level discourse and analysis. Because the authors perceived that elementary school teachers are rarely subject-area specialists, they recommended a procedure of providing a subject-area specialist to work with the teacher to develop units and subtopics, to select a variety of research materials and artifacts, and to deliver occasional benchmark lessons. Noting that the teachers were often as much in need of background knowledge as were the students, Brown and Campione felt that the benchmark lessons would add the extra benefit of professional development. “With increasing exposure to the visitor’s lessons,” note the authors, “the classroom teachers learn more about the content area and increasingly take over responsibility for the benchmark lessons” (p. 299).

Brown and Campione emphasize that topics presented for student study and classroom discussion are not to be presented arbitrarily or at unspecified levels of sophistication, but each lesson should be based on a deepening knowledge of that topic, critically dependent on past experience and on the developing knowledge base of the child. Say the authors, “It should matter what the underlying principles are at, say, kindergarten and grade two; it should matter that the sixth-grade students have experienced the fourth-grade curriculum” (p. 307).

In order to promote social interaction, the FCL model requires that students engage in independent and group research on some aspect of a topic of inquiry, mastery of which is ultimately the responsibility of all members of the class. This requires that they share their expertise with their classmates. This sharing is further motivated by some consequential task or activity that demands that all students have learned about all aspects of the joint topic. According to the authors, “This consequential task can be as traditional as a test or
quiz, or some nontraditional activity such as designing a ‘biopark’ to protect an endangered species (p. 294).

**Academic Tasks**

Doyle (1983) recommended shaping students cognitive processes through the use of selected academic tasks. According to Doyle, students will learn what a task leads them to do (p. 162). They will acquire information and operations that are necessary to accomplish the tasks they encounter. The students’ first step is to acquire information - facts, concepts, principles, solutions - involved in the particular task that is accomplished. Second, the students practice operations - memorizing, classifying, inferring, analyzing - used to obtain or produce the information demanded by the task. Thus, knowing the task students are working on gives access to the kinds of cognitive processes that are likely to be necessary to accomplish the task.

Doyle (1983) points to a relationship between tasks assigned and the kinds of problem-solving strategies that students developed as a result of performing those tasks. Says Doyle, “It is clear that pupils used problem-solving strategies that were consistent with the way in which each method defined the reading task” (p. 161).

The need for diverse and varied instructional resources is emphasized by Doyle (1983) who writes, “Classroom studies indicate that teachers often rely on instructional materials to carry the academic task system: Students spend a good deal of their time working on exercises and reading passages from textbooks and workbooks. Thus, academic work is defined in large measure by commercially-prepared materials” (p. 187).
Summary

Research studies show that direct instruction can be an effective teaching technique, especially when teaching young, inexperienced learners. Therefore, it is reasonable to conclude that elementary students in schools with a history of poor academic performance would benefit from the use of direct instruction in the classroom. This direct instruction should include both subject-matter content and cognitive skills.

Studies in cognitive psychology suggest that students must have knowledge of the facts, ideas, relationships, and concepts which constitute the subject-matter content in a domain of study. The literature reviewed here suggests that direct instruction in subject-matter content will improve students’ reading comprehension and increase their ability to acquire, organize, and use their knowledge in new learning situations. This study applies those findings by identifying the subject-matter content related to the reading and citizenship portions of the Fourth-Grade Ohio Proficiency Test, and prescribing that content as an instructional goal.

A review of the literature also shows that, depending upon the kinds of questions they are required to answer or the kinds of tasks they are asked to perform, students’ cognitive skills can be sharpened and focused in specific ways. The studies reviewed here suggest that effective techniques designed to teach cognitive skills can be used to address specific skill-based instructional objectives. This study adopts an instructional approach which combines direct instruction in subject-matter content and cognitive skills in an effort to improve the performance of students on the reading and citizenship portions of the Ohio Fourth-Grade Proficiency Test.
CHAPTER 3

METHODOLOGY

Subjects

Treatment Subjects

The participants selected for this study were 66 fourth graders, enrolled in three different classrooms at one school in Southeastern Ohio. The students are taught by three different teachers in self-contained classrooms. Over the last three years, students in this school district have scored below the average of the total population of Ohio fourth graders in regard to their corporate test performance. For example, a three-year average of scores in the district of study shows that 35% of the students scored at a proficient level in citizenship, and 28% were proficient in reading. These scores compare with the state average of 61% and 53.5% respectively. The school district of study has a higher proportion of economically disadvantaged students (17.1%) than the state average (15.9%); a lower median household income ($18,884) than the state average ($24,431); and a lower total annual spending per pupil ($5,500) than the state average ($5,939).

Control subjects

Two different levels of control were used. The first level of control was students matched to the district of study according to the similarity of their school district. The school district of study is rated by the Ohio Department of Education according to its similarity to other school districts in the state of Ohio. The determination of this rating is
made on the basis of Average Daily Membership (ADM), percent of students receiving Aid to Dependent Children (ADC), percent of the population in professional occupations, median income of the population, the percent of the population with a college education, percent of agricultural property, percent of mineral property, population density, non-residential and non-agricultural valuation per pupil, and cost of doing business. The school district of study was also compared to other districts in regard to a three-year average of proficiency test scores. On the basis of these characteristics, 95 students were selected from a similar district to serve as the first level of control.

The second level of control was fourth-grade students whose individual scores on the Ohio Proficiency Based Assessment (OPBA), taken during their third-grade year, match exactly with those of the students in the district of study. In addition to the Ohio Proficiency Test, Ohio schools must adopt an additional standardized test for elementary and middle school students at grade levels other than those at which the Proficiency Test is given. Some districts choose the Ohio Proficiency-Based Assessment (OPBA) for this purpose.

The Ohio Proficiency-Based Assessment is similar to, but not the same as, the Ohio Proficiency Test. The OPBA is published by McGraw-Hill, and is designed to reflect the Ohio Proficiency Test in format (both tests include sections on writing, reading, citizenship, math, and science), question presentation (both tests use multiple choice, short answer, and extended response questions), and method of scoring (both tests give greater weight to extended response answers than to multiple choice answers). The OPBA reports student test performance using raw scores and a locally-determined standard for proficiency. On the basis of raw scores, 66 students were randomly selected from two surrounding school districts and matched to the students in the treatment groups to serve as the second level of control.
The district of study and the control groups are representative of school districts whose students do not meet the proficiency standard of the fourth-grade test. They are not representative of those school districts where the students exceed the state average and/or meet the minimum corporate expectation of 75% proficient, as determined by the Ohio Department of Education. The districts selected are appropriate for this study because the treatment prescribed is intended to meet the need of improved student scores on Ohio Proficiency Test outcomes.

Tasks and Materials

The curriculum used by both the experimental and control groups in this study is described by the Ohio *Model Competency-Based Language Arts Program* (1996) and the *Social Studies: Ohio's Model Competency-based Program* (1994). According to the Ohio Department of Education (1994, 1996) these models are intended to facilitate student achievement along five broad performance objectives:

1. Coherence of Knowledge. Students should be able to demonstrate the connectedness of concepts and an ability to access interrelated chunks of information. Student understanding should be demonstrably integrated and structured.

2. Reasoned Decision Making. Students should demonstrate an underlying thought process needed to make decisions rather than the surface features of a task.

3. Knowledge Use. Students should know the conditions that mediate the use of knowledge.

4. Automized Skills. Students should integrate basic component skills into total performance.
5. Metacognitive or Self-Regulatory Skills. Students should be able to monitor their own understanding, use strategies to make questions comprehensible, evaluate the relevance of accessible knowledge, and verify their own conclusions (p. 5).

The Ohio Fourth-Grade Proficiency Test in Reading

The Ohio Fourth-Grade Proficiency Test outcomes in reading are derived from Ohio's Model Competency-Based Language Arts Program (1996) and are identified in the Fourth-Grade Proficiency Tests: Information Guide (1995). The items on the reading test are based on fiction, poetry, and non-fiction reading selections. Reading selections that appear in the test come from published sources and may include poetry, essays, short stories, novel/book excerpts, plays, pamphlets, instruction booklets, and newspapers and magazine articles. The actual subject-matter, topics, or titles of these fiction, poetry, and non-fiction selections are not revealed in the outcomes of the test or in the description of the test which is contained in the Fourth-Grade Proficiency Test Information Guide. The objectives of the Ohio Fourth-Grade Proficiency Test in Reading are as follows:

STRAND I - CONSTRUCTING MEANING WITH FICTION SELECTIONS

Given a fiction/poetry text to read silently, students will demonstrate an understanding of language and elements of fiction/poetry by responding to items in which they:

1. Summarize the text.
2. Use graphic aids (for example, a table or graph) or illustrations to locate or interpret information.
3. Demonstrate an understanding of text by retelling the story or poem, in writing, in own words.
4. Identify and interpret vocabulary (words, phrases, or expressions) critical to the meaning of the text.
STRAND II - EXAMINING/EXTENDING MEANING WITH FICTION SELECTIONS

Given a fiction/poetry text to read silently, students will demonstrate an understanding of language and elements of fiction/poetry by responding to items in which they:

5. Analyze the text, examining, for example, actions of characters, problem/solution, plot, or point of view.

6. Infer from the text.

7. Compare and/or contrast elements such as characters, setting, or events.

8. Respond to the text.

9. Choose materials related to purposes, as evidenced in part by the capacity to
   a) choose or identify reference resources to locate specific information;
   b) select fiction and nonfiction materials in response to a topic or theme;
   c) choose appropriate resources and materials to solve problems and make decisions.

10. Demonstrate an understanding of text by predicting outcomes and actions.

STRAND III - CONSTRUCTING MEANING WITH NONFICTION SELECTIONS

Given nonfiction text to read silently, students will demonstrate an understanding of language and elements of nonfiction by responding to items in which they:

11. Summarize the text.

12. Use graphic aids (for example, a table or graph) or illustrations to locate or interpret information.

13. Demonstrate an understanding of text by retelling the information, in writing, in own words.

14. Identify and interpret vocabulary (words, phrases, or expressions) critical to the meaning of the text.

STRAND IV - EXAMINING/EXTENDING MEANING WITH NONFICTION SELECTIONS

Given nonfiction text to read silently, students will demonstrate an understanding of language and elements of nonfiction by responding to items in which they:

15. Discern major ideas and supporting ideas.

16. Analyze the text, examining, for example, comparison and contrast, cause and effect, or fact and opinion.
17. Infer from the text.

18. Respond to the text.

19. Choose materials related to purposes, as evidenced in part by the capacity to
   a) choose or identify reference resources to locate specific information;
   b) select fiction and nonfiction materials in response to a topic or theme;
   c) choose appropriate resources and materials to solve problems and make
decisions.

20. Demonstrate an understanding of text by predicting outcomes and actions.

The Ohio Fourth-Grade Proficiency Test in Citizenship

The Ohio Fourth-Grade Proficiency Test outcomes in citizenship are derived from Ohio’s Model Competency-Based Social Studies Program (1994) and are identified in the Fourth-Grade Proficiency Tests: Information Guide (1995). The objectives of the Fourth-Grade Proficiency Test in Reading are as follows:

STRAND I - AMERICAN HERITAGE

1. Demonstrate knowledge of and ability to think about the relationship among events by:
   a) identifying sequence of events in history;
   b) grouping events by broad historical eras on a time line;
   c) recognizing that change occurs in history; or
   d) identifying cause-and-effect relationships.

2. Identify and use sources of information about a given topic in the history of Ohio and the United States.

3. Relate major events and individuals in state history to time periods in the history of the nation and the world.

STRAND II - PEOPLE IN SOCIETIES

4. Identify the various kinds of cultural groups that have lived or live in Ohio.

5. Identify or explain how various cultural groups have participated in the state’s development.
6. Identify or compare the customs, traditions, and needs of Ohio's various cultural groups.

STRAND III - WORLD INTERACTIONS

7. Demonstrate map skills by:
   a) identifying various major reference points on the Earth;
   b) locating major land forms and bodies of water; or
   c) using a number/letter grid system to locate places on a map, a map key to understand map symbols, a linear scale to measure distances on a map, and a direction indicator.

