The University of Southern Mississippi

THE EFFECTS OF THINKING MAPS ON READING SCORES

OF TRADITIONAL AND NONTRADITIONAL

COLLEGE STUDENTS

by

Marjann Kalehoff Ball

A Dissertation
Submitted to the Graduate School
of The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

Approved:

_____
Director

_____

_____

_____

_____
Dean of the Graduate School

December 1998

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

Figure

LIST OF TABLES

vii

CHAPTER I

INTRODUCTION

The concerns with education and its support have been legendary in America. One of this country's most enduring values has been the importance attached to education with favored status bestowed on those who earn degrees in higher education. Perhaps the completion of a college education is considered the sine qua non of academic achievement and the gateway to upper mobility with its attendant privileges.

This paper is concerned with the reading instruction of traditional and nontraditional college students. A wide disparity may exist between the desire to attend college and the abilities deemed necessary to achieve the objective. Under the impetus of civil rights legislation and generous governmental and scholarship aid, for the first time many have been motivated and enabled to attend college, propelled by the good feeling that it is an American thing to do.

Although the lenient admissions policy of the past few years has represented a laudable advancement of democratic values, it is one fraught with paradoxes. As unparalleled numbers have been admitted, the perplexing problem persists

of what to do with students who do not have the attitudes,
abilities, and aspirations of what has been considered a
regular college student. Findings indicate that many
incoming freshmen do not possess adequate reading or
mathematical competencies (Fingeret, 1984), and many of them
do not perceive themselves as deficient or in need of
remediation. The functions of education, as well as
curriculum requirements and methodologies of teaching, have
been brought into question. Equality of educational
opportunity requires more than a repetition of experiences
that led to low achievement or failure in previous schooling
and which is inimical to the very raison d'etre of college
education. Brookfield (1987) cautions that the student who
is motivated to enroll in higher education as the royal road
to success but finds that one's abilities are deficient may
face crucial self-esteem difficulties.

<div align="center">Operational Definitions</div>

The following operational definitions are used
throughout the study.

Adult status – a person who has assumed primary
responsibility for oneself and usually for others and who
has concomitantly accepted a functionally productive role in
the community (Verner & Booth, 1964).

Literacy – the ability to use and comprehend written information at a level enabling one to function in society, to achieve one's goals, and to develop one's knowledge and potential.

Mapping – the use of Thinking Maps as a strategy in teaching reading.

Nontraditional students – students who are 25 years old or older or who have assumed at least one of the social roles characteristic of adult status, including (a) being primarily financially self-supporting; (b) acting as a primary caregiver for a relative(s); or (c) being married and living with spouse, or being divorced or widowed and not living with parents or receiving primary financial support from others (Cross, 1980; The University of Southern Mississippi Statistical Profile, 1993).

Status – identification of students as traditional or nontraditional.

Thinking Maps – a thinking skills program based on eight fundamental thinking processes represented and activated by semantic maps.

Traditional students – students pursuing legitimate college goals and programs who have not assumed any of the social roles characteristic of adult status.

<u>Treatment</u> – the treatment variable will have two levels: instruction in reading with mapping and instruction in reading without mapping.

Statement of the Problem

The statement of the problem being addressed in this study is made through the following questions.

1. Which students may be classified as traditional or nontraditional?

2. Will there be a significant difference in posttest reading scores between students receiving mapping and those not receiving mapping?

3. Will there be a difference in posttest reading scores between traditional and nontraditional students?

4. Will there be an interaction between treatment and status?

Purpose of the Study

Although care must be exercised in citing the need for intervention based on perceived failures and shortcomings, students who acknowledge their reading disabilities and/or their desire for improvement should be accommodated. As an instructor in a reading program, this researcher is faced with the task of helping make better readers of all who are enrolled in her courses. A broad spectrum of levels of reading ability may range from students reading at a fourth-

grade level to others who read at a 12th-grade level or beyond. However, the commonality existing among all the students is their perceived weakness in reading.

Information is needed on whether these students are traditional or nontraditional so that curriculum materials and strategies used to accommodate their perceived needs and experiential backgrounds are most appropriate and beneficial. A second major purpose is to determine whether or not a thinking skills program, specifically Thinking Maps, interwoven with the existing reading course would improve reading scores. Determination needs to be made as to how Thinking Maps might affect the scores of traditional/nontraditional students and whether or not a significant difference in test scores would result from an interaction of treatment and status.

<u>Background of the Study</u>

For purposes of clarification and perspective on this study, it is deemed advisable to present in-depth background information on three components: (a) The Emergence of Nontraditional Students, (b) Concerns in Teaching Reading to College Students, and (c) Thinking Maps.

<u>The Emergence of Nontraditional Students</u>

Although consensus exists on the importance of obtaining a college degree, little agreement is found on who

should be enabled to attend. From the beginning, students from wealthy and influential families were expected and encouraged to seek higher education. As the demands for educated and better trained workers grew out of the Industrial Revolution, it became more apparent that abilities existed among the less affluent. Assistance was offered in areas not recognized before such as for agricultural and mechanical education through the Morrill Act. The First World War contributed to an emphasis on providing educational opportunities to those with academic ability and motivation. After World War II and the return of GIs who had been exposed to limitless dreams of success, the government offered help to veterans to continue their education, as well as other incentives for persons to further their education. According to Knowles (1977), "the dam broke and out poured the flood of general support for education" (p. 291) when President Johnson led the enactment of the Higher Education Facilities Act of 1963 as well as the Civil Rights Act of 1964.

"In the 1970s several factors conspired to propel adults back into higher education" (Kett, 1994, p. 447): The emphasis on equal rights, the women's movement, and the desire to secure students from the older population as the proportion of 18-year-olds declined.

Large numbers of Baby Boomers came of age, many clamoring for admission to college. Unprecedented demands for scientific and technological competencies have pressured persons to return to formal education. Especially in lower level occupations, obsolescence of skills has resulted in tremendous reductions of jobs, forcing workers to gain new knowledge and skills. With the changes steadily taking place in the business world, new job skills will be needed several times in the lifetime of the average worker. According to Rachal (1989), the fastest growth of the decade is occurring in service and in information and technology. Fay, McCune, and Begin (1987) predict that by 2000, 80% of all United States workers will be employed in the information industry. Workers increasingly face the demands and competencies of a global economy (Naisbitt & Aburdene, 1990).

One cannot be naive enough to assume that this time and place mark the only period in history where change is disturbing and compelling. However, the rapidity of change in today's high-tech, scientific-based society, with developments surpassing the scope of any previous social revolutions, has left no choice but a continuation of education far beyond the years of youth.

Education traditionally has been assigned the role of socialization of the population. In addition to the basic,

technical foundations that need to be developed care must be exercised in preserving basic values and rights in an information society.

Because of the availability of "instant exposure" from computers, Internet, televison, and radio talk shows, as well as more traditional written means of acquiring information, it is essential that the population can read and think, as well as analyze the bombardment and impact of information. Philosophical/psychological/sociological notions concerning adults have been altered, while increased longevity has provided opportunity for personal growth and development into advanced years. The political revolution in civil rights, such as equal access to all public institutions, has encouraged students of varying levels of academic ability to apply for college admission. The admission of students not characterized by high social status and wealth or by academic merit has resulted in controversies that to date have not subsided. These atypical college students insist that anyone who wants a college education and who has the desire and ability to profit from post-high school education regardless of age, financial status, or previous academic success should be admitted and served by the colleges.

Cross (1974) has suggested that the newcomers are the "new students" and feels it is time to give attention to developing their strengths rather than concentrating on their weaknesses. She has created a profile of these new students, describing them as nervous and shy with the complaint that the academic pace is too fast. They are more uncomfortable in the traditional academic educational system than students for whom most educational experiences are designed, while they are characterized as low in academic ability with scores in the lowest third among national samples on traditional tests. They are mostly Caucasian males whose fathers never attended college and who hold blue collar jobs. Women and ethnic minorities are also included.

Motivation to go to college, generally a community college or vocational school, does not come from anticipation of what the students will learn but from the recognition that education is the way to get a better job and life than their parents had or that their present circumstances provide. Many of these students will leave school with less than a bachelor's degree. Most of them are used to failure, and while they seek ways to avoid it, they appear to do little to build a more positive self-concept.

Grades, the tangible symbols of accomplishment of school, represent the preference of the new students for

concrete rewards as opposed to more intangible ones.
Passivity in learning is common, and they freely accept
authoritarianism and traditional institutions. Most often
they seek help in problem solving before they attempt a
solution on their own. Although they are not as interested
in academic pursuits as traditional students, their
nonacademic interests are not necessarily noncognitive. The
concept of academic talent as the one most worthy of
cultivation and encouragement represents a perspective too
narrow to provide an appropriate base for the development of
a new kind of education for the nontraditional student.

More than describing the differences and shortcomings
of the new kind of students is required. Arguments over
whether these students or their former schools and teachers
should be blamed for their deficiencies are nonproductive.
The dichotomy between the philosophical and academic
positions of the college must also be addressed.
Philosophically, colleges are committed to offering
curricula which will increase knowledge, proficiency,
abilities, and skills of each student; academically, the
educational system appears to continue to demand conformity
in its concern with subject matter.

Early in the 1970s it became apparent that large
numbers of the college applicants were different from the

traditional college student. Although adults had been involved in some formal education in the past, they had never demanded access to the Halls of Ivy in such numbers.

The college population, once composed of students 18 to 22, is graying, as Apps (1989) expresses it. The United States Bureau of Census (1985) predicts that in the 1990s over half of the students will be 25 years of age or older. Beder (1989) suggests that educational programs for the nontraditional student should be based on adult education principles and proposes a set of core principles that form the basic foundation of adult education, among which may be found the statement that "although adults may or may not differ from pre-adults in respect to the basic cognitive processes of learning, the context of adult education differs substantially from the context of pre-adulthood. Hence, adults should be educated differentially from pre-adults" (p. 48).

The National Center for Education Statistics (1986) defines adult education as any course or educational activity taken part-time. Some refer to adult education within the context of the college or university as continuing education, while other forms are subsumed under the term adult education. Apps (1989) indicates that "the clear distinction that some like to make between higher

education and adult education is disappearing. For others, the distinction never existed" (p. 282).

Griffith and Fujita-Starck (1989) note that adult education is given public support when the public can see the connection between education and the solution to a threatening situation such as economic growth and social order. For example, economic opportunity as a purpose of adult education found expression in the Economic Opportunity Act of 1964 which provided the first substantial federal funding for adult literacy. Later the responsibility for adult literacy was transferred to the Office of Education.

Rachal (1989) suggests that "adult education can and should play an integral role in improving not only individuals' lives but also improving society. Adult education can promote change as well as react to it" (p. 4).

Troll (1982) bases the definition of an adult on biological, social, psychological, and existential factors. Verner and Booth (1964) suggest that an adult is a person who has assumed responsibility for oneself and usually for others and who has concomitantly accepted a functionally productive role in the community.

Concerns in Teaching Reading
to College Students

In an effort to cope with the problem of how to meet the needs of students, both traditional and nontraditional,

with perceived deficiencies, junior/community colleges have been turned to as the most appropriate institutions to handle the situation. The evolving thrust in community colleges may be in general education which focuses on developing a framework for organizing knowledge from numerous sources and for learning to think, to develop values, and to understand transitions and cultures (Shearon & Tollefson, 1989). The community college generally practices the open-door policy, permitting access to any person who seeks further education. Warren (1985) reports that more academically underprepared students are being enrolled in community colleges. At least half of the adults entering community colleges are deficient in essential basic skills, according to Roueche, Baker, and Roueche (1987). Acknowledgment generally has been made by the community colleges of the problem that some of their students are deficient in reading skills which inhibit satisfactory academic performance or vocational development. It appears that not only Johnny can't read, but Johnny, Sr., cannot either.

Reading courses at the college level attempt to improve reading proficiency as well as basic reading skills. Little change over the past 50 years has been put into effect in college reading programs in spite of reported increases in

student deficiencies. Traditionally, basic skills are taught, not reading and thinking strategies. This mode of instruction appears inadequate in preparing college students for reading, analyzing, or synthesizing since its use does not generate ideas but allows students simply to choose from among several ideas presented.

Harman (1987) and Kazemek (1984), among others, have documented the inappropriateness of much of the materials, strategies, and assessment procedures employed in college reading courses. Often the programs are based on the misconception that adults and children have the same needs and experiential bases. When mature students are taught by procedures designed for children, they are treated largely as inadequate and incomplete adults whose language needs and abilities are more like those of youngsters rather than those of their literate peers.

Perhaps the best approach to creating better readers is to guide them in acquiring their own strategies in dealing with texts. The gradual transfer of strategic control from experts, such as teachers or computers, to students so that they can progress within their expanding competency range and take charge of their own learning is the ultimate goal of a successful reading program.

One of the most encouraging trends in reading programs is the employment of thinking skills with a growing interest in developing instructional strategies to improve students' critical thinking skills and dispositions. Little consensus exists on how they should be taught; however, there is agreement that items central to critical thinking are analysis, evaluation, and inference including metacognitive or self-monitoring skills (Jones & Ratcliff, 1993). Reading improvement can result from the development and use of thinking skills (Brandt, 1990). Research by Cronin et al. (1990) supports the contention that graphic organizers lead to higher scores on reading tests. As students use graphics in networking information and constructing knowledge, they are empowered to shift from passive to interactive learning.

Groller et al. (1991) report a study indicating that metacognitive strategies help when using advance organizers which are defined as "a set of materials related to new material but written on a higher level of inclusiveness" (p. 470). The results of the study also show that the use of metacognitive strategies led to significantly higher reading scores. It is important for a teacher to "analyze one's teaching activities to find out how often students are given opportunities for developing metacognitive skills" (Casanova, 1990, p. 17).

Several reading programs have been developed with encouraging results. Project THISTLE (Thinking Skills in Teaching and Learning) has been designed to improve basic skills of college-bound high school students. Project THISTLE is interdisciplinary, focusing on thinking as an integral part of both subject area learning and basic skills development. Improvement in thinking skills is reflected in better scores on basic skills tests as well as growth rate in reading comprehension (Palladino, 1992).

The Reciprocal Teaching Program, reported by Palincsar and Brown (1984), is an example of scaffolding in the class whereby a teacher and a group of students take turns leading a dialogue concerning material they are trying to understand. The dialogue consists of spontaneous discussion and argument with four main activities: summarizing, questioning, clarifying, and predicting. These activities are intended to help students acquire strategies for attacking texts on their own through reading skills.

Another thinking skills program, Thinking Maps, is based on a metaphor of connectivism (Belenky, Clinchy, Goldberger, & Tarule, 1986). It proposes a new paradigm of knowing/thinking which synthesizes personal experiences of individuals within interpersonal and social connections in the construction of new knowledge. The Thinking Maps program

is concerned with making analogies, establishing frames of reference, describing qualities, comparing and contrasting, classifying, finding whole/part relationships, sequencing, and identifying cause and effect (Figure 1). Since these skills closely correspond to those included and emphasized in the reading course taught by the researcher of this study, they might be more efficiently acquired by the addition of the strategy of the Thinking Maps. After a review of various thinking skills programs, it was believed that Thinking Maps could enhance the reading course at the site. Following is a description and explanation of the program.

<u>Thinking Maps</u>

Thinking Maps are modeled on a set of interrelated thinking processes defined by Albert Upton (1941) in his text <u>Design for Thinking</u> and later used in a semantics course at Whittier College where students were directed to use a few diagrams to apply these processes. With the collaboration of colleagues, Upton formally produced a nonhierarchical, nonlinear thinking process model. This model was modified by Upton's colleague Richard Samson (1975).

Successes from the use of the model led to the establishment of a thinking skills publishing company,
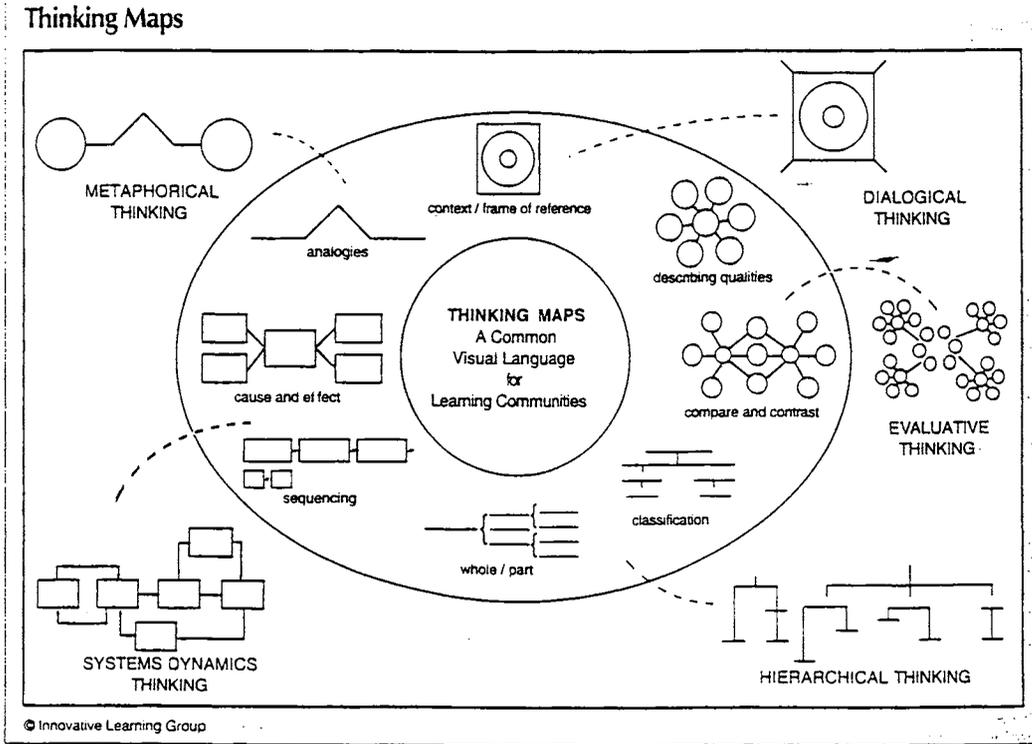
Figure 1. Components of Thinking Maps.

Innovative Sciences, Inc., which bases its materials and staff development on the Upton model. The formats used earlier, including graphic organizers, were enlarged and in the late 1980s incorporated into a program called Thinking Maps. Through the work of Hyerle and other consultants, the program has been further defined through <u>Designs for Thinking Connectively</u> (1989) and <u>Tools for Learning</u> (1995) to develop the present approach.

Thinking Maps are based on eight fundamental thinking processes represented and activated by semantic maps. The maps are introduced to the students as a related set of tools for content learning. The students are shown how to use the maps as needed, either isolated or together. As student thinking improves, knowledge of content increases, and metacognition takes place, the graphic configuration of each map becomes more complex, and many maps may be used connectively in a problem-solving task. Each Thinking Map corresponds to a single thinking process. The basic graphic designs help generate hierarchical relationships as well as a systems feedback flow as thoughts and ideas are organized.

The Thinking Maps include the Circle Map, the Bubble Map, the Double Bubble Map, the Tree Map, the Brace Map, the Flow Map, the Multi-flow Map, and the Bridge Map. The Circle Map presents various points of view and perception in

addition to defining words/objects in context. The Bubble Map describes qualities (emotional, sensory, logical) and gives characteristics, attributes, or properties to things. The Double Bubble Map compares and contrasts characteristics between and among objects. The Tree Map classifies objects/words based on likenesses and indicates relationships between main ideas and supporting points. The Brace Map shows whole-part relationships and analyzes structures. The Flow Map reveals orders, sequences, and patterns while the Multi-flow Map shows causes and effects, makes predictions, and gives possibilities. The Bridge Map is used to form analogies and to see metaphors.

Written or spoken messages in language are linear and hierarchical whereas knowledge is stored in individuals' minds in a kind of holographic structure (Novak & Gowin, 1984). Thinking maps provide a "new language" that helps students think as they verbally and visually connect ideas in holistic ways. The language of the maps explicitly links a learner's frame of reference in the construction of knowledge and provides also for the multiple modes of understanding as dialogue and perspectives are explored and constructed. Assessment, both formal and informal, is provided for through Thinking Maps techniques.

Any language needs a lexicon and syntax or a defined vocabulary and set of rules for communicating. Hyerle (1993) explains:

> Each thinking map has its own lexicon: a rectangle is a symbol communicating a stage in a sequence; a small circle within a large circle is a symbol for defining in context; a bubble extended from a circle using a line is a symbol for a quality. Each map has visual syntax from which, like an xxxxx on a geographical map, rules are used to generate simple to complex relationships. (p. 220)

The language of the Thinking Maps forms a visual basis for communicating. Every line, circle, or rectangle is meaningful and consistent. "Rectangles and arrows are used when investigating sequences. Horizontal, vertical, or diagonal lines represent hierarchical or radial categorizations. When seeking qualities, ideas are placed in the center circle and extension lines drawn with bubbles" (Hyerle, 1993, p. 206).