8. Use maps and diagrams as a source of information to:
   a) recognize continents by their outlines and major physical features;
   b) recognize characteristics of major land forms and bodies of water;
   c) describe physical differences between places; or
   d) explain the influence of the natural environment on the settlement of Ohio and on changes in population patterns, transportation, and land use.

9. Identify or describe the location of Ohio in relation to other states, to regions of the United States, and to major physical features of North America.

STRAND IV - RESOURCE ALLOCATION (DECISION MAKING AND RESOURCES)

10. Identify the factors of production (land, labor, capital, and entrepreneurship) needed to produce various goods and services.

11. Name the resources needed to produce various goods and services, classify each resource by the factors of production, or suggest alternative uses for those factors.

12. Classify various economic activities as examples of production or consumption.

STRAND V - DEMOCRATIC PROCESSES

13. Identify the function of each branch of state government.

14. Identify the purposes of state government.
   a. protecting the health and safety of citizens (e.g., state highway patrol, use of National Guard in emergencies);
   b. providing and maintaining public services through the collection of taxes (e.g., road construction, wildlife preserves);
   c. providing for a system of justice (e.g., state civil and criminal courts);
d. protecting the rights of individual citizens (e.g., rights guaranteed in the state constitution and laws); and

e. promoting the common welfare (e.g., providing funds for schools, trade missions to other nations).

15. Identify or explain the purposes of local government.

Local government serves several broad purposes. Those purposes include:

a. protecting the health and safety of citizens (e.g., fire department, police, snow removal);

b. providing and maintaining public services through the collection of taxes (e.g., parks, libraries, public records);

c. providing for a system of justice (e.g., local courts);

d. protecting the right of individual citizens (e.g., fair housing ordinances, zoning); and

e. promoting the common welfare (e.g., sponsoring day care facilities, providing public parking).

STRAND VI - CITIZENSHIP RIGHTS AND RESPONSIBILITIES

16. Differentiate between statements of fact and opinion found in information about public issues and policies.

17. Identify and assess the possibilities of group decision making, cooperative activity, and personal involvement in the community.

18. Identify the elements of rules relating to fair play.

Independent Variable

Treatment Condition. In an attempt to improve student scores on the Reading and Citizenship portions of the Ohio Proficiency Test, a treatment was designed which specifically addresses the outcomes of those portions of the test. The treatment includes the use of question stems and activities that guide classroom discussion, and a content map which prescribes topics of study. The three participating classroom teachers were to be introduced to the study during one all-day training session, where they would be advised of the purpose and use of the question stems, activities, and content map. The training session was scheduled to take place in December, 1998, and student instruction was to commence in
January, 1999, following Christmas break. Student instruction was to continue until the March, 1999 administration of the Ohio Fourth-Grade Proficiency Test.

Question stems and classroom activities were created to serve as prompts to prime student thinking along predetermined paths (Collins, Brown, & Holum, 1991; King, 1990, 1994; Martin & Pressley, 1991; Palinscar & Brown, 1984; Schuder, 1993). These questions were used during classroom discussion of reading assignments and lessons associated with social studies and citizenship. For example, in order to focus student thought on the reading objective which states, “Compare and/or contrast elements such as characters, setting, or events,” the corresponding activity to be employed by the teacher in the classroom states: “List three or more statements about how two or more characters or events are alike, and how are they different. Select the best one.”

Both teachers and students were to be given opportunities to employ the question stems and activities, either in a reciprocal format where the teacher and students alternate between asking questions and giving a response, or in a cooperative peer questioning format, where students are able to ask questions of one another. Rather than generating random questions, questioners were instructed to work from the list of prescribed activities when formulating questions for classroom discussion.

In order to facilitate the development of relevant background knowledge among the students, the classroom teachers were provided with a content map which explicitly describes the foundational knowledge required for the citizenship portion of the Ohio Fourth-Grade Proficiency Test. Because the outcomes for the Ohio Fourth-Grade Proficiency Test in Reading included no specific subject-matter content, no content map was developed or provided for the reading test.

The required content knowledge for citizenship is derived from the outcomes and corresponding descriptors included in the Ohio Fourth-Grade Proficiency Test Information
Guide as provided by the Ohio Department of Education, and through analysis of the topics addressed in tests from three previous years of the Proficiency Test.

The curriculum map prescribes topics to be studied as a necessary aid to background knowledge for the citizenship test. For example, in order to meet the learning objectives of the economics section of the citizenship test, students must be familiar with four basic factors of production - land, labor, capital, and entrepreneurship. These “four factors of production” are included on the content map and were prescribed for introduction to the students between the resumption of school in January and the administration of the Proficiency Test in March.

In addition to teaching according to the instructional model, participating teachers were interviewed about their experiences during the treatment period. Among other things, teachers were asked to reflect about teaching from the model, the difficulties they may have encountered in using the question stems; the preparation required in teaching the topics of the content map; and reactions of students to the experience of structured class discussion.

Also, rather than create random classroom assessments, teachers were asked to select or design assessments which are specifically designed to reflect and reinforce Ohio Fourth-Grade Proficiency Test outcomes. For example, in order to meet the reading outcome which states, “Use graphic aids (for example, a table or graph) or illustrations to locate or interpret information,” the corresponding task for students to accomplish might be to create or use a table, graph, or illustration; and to locate or interpret information designated by the teacher.

**Control Condition.**

Teachers of students in the control groups were not provided with a content map for the regulation of subject-matter content, or with question stems for structuring and directing
classroom and small group discussion. Control groups were unregulated except by the instructional priorities and guidelines adopted in their individual districts. Individual teachers working with students in the control groups were free to use teaching techniques of their own devising, based upon their experience with effective teaching methods and their professional judgment about the best approaches for preparing students to take the Ohio Proficiency Test.

**Dependent Variables**

Student scores on the Ohio Fourth-Grade Proficiency Test in reading and citizenship served as the dependent variables in this study. The Ohio Fourth-Grade Proficiency Test is administered annually, beginning the first Monday following March 15. One section of the test is administered each day, beginning with the writing portion on Monday, and ending with the science portion on Friday. In 1999, the reading portion of the test was to be administered on Tuesday, March 16, and the citizenship portion on Thursday, March 18. The test is administered in the students' classrooms by their classroom teachers. All tests are administered at the same time of day, usually in the morning.

At the time of the test, all student work is done in the test booklets provided by the Ohio Department of Education. When taking the test, students are not permitted to use reference materials or tools other than writing instruments. Charts, maps, and other materials in the classroom that could assist students with test items must be covered or removed during the test administration. Students have a maximum of two-and one-half hours to finish each test. It is expected that most students will be able to complete work on a test within approximately 75 minutes. One break is allowed during the administration of each test, occurring approximately 35 minutes after the initiation of the test.
Each multiple choice question has three response choices, only one of which is correct. There is no penalty for guessing. The three response choices for each multiple choice item are plausible, in a logical order, and consistently worded. Items usually ask direct questions. An item could use the expression, “choose the best answer’’ or could be worded negatively, but this rarely occurs. Response choices such as None of the above or All of the above are not used.

Each form of the reading test contains multiple-choice items, short-answer items, and extended-response items. Multiple choice items are used whenever a single, concise answer to a question is possible. Multiple-choice questions included on the Ohio Fourth-Grade Proficiency Test in Reading emphasize critical thinking rather than factual recall. Each reading selection has at least one short-answer or one extended-response item. Some of the open-ended items make use of graphic organizers such as a Venn Diagram, a two-column chart, or other tables and graphs. There are five field-test items embedded in the citizenship test, making a total of 45 items, only 40 of which are counted to obtain the students’ citizenship scores.

Each form of the citizenship test contains 30 multiple-choice items, 8 short-answer items, and 2 extended-response items. In all, the multiple-choice items account for 55% of the total score; short-answer items, 30%; and extended-response items, 15%. Multiple-choice items on the citizenship test often require factual recall. Short-answer items typically ask students to explain a conclusion, provide examples, complete a chart, interpret information, or provide a rationale for an answer they have chosen. Extended-response items might ask students to interpret information from a paragraph on a specific topic, reach a conclusion and justify that conclusion, or provide examples. Credit for answers to extended-response items is based on demonstrated understanding of concepts. The more understanding that a student demonstrates, the more credit the student may be assigned.
All tests and test booklets are returned to the Ohio Department of Education at the end of the testing week. The Ohio Department of Education scores the tests, converts each student's raw score into a state-wide scaled score, and releases the score results to the schools in late May or early June.

Test Validity. According to the Ohio Department of Education (1995), both teachers and administrators are involved in aspects of establishing content validity for the Ohio Fourth-Grade Proficiency Test. The Ohio Department of Education begins by asking school districts and many professional organizations for names of people they would like to recommend to serve on content committees. Included among the organizations are Ohio Education Association, Ohio Federation of Teachers, Ohio School Boards Association, Buckeye Association of School Administrators, Ohio Association of Elementary School Administrators, Ohio Association of Supervision and Curriculum Development, Ohio Association for the Education of Young Children, Ohio School Supervisors Association, Ohio Council for the Teaching of Language Arts, Ohio Council of International Reading Association, Ohio Council of Teachers of Mathematics, and Science Education Council of Ohio. The names submitted are used to build committees that represent diversity in ethnicity, gender, geography, and size and kind of school districts. A committee of 25 is built for each content area with teachers representing half of the 25 selected for each group. This group of 25 is known as the content review committee in a specific test area.

The Ohio Department of Education then creates an "invitation to bid" that lists and describes all activities and products involved in the scope of work that a contractor would have to perform. Potential contractors submit bids on how they would complete all activities and products required; the Ohio Department of Education evaluates proposals to find the lowest and most responsive bid. The successful contractor then proposes test and item
specifications to the content review committees which have specified learning outcomes (Ohio Department of Education, 1995, pp. 2,3).

Furthermore, validity of the test for this study is established by the test’s relationship to the instructional model. While in most circumstances instruction precedes the test, in this case the test precedes the instruction. The instructional model is derived directly from the test objectives.

Test Reliability. Each item on the Ohio Proficiency Test goes through a five-step process before it can appear in an operational form of the test:

Step 1 - The Bias Review/Sensitivity Committee looks over all materials to make sure materials do not disadvantage individuals or groups.

Step 2 - The content review committee (one in each of the fourth-grade test areas) also looks at all materials in that content area and makes changes that the group desires.

Step 3 - Items are field tested in circumstances similar to those for operational testing, that is, on a similar population and at a similar time of the year. Operational test forms for reading, mathematics, citizenship, and science will contain some embedded field-test items, so that successful new test items can be continually added to the item bank.

Step 4 - Field-tested items go back through bias review with information about the performance of the items in the field testing. Any changes the committee decides to make to items will necessitate field testing again. Each item is voted on by the committee.

Step 5 - Field-tested items go back through the specific content review committees with information about performance of items in the field testing. Any changes the committee decides to make to items will necessitate field testing again. Each item is voted on by the committee.
Only items that go through all five steps successfully are eligible to be included in the item bank and used in an operational form of the test or in the practice test (Ohio Department of Education, 1995, p. 3).

Reliability of the Ohio Proficiency Test in reading and citizenship is determined by a measure of equivalent forms. Multiple forms of the test are administered to Ohio fourth graders during the week of testing in March. Scores on these parallel forms were used to establish a Cronbach's alpha of .82 for the 1999 form of the citizenship test and the reading test.

The large number of students who take the fourth-grade proficiency test results in a very heterogeneous testing group. Because of the heterogeneity, a satisfactory alpha coefficient must be reasonably high. The acceptability of the .82 alpha is somewhat subjective. One common way to determine a satisfactory coefficient of reliability is to compare the alpha of one test with reliability coefficients of similar tests (Ary et al, 19??, p.). Because the Ohio Proficiency Test is not a nationally norm-referenced standardized test, such comparisons are difficult.

Some conclusions can be drawn about the .82 alpha by comparing the coefficient with reliability coefficients from previous administrations of the Ohio Proficiency Test. When examining such data, it can be seen that the reliability coefficient has been consistent for several years. Over the past five years, the reliability coefficient has ranged from .80 to .83. The corresponding range of the citizenship test has been .81 to .86.