The Thinking Maps as tools are embedded in cognitive research. Especially helpful is the use of the frame of reference for incorporating personal, interpersonal, and social viewpoints of the students while the radial tree provides for categorizations. The Multi-flow Map displays

system dynamics, and the Bridge Map helps in forming analogies and metaphors. These incorporate "lower" and "higher" order thinking in a nonhierarchical model.

Hypotheses

The present study considered the following hypotheses stated in the null form:

H_1: There will be no significant difference in the posttest reading scores (subtests and total) of the experimental group exposed to Thinking Maps and the control group receiving no exposure to Thinking Maps.

H_2: There will be no significant difference in the posttest reading scores (subtests and total) of traditional and nontraditional students.

H_3: There will be no significant interaction between treatment (mapping/no mapping) and status (traditional/nontraditional) on the posttest reading scores (subtests and total).

Delimitations

1. Other skills and processes, in addition to those being investigated, may be employed by the participants. Knowles (1980) stated that "Human behavior is too complicated, and the variables affecting it are too numerous for us to be able to prove that it is our program alone that produces the desired change" (p. 199). Uncontrolled

variables may limit the effect of the treatment administrated in this study.

2.   The participants will be drawn from reading courses at a single site, possibly limiting extrapolations to other populations.

Assumptions

1.   Participants will respond to the items on the instruments (the Stanford Diagnostic Reading Test and the Student Questionnaire) to the best of their knowledge.

2.   Participants will respond objectively to the instruments.

Justification

It is believed that this study is justified sufficiently on the basis of two major premises.

1.   The study provides an instrument and procedure for obtaining and identifying traditional and nontraditional students placed together in a class. Differences may be found which need to be addressed.

2.   The second justification is that the use of a strategy of a thinking skills program, namely Thinking Maps, used in conjunction with the existing curriculum of the reading program, may enable students to think and read better. Since reading is a core, fundamental skill that affects every phase of education, it is essential that

students develop the skill as much as possible. As students
are provided with tools to organize their ideas on paper or
by computer, greater competency in thinking may result. As
reading comprehension is improved as structures such as
sequencing, cause/effect, and main ideas are understood, the
connective thinking induced by Thinking Maps may help
students understand the organization of and their
interpretation of a variety of materials.

CHAPTER II

REVIEW OF RELATED LITERATURE

Within the past decade or so, emphasis has been given to the necessity for creating more holistic paradigms of adult development. Perspective and direction in the study of adults have resulted from observing effects of sociocultural factors; learning, thinking, and other psychological variables; and literacy and reading skills (Dannefer & Perlmutter, 1990). Following are highlights of discussion on some influences from these variables.

Sociocultural Factors

Literacy education on a societal level involves the transmission of values as well as particular skills carried out in the context of socially diverse groups. The differences of backgrounds and experiences add to the challenge in the instruction and acculturation of various groups and must be addressed in any program of reading. Literacy cannot be understood or defined without taking into consideration the forces of culture. Literacy is a social achievement, never merely a private accomplishment, and it is constrained by social and cultural practices. Because

25

cultures are in flux, so are the definitions and consequences of literacy. Learning rarely occurs "in splendid isolation from the world in which the learner lives . . . it is intimately related to that world and affected by it" (Jarvis, 1987, p. xxx).

Culture is meaningful only in a group sense; it must be learned, and it exists only when shared. A person is socialized into certain social practices, depending on the groups in which he or she has interactions. Sociological and psychological factors influence a person as social identity is established. Social identity consists of aspects of an individual's self-image that derive from the social categories in which belonging is perceived. Socioeconomic differentials are powerful factors affecting one's identity. Cultural identity involves behaviors, beliefs, values, and norms that a person considers in defining himself or herself as a member of a particular ethnic group.

An individual does not exist outside of the contexts of group membership. Groups may be construed as communities of people sharing commonality of origin, background, or interests, while contexts refer to the specific situations in which people, regardless of origin or membership, must function. Language forms the heart of the process by which social groups are maintained and communicate; it is the sine

qua non of culture. It has been stated succinctly that culture is the <u>what</u> of a society, with language the <u>how</u> of thought.

Goodnow (1990), in his review of cognition in adults, finds a major theme of how social and cultural contexts may affect cognitive functioning. "We need to look directly for effects of cognitive socialization in the performance and measurement of individual cognitive tasks" (Keating & MacLean, 1988, p. 313). Sociocultural influences on individuals within a group show little sign of abatement; in fact, the lines may be drawn more tightly. Naisbitt and Aburdene (1990) predict a growing ethnic and cultural diversity as a megatrend of the 21st century. As the spatial, communication, and economic barriers of a global world are reduced or diminished, all that remain are the tenuous connections of group identity with some degree of security and stability. As social groups are further polarized and separated, they may become subcultures with their own language, norms, values, perceptions, and behavior.

Sociocultural factors exert influence on who will participate in adult education. Darkenwald and Merriam (1982) document that general social participation, occupational complexity, and lifestyle press one in varying

degrees toward learning and emphasize that socioeconomic status, in particular, is decisive in adult education activities.

Sociocultural forces exert powerful effects on the educational structures of a society. Rubenson (1989) feels that the formal system of adult education in North America has taken precedence over individual or informal activities, indicating "adult education" is more a force for maintaining the present power structure than it is a force for change (p. 66). Kozol (1991) declares that the economic and intellectual reproduction of socioeconomic class is linked to the educational system. An extreme position is taken by Freire (1970) as he states that empowering persons to read is a political act. Adherents of this point of view maintain that requiring illiterate adults on welfare to go to school implies that the blame rests on the illiterates for their being uneducated, poor, and unemployed rather than on the political and economic structures that limit disenfranchised groups.

It has been charged that various reading approaches discriminate against lower socioeconomic and minority groups. Knowles (1984) believes that as individuals gain the ability to read and comprehend by thinking critically and

reasoning rationally, they become powerful in control over
the forces which affect them.

Within the context of the school, a primary objective
is literacy instruction which is a powerful and empowering
means of cultural transmission. Schools, selecting what to
teach and how it is to be taught and evaluated, reaffirm
what the dominant culture values as knowledge. Throughout
history, education has stressed behaviors and attitudes as
perceived by the elite of society. Ultimately, there is no
autonomous literacy since groups exercise their influence on
what and how one reads. Different groups make different
determinations based on their perceptions, norms, and values
which are unique to specific places, situations, and times.
As part of formal schooling, students become literate in the
cultural image represented by the school. As the school
system interacts with the ethnic group, socioeconomic class,
family, peers, and mass media of its students, it may result
in congruence or conflict.

The importance of the role of sociocultural variables
between the individual and literacy cannot be denied. It has
been proposed by Hirsch (1987) that being literate means
being culturally knowledgeable. Opposition to this position
has mounted the argument that to educate all students about
a set of facts in the name of literacy education may be

interpreted as an imposition of a particular type of sociocultural identity.

Giroux and Aronowitz (1985) conclude that reform needed in education is based on schools being accepted as sites where literacy can be organized around a core curriculum. It is vital that a person can find meaning in what is read in a culturally significant way, while at the same time not be disconnected from a personal point of view. Orem (1989) proposes that the single greatest obstacle in reducing illiteracy during the 1990s will likely continue to be funding.

Learning, Thinking, and Other Psychological Variables

Much of what is written and done about learning and thinking reflects the influence of psychology. Psychology offers insights into the process of how thinking occurs and thus how thinking procedures can be taught. Thinking is not a wholly rational activity, but emotive aspects of feelings and intuitions are central (Brookfield, 1987). Emotions are inseparable from all behavior and thinking. Czikszentmihalyi (1991) suggests that one's responses are affected by the degree of feeling about a situation. It may also be noted that emotions can be quite inconsistent. Nicholson (1984) argues that perception is based on interpretation, which in turn is based on empathy.

For educators, the greatest challenge of brain research is the comprehension of the complexity and potential of the human brain, as well as the discovery about the role of emotions, stress, threats, and imagination as these conditions interact with physiological functioning (Caine & Caine, 1990, 1991). The brain ceaselessly performs many functions simultaneously with thoughts, emotions, and predispositions operating concurrently and interacting with other brain processes.

A crucial problem often arises when emotions and cognitions meet in the process of formal thinking. Formal thinking requires a high tolerance for lack of closure. When a person cannot organize his or her milieu, he or she may experience unease, even panic. The situation is especially indicative of students who have a lower tolerance for ambiguity and a past history of academic failures. These students often stay with or regress to structures which are inadequate for a symbolic processing of the world.

A common process in the development of thinking is the perception of contradictions between how the world is supposed to work and how it actually works in one's own experiences. Perspective transformation may lead to disorienting dilemmas (Mezirow, 1990), especially as the old

ways are left behind and new ways are formulated (Apps, 1985).

The contributions of psychologists to the nature of knowing, learning, and thinking cannot be underestimated. The understanding of knowledge has been based on philosophical investigations of knowing. Hergenhahn (1988) reports that it was not until the 19th century that learning was studied scientifically. Operationally, learning can be stated "as a process by which behavior changes as a result of experiences" (Maples & Webster, 1980, p. 1). Since there is little consensus on how many learning theories there are, Merriam and Caffarella (1991) have organized them into orientations: behaviorists represented by Thorndike who contributed the Stimulus Response Theory with three laws of learning--effect, exercise or repetition, and readiness--and by Skinner who introduced operant conditioning; the cognitive orientation based on work of Gestalt psychology emphasizing the whole rather than its parts and developed greatly by Piaget who proposed one's cognitive structure changes as maturational change interacts with the environment, by Ausubel (1967) who distinguishes between meaningful and rote learning, and by Bruner (1956, 1984) who emphasizes learning through discovery. The humanist orientation considers learning from the perspective of the

human potential for growth supported by Rogers (1983) who believes his client-centered therapy is similar to student-centered learning and Maslow (1970) who formulated a hierarchy of needs. A fourth orientation, social learning, perhaps is explained satisfactorily by Bandura (1972) who proposes that how people feel about themselves influences their responses which in turn influence the way they behave.

These orientations are of special significance to adult learning: behaviorists advocate reinforcement of desired behavior and can be seen in training and vocational adult education; cognitivists are interested in how information is processed, stored, and retrieved and focus on how aging affects an adult's mental structures; humanists feel that learning involves more than cognitive processes and behavior. Much of the adult learning theories of andragogy and self-directed learning are based on a humanistic stance and social learning adherents who believe that learning is a function of the interaction of the person, the environment, and behavior. Social learning theories highlight the importance of social context and encourage the processes of modeling and mentoring. "Constructivist theory draws on philosophical and psychological models of how the mind works, how human intellectual capacities emerge, how humans

derive meaning and how knowledge is structured" (Hyerle, 1996, p. vii).