Reliability of the Ohio Proficiency Test is also established by the Standard Error of Measurement. Like the Cronbach's alpha, the Standard Error of Measurement for each year of the test has been consistent. In 1999, the standard error for the reading test was 7.60, and the standard error of the citizenship test was 10.68. Over five years, the standard...
error of the reading test has ranged from 7.48 to 12.8. The standard error of the citizenship test has ranged from 8.37 to 11.1 (Ohio Department of Education, 1999).

Research Design

This study is a quasi-experimental, non-equivalent control group research design. This design was selected because the study was to take place in the actual school setting of an elementary school in Southeastern Ohio where it was not possible to assign subjects randomly to the treatment. OPBA scores served as pre-observations. The basic non-equivalent control group design for this study would be:

\[
\begin{array}{c}
O_1 \quad X \quad O_2 \\
\hline
O_3 \quad O_4
\end{array}
\]

Where

- \(O_1\) represent the OPBA scores of the treatment group
- \(O_2\) represents the Proficiency Test scores for the treatment group
- \(O_3\) represents the OPBA scores for the control group
- \(O_4\) represents the Proficiency Test scores for the control group
- \(X\) represents the treatment
This basic design was modified to allow for a second level of control. The resulting research design for this study is:

\[
\begin{array}{ccc}
O1 & X1 & O2 \\
\hline
O3 & X2 & O4 \\
O5 & X3 & O6 \\
\end{array}
\]

x2 (reading and citizenship)

Where

X1 represents the treatment group
X2 represents the matched-districts group
X3 represents the matched-subjects group
O1, O3, O5 represent the OPBA scores
O2, O4, O6 represent the Proficiency Test scores

Threats to Internal Validity. Two levels of control are used in this study. The first level is a matched-districts group of students selected from a school district similar to the treatment district. The second level is a matched-subjects group of students whose third-grade OPBA citizenship scores, and an equivalent number of students whose third-grade reading scores match exactly with subjects in the treatment district. Students in the matched-subjects group were selected from two different school districts. There is no overlap among the subjects in the matched-district group and the matched-subjects group.

The two levels of control are used to help defeat the combined threats of selection and regression by compensating for inherent weaknesses when either control is used alone. The use of intact, non-equivalent classes rather than randomized groups creates a potential difficulty in controlling for selection bias. This problem mandates the use of a pretest to
demonstrate initial equivalence of the intact groups (Tuckman, 1999, p. 173). OPBA scores serve as pretest data, and as a basis for creating a matched-subjects group.

Selection bias is reduced through the use of a matched-subjects group, because the subjects are exactly equivalent on the pretest. However, the exclusion of students whose scores did not precisely correspond with those of the treatment group creates the possibility that scores in the matched-subjects group are atypical, and therefore vulnerable to regression. Thus, the use of a matched-classrooms group compensates for this threat.

**Data Analysis**

Data analysis was accomplished through one-way analysis of covariance with OPBA scores as the covariate.
CHAPTER 4

RESULTS

Purpose

The purpose of this study was to improve student mastery of the cognitive skills and subject-matter content of the Ohio Proficiency Test. Specifically, this study tested an instructional model expressly designed for the Reading and Citizenship portions of the Ohio Proficiency Test.

The hypothesis tested in this study was that students whose teachers use the instructional model for teaching cognitive skills and subject-matter content would demonstrate higher performance on the reading and citizenship portions of the Ohio Proficiency Test than equivalent students whose teachers did not use the model. It was predicted that, when tested on those portions of the Ohio Proficiency Test, the mean score of fourth-grade students who received the prescribed instruction would be higher than the mean score of equivalent fourth-grade students who took the same tests, but did not have the instructional treatment.

Two levels of control were used in this study. The first level was a matched-district group of 95 students selected from a school district similar to the treatment district. Ten of the students originally selected for the control group are not included in the final results of this study because they did not take the Ohio Proficiency Test in the matched district during their fourth-grade year.
The second level of control was two matched-subjects groups of 66 students whose third-grade OPBA citizenship scores and third-grade reading scores, matched exactly with the 66 subjects in the treatment district. A pool of students with OPBA scores which matched the treatment group was drawn from two different school districts. Students in the matched-subjects control groups were randomly selected from the pool of eligible students. Two of the students originally selected for the matched-subjects groups are not included in the results of this study because only 64 of the original 66 students in the treatment group took the Ohio Proficiency Test in the treatment district during their fourth-grade year.

Student scores on the Fourth-Grade Proficiency Test in Reading and Citizenship served as the dependent variables. The proficiency test scores of individuals from each of the comparison groups were analyzed using a one-way analysis of covariance with OPBA scores as the covariate. OPBA scores for the matched-subjects groups were identical by design. OPBA scores in the matched-district groups showed that the treatment and control groups were similar, although not identical. The tables below display the OPBA means for the matched-districts groups:

**TABLE A** MATCHED DISTRICTS - OPBA READING SCORES

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>Number</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group</td>
<td>85</td>
<td>39.34</td>
</tr>
<tr>
<td>Treatment Group</td>
<td>64</td>
<td>34.91</td>
</tr>
</tbody>
</table>

**TABLE B** MATCHED DISTRICTS - OPBA CITIZENSHIP SCORES

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>Number</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group</td>
<td>85</td>
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<tr>
<td>Treatment Group</td>
<td>64</td>
<td>29.50</td>
</tr>
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</table>
Tables 1 and 2 compare scores between the treatment group and the matched-district control group. Table 1 describes the reading scores, and Table 2 describes the citizenship scores for these two groups.

Table 1 shows the grand mean of the tested sample (N=149), the mean of the control group (n=85), and the mean of the treatment group (n=64) on the reading scores of the matched districts. The mean of the control group (211.97) was slightly higher than the mean of the treatment group (208.56), but no significant difference was found between the two groups (p > .05).

**TABLE 1**

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>Number</th>
<th>Mean</th>
<th>Proficiency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested Sample</td>
<td>149</td>
<td>210.27</td>
<td>low - high</td>
</tr>
<tr>
<td>Control Group</td>
<td>85</td>
<td>211.97</td>
<td>168 - 258</td>
</tr>
<tr>
<td>Treatment Group</td>
<td>64</td>
<td>208.56</td>
<td>168 - 238</td>
</tr>
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</table>

<table>
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<th>df</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPBA Reading</td>
<td>274343.04</td>
<td>1</td>
<td>134.429</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Treatment</td>
<td>402.782</td>
<td>1</td>
<td>3.006</td>
<td>0.085</td>
</tr>
<tr>
<td>Error</td>
<td>133.994</td>
<td>146</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R Squared = 0.512
Table 2 presents the grand mean of the tested sample (N=149), the mean of the control group (n=85), and the mean of the treatment group (n=64) on the citizenship scores of the matched districts. In this case, the mean of the treatment group (219.25) was slightly higher than the mean of the control group (215.01), but once again, results revealed no significant difference between the treatment and control groups ($p > .05$).

The OPBA scores of the subjects in the matched districts were found to be a significant predictor of proficiency test scores ($p < .001$). The R squared calculation shows that somewhat more than half of the variance in reading scores ($R^2 = .512$) and slightly more than one-third of the variance in citizenship scores ($R^2 = .367$) was accounted for by the measured variables.

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>Number</th>
<th>Mean</th>
<th>Proficiency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested Sample</td>
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<td>216.83</td>
<td>low - high</td>
</tr>
<tr>
<td>Control Group</td>
<td>85</td>
<td>215.01</td>
<td>172 - 269</td>
</tr>
<tr>
<td>Treatment Group</td>
<td>64</td>
<td>219.25</td>
<td>177 - 286</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>F</th>
<th>$p$</th>
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</thead>
<tbody>
<tr>
<td>OPBA Reading</td>
<td>23112.049</td>
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<td>84.32</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Treatment</td>
<td>625.818</td>
<td>1</td>
<td>2.28</td>
<td>0.133</td>
</tr>
<tr>
<td>Error</td>
<td>274.069</td>
<td>146</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$R^2 = 0.367$
Matched Scores

Tables 3 and 4 compare scores between the treatment and control groups matched by third-grade OPBA scores. Table 3 describes the reading scores, and Table 4 describes the citizenship scores for these two groups.

Table 3 shows the grand mean of the tested sample (N=124), the mean of the control group (n=62), and the mean of the treatment group (n=62) of subjects matched by OPBA reading scores. As with the matched-district reading scores, the mean of the control group (210.01) was slightly higher than the mean of the treatment group (206.77), but no significant difference was found between the two groups (p > .05).

<table>
<thead>
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<th>SOURCE</th>
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<th>Mean</th>
<th>Proficiency</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested Sample</td>
<td>124</td>
<td>208.4</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>Control Group</td>
<td>62</td>
<td>210.01</td>
<td>185</td>
<td>238</td>
</tr>
<tr>
<td>Treatment Group</td>
<td>64</td>
<td>206.77</td>
<td>177</td>
<td>238</td>
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</tbody>
</table>

<table>
<thead>
<tr>
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<th>df</th>
<th>F</th>
<th>p</th>
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</thead>
<tbody>
<tr>
<td>OPBA Reading</td>
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<td>78.93</td>
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</tr>
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<td>Treatment</td>
<td>325.815</td>
<td>1</td>
<td>2.82</td>
<td>0.095</td>
</tr>
<tr>
<td>Error</td>
<td>115.398</td>
<td>121</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R Squared = 0.403
Table 4 presents the grand mean of the tested sample (N=124), the mean of the control group (n=62), and the mean of the treatment group (n=62) on the citizenship scores of the matched districts. Analysis of the citizenship scores revealed that the means of the two groups were very nearly the same. Once again, the mean of the control group (217.6) was slightly higher than the mean of the treatment group (216.1), but no significant difference was found between the two comparison groups (p > .05).

As with the matched-district groups, when subjects were matched by their third-grade OPBA scores, those pretest scores proved to be a significant predictor of proficiency test scores (p < .001). The R squared calculation shows that approximately 40% of the variance in reading scores (R Squared = .403) and citizenship scores (R Squared = .398) was accounted for by the measured variables.

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>Number</th>
<th>Mean</th>
<th>Proficiency</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tested Sample</td>
<td>124</td>
<td>216.85</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>Control Group</td>
<td>64</td>
<td>217.6</td>
<td>183</td>
<td>286</td>
</tr>
<tr>
<td>Treatment Group</td>
<td>64</td>
<td>216.1</td>
<td>177</td>
<td>286</td>
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</tbody>
</table>

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>OPBA Reading</td>
<td>20980.729</td>
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<td>82.28</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Treatment</td>
<td>72</td>
<td>1</td>
<td>0.282</td>
<td>0.596</td>
</tr>
<tr>
<td>Error</td>
<td>254.966</td>
<td>121</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R Squared = 0.398
CHAPTER 5

DISCUSSION

The Ohio Fourth-Grade Proficiency Test

Since the time that this study was initially undertaken, the Ohio Fourth-Grade Proficiency Test has not diminished in its importance to Ohio's elementary and secondary schools. In fact, with the approval of legislation known as Senate Bill 55, proficiency testing has only grown in its influence on Ohio school children and school districts. Examples (Ohio Department of Education, 1999):

- Beginning in the summer of 1999, Ohio school districts are required to offer summer remediation to those students who are below standard in three or more fourth or sixth-grade proficiency tests.

- Beginning with the 1999-2000 school year, Ohio school districts are permitted to retain those students who are below standard in three or more fourth or sixth-grade proficiency tests.

- Local report cards published by the Ohio Department of Education include an official performance accountability rating for each school district. Beginning with the 2000-2001 school year, the rating categories (Effective, Continuous Improvement, Academic Watch, and Academic Emergency) will remain unchanged, but each district's performance will be measured against 27 state performance standards, an increase of 9 over the 18 standards featured on current report cards.
• The 9 new standards include all sixth-grade proficiency test results as well as the addition of science test results for all other grades. Twenty-five of the 27 standards are derived from proficiency test scores.