Theories abound in explaining adult learning, but there is no single encompassing, comprehensive model. According to Merriam and Caffarella (1991), theories may be divided into several categories: (a) those based on adult characteristics such as Knowles' (1980) andragogy and Cross's (1981) characteristics study; Knox's (1980) proficiency theory (capability to perform involving attitude, knowledge, and skills), and Jarvis' (1987) model based on a discrepancy between biography (where a person is at a particular time) and experience (an incident a person cannot handle at the moment).

Another set of theories is based on changes in consciousness as a result of reflective thinking such as Mezirow's (1990) theory of emancipatory/transformative learning and Freire's (1970) social change theory based on the notion that education either oppresses or liberates. It is difficult to determine whether or not a theory is comprehensive to include all types of learning. Rachal (1986) suggests that the criteria of the adequacy of a theory are the practicality and the universality of its application.

Learning in adulthood can be distinguished from childhood in terms of the context, the learner, and the process with the configuration of these together making adult learning different (Merriam & Caffarella, 1991). Boucouvalas (1989) distinguishes between adult development and learning with learning being construed in narrower terms. A multidisciplinary approach to understanding adult development and learning is required in examining the forces impinging on the adult, including sociological, biological, psychological, historical, and contextual factors. Erickson (1982) uses the term "psychosocial" to indicate the dualities of self or psyche with the world as they occur at various stages of life.

Although Piaget (1972) did most of his work among children, he has laid the foundation of working with adults, and as Dewey did earlier, has contributed the notion that learning through activity is productive. Daloz (1986) and Belenky et al. (1986) have produced studies with a commonality of theme apparent: Learners involved in the studies report that educational activities most meaningful were those for which they could make a direct connection to past experiences or current concerns.

In addition to reviewing theoretical descriptions of how adults learn best, it is also important to consider the

learning/cognitive styles preferred by the adults themselves. The selected ways in which one engages in learning activities are termed learning style. Intelligence, personality, age, formal education, and previous specialized experiences contribute to the great variety of learning styles (Dunn & Dunn, 1978). Messick (1984) suggests that with age and experience, persons may develop more categorical inferential styles with more analytical ways of conceptualizing relationships.

Through formal or informal means of schools, churches, religious groups, industry, and community and civic organizations, teaching students to think remains the basic goal of any educational pursuit. The complex interplay of phenomena involved in cognitive development among adults must be explored in order to understand how thinking patterns can be changed (Merriam & Caffarella, 1991).

A number of definitions of thinking have been produced such as that of Brookfield (1987) who suggests that reflecting on assumptions underlying ideas and actions, exploring alternatives, and then making choices constitute critical thinking. Thinking cannot be finished in some final, static manner, for it is a process. De Bono (1985) feels that thinking is an operational skill that creatively can be improved. To McPeck (1981), thinking is an attitude,

a frame of mind with a propensity toward determining the
authenticity, accuracy, and worth of information or
knowledge claims. Sampson (1975) proposes that thinking is a
process of naming entities in context, identifying the
sensory, logical, emotional/aesthetic qualities of things,
and finding relationships.

McPeck (1981) makes a comparison between thought and
language. Language is not an abstract set of rules that can
be applied to any situation, but it is always about
something. The same can be applied to thinking; it is always
about something, and it always has a purpose. If a person
does not understand what is being thought about, then it
will look as if one does not know how to think. Thinking is
possible based on one's experiences and prior knowledge.

Sampson (1975) proposes that words appear to control
and guide all other phases of thinking and allow one to
symbolize things, qualities, types, parts, stages, and
abstract relations. Things are first fashioned in the mind;
therefore, by improving the use of words and by learning to
use them more skillfully, thinking is enhanced. Language is
indispensable in interpreting other symbols, while words and
nonlinguistic symbols may be utilized to make new meanings.
As new objects and concepts are invented, new meanings must
be created also. The development of knowledge can be

accelerated by learning to adapt words and other symbols to expanded structures and functions.

The traditional approach to creating a thinking student seems to be less than successful. In spite of the acceptance of the importance of learning how to think, little evidence is found of thinking instruction (Goodlad, 1984). Pogrow (1990a, 1990b) suggests that poor student performance may be due to inadequate metacognitive skills--not understanding what it means to understand something.

Rumblings of dissatisfaction with the modes of instruction have been intensified by developments such as the launching of Sputnik which led to modifications in the ways math and science are taught. Another severe jolt came to the academic community when the scathing report A Nation at Risk (1983) was published, indicating that many citizens could not read and comprehend effectively.

Assaults on the perceived failure of educational structures to improve cognitive abilities have been made. Even as the world engaged in its first world war, the explosive work of Dewey set off an educational war that has not subsided. For the first time, it was proposed that "thinking is the intentional endeavor to discover specific connections between something which we do and the consequences which result" (Dewey, 1916, p. 145). According

to Dewey, learning as thinking is a connective, reflective, and projective experience that is personally active and linked to the interpersonal and social worlds. The value of this connective experience lies in "the perception of relationships. It includes cognition in the degree it has meaning" (p. 140).

When one thinks of cognition, one thinks of Piaget (1966), another luminary in cognitive development. He proposes the idea of stages formation as explanation for changes in the internal cognitive structure which occur partly as a result of maturation and partly as a result of interactions with the environment. Piaget postulates that a force called equilibration is a basic self-regulatory mechanism of change in which thinking is dialectical and constructive. Equilibration requires balance between the binary contrasts of affirmation (focus on existing properties of objects) as opposed to negation (construction based on factors not present). The ability to construct negations allows for the reversibility of mental actions and permits thinking. If progress through dialectic demands and constructions has not occurred, the means of formal thinking will not be present.

Hilda Taba possibly may be viewed as the pioneer of the current thinking skills movement. The Taba Teaching

Strategies include the notions that thinking can be learned, and it can be taught. Thinking takes many forms as the quality of individual thinking differs (Trezise, 1972). With the support of numerous educators and cognitive psychologists, the movement has gained momentum. As reported by Costa (1985, 1991), over 30 thinking skills programs classified as teaching for, of, and about thinking were offered by the mid-1980s. It appears that thinking can be enhanced rather than constrained by the form which allows for holistic thought representing relationships in context. Graphic organizers such as flowcharts and pie diagrams contribute to metacognitive abilities as students become more aware of their general thinking skills, learning styles, problem-solving techniques, and reflection on knowledge gained. Lakoff (1987) and Fillmore (1986) emphasize the importance of personal, interpersonal, and social frames of reference on how categories are constructed. A development in cognitive science is highlighted by Lakoff (1987), a linguist, who states, "We organize our knowledge by means of structures called idealized cognitive models, or ICM's" (p. 87). In other words, our experiences in the world provide the structures to categories in language.

The cognitive position as proposed by Lakoff is novel in the sense that instead of being a "mirror of objective truth" (Rorty, 1979), individuals "generate cognitive models within the world, and over time propositions are generated within the wider context of individual and social frames. Complex metaphors, which draw from our daily interactions and ordinary language are used to develop and stabilize concepts" (Hyerle, 1993, pp. 62-63).

As the approaches to strategies for developing and improving thinking skills have increased, the critics have emerged. The progressive movement of Dewey underwent a tremendous rejection while Piaget's work has been challenged by many, such as Keil (1989). Hirsch (1987) promotes the idea of a common cultural base as a kind of objective truth as a prerequisite to thinking instruction, while Adler (1986) feels that thinking is a skill that cannot be acquired in isolation from other skills.

A controversial discussion concerns whether or not a hierarchy of thinking ranging from lower to higher orders exists. Resnick (1987) warns against the assumed thinking level to which individuals aspire is an advanced one with a prerequisite of lower level to achieve it. Another radical aspect of hierarchical arrangement is highlighted by Lipman (1991) who proposes that the hierarchical concepts of

Bloom's Taxonomy (Bloom, 1956) blend with Piagetian theory of developmental stages. Kozol (1991) and others insist that with the application into the schools of this concept, the influence of factors such as socioeconomic status, race, ethnicity, gender, and geographical location becomes more pressing on the consideration of cognitive issues.

Philosophy goes beyond psychology in giving meaning to cognitive processes. The influence of philosophical thought still provides the base of continuing debate. The use of Aristotelian logic is embodied in positivism in the process of categorizing of information into a hierarchy of groups which become "objective facts" (Wittgenstein, 1953). The objectivist view of knowledge remains the silent underpinning of relationships between teachers and students with the teacher referring to reality as if it were static and predictable (Freire, 1970). The opposite position is called subjectivist which proposes that everyone has the right of a separate, legitimate view of the world that is not affected by influences of others.

Other bitter struggles based on dichotomous categories appear to result more in confusion than solution such as content/process, progressive/traditional, genetics/environment, behavioristic/humanistic, quantitative/qualitative, figurative/literal. It seems that

it is time for individuals to incorporate dialectical, eclectic principles into paradigms rather than to remain locked behind rigidly constructed categories.

Hyerle (1993) observes that the tradition of a linear approach remains a critical problem in American educational systems. "The linear approach to communication and generation of ideas is such a fundamental practice in classroom learning that holistic or nonlinear representations are rarely apparent" (p. xx). The development of a linear concept occurred over 100 years ago, according to Buzan (1979), who says that for a very long time:

> It has been thought that man's mind worked in a linear or list-like manner . . . in speech and hearing we are restricted to one word at a time. Speech was thus seen as a linear or line-like process between people. Print was seen as even more linear. (p. 88)

Novak and Gowin (1984) observe that knowledge is stored in individuals' minds in a kind of holographic structure while their holistic patterns of ideas are most often communicated through linear representations.

The Thinking Maps help students organize new information and reorganize old information. The processing of information becomes easier because the students place new

concepts into eight familiar visual patterns and make connections to their previous experiences. In order for learning to be most effective, a framework is needed enabling students to organize data and to make sense of existing knowledge (Caine & Caine, 1994). The brain is a pattern seeker and resists information presented in isolated pieces which make no sense to the student (Jensen, 1995). Because the Thinking Maps create in the students' minds patterns which are familiar and consistent, stronger connections are made, and reading is improved. A study of readers by Bower and Morrow (1990) revealed an increase in comprehension when a reading pattern was created by the readers.

Inquiry has been made into whether or not skills learned in one area will transfer to another. Resnick and Klopfer (1989) conclude that this question cannot be answered on the basis of current research, although they suggest that the thinking curriculum joins content and skills. Successful work in reading comprehension through which students transferred self-monitoring strategies in reading across different disciplines is reported by Palincsar and Brown (1984). DiVesta (1987) observes that "the cognitive movement, rather than seeking all-encompassing laws for controlling and predicting behavior,

is directed toward miniature models of specific facets of cognition such as . . . the development of cognitive skills" (p. 229).

Some consideration needs to be given to the concept, or metaphor, of intelligence as a factor in assigning students to their appropriate thinking skills grouping. Arthur Jensen (1969) made a last-ditch stand for the idea that IQ is primarily determined by genetics, remains static over a lifetime, and can be tested. Whimbey and Lockhead (1984) were among those who have shown that intelligence can be changed, but the Jensen view still influences schools. Sternberg (1986) advanced the notion that intelligence can be taught.

The traditional single factor termed general ability or "g" factor of intelligence as espoused by Binet and Stern (Hayslip & Panek, 1989) is deemed appropriate for explaining a person's performance on different types of tests in terms of a single ability. Thorndike (1928) pioneered in the assessment of adults, challenging the notion that learning ability peaks early in life, while Wechsler (1958) further challenged the accepted notions of adult intelligence. Horn and Cattell's work (1967) has been concerned with the theory of fluid and crystallized intelligence in which "fluid" has more of the old, innate, and biologically determined concept

of IQ, whereas "crystallized" intelligence is influenced more by education and experiences, and may increase over adult years. Cross (1981) notes that as people get older, they accumulate knowledge and develop perspective and experience in the use and application of it. Cattell introduced the notion of "culture free" tests (Kalehoff, 1970). Merriam and Caffarella (1991) press for "age-fair tests" while Mensh and Mensh (1991) lament that the form and content of tests used presently to measure intelligence are culturally biased and unfair to minorities.

The idea of a single factor of intelligence, especially in adults, has been assaulted by many. Among them are found Guilford (1967) with his model of 120 factors of intelligence, Gardner (1983, 1990) with his theory of multiple intelligences, and Sternberg (1985, 1986, 1990) with a theory supporting his notion that intelligence consists not only of academic abilities but also the capacity to perform in the everyday world (the writer's grandpa called this "the common sense factor"). Still the idea of a single factor exists and must be dealt with in adult education.

As cognitive scientists and others persist in their search for better understanding of the area of knowing/learning/thinking, Gardner (1983) reports that the

cognitive scientist rests his or her discipline on the assumption that human cognitive activity must be described in terms of symbols, schemas, images, ideas, and other forms of mental representations. Lakoff and Johnson (1980) are convinced that a new paradigm is urgently needed--a paradigm of connectivism in which knowing and thinking connect the individual to larger interpersonal understanding within the context of society.

Literacy and Reading Skills

Another area of relevance for this study is literacy and reading skills. Since reading skills are considered indispensable in contemporary society, it is interesting to recall that Homo sapiens is a species that uses oral speech to communicate and by nature is not a reader or writer. Reading is not only a set of cognitive skills; it is also a set of complex relationships.

Knowledge of English is essential for integration into American society; therefore, learning to read is the essential component of entry and membership in the dominant culture. The value of high literacy standards is widely accepted with penalties exacted on those who do not possess them. The ability to read is mandated as a nationwide objective, creating expectations that good citizens can read at stipulated levels and that they possess both general and

specific knowledge relating to the contexts in which citizens function. The goal of America's educational system through the 1950s was high school graduation of as many as possible with the assumption that 12 years of schooling would be sufficient to establish functional literacy among the graduates (Copperman, 1978).

Data continue to record a large number who lack necessary literacy skills. Some appear to be functionally incompetent, unable to perform simple tasks, and many others deficient in basic skills. Kozol (1985) contends that 27 to 67 million illiterates may be found in the country; the Census Bureau (1985) placed the number between 17 million and 21 million. Kazemek (1984) states that data appear to be based on inappropriate assessment tools, while Taylor (1989) is of the opinion that the differences in studies highlight the need for clarity of requirements of adult roles and for a benchmark of functional literacy.

The fact remains, however, that national test scores for the state of Mississippi indicate its consistent rank as 50th on almost any educational assessment. The 1990 Census reports that the state lags behind the national average for high school and college graduates with only 64.3% of Mississippians over the age of 25 with a high school education and 14.7% with bachelor's degrees. Thousands in

the state apparently do not possess functional literacy, and some of these come to the researcher's classes.

Debates and disagreements continue among writers and leading educators on the issue of literacy with little consensus of its definition or incidence. Literacy as defined by the National Assessment of Educational Progress (McCuen, 1988) is the ability to use printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential.

As defined by Cooper (1997), "literacy is the ability to communicate in real-world situations which involves the abilities of individuals to read, write, speak, listen, view and think" (p. 7). These components do not develop separately, although in school-based settings students spend more time on learning isolated reading skills than on learning the types of literacy they are likely to use in real life (Guthrie & Greaney, 1991).

Three literacy scales represent distinct aspects and include prose literacy or the knowledge and skills needed to understand information from news, poems, etc.; document literacy, or the skills required to use information on job applications, maps, etc.; and quantitative literacy or the skills needed to balance a checkbook, figure out a tip, etc. The literacy problem for adults appears to be the inability

to perform at a complex level on the three scales. McCuen
(1988) concludes that "illiteracy" is not a major problem
for this population but that "literacy" for more moderate or
complex tasks does exist (p. 13).

Kirsch and Guthrie (1978) advocate the position that
literacy is a relative phenomenon, both personal and social;
it occurs in situational as well as in cultural contexts; it
depends on the reader's purposes; and it varies according to
the nature of the text. When social and cultural
backgrounds, needs, and aims of learners are ignored, a
narrow view of literacy abounds. The lack of consensus on
what literacy means continues to result in enormous
variances in data computations.

Concern about and discussion as to how to reduce and
alleviate the problem of illiteracy continue. However,
consensus does exist on the most promising approaches to
literacy education as those which focus on the use of
appropriate learning principles built upon the sociocultural
characteristics of students. These strategies recognize the
need to organize learning experiences in distinct units
relating to immediate concerns, perceptions, and motivations
of the clientele served (Harman, 1987).

Merriam and Caffarella (1991) observe that deficiency
indicates some standard or norm for measurement. An

VITA

Marjann Kalehoff Ball, daughter of Dorothy and E. Woodley Kalehoff, was born on November 16, 1950, in Philadelphia, Pennsylvania. She graduated from Rancocas Valley Regional High School, Mt. Holly, New Jersey, in 1968. The Bachelor of Science and Master of Education degrees were received from The University of Southern Mississippi in Hattiesburg, Mississippi. In 1998, she obtained the Doctor of Education degree in adult education from The University of Southern Mississippi.

She has taught kindergarten and served as a reading teacher for upper-elementary students. Presently, she is a reading/writing/critical thinking skill instructor at Jones County Junior College.

Professional memberships include Phi Delta Kappa, Mississippi Association for Developmental Education, and National Association for Developmental Education.

Marjann is married to Dennis U. Ball and has four daughters, Jennifer, Madelyn, Kaley, and Ariel; two sons-in-law, Matt and Rhye; and two grandsons, Rhen and Tallon.

acceptable level of literacy fluctuates with time and is socially determined. Generally, this level is considered appropriate when one demonstrates enough proficiency in reading and writing to attain a high school diploma.

Reading instruction consists of many facets including word recognition (sight words, phonics, structure analysis, and context clues) and comprehension skills such as locating main ideas, selecting significant details, following directions, and predicting outcomes. Work/study skills (for example, note taking, test taking, and SQ3R) and recreational reading are also components of reading instruction.

In connection with Thinking Maps, attention is directed to the following skills because of their correlation to Thinking Maps. Basic skills required in reading include defining, describing, comparing/contrasting, classifying, structuring, sequencing, identifying cause/effect, and making analogies. Disabled readers especially need instruction in structural cues such as the relationship between sentences and paragraphs.

Functions of reading include reflectiveness as personal, interpersonal, and social implications of a text are made and multiple perspectives on ideas considered. Reading is a means whereby readers discover and reflect upon

themselves as to who they are and what matters to them. The connective function is also extremely important. Persons separated in time, space, or circumstance are enabled to collaborate and exchange thoughts through the permanence of symbolic representations. Were it not for writers and readers, the heritage of the past, the happenings of the present, and the visions for the future might not be communicated or preserved.

Reading is a skill that assumes value when it enables the reader to understand what is being read. Learning from texts demands a split mental focus: Simultaneous concentration is required on both the material being read and on the learners themselves to see if they are actually learning. In short, reading is thinking. Early on, Thorndike (1928) interpreted reading as involvement in creating and thinking, not translating. The development of reading comprehension skills has always been a critical aspect of any reading program and can be taught effectively and more efficiently--if the right tools are found. Simply telling students to read more critically to understand the material world of objects and events, as well as the inner world of values and feelings, will be an empty phrase unless the symbols can be meaningfully comprehended and interpreted.

Since the ability to read covers a vast area of decoding, comprehension, and speed, identification of levels of reading skills has been necessary. A continuum of reading competency exists with a dichotomy of very literate to disabled readers, while reading comprehension may be presented in a schema of levels including literal, interpretive, and creative.

Opinions differ as to the most efficient technique in teaching reading. A prominent disputation concerns meaning-emphasis versus code-emphasis methods, but writing and thinking are not the exclusive properties of any single approach. While basic word recognition and decoding are important for early progress in reading, they are still needed even when more advanced skills are required. Although the basic reading skill of decoding may be improving, a decrease in reading comprehension scores is reported. This decline seems to be due largely to the fact that decoding skills are easier to teach and to test. Students are instructed by teachers to think and comprehend but may not be taught how or given the tools with which to perform complex maneuvers. As poor readers fall farther behind, emphasis is focused on decoding rather than on comprehension difficulties.

In the traditional sense, decoding has described the process of word identification without importance placed upon their meanings. Viewed more contemporarily, decoding is analyzing the graphic symbols with the intention of constructing meaning (Cooper, 1997, p. 14).

Generally, after the eighth grade, teachers are expected to convey content and not teach reading. If formal reading instruction is required after that point, it is clearly designated as remedial and tends to focus largely on decoding skills. Kazemek (1984) has suggested that it would be better to think of reading instruction for the nontraditional student as a dialogic process in which one adult helps another to do what one wants and needs to do. College students who enroll in reading courses usually have had limited academic success, besides lacking in the confidence needed to acquire essential skills.

Whatever strategies are selected for teaching and reading to these students, they should focus upon the students as well as utilize available resources. As the students are encouraged to take responsibility for their own learning, they may develop a more positive self-image. The role of the teacher in these courses is not so much communicating facts and information as teaching perspectives for making sense of information (Meyers, 1986). Daloz (1986)

supports the notion that the function of mentors is to support, challenge, and provide vision to their proteges. Shor (1987) feels that challenges and excitement in the climate of the classroom should be provided.