• The Fourth-Grade proficiency tests are currently administered in March of each school year. Beginning with the 2000-2001 school year, Ohio school districts must administer the fourth-grade test in Reading three times each year (fall, spring, and summer).

• Beginning with the 2000-2001 school year, Ohio school districts must retain fourth-grade students that do not meet the score standard on the fourth-grade proficiency test in reading, and offer summer remediation for students who don't meet the reading standard in fourth grade.

According to the Ohio Department of Education (1999), in March 1999, over 129,200 students took the Ohio Fourth-Grade Proficiency Tests. Approximately 32% of all students who took all the tests met at least the minimum score standards in all five test areas. The passage rate among those fourth-graders who took the reading test was approximately 60%. Approximately 71% of Ohio's fourth-graders who took the citizenship test met or exceeded the minimum standard (p. 2).

Sixth-graders performed comparably. Approximately 33% of the 126,875 sixth-graders who took the proficiency test passed all five parts. Passage rate for the sixth-grade test in reading was approximately 53%. Approximately 72% of sixth-graders who took the citizenship test met the standard. None of these scores meets the stated goal of a 75% passage rate set by the Ohio Department of Education for each section of the Proficiency Test (p. 2).
The trends associated with the Ohio Proficiency Tests and the scores recorded by Ohio's school children suggest that there is a continuing need for an instructional strategy to improve student performance on the Ohio Proficiency Test, particularly on the Ohio Fourth-Grade Proficiency Test in Reading. Does the instructional model used in this study offer potential as an effective instructional tool for this purpose? Did the use of the instructional model show positive results under the conditions designed for this quasi-experimental study?

The results of the statistical analysis showed no statistically-significant difference between the mean scores of the treatment and control groups used in this study. In fact, the mean score of the treatment group was higher than the mean score of the control group in only one case. Neither was any statistical difference evident when the data was broken down by individual teacher. Why was there no significant effect? The experimental conditions used in this study suggest at least three considerations. Each of these considerations will be examined in this final chapter of the study.

*The Instructional Model*

*Relationship to the Test.*

Consideration one is that the instructional model was not well-related to the demands of the tests. The intent of the instructional model was direct instruction on the academic skills and subject-matter content of the Fourth-Grade Proficiency Tests in Reading and Citizenship. If the instructional model was not appropriately aligned with the test, it would help to explain the lack of statistically-significant difference between the performance of students in the treatment and control groups. A close examination of the instructional model and a look at qualitative data gathered from participating teachers provides some insight about this consideration.
The Citizenship Model

The instructional model for citizenship was designed to identify and describe the subject-matter content and the academic skills associated with the Ohio Fourth-Grade Proficiency Tests in Citizenship. The citizenship test requires a certain amount of factual recall about Ohio history, state and local government, and geographical features. Teachers were provided with a content map which could be used to identify the subject-matter content associated with the citizenship test (Appendix A).

Subject-matter content associated with the Fourth-Grade Proficiency Test in Citizenship was identified on the citizenship content map provided to teachers of the treatment groups. The topics identified there were intended to serve as the basis for topic selection in preparation for the citizenship test. For example, major events in Ohio history between 1500 and 1900 are an expressed learning outcome for the Ohio Fourth-Grade Proficiency Test in Citizenship. Therefore, a study of US Presidents from Ohio, or a unit on Ohio Indian tribes, would be appropriate topics of study.

Academic skills described by the outcomes of the Ohio Fourth-Grade Proficiency Test in Citizenship served as the rationale for prescribing specific instructional methods. For example, one expressed learning outcome for the Ohio Fourth-Grade Proficiency Test in Citizenship is to "differentiate between statements of fact and opinion." Therefore, one or more of the instructional techniques prescribed for teachers was that students should be provided an opportunity to practice that particular skill when studying US Presidents from Ohio, when learning about Ohio Indian tribes, or when pursuing a study of some other appropriate topic from Ohio history.

The instructional model for the Ohio Fourth-Grade Proficiency Test in Citizenship included nine different citizenship activities (Appendix B). In some cases, the activity could be integrated with a topic of study selected from the subject-matter content associated with
the test; in other cases, the activity itself was virtually inseparable from the topic of study. For example, statements of fact and opinion can be generated and integrated into a unit on US Presidents from Ohio, or other appropriate topics of study. On the other hand, examples of state and local government are most logically part of a unit where government is the topic of study.

In a manner similar to reciprocal teaching (Palinscar and Brown, 1984), activities for the citizenship test were designed to be teacher-led, student-led, used in group discussion, and used as a basis for assessment. Teachers were asked to employ all four methods in the classroom. Teachers were also provided with guidance about the typical format of the Ohio Fourth-Grade Proficiency Test in Citizenship. For example, they were informed that prompts used for the citizenship test are no more than a single paragraph in length, and make frequent use of charts, maps, and graphs. Teachers were expected to select similar materials for use in the classroom.

The Reading Model

The outcomes for the Fourth-Grade Proficiency Test in Reading included no specific subject-matter content. In other words, no specific books, stories, poems, fables, myths, speeches, etc. are identified by the test outcomes. All of the outcomes for the Ohio Fourth-Grade Proficiency Test in Reading are skill-based. Content selection is left exclusively and entirely to the individual classroom teacher. As a result, no content map was developed or provided for the reading test.

This lack of content specificity diminishes the power of the instructional model used in this study. A review of the literature exposes compelling data which suggests that background knowledge is a necessary and vital element in organizing, acquiring, and applying thought processes. Studies that recommend a strong content component to
instruction (Alexander et al., 1994; Ashcraft, 1994; Ausubel, 1978; Collins & Quillian, 1972; Doyle, 1983; Hirsch, 1987; Paris et al., 1984; Recht & Leslie, 1988) are not taken into consideration by the Ohio Proficiency Test. The heavy reliance on skill instruction necessary to meet the demands of both the reading and citizenship tests, is contrary to the balance between skills and knowledge employed in this instructional model. As a result, the reading and citizenship activities prescribed in the instructional model greatly overshadowed the content map as an aid to direct instruction of Ohio Proficiency Test outcomes.

The instructional model for the Fourth-Grade Proficiency Test in Reading included eleven different reading activities (Appendix C). Two of the activities required students to compose written responses. The remaining nine activities mimicked the multiple choice format of the Ohio Proficiency Test by inviting the teacher or students to develop possible answers to a question, and then to select the best answer among those that were suggested. In the manner of reciprocal teaching (Palinscar and Brown, 1984), activities were designed to be teacher-led, student-led, used in group discussion, or used in assessment instruments. Teachers were encouraged to use all four approaches in the classroom.

As with the citizenship test, teachers were provided with guidance about the typical format of the Ohio Fourth-Grade Proficiency Test in Reading. They were informed that reading selections used for the Fourth-Grade Proficiency Test in Reading are no more than a page or two in length, and usually include an illustration, a chart, a map, or a graph. Teachers were instructed to select similar materials for use in the classroom.

*Teacher Reaction to the Instructional Model*

The nine citizenship activities and eleven reading activities were designed to shape discussion, provide structure for classroom activities and assessment, and give guidance to
adult-led and student-led instruction. King (1990, 1994) provided similar structure through the use of question stems and guided cooperative questioning. Other research models on guided teaching processes have taken similar approaches (Paris, Cross, and Lipson, 1984; Schuder, 1993; Pearson and Johnson, 1978; Collins, Brown, and Holum, 1991; Brown and Campione, 1996).

Interviews conducted with the participating teachers following the period of instruction support an assertion that the instructional model was well-aligned with the test and that the prescribed instructional approaches were consistent with the test expectations. Teachers of students in the treatment group anticipated that the treatment would be effective, and expressed appreciation for the guidance that the instructional model provided about topic and resource selection.

"I sat there when they were taking the test," indicated one of the teachers. "I just made different categories for each question, and there were like nine maps. [The students] really had a lot of maps this year and I felt good about that, because we had even made maps of Ohio, and they knew the boundaries; they knew all the states; they had painted them. I felt like they should have done all right on those maps."

"And the government charts," another teacher added. "I think it depends on the way that they ask some of those questions. I think this helped them to ask the question in some other way. Because they know that information, but they don't know how to answer it in the form that it comes to them. Plus the fact that they have to read it for themselves."

Teacher Training

Adequacy of the Training

A second consideration for the lack of statistical difference between the treatment and control groups in this study is that the teachers who agreed to use the instructional
model were not adequately trained. They may not have fully understood the model, or they may not have been comfortable or competent in their application of the prescribed techniques. An examination of the training which was provided to the participating teachers in this study, and a comparison of that training with the training provided to teachers using other kinds of instructional models, provides some insight about this possibility.

Teachers of students in the treatment group met with the researcher on Monday, December 14, 1998, for one full day of training. At that time, a content map for the citizenship test (Appendix A) and a written activity guide for both the reading and citizenship activities (Appendix B, C) were provided to each of the three teachers. The eleven reading activities and the nine citizenship activities were then reviewed and discussed. Each activity was examined and explained, and time was allowed for questions and clarification.

As can be determined by examining the activity guides, each activity is accompanied by four examples selected from actual proficiency tests given to Ohio fourth-graders in the three previous school years. Sample prompts which served as the basis for the sample questions were not included with the examples. However, sample prompts selected from actual proficiency tests were included separately to be used in practicing the prescribed reading activities.

After reviewing the activity guides, the researcher conducted a demonstration lesson for the participating teachers. Using *The Polar Express* by Chris Van Allsburg as the topic for a reading lesson, the researcher led a class of fourth-grade students through each of the eleven reading activities. After reading the story aloud to the students, the model lesson proceeded as follows:
The Training Lesson

Investigator: "When the Polar Express arrived at the North Pole, and the children met Santa Claus, one little boy was selected to receive the first gift of Christmas. How do you think he felt when Santa picked him out, and the conductor lifted him into Santa's sleigh?" Hands immediately went up, as the students were eager to ask the question.

Investigator: "Just a minute. Let me give you some choices. Do you think he felt worried because he might not get a present he liked? Do you think that he felt happy and excited because he was receiving a special honor? Or do you think he felt excited because he was about to get a ride in Santa's sleigh?"

The three choices were repeated so that the students were clear about their options, and then students were selected to choose one answer and explain the reason for their selection. Most students chose the middle answer, although a few selected the third. After discussion, the consensus decision of the class was that the middle answer was the best choice.

Investigator: "Now let's look at the picture of the children sitting on the train. All the children in the illustration are gathered around one little boy in the center of the picture. What event in the story do you think this picture represents?"

Once again the students spontaneously raised their hands, anxious to offer their opinion of the illustration. This time, no choices were offered by the instructor. Instead, student suggestions were written on the chalkboard until the class had four or five possibilities, all generated by the students themselves. When selected randomly, some students said they could not interpret the picture. Others were reluctant to try, but gave reasonable answers when encouraged. Several students were quick to suggest that the illustration represented the moment after the little boy lost his precious gift from Santa. The
boy's sad expression and the looks of sympathy on the faces of the other children were pointed out as appropriate clues to a correct interpretation of the illustration.

Investigator: "Boys and girls, did you enjoy this story?"

Nearly everyone in the class indicated that they did enjoy the story. Many students said they liked the part about the train ride to the North Pole.

Investigator: "If you wanted to learn more about trains, where would be a good place to look? Before you answer, let me offer some choices to think about. Do you think that it would be a good idea to look at a book titled, A Journey to the North Pole? Would it be better to look at a book called Trains and How They Work? Or would you look at a book called Santa Gets Ready for Christmas?"

The students offered their opinions about the most appropriate source for more information about trains. Most of them correctly selected choice number two; a few were unsure about the best answer; very few chose answer number one or three. The sample lesson continued in this manner until all of the reading activities had been covered. Student attention and participation was very good.