Brookfield (1986, 1987) describes the role of facilitator as one who helps students overcome their fears and poor self-images. Knowles (1984) describes facilitators as those who treat adult learners very differently from children. Three paradigms of facilitation include behaviorist, humanistic, and the critical (Brookfield, 1987) with their commonality being the willingness of the teacher (facilitator) to take risks also. When facilitators encourage learners to become independent thinkers, balancing the demands of content/process, they contribute to the improvement of the self-image of students.

Reading demands a variety of skills and problem-solving activities because reading is problem solving. Reading, like other cognitive activities, involves self-awareness and self-control which contribute to reasoning. The knowledge, awareness, and control which students have over their own thinking and learning activities is referred to as metacognition. Dewey's system of reflective thinking was really a call for metacognitive development. As readers plan their approach to the task at hand, monitor their learning

as they read, apply strategies to foster learning, evaluate and if necessary revise their approach to learning from texts, they are utilizing metacognitive skills which promote progress (Palincscar & Brown, 1984).

Summary of Influences

After the review of literature, it has become even more apparent that helping college students improve their reading proficiencies cannot be accomplished in a singular, simple fashion. The numerous concepts and their interrelationships are complex. It may be concluded that no single method is the best one, that no theory offers a complete explanation, and that no learning component or expert goes unchallenged. It is clear the search for understanding and solutions must go on.

The review has provided helpful insights into a greater understanding of the writer's students and direction for her instructional and facilitating functions. Since reading and thinking are interwoven, a productive mode of instruction appeared to be combining a thinking skills program, Thinking Maps, into the context and methodology of the reading course at the site.

Accordingly, a study was set up for two semesters in the reading classes of the writer to determine whether or

not the use of Thinking Maps would make a difference in

reading scores.

CHAPTER III

METHODOLOGY

The present study was designed to assess the effects of the inclusion of Thinking Maps in an existing reading instruction program on reading test scores. The data were also analyzed to ascertain if the effects of the use of Thinking Maps were the same for traditional and nontraditional students.

Description of the Site

The researcher is a member of the faculty of a junior college as a reading/study skills instructor. The college serves an eight-county radius in a predominantly rural, small community setting. Approximately 4,500 students, both in-residence and commuter, attended the college during the 1997-1998 school year. The college follows the open-door policy, encouraging the enrollment of students with diverse competencies and goals. A 2-year academic degree is offered, based on the satisfactory completion of 64 hours of credit. The programs meet most requirements for transfer of credit to 4-year colleges or technical schools. Also available is a

58

broad-based 2-year program of occupational/technical/ vocational education.

The college is one of the largest community colleges in the state and enjoys an enviable position because of its numerous outstanding alumni. At the same time, the college leadership has recognized deficiencies among some of the students in reading skills based on American College Test (ACT) scores.

Participants in the Study

Each semester the college offers courses designed to help develop and/or improve reading skills. Students are not required to take a reading class; and for those who choose to do so, no entry or placement tests are required. It is only upon disabilities perceived by the student or upon recommendation of an advisor that a person may enroll voluntarily.

Students are placed in reading classes according to their schedule needs. Placement is not based on reading scores with the result of a wide range of reading abilities existing in a single class. In addition, a class may be composed of both traditional and nontraditional students.

Procedures

By random selection in the fall semester 1997, four classes were chosen, two from the morning session and two

from the afternoon session, to participate in the study. The procedure was repeated for the spring semester 1998 to secure an adequate sampling of 92 students.

During each semester two of the four classes were designated as the control group and two as the experimental group. For each group one class was selected from the morning session and one from the afternoon session to reduce bias which might occur because of the time of day. Instruction for both groups was as nearly identical as possible. The skills of describing qualities, comparing/contrasting, classifying, finding whole/part relationships, sequencing, cause/effect, making analogies, and establishing frames of reference were emphasized in both groups to meet the course requirements of developing vocabulary and improving reading comprehension. The only difference in the treatment was the use of Thinking Maps interwoven with the curriculum for the experimental group.

At the beginning of each semester, both groups were administered the Stanford Diagnostic Reading Test, Form G. At the end of each semester, the Stanford , Form H, was given.

In order to determine whether a student could be categorized as traditional or nontraditional, a questionnaire, prepared by the writer, was administered to

the participants at the beginning of the semester. This identification was necessary so that analysis could be made to find out whether or not a traditional/nontraditional student status would affect test scores.

Treatment

The experimental group was instructed with mapping while the control group was not exposed to the Thinking Maps. Both groups were instructed identically, as nearly as possible, by the same instructor in the regularly prescribed course curriculum. A detailed explanation of instructional methods used in the two groups may be found in Appendix B.

Instrumentation

The instruments selected for the investigation included the Student Questionnaire and the Stanford Diagnostic Reading Test, Forms G and H, Blue Level.

Student Questionnaire

The questionnaire (see Appendix C) was designed to collect information on the participants. It included categories of sex, race, age, marital status, and previous education. Also, inquiries were made as to whether or not the participant lives at home with his/her parents, is responsible for own support, has children, and is employed while attending college.

The questionnaire was given to the students during class time in the first week of the semester and was coded with the reading test to protect the identity of the participant. Students were classified as nontraditional if they were 25 years old or older or if they had assumed at least one of the social role characteristics of adult status, including (a) being primarily financially self-supporting; (b) acting as a primary caregiver for a relative(s); or (c) being married and living with spouse, or being divorced or widowed and not living with parents or receiving primary financial support from others. Traditional status was given to all other students enrolled in the reading course.

The Stanford Diagnostic Reading Test, Form G and Form H

The Stanford Diagnostic Reading Test (SDRT) Third Edition, Blue Level, was selected for the reading test. Form G was used as the pretest which was administered to the students in a classroom setting during the first week of the semester. Form H was given to the students in a class setting during the final week of the course as the posttest.

The SDRT yields information on a student's skills in reading comprehension, vocabulary, fast reading, phonetic analysis, structural analysis, word parts, and skimming/scanning. Since these areas correlate with the

objectives formulated for the reading course at the site, this instrument was deemed appropriate for the testing.

According to the <u>Eighth Mental Measurements Yearbook</u> (1978), the blue level of the SDRT was added in 1974 to use with community college students. The primary purpose of the test is to diagnose pupils' strengths and weaknesses in reading.

> The SDRT has few peers among group diagnostic reading tests. Technical characteristics seem to be highly satisfactory--K-R 20 reliabilities range from .79 to .98 for the various subtests across levels, with a vast majority of the coefficients exceeding .90. (p. 777)

The tests, composed of objective type items, were scored by hand.

Analysis of Data

The present study considered three hypotheses:

H_1: There will be no significant difference in the posttest reading scores (subtests and total) of the experimental group exposed to Thinking Maps and the control group receiving no exposure to Thinking Maps.

H_2: There will be no significant difference in the posttest reading scores (subtests and total) of traditional and nontraditional students.

H_3: There will be no significant interaction between treatment (mapping/no mapping) and status (traditional/nontraditional) on the posttest reading scores (subtests and total).

The hypotheses concerning the reading subtests were tested by using a two-way (treatment by status) multivariate analysis of covariance (MANCOVA) using Wilk's lambda criterion with level of significance set at .01. A univariate two-way (treatment by status) analysis of covariance was used to examine differences in the total posttest reading scores.

CHAPTER IV

ANALYSIS OF DATA

The subtest data were analyzed using a two-way status (traditional/nontraditional) by treatment (mapping/no mapping) multivariate analysis of covariance (MANCOVA) using Wilk's lambda criterion. The significance level for all tests was set at .01.

Table 1 presents the results of the MANCOVA. Statistically significant main effects were found for treatment ($p \leq .01$). There were no significant main effects for status, nor was there a significant interaction between treatment (mapping/no mapping) and status (traditional/nontraditional).

To determine on which variables the mapping group differed, univariate comparisons were carried out on the fast reading, phonics, comprehension, scanning, structure, vocabulary, and word parts subtest scores (Table 2). Significant differences at the .01 level were found for the five variables of fast reading, comprehension, structure, vocabulary, and word parts. No statistically significant

Table 1

Summary of Results of MANCOVA

Source	df	F	p	Eta^2
Pre	7/81	106.31	≤.01	.90
Treatment (T)	7/81	15.09	≤.01	.57
Status (S)	7/81	0.54	N.S.	
Treatment by Status	7/81	2.24	N.S.	

difference was found for phonics and scanning. Adjusted
group means are presented in Table 3.

The results of the univariate treatment by status
analysis of covariance for the total reading scores are
presented in Table 4. As with the multivariate analysis,
only the main effects for treatment were statistically
significant. No statistically significant effects were found
for status nor was the interaction between treatment and
status statistically significant.

Examination of the means of the mapping and no mapping
groups indicated that the mean of the mapping group was
higher than the no mapping group (see Table 3). Descriptive
statistics including the cell means, standard deviations,
and sample sizes for the seven subtest variables are
presented in Appendix C.

<u>Tests of Hypotheses</u>

In Hypothesis 1 it was predicted in the null form that
there would be no significant difference in the posttest
reading scores (subtests and total) of the experimental
group and the control group. Based on the analysis of the
MANCOVA, statistically significant main effects were found
for the treatment group ($\underline{p} \leq .01$) and .57 of Eta^2 indicated
strong effects for the treatment. Univariate comparisons
made on the seven subtest variables indicated significant

Table 2

Summary of Results of Univariate Comparisons of Mapping and No Mapping Groups

Variable	df	MS	MSE	F	p	eta^2
Fast Reading	1/87	443.25	23.26	19.06	<.01	.180
Phonics	1/87	0.34	37.16	0.00	n.s.	
Comprehension	1/87	184.29	24.84	7.42	<.01	.079
Scanning	1/87	31.34	15.82	1.98	n.s.	
Structure	1/87	56.20	6.75	8.33	<.01	.087
Vocabulary	1/87	64.40	6.71	9.60	<.01	.099
Word Parts	1/87	127.06	6.73	18.89	<.01	.128

Table 3

Adjusted Estimated Means for Treatment and Status Groups

Dependent Variable	Treatment	Adj. Mean	Status	Adj. Mean
Fast Reading Post	mapping	19.38	traditional	17.40
	no mapping	14.77	nontraditional	16.76
Phonics Post	mapping	18.32	traditional	17.81
	no mapping	14.45	nontraditional	18.96
Comprehension Post	mapping	47.79	traditional	46.08
	no mapping	44.82	nontraditional	46.53
Scanning Post	mapping	19.80	traditional	19.42
	no mapping	18.57	nontraditional	18.95
Structure Post	mapping	25.66	traditional	24.62
	no mapping	24.02	nontraditional	25.06
Vocabulary Post	mapping	25.00	traditional	23.94
	no mapping	23.25	nontraditional	24.32
Word Parts Post	mapping	22.13	traditional	21.21
	no mapping	19.66	nontraditional	20.58
Total	Mapping	178.089	Traditional	170.483
	No Mapping	165.564	Nontraditional	171.170

Table 4

Summary of Results of Analysis of Covariance: Total

Postscores

Source	df	Mean Square	F	Sig.	Eta^2
Pre	1	49536.70	696.74	<.01	.89
Treatment	1	4413.55	62.08	<.01	.42
Status	1	9.98	.14	n.s.	
Treatment by Status	1	.28	.04	n.s.	
Error	87	71.10			

differences at the .01 level for five of the variables: Fast reading, comprehension, structure, vocabulary, and word parts. The mapping group outperformed the no mapping group on five of the seven variables. The means of the mapping group were higher than the no mapping group. The analysis of covariance showed a significant difference of $p \leq .01$ in the total posttest reading scores of the treatment group. Therefore, Hypothesis 1 was rejected.

Hypothesis 2 predicted that there would be no significant difference in the posttest reading scores based on status (traditional and nontraditional). No significant main effects for status were found through either the multivariate or univariate analyses. Therefore, Hypothesis 2 was not rejected.

Hypothesis 3 indicated that there would be no significant interaction between treatment (mapping/no mapping) and status (traditional/nontraditional). The two-way status by treatment multivariate analysis of covariance showed that there was no significant interaction between treatment and status. The univariate treatment by status analysis of covariance for the total posttest reading scores found no statistically significant interaction between treatment and status. Therefore, Hypothesis 3 was not rejected.

In summation, the tests found that exposure of a group to the strategy of Thinking Maps had statistically significant effects on posttest reading scores. There were no statistically significant differences in the posttest reading scores (subtests and total) based on the status of students. There was no significant interaction between treatment and status on the subtests and total posttest reading scores.

Findings of the Questionnaire

It was found that 25 males and 67 females participated in the study. There were 43 nonwhite and 49 white respondents.

APPENDIX A

STUDENT QUESTIONNAIRE

Please check or respond to appropriate category.

1. Sex: Male_____   Female_____

2. Race: Nonwhite_____   White_____

3. Age: Below 18_____   18-24_____   25-31_____
              32-38_____   39-45_____   46-52_____
              Over 52_____

4. Marital Status:
    Married_____   Single_____   Divorced_____   Widowed_____

5. Previous Education:
    8th grade or below_____
    Some high school_____
    High school graduate_____
          Year of graduation_____
          Location of high school_____
    Date of entry into college_____

6. Do you live at home with your parents at the present time?
    Yes_____   No_____

7. Are you responsible for your own support?
    Yes_____   No_____

8. Do you have children?   Yes_____   No_____
    If yes, how many?_____

9. Are you responsible for supporting the children?
    Yes_____   No_____

10. Employment - How much have you worked during the past year?
    None_____   Less than 3 months_____
    4 to 8 months_____   9 to 12 months_____

11. Are you employed now in addition to attending college?
    Yes_____   No_____
    If yes, how many hours per week are you employed?_____

APPENDIX B

DESCRIPTION OF TREATMENT

LESSON PLAN USING THINKING MAPS QUESTIONS SHEET

During the 16-week semester, many reading skills were taught. For the purpose of this study, these reading skills were taught to both the experimental and control groups with the only difference being the use of Thinking Maps to teach and reinforce the reading skills in the experimental group.

For the first 8 weeks of the semester, students in the experimental group were taught a reading concept using a Thinking Map while the control group was taught the same reading concept without the use of a Thinking Map. A short introduction of each Thinking Map was given at the beginning of each week with the reading concept for that week integrated into that Thinking Map. Only one Thinking Map was introduced per week with the sequence of maps being Circle, Bubble, Double Bubble, Tree, Brace, Flow, Multi-flow, and Bridge.

After the first 8 weeks of instruction in the experimental group, any Thinking Maps that were appropriate for the reading concept being taught were implemented. Thinking Maps were modeled by the instructor during lectures and used regularly by the students for homework assignments, projects, and assessments. Modeling, questioning, and reinforcing of the maps were essential as the students learned to use the tools.

The following plan was used:

Lesson Plans

Week	Control Group	Experimental Group
1	Building vocabulary How words come into our culture	Building vocabulary with Circle Map How words come into our culture using Circle Map
2 & 3	Context clues Related words	Context clues using Bubble Map Related words using Double Bubble Map
4	Figurative language	Figurative language using Tree Map
5	Parts of a textbook SQ3R & PQRST	Parts of a textbook using Brace Map SQ3R & PQRST using Brace Map
6	SQ3R & PQRST with textbook of choice	SQ3R & PQRST with textbook using How Map
7	Prediction and point of view	Prediction and point of view using Multi-flow Map
8	Analogies	Analogies using Bridge Map
9	Test-taking strategies	Test-taking strategies using Circle Map and Tree Map
10	Analyzing through structure	Analyzing through structure using Tree Map and Brace Map
11	Main idea and supporting details	Main idea and supporting details using Tree Map
12	Critical reading Fact and opinion	Critical reading: Fact and opinion using Double Bubble Map
13	Critical reading Propaganda	Critical reading Propaganda using Tree Map and Multi-flow
14	Recreational reading	Recreational reading with Thinking Maps
15	Reading selections	Reading selections with Thinking Maps
16	Reading selections	Reading selections with Thinking Maps

Metacognitive Questions and Thinking Processes Used With Thinking Maps

Questions from Texts, Teachers and Tests	Thinking Processes	Thinking Maps as Tools	
How are you defining this thing or idea? What is the context? What is your frame of reference?	DEFINING IN CONTEXT	Circle Map	
How are you describing this thing? Which adjectives would best describe this thing?	DESCRIBING QUALITIES	Bubble Map	
What are the similar and different qualities of these things? Which qualities do you value most? Why?	COMPARING and CONTRASTING	Double Bubble Map	
What are the main ideas, supporting ideas, and details in this information?	CLASSIFYING	Tree Map	
What are the component parts and subparts of this whole physical object?	PART-WHOLE	Brace Map	
What happened? What is the sequence of events? What are the substages?	SEQUENCING	Flow Map	
What are the causes and effects of this event? What might happen next?	CAUSE and EFFECT	Multi-Flow Map	
What is the analogy being used? What is the guiding metaphor?	SEEING ANALOGIES	Bridge Map	
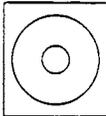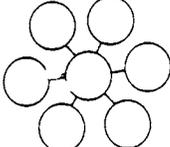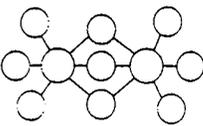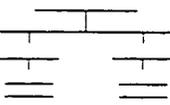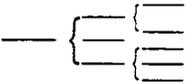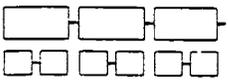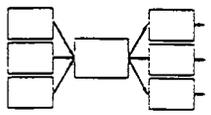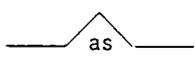
INNOVATIVE LEARNING GROUP

Hyerle, (1996)

Week One
Circle Map

other
cultures

technology

acronyms

combining
morphemes

words
come into
our culture

slang

initials
and
letters

people's
names

blending

products

borrowing

Beauty
and the
Beast

red

Titanic

colorful

love

difficult
to grow

happiness

sweet

Valentine's
Day

delicate

fragile

Rose

get up

soft

fragrant

name

forgiveness

prickly

football

song

hyond

Week Two: Bubble Map

committed

feisty

disenchanted

beautiful

Rose in
Titanic

brave

romantic

classy

cultured

unhappy

lovestruck

Week Three: Double Bubble Map

one on
one

teaching

vocational

help

tutoring

training

group

academic

intense

military

hands-on

Week Four: Tree Map

Figurative Language

Simile	Metaphor	Personification	Allusion	Idiom
The runner is like a rocket.	The runner is a rocket.	The stairs groaned under the man's weight.	Beam me up, Scotty.	Get lost.
The student is as sharp as a tack.	The children are angels.	The moonbeams danced on the lake.	The nursing student is a modern day Clara Barton.	Time flies.
The parking lot is like a sardine can.	The soldier is a lion in battle.	Money talks.	The East Building is in Never Never Land.	It's raining cats and dogs.

Week Five: Brace Map

SQ3R {
Survey
Question
Read
Recite
Review

unhappily {
un
happy
ly

Week Five: Brace Map

textbook

- title page
- copyright page
- chapter
  - chapter title
  - chapter introduction
  - headings
  - subheadings
  - bold-faced words
  - graphics
  - study questions
  - references
- glossary
- appendix
- preface
- table of contents
- index

Week Six: Flow Map

| Survey | → | Question | → | Read | → | Recite | → | Review |

Week Seven: Multi-Flow Map

Using Thinking Maps → Making an "A" on the reading test → Getting a higher GPA

Being a good listener → Making an "A" on the reading test → Builds self confidence

Studying → Making an "A" on the reading test → Reinforces study habits

Paying attention in class → Making an "A" on the reading test → Family is proud.

Taking accurate notes → Making an "A" on the reading test

Week Eight: Bridge Map

was the tyrant in
————————
Relating Factor

Napoleon —/as\— Hitler
————————
Animal Farm   Germany

APPENDIX C

DESCRIPTIVE STATISTICS

FAST READING

	MAPPING	TRAD.	Group Mean	Std. Deviation	Sample Size
FASTPOST	mapping	traditional	19.15	5.33	20
		nontraditional	20.65	6.60	31
		Total	20.06	6.12	51
	no mapping	traditional	14.08	5.79	24
		nontraditional	13.71	4.57	17
		Total	13.93	5.26	41

PHONETIC ANALYSIS

	MAPPING	TRAD.	Group Mean	Std. Deviation	Sample Size
PHONPOST	mapping	traditional	18.30	7.49	20
		nontraditional	19.81	8.09	31
		Total	19.22	7.82	51
	no mapping	traditional	15.13	7.73	24
		nontraditional	19.29	6.44	17
		Total	16.85	7.43	41

COMPREHENSION

	MAPPING	TRAD.	Group Mean	Std. Deviation	Sample Size
COMPOST	mapping	traditional	46.45	5.44	20
		nontraditional	50.87	6.52	31
		Total	49.14	6.44	51
	no mapping	traditional	43.08	9.51	24
		nontraditional	43.59	7.35	17
		Total	43.29	8.59	41

SCANNING

	MAPPING	TRAD.	Group Mean	Std. Deviation	Sample Size
SCANPOST	mapping	traditional	19.40	4.41	20
		nontraditional	21.42	6.51	31
		Total	20.63	5.81	51
	no mapping	traditional	17.58	5.66	24
		nontraditional	17.47	4.35	17
		Total	17.54	5.09	41

STRUCTURAL ANALYSIS

	MAPPING	TRAD.	Group Mean	Std. Deviation	Sample Size
STRUPOST	mapping	traditional	25.70	2.52	20
		nontraditional	26.06	2.35	31
		Total	25.92	2.40	51
	no mapping	traditional	22.88	3.78	24
		nontraditional	24.41	2.98	17
		Total	23.51	3.52	41

VOCABULARY

	MAPPING	TRAD.	Group Mean	Std. Deviation	Sample Size
VOCPOST	mapping	traditional	24.00	2.85	20
		nontraditional	26.81	3.73	31
		Total	25.71	3.65	51
	no mapping	traditional	22.67	3.67	24
		nontraditional	22.47	3.99	17
		Total	22.59	3.75	41

WORD PARTS

	MAPPING	TRAD.	Group Mean	Std. Deviation	Sample Size
WRDPOST	mapping	traditional	21.15	4.20	20
		nontraditional	23.97	3.87	31
		Total	22.86	4.20	51
	no mapping	traditional	19.96	3.41	24
		nontraditional	17.88	3.41	17
		Total	19.10	3.52	41

REFERENCES

Adler, M. (1986, September 17) Why critical thinking programs won't work. Education Week, p. 32.