Teacher Perspectives on the Training

Interviews with the participating teachers conducted after the instructional period suggest that the teachers were satisfied with the level of preliminary training they received. One teacher explained, "I understood we were to take the activities [for] the citizenship and the reading test as being the typical ones that were on the test. We were to apply those to the activities that we did in our classrooms, like parts of books or short stories, to come up with activities that matched. [We were] even to use some of the examples that you gave so that we could get ourselves started with the students, and then come up with things on our own, and continue to use those a lot. That's what we were supposed to do."
"That pretty much sums it up," the teacher's colleague agreed. "[We were] to use the reading activities with everything we did. When we met with you before Christmas, I was a little bit confused on what to do until I saw you conduct the model lesson. Basically these activities are things that we have done down through the years, it's just making sure that you do them, and making sure that you give the students all of the choice questions and that type of thing. I felt like I understood that."

"I feel like I did too," agreed the third teacher, "but I also think that observing you do it was a benefit to making sure that we understood, and that we saw that it was easier to do than we thought it was going to be. It might have been helpful if you had come in and done more of the actual teaching with the kids."

Because the model lesson was conducted orally, in a classroom discussion format, teachers said that after the training, they were slow to expand the use of the oral techniques to include various kinds of written activities. "I did a lot of these activities orally, and I wish I had typed a lot of them out so that the kids had to read them and answer questions," commented one teacher. "I think that would have made a difference. I thought when I did it orally that the kids were getting it, but then after I put it on paper, I could really see where they were having some trouble."

Another teacher agreed, "That was why when I started on some of the citizenship things, I put the question up and we would read through it, but then instead of having them orally giving the answers, I gave them index cards and I had them write their responses down. Then they could share them. That way everyone had to come up with a response, rather than depending on the good kid in the class or the kid that always has a response. They couldn't depend on someone else to give a response; they had to give it themselves. In the reading groups, they were broken down into small groups, so that could be
accomplished. When I was doing the whole classroom with citizenship, everybody didn't get a chance when they were doing it orally."

"I agree they need to be written out," said the third teacher. "But maybe if we would just make a goal at least once a week to have a written one, but still doing some of the questions orally as you go along."

No demonstration model was conducted for the citizenship activities, but the teachers expressed confidence in their understanding of the model and their ability to conduct the lessons as prescribed. One teacher conceded that it might have been beneficial to observe the citizenship activities being taught by the researcher, but did not believe that the absence of such a demonstration had any negative effects. She said, "I took the examples that were given and used those, and then we had those charts on the branches of government, and we had the charts on the cultural groups. We tried to make up charts of different things. We had charts that we ran off so that we all had those to use. Besides, a lot of the citizenship [activities] overlapped with the reading."

In spite of the confidence expressed by teachers in their post-instruction interviews, a review of the literature on teacher training for various instructional models suggests that the teachers associated with the treatment group in this study might have benefited from a longer, more intensive, period of training. King (1994) states that "teachers received extensive training from the investigator" in how to teach the explanation procedure and the question-generation strategies for her Guided Questioning model (p. 343). Palinscar and Brown's (1984) initial experiments with Reciprocal Teaching, and Paris, Cross, and Lipson's (1984) experiments with Informed Strategies for Learning were conducted by the investigators themselves, eliminating the need to train teachers. When Palinscar and Brown (1984) determined to train teachers for their second study, training of classroom teachers included practice with the investigators, practice with students who were not part of the
study, several pages of directions about the format of the teaching model, and weekly checks and discussions with the investigators (p. 158). Schuder (1993) concluded that, on average, it takes three to five years to develop a proficient teacher for his SAIL model for developing learning strategies (p. 196).

**Using the Instructional Model**

**Application**

A third consideration is that the prescribed treatment was not adequately applied. What evidence can be offered to demonstrate that the instructional model was used as intended? Was there enough supervision during the course of the treatment period to insure that participating teachers employed the instructional model as designed? Did the treatment last for a period of time which was long enough to make a difference? Insight can be gained about these questions through an examination of the participating teachers' methods, and the degree to which those methods adhered to the prescribed model.

Affirmation of the instructional process was accomplished through observation and teacher testimony. Three observations were conducted on each of the three teachers who used the instructional model. One of those three observations was video taped. In addition to the observations, teachers of students in the treatment group were able to provide detailed descriptions of their experience with the instructional model. Their comments and personal observations help to substantiate their use of the prescribed instruction. These remarks, which are included as part of the experimental record, indicate that students participated willingly in the lessons their teachers conducted, and that lesson design became easier and more natural as the teachers' and students' experience increased.

Observations of classroom instruction conducted by the teachers associated with the treatment group took place on Monday, February 1, 1999, and Friday, February 19, 1999.
Both of these observations were accompanied by a meeting between the participating teachers and the investigator. These meetings allowed the teachers to share their experiences, ask questions, and get clarification about the prescribed teaching process. In addition, on Monday, March 1, 1999, a video tape was made of a lesson in progress.

These observation sessions and mid-treatment conferences support an assertion that teachers did use the prescribed instructional method, and that they were confident and proficient with it in most cases. The following description of three actual lessons taught by the participating teachers provides some clarification about the ways these teachers used the instructional model:

Lesson Description

On this particular day, the first of the three teachers in the treatment district is conducting a reading lesson. She stands at the front of the classroom, her students seated at their desks before her. They have been reading a story titled *The Crocodile's Cousin* by Eleanor B. Heady, and the teacher is about to lead the students through some of the reading activities.

"Get out a sheet of paper," she instructs her students. "Put your name at the top and number your paper from one to eight." As the students busy themselves looking for paper and carrying out their assigned task, the teacher goes to her desk and gets a large sheet of chart paper. She posts it on the chalkboard in the front of the room. She has prepared eight questions for her students to answer. Each one is derived from the activities that make up the instructional model for reading. She begins with Activity 6 (*List three or more one-sentence summaries of the story, or of a main idea in the story. Select the best one*).

"Question one," announces the teacher. "You are going to choose from the answers given. The letters A, B, C, or D are all you need to write down. Here is the first question:
What is Momba's problem in the story?

A. he cannot swim in the river;

B. there is nothing for him to eat;

C. he does not have a family; or

D. some chickens have taken his feed."

Some of the students raise their hands to answer the question, but the teacher reminds them not to talk but rather to write their answer down on the paper. "Question two," the teacher continues. "According to Coo Coo, how are crocodiles and birds alike?

A: they both eat worms;

B. they both come from eggs;

C. they both can fly; or

D. they both have two legs."

The teacher is working on Reading Activity 5 (List three or more statements about how two or more characters or events are alike, and how are they different). The students are into the routine now. The classroom is quiet and the students mark their answers and wait patiently for the next question.

The third question that the teacher has prepared focuses on Activity 9 (List three or more words or phrases that might describe the feelings or characteristics of a person in the story. Select the best one). "The story says they didn't want to offend Coo Coo," the teacher reminds them. "What does the word offend mean? Does it mean,

A. they didn't want to make friends with;

B. they didn't want to get close to;

C. they didn't want to make angry or upset, or

D. they didn't want to stand beside."
Activity 9 is similar to Activity 2, which requires students to use the story or poem to explain feelings. In Activity 9, choices are provided in a multiple choice format. In the case of Activity 2, students must supply their own short-answer written response. Although the teacher did not cover Activity 2 in her lesson on this day, she indicated in post-instruction interviews that she tried to train her students to be descriptive about feelings:

"We made a list of feeling words," the teacher said, "a big list of words. Instead of saying they felt bad, or they felt good, which the kids always do; we tried to get them to use [words from the list]. I know that is one particular thing all of my reading groups did, because [the words] would be hanging on the board, and all of a sudden some kid from some reading group would come running across the room, tear a word off the board, and run back to his reading group. Then I knew that they were working on feeling questions and they wanted words other than good, and bad."

While the first teacher continues with her reading activities, her colleague in the room next door is beginning a lesson based on the content of the citizenship test. Her students are seated at their desks, arranged like one big table at the front of the room. Before them, posted on the chalkboard, are three large charts. The first chart describes the five purposes of state government; next to it is a similar chart which lists the five purposes of local government. The third chart identifies the three branches of government and their purposes. The teacher is introducing the lesson by reminding her students about their previous discussions.

"What we started last week, was to try to review all the branches of government, and to try to get down in our minds that there are two different governments that they will probably test you on. One is called the state government, and one is called the local government."
She then reviews the three branches of government with her students. The chart at
the front of the room provides all the answers to her questions. In order to respond
properly, the students do not have to work from memory; they only need to read and
interpret the charts. "Let's start with the three branches of government," says the teacher.
"Who can name one? Kiesha, what is one of the branches of government?"

"Executive," Kiesha answers.

"Executive," the teacher agrees, "and what does it do? We have to know the purpose
of it. What does it do?" She calls on another student. One by one, the teacher reviews the
three branches of government, their purpose, and examples of each. A few students are
occasionally confused. Even with the charts before them, some incorrect answers are
offered, and sometimes they cannot locate the required answer on the charts.

"Now," says the teacher, "these are the two [charts] that we want to get at today. I've
color-coded the charts. Green is for the state government and blue for the local government.
Notice that the purposes for the state government are the same as the purposes for the local
government. Why do we have to have a state government and then also have to have a local
government?" The teacher shows her students the differences between the two by citing
examples of state government and corresponding examples of local government. They
discuss the state highway patrol, the national guard, the state department of health; and then
they talk about corresponding local agencies such as their local police department, water
department, and health department.

Across the hall, the third teacher is also doing citizenship activities. Her emphasis,
however, is on Ohio history timelines. She also has a large chart posted at the front of the
room. Across the top of the chart are three time periods: the Colonial Period, the
Revolutionary War Period, and the Nation-Building Period. In the middle of the chart is a
series of dates which divide the timeline into equal parts, each part representing a ten-year
period of time. The dates begin with 1760 and extend through 1810. On the bottom of the chart, below the equally-spaced dates, are several events. Each event is sequentially placed on the timeline and accompanied by a specific date. The four events are:

1. 1763: France gives up claim to Ohio;
2. 1783: Great Britain gives up claim to Ohio;
3. 1787: The US creates a new territory which includes Ohio; and
4. 1803: Ohio becomes a state.

"Take a look at this chart," the teacher instructs her students. "I want you to give me a one-sentence summary of what best explains this timeline." (Citizenship Activity 3: Provide a map, illustration, or timeline associated with the topic of study. List three or more statements about the map, illustration, or timeline. Select the one which is most accurate).

The students raise their hands and the teacher chooses some to give an answer to the question. As each student offers a summary, the teacher writes that summary on the chalk board. She continues calling on students until she has six choices on the board. Once all the choices have been written on the board the teacher continues, "Choose the best answer and write it down on your paper."

The students do as they have been instructed; then by show of hands, they vote for the summary that in their opinion best describes the timeline. The unanimous choice is a summary which says, "The timeline shows important events that happened over fifty years in Ohio."

The teacher then divides her students into two groups and assigns each group a color. One group is yellow, the other group is orange. She begins by addressing questions
only to those students who are part of the orange team. "Orange team, look at the timeline. In what time period did France give up claim to Ohio? Write the answer down on your paper."

When the students have had time to respond to the question, the teacher checks for the correct answer. "What time period, Danny?" Looking at the bottom of the timeline, Danny sees that France gave up claim to Ohio in 1763.

"1763," Danny answers.

"Look again," says the teacher. "That was the correct year, but the question asked for the time period. Ashley?"

Ashley correctly answers, "The Colonial Period."

Yellow team," says the teacher, "check the orange teams' answers. If they put Colonial Period, give them a chip." Members of the yellow team check the answers of their partners on the orange team. Those orange team members that have the correct answer receive a poker chip from their partners on the yellow team.

The chips provide a special incentive for the students, and add some interesting variety to the citizenship activities. The teacher asks several more questions, each one directed only to the orange team:

"1776 was the beginning of what time period?"

"What two Ohio events happened during the Nation-Building time period?"

"What Ohio event happened during the Colonial Period?"

After each question, if the answers are correct, the students on the yellow team give chips to their partners on the orange team. When the orange team has answered all their questions, the teacher asks, "Who has five chips?" Several students raise their hands. "OK, each of you needs to see me first thing in the morning," she says. The students realize that they will receive some special surprise as a result of their five correct answers.
The two teams now switch roles as the teacher asks five new questions to members of the yellow team. Orange team partners check the answers and provide chips for each correct response. When the questions have all been asked, certain members of the yellow team are also designated for a special treat.

Before ending the lesson, the teacher has one final bonus question for the entire class: The question is derived from Reading Activity 4 (List three or more resources which might be used to learn about a person, place, or event in the story. Choose the best one). "If you wanted to learn more about Ohio before 1810, which of these books would be the best one to use?" The teacher writes three titles on the board:

A. Presidents from Ohio
B. A Parade in the 17th State
C. Events that Helped Ohio Become a State

Those students who select the final choice are given an extra chip, and told that if the final chip makes a total of five, they should see the teacher in the morning.

Time Factors

Observations and post-instruction interviews with the participating teachers revealed that teachers were somewhat more certain about the reading activities than they were about the citizenship activities, and therefore were more likely to concentrate on reading-related instruction.

"I used the reading method much more than I did the citizenship activities," said one teacher. "And I used those in small reading groups. [When teaching] the citizenship, I used various charts, which would be timelines and the branches of the government, and asked the citizenship questions."
A second teacher agreed, "I feel like we covered [the reading] activities. As far as citizenship went, I guess I didn't use it quite as much as reading, but we shared all the time lines and the charts that we made up, and we shared the branches of government. We tried to hit the basic content. I felt like I covered everything."

The third teacher expressed her belief that her instruction in the two areas was fairly well-balanced, but expressed concern about the total amount of teaching time available during the treatment period. School was scheduled to begin in the treatment district on Monday, January 4. The administration of the Ohio Fourth-Grade Proficiency Test was originally scheduled to begin on Monday, March 22, but because of conflicts with the treatment district's spring break, permission was obtained to administer the test one week earlier than scheduled. The interval between the end of Christmas break and the administration of the Ohio Fourth-Grade Proficiency Test allowed for 48 scheduled days of instruction.

"Basically it's the time factor," explained a teacher. "It takes a lot of time to work up all of this. I don't know if I did more reading activities than I did citizenship, because I did a lot of citizenship too, but I still didn't do it every day. I can't say that it was done every day."

"I really think that I should have done it more, and I really think that a lot of the things that happened were the snow days, and trying to catch up all those days that we missed, and trying to get things so that we could get started on the proficiency things full course, and getting ready for the proficiency tests. I'm not really sure; I tried, but I don't know if I used it extensively enough."

Inclement weather was a factor in the amount of instructional time available to the participating teachers. Of the 48 days available for instruction, 11 were eliminated when school was canceled due to heavy snowfall. Among the days canceled were nine of the first ten school days in January, extending the break between the December training and the
January initiation of teaching by two weeks. As a result, there was a five-week gap between
the training and the initiation of instruction. Once instruction began, participating teachers
had only 37 instructional days to gain facility and confidence with the teaching methods and
to acquaint students with the prescribed activities.

The attempt to effect significant change within such a short period of time was
perhaps the greatest challenge to the teachers in the treatment group. As Hoy & Miskel
(1996) point out, "a neglected factor in the study of organizations, and the assessment of
their effectiveness, is time. Yet issues of time are absolutely of central importance" (p. 162).
The instructional model, even when applied consistently and thoroughly, was not applied for
an extended period of time. After factoring in holidays and school days canceled for
inclement weather, too few instructional days remained for teachers and students to become
familiar and proficient with the prescribed activities.

The amount of the time available for instruction also had an effect on the teachers'
ability to utilize the positive effects of reciprocal teaching (Palinscar and Brown, 1984). At
least two of the teachers found time to employ student-led activities in small group settings,
but by the time the teachers had become capable enough to model the process for their
students, there was too little time remaining for students to become effective in the teaching
role when working with peers.

Testimony by the participating teachers indicates the kind of effort that was made to
encourage student-led discussions around the prescribed activities. "We had four reading
groups," one teacher explained, "including the Title I teacher. I tried to explain and show
them what we were doing so that they could use it in their group. I tried to keep track of
that and I feel like they did do it. And I know two groups met in my room with me and I
could hear those students going over it."
Her colleague agreed, "I did similarly, because I had made up the activities to go along with the reading book. I ended up with six groups. I gave [the activities] to them and asked them to read them over, and I explained the questions to them and tried to get them to use them. You can only use them on a small selection, so I did it with this little area of the book that they could read, not with the whole book. All the way through the book I asked them to please try to do at least one, if not two, activities every day. I have no handle on how they actually did it."

In summary, observations and interviews conducted in the treatment school district indicate that the participating teachers made an effort to apply the prescribed teaching methods, but the time allotted for instruction was not sufficient enough to make a difference in student performance on the Ohio Proficiency Test. Important aspects of the instructional model were neglected or not fully developed. Prescribed activities were not always part of the daily lessons; citizenship activities were not as consistently practiced as were the reading activities; reciprocal teaching methods could not be fully developed; and the instructional period, which was already minimal, was further shortened by school cancellations due to severe winter weather.

No observations were conducted in the classrooms of the control groups. This lack of comparison observation or testimony of the control classrooms somewhat weakens the results of this study. A possibility exists that the lack of significant difference in the performance of the students in this study is a result of an equally insignificant difference between the prescribed instructional model and the classroom routines of the control group teachers. Further use of the instructional model used in this study should include observation and other qualitative data from all comparison groups.

In addition, further application of the instructional model should take experimental effects into account. Teachers of students in the treatment group demonstrated a faithful
commitment to using the instructional model. Part of that commitment was grounded in their role as participants in an experimental study. Teachers outside of controlled experimental conditions may not be as reliable in their application of the prescribed instruction. Many teachers are reluctant to leave familiar routines and practices in order to try new approaches. Even when they venture to try new techniques and methods, they are unlikely to sustain their initial efforts without active encouragement from colleagues, supervisors, or administrators.

In order to establish the instructional model in a way that assures a permanent or enduring place in the school curriculum, on-going sustained training must be accompanied by administrative support and encouragement. Superintendents talk about politics, school boards, teacher unions, stress, public exposure, conflict, and so on. Curriculum, instruction, staff or professional development rarely arise in a prominent way. Even when the source of change is elsewhere in the system, a powerful determining factor is how central office administrators take to the change. If they take it seriously, the change stands a chance of being implemented. If they do not, it has little chance of going beyond the odd classroom or school. Adopted changes will not go anywhere on any scale unless central staff provide specific implementation pressure and support (Fullen & Stiegelbauer, 1991, p. 57).

Conclusions

The trends associated with the Ohio Proficiency Tests and the scores recorded by Ohio's school children suggest that there is a continuing need for an instructional strategy to improve student performance on the Ohio Proficiency Test, particularly on the Ohio Fourth-Grade Proficiency Test in Reading. The instructional model used in this study was tested under actual classroom conditions to see if it would positively effect student performance on the Ohio Fourth-Grade Proficiency Tests in reading and citizenship. Comparisons of the
test results among students who received the prescribed instruction and comparable students who did not, show no significant performance difference. The search for an explanation of those test results leads to an analysis of the instructional processes. Investigator and participant observations, and the literature that addresses change processes, suggest several conclusions.

First, the instructional model was closely related to the actual test. Prescribed activities were derived from actual proficiency tests administered in previous years. These prescribed activities featured an emphasis on the specific academic skills which are measured by the Ohio Fourth-Grade Proficiency Tests. However, the relationship between the instructional model and the Ohio Proficiency Test is weakened by the imbalance between the skill objectives and knowledge objectives of the test. The Ohio Proficiency Test focuses far more on skills than on knowledge. Teaching and learning studies suggest that effective skill instruction should be accompanied and supported by a thorough knowledge of subject content. Such an approach is not possible without some clear indication of what the subject content is. Specific people, places, events, and issues are typically provided as part of the test item material, but are not disclosed in advance of the test. The instructional model might have greater power if the test outcomes were more specific about the content that is the basis for test questions. Without a clear disclosure of the topics that may appear on the Ohio Proficiency Tests, teachers are left, as Munroe & Smith (1998) put it, “scratching their heads as to just what is expected of them” (p. 6).

Second, the teachers associated with the treatment district received minimal pre-instruction training, but nevertheless felt confident about the purpose of the activities and the recommended approaches to the instructional model. The ability of teachers to easily implement the model suggests that the format of the instructional model is straightforward and uncomplicated. However, additional training might have added to the teachers’ sense of
confidence and security in using the prescribed methods, and might have encouraged better balance between the reading and citizenship activities.

In addition, better training might have led to a more diverse use of the instructional model. Because the training module focused on reading activities conducted orally with students, participating teachers naturally modeled that approach once they began to teach. The expansion of their lessons to include the citizenship activities and the use of written forms of the prescribed activities were therefore slow in developing. As one teacher explained, “I think they learned how to answer those types of questions, but their reading capability still isn't good enough to have read the material. Rather than being done orally, as you did in the demonstration, and then as we had done, some of it has to be done silently by them because that's how they're going to take the proficiency test.”

Third, the number of instructional days available between the time that teachers began to use the model, and the administration of the Ohio Fourth-Grade Proficiency Test, was not adequate to produce a desirable effect on the students. Certain dimensions of the model, especially the reciprocal teaching component, were underdeveloped as a result of time constraints. “Start at the beginning of the year,” advised one of the teachers. “We were trying to cram it all in right before the proficiency test and it's too much. That was one of the things that we noticed, we were trying to do too much. They need to have this kind of questioning from the very beginning of the year. But when you’re not doing it until the end of January, it’s too late.”

The attempt by this study to effect dramatic change in student performance over a very short period of time was ambitious, but perhaps unrealistic. “There is no quick and simple way to change the culture or climate of schools,” Hoy and Miskel (1996) point out. “Long-term systemic effort is more likely to produce change than short-term fads” (p. 162). Among other things, this study confirms that substantive change is not likely to occur
quickly, and school districts seeking to improve proficiency test scores should not hope for a fast and easy solution. As Schlechty (1993) asserts, "It seems unlikely that fundamental change can be implemented in school systems unless a change system is invented and installed. Without such a system, change will go by fits and starts, and what starts as developmental resources somehow gets turned into supporting the status quo" (p. 97).

If the instructional model used in this study has promise, its promise is in long-term use by many teachers over many months, or even over many years. The effect of using this model at one grade level for 37 days may be unmeasurable or even non-existent. The effect of using this model in multiple grade levels over several years, could be entirely different. According to Brown and Campione (1996), "When a particular set of procedures is chosen, it is necessary to consider not only the principles on which each is based, but also to consider the systemic nature of the package" (p. 322). Over time, the widespread use of the techniques employed in this study might begin to affect the deeper culture of the school, causing teachers and administrators to "think differently about their work, and work differently because of what they come to think" (Schlechty, 1993, p. 107).

Fullen and Stiegelbauer (1991) state that "the complexity of change is such that it is impossible to bring about widespread reform in any large social system. Progress occurs when we take steps that increase the number of people affected. Our reach should exceed our grasp, but not by such a margin that we fall flat on our face. Instead of being discouraged by all that remains to be done, be encouraged by what has been accomplished by way of improvement resulting from your actions" (p. 109).

"Assume that effective change takes time," the authors go on. "It is a process of development in use. Unrealistic or undefined time lines fail to recognize that implementation occurs developmentally. Significant change in the form of implementing specific innovations can be expected to take a minimum of two or three years; bringing
about institutional reforms can take five or more years. Persistence is a critical attribute of successful change” (p. 127).

Interview and observational data gathered for this study suggest that persistence is warranted. The academic skills and subject-matter content associated with the Ohio Fourth-Grade Proficiency Tests in reading and citizenship are specific and fairly limited. Other studies have demonstrated that an extended period of instruction which employs activities closely related to the demands of a test will produce positive results (Brown & Campione, 1996; Collins, Brown, & Holum, 1991; King, 1990; Palinscar & Brown, 1984; Paris, Cross, & Lipson, 1984).

Participating teachers concur. As one teacher indicated, “I think we'll start using it right from the beginning of the school year. I know usually during the summer I sit around and do something on the computer, and my guess is that some of this stuff is what I'll be doing on the computer. That's what this focus is. How do the answers come up? How do you get the answers? I've always said that doing anything with these tests is really difficult because the wording in it is not something that they're familiar with, but by using these activities, they're becoming familiar with the wording that's used on the proficiency test.”

The results of this study are not surprising considering the circumstances under which the instructional model was applied. “Do not assume that the reason for lack of implementation is outright rejection of the values embodied in the change,” say Fullen and Stiegelbauer (1991). “Assume that there are a number of possible reasons: value rejection, inadequate resources to support implementation, insufficient time elapsed” (p. 157).

Insufficient time elapsed is a likely factor in the lack of significant difference between the treatment and control groups of this study. Observations conducted in the classrooms of the treatment district showed that progress toward improved test skills can proceed at an almost glacial pace. Each lesson, although it may have been focused on only a
few of the expected skills, required a great deal of planning time, resource preparation, and patience on the part of teachers. For each question posed to the students, dozens of hands may be raised in response, each student eager to offer his or her particular explanation or interpretation of the question before them. Students in the treatment district were not interested in condensing their responses to the neat, tightly-defined manner of the answers found on the Ohio Proficiency Test. Instead, they typically competed with one another for a chance to speak, and were anxious to elaborate on their response and defend their point of view. The teachers were challenged to acknowledge and even encourage this kind of free-flowing response, while keeping their students focused on the specific question they wanted them to answer.

Observations revealed that, for many students, the act of answering a question is a more important goal than actually gaining understanding. While the teacher is calling on other students, such pupils are either waving their hands frantically, hoping to be the next one called upon; or possibly propping an arm up with their free hand, idly and absently staring across the room at some irrelevant distracter, patiently waiting their turn to speak. When called upon, they may have forgotten both the question and the answer that prompted them to raise their hand in the first place. Such students lose interest as soon as they have had their opportunity to respond.

Questions posed by the teachers were often misunderstood or ignored by some students, forcing the teachers to repeat each question several times. Bright students who were paying attention the first time the question was asked often failed to contain their enthusiasm, and blurted out the answer prematurely. Teachers tried to contain these students, admonishing them to be silent while providing clarification or repetition for their less attentive classmates. Meanwhile, the teacher might be required to break the flow of the lesson in order to scold or discipline students who were off-task and engaged in some
irrelevant personal activity. For students with limited attention spans, such distractions made it difficult to understand the relationship between classroom activities and the test they would be taking several weeks in the future.

"I have some very poor readers; and I have some that don't stay on task no matter what," explained one of the participating teachers. "You were thinking about things that you thought might affect their scores, and I think as hard as they worked, and I give all of them credit - they were quiet; they didn't finish in 15 minutes; they stayed on task - this is just not something that some of these kids do well. So I don't know. They might do better than they would have done without it, but their attention span and their staying on task ability is just not there."

The teachers in the treatment district appeared to be committed to and competent with the instructional model, but the same cannot be said of the students. The nine and ten-year old children in the treatment district did not appear to grasp the urgency of the Ohio Proficiency Test. Other fourth-grade students probably behave similarly. As a general rule, fourth-graders don’t read the headlines in the newspapers; they know nothing of school district report cards; they are unconcerned about their school district’s accountability rating; they do not reflect on the consequences of failing the proficiency test; they do not demonstrate an appropriate concern about their failure to grasp a concept or idea. Fourth-Graders often move through their school day without the sense of academic mission that drives the adults who design and teach to the Ohio Proficiency Test.

The Ohio Fourth-Grade Proficiency Test demands that children execute mental exercises and demonstrate academic skills which in some cases may be weeks, months, or even years in their future, but in spite of the differences among students, the state of Ohio has set a deadline which all fourth-graders are expected to meet. The ideal to which the test aspires is attainable by some students, but is clearly unattainable by others outside of some
radical intervention by teachers. The instructional model used in this study was intended to hasten the development of those skills at a pace necessary to meet the deadline. This study suggests that intervention must begin early and be maintained consistently for many months, or many years.

The rush for school accountability may be politically popular, but manifesting that accountability through a single standardized test presents a considerable challenge to Ohio's elementary and secondary school teachers. The minds of nine and ten-year old children are not standardized, and students do not naturally accept or understand the importance that adults ascribe to certain academic skills, or the emphasis they place on certain tests. No amount of legislation or testing will provide the intellectual uniformity that the Ohio Fourth-Grade Proficiency Test requires. If such uniformity is possible, it will require teachers to be correspondingly uniform in their teaching methods. This study tested a model of direct instruction which was intended to create such uniformity. After 37 days of instruction, no statistically significant improvement was detected in the treatment group; but more extended use of these methods, by a broader range of teachers, over a larger amount of time, might provide the systemic change necessary to meet the demands of the Ohio Proficiency Test.
BIBLIOGRAPHY


APPENDIX A

CITIZENSHIP CONTENT MAP
CITIZENSHIP
SUBJECT MATTER CONTENT

Five purposes of local government: (4)
   a. protecting the health and safety of citizens (e.g., fire department, police, snow removal);
   b. providing and maintaining public services through the collection of taxes (e.g., parks, libraries, public records);
   c. providing for a system of justice (e.g., local courts);
   d. protecting the right of individual citizens (e.g., fair housing ordinances, zoning); and
   e. promoting the common welfare (e.g., sponsoring day care facilities, providing public parking)

Five purposes of state government: (4)
   a. protecting the health and safety of citizens (e.g., state highway patrol, use of National Guard in emergencies);
   b. providing and maintaining public services through the collection of taxes (e.g., road construction, wildlife preserves);
   c. providing for a system of justice (e.g., state civil and criminal courts);
   d. protecting the rights of individual citizens (e.g., rights guaranteed in the state constitution and laws); and
   e. promoting the common welfare (e.g., providing funds for schools, trade missions to other nations).

Four basic factors of production - land, labor, capital, and entrepreneurship (4) (6)

The three branches of state government - legislative, executive, and judicial - and their primary functions (4) (6).

Terms: (4) (6)
   The Ohio General Assembly (4)
   The State Legislature (4)
   Consumer (6)
   Producer (6)
   Supply and Demand (6)
   Monarchy (6)
   Democracy (6)
   Dictatorship (6)

Major developments in Ohio history between 1500 and 1900 AD (4)

Maps (4) (6)
   Maps of Ohio, the United States, and the world including map keys, map symbols, linear scales to measure distances, direction indicators, time zones, and major reference points or lines including the North and South Poles, the Equator, the Prime Meridian, and the Arctic and Antarctic Circles.

   On maps of Ohio, students should be able to locate or identify Lake Erie and the Ohio River.
   On maps of the United States, students should be able to locate or identify the Great Lakes, Mississippi River, Appalachian Mountains, and Rocky Mountains. (4) (6)
   On maps of the world, students should be able to locate or identify the continents and oceans.

Timelines (4) (6)
APPENDIX B
CITIZENSHIP ACTIVITIES
Citizenship Activities

1. There are nine different citizenship activities prescribed in this instructional model. In some cases, the activity can be integrated with a topic of study selected by the teacher, in other cases, the activity may actually be the topic of study. For example, statements of fact and opinion can be generated about almost any topic of study. On the other hand, examples of state and local government are most effective when government is the topic of study.

2. Activities may be teacher-led, student-led, or used in group discussion. All three methods should be used in the classroom.

3. Prompts used for the Fourth-Grade Proficiency Test in citizenship are no more than a single paragraph in length, and make frequent use of charts, maps, and graphs. Teachers should select similar materials for use in the classroom.

4. Each activity includes four examples selected from previous proficiency tests.

5. The citizenship test requires a certain amount of factual recall about Ohio history, state and local government, and geographical features. The accompanying content map is intended to identify the subject-matter content which is necessary for this test.
Citizenship Activity 1: Choose a public issue related to the topic of study. List three or more civic activities. Select the activity most closely related to the public issue.

Examples:

1. You and your friends want to improve your neighborhood. Which of the following is something you can safely do?
   A. Solve crimes
   B. Clean up litter
   C. Patch potholes

2. It is a problem to get rid of garbage and other waste. Some of this waste is dangerous if it gets into our air, water, or soil. What are two things people can do to help solve this waste problem?
   A.
   B.

3. Littering is when people carelessly throw away candy wrappers, paper cups, or other trash. What are two things you and your classmates could do about the littering in a park near your school?
   A.
   B.

4. Children and parents in the neighborhood want another playground. What can they do to get a new playground?
   A. Buy a playground
   B. Talk to community leaders
   C. Move to another neighborhood
Citizenship Activity 2: List three or more statements about the topic of study. Identify which are statements of fact, and which are statements of opinion.

Examples:

1. Which statement is an opinion rather than a fact?
   A. There are more than 1,000 poison waste sites in Ohio.
   B. The state of Ohio has passed laws to clean up the sites.
   C. These laws will cause some businesses to leave Ohio.

2. The following stories were on two television channels.
   Channel 2: A new train line has started running in central City. It runs from City Hall to the airport.
   Channel 4: A new train line in Central City runs to the airport. It should have been built many years ago.

Which channel gives the viewers an opinion? Explain why you think so.

3. Which is a statement of fact rather than opinion?
   A. Ohio has enough public schools
   B. Ohio law says that children must get schooling.
   C. Ohio’s public schools have the best teachers in the country.

4. Shirley has heard that a new public swimming pool might be built in her town. Much is being said about the pool in the newspapers and on radio and TV. Shirley wants to know what is fact and what is opinion. The following are some statements about the pool. Select one statement and tell whether it is a fact or an opinion. Explain why you think so.
   A. People should swim in lakes and rivers.
   B. A public swimming pool needs lifeguards.
   C. Taxpayers should not pay for a swimming pool.
Citizenship Activity 3: Provide a map, illustration, or timeline associated with the topic of study. List three or more statements about the map, illustration, or timeline. Select the one which is most accurate.

Examples:

1. Why is iron ore shipped from Duluth to Cleveland? (Map)
   A. To make steel
   B. To make gasoline
   C. To make aluminum

2. What event took place when Milliard Fillmore was president? (Timeline)
   A. Ohio became the 17th state.
   B. The first steamboat was on the Ohio River.
   C. The second Ohio Constitution was approved.

3. Use the graph to answer the question. The ancestors of the people of Ohio came from many places. Out of every 100 Ohioans, about how many are African Americans?
   A. 3
   B. 10
   C. 87

4. Use the chart to answer the question. Rashad Singleton just moved to Ohio. He hopes to get a teaching job. Which government department could help him get permission to teach?
   A. Department of Education
   B. Department of Highway Safety
   C. Department of Natural Resources
Citizenship Activity 4: Choose a branch of state or local government. List three or more examples from the topic of study which are associated with that branch of government.

Examples:

1. What does the legislative branch of Ohio's state government do?
   A. Makes laws  
   B. Enforces laws  
   C. Interprets laws

2. One purpose of local government is to protect people's health and safety. Name four things local government does to see that people are healthy and safe.
   A.  
   B.  
   C.  
   D.  

3. Some of the taxes collected by the Ohio state government are spent on state parks. This includes taking care of beaches and rental rowboats. Which purpose of state government deals with state parks?
   A. Providing public services  
   B. Providing a system of justice  
   C. Protecting the rights of individuals

4. Use the chart provided to answer the question:
   (1) City governments make sure there are public parks.  
   (2) City governments make sure there is police protection.  
   (3) City governments make sure there is clean water.

What do city governments do to provide places for public recreation?
   A. (1)  
   B. (2)  
   C. (3)
Citizenship Activity 5: *List three or more examples from the topic of study related to production or consumption.*

Examples:

1. Which of the following people is producing something?
   - A. Ms. Gonzales makes fishing poles.
   - B. Mr. Chung gives out fishing licenses.
   - C. Ms. Everett sells worms for fishing bait.

2. A strip of land along a river is flat. It is used for farming. What else might that land be used for? Give a reason why?

3. Coal is mined in eastern Ohio. What is coal used for?
   - A. Something to wear
   - B. Something to build
   - C. Something to burn for energy

4. Lumber cut from trees is used in making furniture. Which factor of production do trees represent?
   - A. Land
   - B. Labor
   - C. Capital
Citizenship Activity 6: *List three or more rules associated with the topic of study. Identify which are fair, and which are unfair.*

**Examples:**

1. Read the following paragraph to answer the question:

   Linda and Stefan were asked to choose games for a school party. They set the following rules:
   
   Rule 1. Everyone may take part in the game he or she chooses.
   Rule 2. Only boys may choose sides for team games.
   Rule 3. Nobody may leave the party early.

   Which rule favors one group over another?
   
   A. Rule 1
   B. Rule 2
   C. Rule 3

2. Your teacher asks each student to look up five words in the dictionary. You are one of four students who have dictionaries. What is the fair thing to do?

   A. Share your dictionary after you have completed your work.
   B. Let the best student use your dictionary and then copy her work.
   C. Look up the words slowly so you won't have to share your dictionary.

3. Which of the following playground rules is made to give everyone a fair chance?

   A. Children must play ball every day.
   B. Children must run at least two miles.
   C. Children must take turns jumping rope.

4. Derrick and Jerome are waiting in the lunch line at school. Tom comes along and cuts in front of them. Derrick and Jerome are upset with Tom. Why is what Tom did unfair?

   A. He did not wait his turn.
   B. He did not bring his lunch.
   C. He did not stand up straight.
Citizenship Activity 7: *List factual examples mentioned in the topic of study.*

Examples:

1. Read the paragraph to answer the question. Name two ways that the St. Lawrence Seaway helped people in Ohio.

2. Read the paragraph to answer the question. Give two examples of how the Amish have helped in the growth of Ohio.

3. Read the paragraph to answer the question. What are two examples of how life was different for Chaska and Winona than it is for you today?

4. Read the paragraph to answer the question. Explain how they would best work together to do the job.
Citizenship Activity 8: List contributions made to Ohio by cultural groups.

Examples:

1. Erie, Miami, and Wyandot are the names of some counties in Ohio. From which group of people do these names come?
   A. Irish Americans
   B. German Americans
   C. Native Americans

2. There are many cultural celebrations in Ohio every year. Among them are the German Village Octoberfest and the Italian Festival in Columbus. The people whose backgrounds are celebrated in these events come from
   A. Asia
   B. Africa
   C. Europe

3. Many people enjoy the Midwest Tejano Mexican Festival every year in Toledo. Which group created this event to celebrate their background?
   A. Asian Americans
   B. Native Americans
   C. Hispanic Americans

4. Use the diagram to answer the question. Choose an immigrant group from above or any other immigrant group in Ohio. Describe how they made a living in Ohio when they first came to the United States.
Citizenship Activity 9: Recall facts from Ohio History.

Examples:

1. During the colonial period, two foreign countries claimed the Ohio area. Name one of the foreign countries.

2. During the Nation-Building period, what was one event that happened to Ohio?

3. What is one way that people traveled in the Ohio area about 300 years ago?
   A. By cars
   B. By canoes
   C. By steamboats

4. Native Americans have lived in Ohio for thousands of years. Some of them were called the Delaware, the Miami, and the Shawnee. What was the name of another Native American people who lived in Ohio?
   A. The Erie
   B. The French
   C. The Spanish
APPENDIX C
READING ACTIVITIES
Reading Activities

1. There are eleven different reading activities prescribed in this instructional model. Two of the activities require students to create their own written responses. The remaining nine activities invite the teacher and students to develop possible answers to a question, and then select the best answer among those that have been suggested.

2. Activities may be teacher-led, student-led, or used in group discussion. All three methods should be used in the classroom.

3. Selections used for the Fourth-Grade Proficiency Test in reading are no more than a page or two in length, and usually include an illustration, a chart, a map, or a graph. Teachers should select similar materials for use in the classroom.

4. Each activity includes four examples selected from previous proficiency tests. The actual prompts which served as the basis for the sample questions are not included with the examples. However, two prompts are included separately to be used in practicing the prescribed reading activities.
Reading Activity 1: *Retell the story or poem.*

Examples:

1. Imagine that you are telling a friend what happened when David Campbell sent his message in a bottle. Finish retelling what happened: (Prompt) David sent a letter in a bottle when he was in Tahiti. Jimmy, who lives 2,700 miles from Tahiti,....

2. Imagine you are Miata talking to a friend. Retell the story in detail.

3. In your own words tell what happened in this poem.

4. Imagine that the other sister had written this story. What are two things she might say about her sister?
Reading Activity 2: *Use the story or poem to explain feelings.*

Examples:

1. How does Tooky feel about Kyo? Use the story to explain why you think this.
2. Would you like to have Tooky for a friend? Use the story to explain why you feel this way.
3. How does this selection make you feel about sharks? Use the selection to explain why you feel this way.
4. How does this poem make you feel? Use the poem to explain why you feel this way.
Reading Activity 3: Provide a map or illustration. List three or more statements about the map or illustration. Select the one which is most accurate.

Examples:

1. Look at the map. David's bottle floated 2,700 miles. How far is 2,700 miles? It is about the distance across

   A. New Zealand
   B. Mexico
   C. the United States

2. Look at the picture of the dance. Why can people see both the old skirt and the new?

   A. Miata is holding out the top skirt so both show.
   B. Miata is moving fast and the wind is blowing the skirts up in the air.
   C. Miata is kicking her legs up high.

3. What does the picture show you about Miata?

   A. She has forgotten the steps to the dance.
   B. She is the best dancer in the group.
   C. She wants people to see both the old and new skirts.

4. Look at the picture showing shark products. Which sentence best tells about how shark products are used?

   A. Shark products are very expensive.
   B. A shark's skin has no use and is thrown away.
   C. Doctors and nurses use shark products to help people.
Reading Activity 4: List three or more resources which might be used to learn about a person, place, or event in the story. Select the best one.

Examples:

1. If David wanted to learn the names of the islands that make up Vanuatu, which book should he use?
   - A. Snorkeling Around the World
   - B. The Atlas of the South Pacific
   - C. Tips for a Tahitian Holiday

2. What video would be likely to show you the most about Kyo’s way of life?
   - A. Living in a Land of Snow and Ice
   - B. Seals Around the World
   - C. The History of the State of Alaska

3. Suppose you wanted to hear the music that is played for folklorico. Which tape would be most likely to have this music?
   - A. Folk Music of the World
   - B. Music for Romantic Dancing
   - C. Children’s Songs and Games

4. Now that the dog has returned, which book do you think would be helpful to the speaker in the poem?
   - A. How to Train Your Dog in Thirty Days
   - B. Mammals of North America
   - C. How to Keep Your Pet at Home
Reading Activity 5: *List three or more statements about how two or more characters or events are alike, and how are they different. Select the best one.*

Examples:

1. How are David and Jimmy alike, and how are they different. Read the numbered ideas below. Fill in the diagram with the number of each idea that tells about David, about Jimmy, and about both boys. You will use each numbered idea once.

   1. Fishes with a net
   2. Lived in Singapore
   3. Likes to go snorkeling
   4. Likes to make new friends
   5. Has traveled to many far-off places

   David       Both       Jimmy

2. The writer is looking back on her childhood in this selection. How do the sisters’ feelings seem to change over the years?

   A. When young, the sisters often fought; when older, they became friends.
   B. When young, the sisters often fought; when older, they did not speak to each other.
   C. When young, the sisters were friends; when older, they often fought.

3. How is the cat different today from when the speaker first got it?

   A. From a hungry kitten, it has become a loving, happy cat.
   B. From a hungry kitten, it has become a good hunter.
   C. From a hungry kitten, it has become a prize-winning cat.

4. In the selection, how is snow like a blanket?

   A. It is good for plants and animals.
   B. It is fluffy and white.
   C. It covers and provides warmth.
Reading Activity 6: List three or more one-sentence summaries of the story, or of a main idea in the story. Select the best one.

Examples:

1. Which sentence best tells what happens in this story?
   
   A. Kyo goes for a swim with a seal named Tooky.  
   B. Kyo and a seal named Tooky become friends.  
   C. Kyo tries to follow Tooky and meet other seals.

2. Which idea from the story tells about why sharks are dangerous?
   
   A. Sharks sometimes attack people to find food.  
   B. Many different products are made from sharks.  
   C. Sharks often attack people for no good reason.

3. Why are thousands of sharks killed by people each year?
   
   A. To make them disappear from the oceans  
   B. Because they are mean, dangerous animals  
   C. For food and other products and for sport

4. Choose the sentence that best tells what this selection is about.
   
   A. Two sisters find many ways to be mean to one another.  
   B. A younger sister tries to catch up with her older sister.  
   C. A younger sister wants to take music lessons with her older sister.
Reading Activity 7: List three or more one-sentence explanations of an event in the story. Select the best one.

Examples:

1. Why did David Campbell drop his bottle into the ocean?
   A. To tell about his trip to Tahiti
   B. To see if anyone would find his message
   C. To make the ink on the message smear

2. Why does Kyo want to visit the sea with Tooky?
   A. To hunt for food
   B. To catch some fish
   C. To have an adventure

3. Why does Miata wear the old skirt?
   A. Her mother says she must.
   B. It was her mother’s.
   C. The new one is not as pretty.

4. Which sentence best tells why Miata’s mother is smiling proudly at the dance?
   A. Miata is the leader of the group.
   B. Miata is wearing the old skirt.
   C. Everyone is watching Miata.
Reading Activity 8: List three or more one-sentence explanations of a phrase in the story. Select the best one.

Examples:

1. At the beginning of the story, Kyo “inched toward” Tooky on his hands and knees.
   This means that
   A. he moved slowly and with great care.
   B. he used a ruler to find Tooky.
   C. he counted his steps moving toward Tooky.

2. What are the “spinning colors of Mexico” in the story?
   A. A pinwheel spinning on the ground
   B. The flags waving in the breeze
   C. The colors of the two skirts as Miata dances

3. The selection says that sharks and people are “important links in the chain of living things.” What does this mean?
   A. Dangerous living things are not as important as other living things.
   B. All living things are important because they are all connected.
   C. Sharks and people are more important than other living things.

4. “Great reward” means something different to the heron and the wolf. How do we know that the heron expects a different kind of reward than the one she gets?
   A. She tells the wolf she will not accept his reward.
   B. She gets angry and yells at the wolf.
   C. She asks the wolf where the reward is.
Reading Activity 9: List three or more words or phrases that might describe the feelings or characteristics of a person in the story. Select the best one.

Examples:

1. How did David feel about receiving a letter from Jimmy?
   A. Happy to get his bottle back
   B. Surprised to hear from an old friend
   C. Surprised because he did not expect anyone to find his message.

2. While the dog was gone, how do you think the speaker in the poem felt?
   A. Worried
   B. Relaxed
   C. Relieved

3. Choose the sentence that tells about Mrs. Sylvester.
   A. She likes to share stories from the past.
   B. She is patient with the neighborhood children
   C. She is neat and clean about her home.

4. In the circles write words and groups of words from the poem to tell about the cat.
   A. (prompt) loves the sun
   B.
   C.
Reading Activity 10: List three or more people who might be telling the story. Select the best one.

Examples:

1. Who is talking in this poem?
   A. Reuben Ranzo
   B. The owner of Ruben Ranzo
   C. A firefighter

2. Who is telling this story?
   A. The mother
   B. The older sister
   C. The younger sister
Reading Activity 11: *Predict three or more possible courses of action for a character or event in the story. Select the best one.*

Examples:

1. What do you think the speaker will do with Reuben Ranzo in the future?
   
   A. Watch the dog more carefully.
   B. Introduce the dog to the local firefighter.
   C. Hold a parade to celebrate the dog's return.

2. Do you think Jesse succeeded in doing what coach Riley told him to do, train for the future?
   
   A. Yes, because Jesse set junior high school records for the long jump and the high jump.
   B. Yes, because Jesse won many races throughout his life.
   C. No, because Jesse did not break any records even though he won races.

3. If the cat in this poem had a chance to go outside for a day, what do you think he would most like to do?
   
   A. Chase other cats.
   B. Sleep in the sun.
   C. Hunt with other cats.

4. What might happen to plants if they are not covered with snow during the winter?
   
   A. They would begin blooming much earlier in the spring.
   B. Animals such as chipmunks and mice would eat them.
   C. They might die because of cold winds and ice.