Apps, J. W. (1985). Improving practice in continuing education. San Francisco: Jossey-Bass.

Apps, J. W. (1989). Providers of adult and continuing education: A framework. In S. B. Merriam & P. M. Cunningham (Eds.), Handbook of adult and continuing education (pp. 275-286). San Francisco: Jossey-Bass.

Ausubel, D. P. (1968). Educational psychology: A cognitive view. New York: Holt, Rinehart, & Winston.

Bandura, A. (1992). Self-efficacy mechanism in sociocognitive functioning. Paper presented at the annual meeting of the American Educational Research Association.

Beder, H. (1989). Purposes and philosophies of adult education. In S. B. Merriam & P. M. Cunningham (Eds.), Handbook of adult and continuing education (pp. 37-49). San Francisco: Jossey-Bass.

Belenky, M. F., Clinchy, B. M., Goldberger, N. R., & Tarule, J. (1986). Women's ways of knowing. New York: Basic Books.

92

Bloom, B. S. (Ed.). (1956). Taxonomy of educational objectives handbook I: Cognitive domain. New York: McKay.

Boucouvalas, M. (1989). Adult development and learning. In S. B. Merriam & P. M. Cunningham (Eds.), Handbook of adult and continuing education (pp. 183-200). San Francisco: Jossey-Bass.

Bower, G. H., & Morrow, D. G. (1990). Mental models in narrative comprehension. Science,

Brandt, R. (1990, February). On knowledge and cognitive skills: A conversation with David Perkins. Educational Leadership, 47, 50-53.

Brookfield, S. (1986). Understanding and facilitating adult learning. San Francisco: Jossey-Bass.

Brookfield, S. (1987). Developing critical thinkers. San Francisco: Jossey-Bass.

Bruner, J. (1956). A study of thinking. New York: Wiley.

Bruner, J. (1984). Narrative and paradigmatic modes of thought. Toronto: American Psychological Association.

Buros, O. K. (1978). The eighth mental measurements yearbook. Highland Park, NJ: Gryphon Press.

Buzan, T. (1979). Use both sides of your brain. New York: E. P. Dutton.

Caine, R. M., & Caine, G. (1990, October). Understanding a brain-based approach to learning and teaching. Educational Leadership, 48(2), 66-70.

Caine, R. M., & Caine, G. (1991). Making connections: Teaching and the human brain. Alexandria, VA: Association for Supervision and Curriculum Development.

Casanova, V. (1990, January). Helping kids learn how to learn. Instructor, pp. 16-17.

Cattell, R. B. (1987). Intelligence: Its structure, growth and action. Amsterdam: North-Holland.

Cooper, F. D. (1997). Literacy. Boston: Houghton Mifflin.

Copperman, P. (1978). The literacy hoax. New York: William Morrow.

Costa, A. L. (Ed.). (1985, 1991). Developing minds. Alexandria, VA: Association for Supervision and Curriculum.

Cronin, H., Meadors, D., & Sinatra, R. (1990). Integrating computers, reading, and writing. Educational Leadership, 63(8), 57-62.

Cross, K. P. (1974). Beyond the open door. San Francisco: Jossey-Bass.

Cross, K. P. (1981). Adults as learners: Increasing participation and facilitating learning. San Francisco: Jossey-Bass.

Czikszentmihalyi, M. (1991). Flow: The psychology of optimal experience. New York: Harper Perennial.

Daloz, L. A. (1986). Effective teaching and mentoring: Realizing the transformational power of adult learning experiences. San Francisco: Jossey-Bass.

Dannefer, D., & Perlmutter, M. (1990, May/June). Development as a multidimensional process. Human Development, 33, 108-137.

Darkenwald, G. G., & Merriam, S. B. (1982). Adult education: Foundations of practice. New York: Harper & Row.

de Bono, E. (1985). Six thinking hats. Boston: Little, Brown, & Company.

Dewey, J. (1916, 1948). Democracy and education. Ontario: Collier-Macmillan.

Divesta, F. J. (1987). The cognitive movement and education. In J. Glover & R. Ronning (Eds.), Historical foundations of education (p. 229). New York: Plenum.

Dunn, R., & Dunn, K. (1978). Teaching students through their individual learning styles: A practical approach. Reston, VA: Reston.

Erickson, E. H. (1982). The life cycle completed. New York: Norton.

Fillmore, C. (1986). Frames and the semantics of understanding. In Quadernia di Semantica, 6(2), 222-253.

Fingeret, A. (1984). <u>Adult literacy education</u> (Information Series No. 284). Columbus, OH: ERIC Clearing House on Adult, Career, and Vocational Education.

Freire, P. (1970). <u>Pedagogy of the oppressed.</u> New York: Herder & Herder.

Gardner, H. (1983). <u>Frames of mind.</u> New York: Basic Books.

Gardner, H. (1990, September). <u>Art and intelligence: A personal perspective.</u> Keynote address presented at the Human Spirit: The Arts in Education, Greeley, CO.

Giroux, H. A., & Aronowitz, S. (1985). <u>Education under siege.</u> South Hadley, MA: Bergin & Garvey.

Goodlad, J. I. (1984). <u>A place called school.</u> New York: McGraw-Hill.

Goodnow, J. J. (1990, May/June). Using sociology to extend psycho-social accounts of cognitive development. <u>Human Development, 33,</u> 81-107.

Griffith, W. S., & Fujita-Starck, P. J. (1989). Public policy and financing of adult and continuing education. In S. B. Merriam & P. M. Cunningham (Eds.), <u>Handbook of adult and continuing education</u> (pp. 168-180). San Francisco: Jossey-Bass.

Groller, K. L. Kender, J. P., & Honeyman, D. (1991). Does instruction on metacognitive strategies help use advance organizers? Journal of Reading, 34(6), 470-473.

Guilford, J. P. (1967). The nature of human intelligence. New York: McGraw-Hill.

Guthrie, J. T., & Greaney, V. (1991). Literacy acts. In P. Barr, M. L. Kamil, P. Mosenthal, & P. D. Pearson (Eds.), Handbook of reading research (vol. 2, pp. 68-96). New York: Longman.

Harman, D. (1987). Illiteracy: A national dilemma. New York: Cambridge Book.

Hayslip, B., & Panek, P. (1989). Adult development and aging. New York: Harper and Row.

Hergenhahn, B. R. (1988). An introduction to theories of learning (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Hirsch, E. D., Jr. (1987). Cultural literacy. Boston: Houghton Mifflin.

Horn, J. L., & Cattell, R. B. (1967). Age differences in fluid and crystallized intelligence. Acta Psychologica, 26, 107-129.

Hyerle, D. (1989). Expand your thinking. Cary, NC: Innovative Sciences.

Hyerle, D. (1993). Show your thinking. Cary, NC: Innovative Sciences.

Hyerle, D. (1994). Thinking Maps: Tools for learning. Cary, NC: Innovative Learning Group.

Hyerle, D. (1995). Thinking maps as tools for multiple modes of understanding. Unpublished doctoral dissertation, University of California, Berkeley.

Hyerle, D. (1996). Visual tools for constructing knowledge. Alexandria, VA: Association for Supervision.

Jarvis, P. (1987). Adult learning in the social context. London: Croom Helm.

Jensen, A. (1969). How much can we boost IQ and scholastic achievement? Harvard Educational Review, 39, 1-123.

Jensen, E. (1995). The learning brain. San Diego, CA: Turning Point Publishing.

Jones, E., & Ratcliff, G. (1993). Critical thinking skills for college students. University Park, PA: National Center on Postsecondary Teaching, Learning, and Assessment.

Kalehoff, D. W. (1970). Selected personal characteristics of the adult basic education student. Unpublished doctoral dissertation, Mississippi State University, Starkville, MS.

Kazemek, F. E. (1984). Adult literacy education. Cheney: Department of Education, Eastern Washington University.

Keating, D. P., & MacLean, D. J. (1988). Reconstruction in cognitive development: A post-structuralist agenda. In P. B. Baltes, D. L. Featherstone, & R. M. Lerner (Eds.), Life span development and behavior (p. 313). Hillsdale, NJ: Erlbaum.

Keil, F. C. (1989). Concepts, kinds, and cognitive development. Cambridge, MA: MIT Press.

Kett, J. F. (1994). The pursuit of knowledge under difficulties. Stanford: Stanford University Press.

Kirsch, I., & Guthrie, J. (1977-78). The concept and measurement of functional literacy. Reading Research Quarterly, 13(4), 485-507.

Knowles, M. S. (1977). The adult education movement in the U.S. Huntington, NY: Krieger.

Knowles, M. S. (1980). The modern practice of adult education: From pedagogy to andragogy. Englewood Cliffs, NJ: Prentice-Hall.

Knowles, M. S. (1984). Andragogy in action. San Francisco: Jossey-Bass.

Knox, A. B. (1980, October). Proficiency theory of adult learning. Contemporary Educational Psychology, 5, 378-404.

Kozol, J. (1985). Illiterate America. New York: Doubleday.

Kozol, J. (1991). Savage inequalities. New York: Crown.

Lakoff, G. (1987). Women, fire, and dangerous things. Chicago: University of Chicago Press.

Lakoff, G., & Johnson, M. (1980). Metaphors we live by. Chicago: University of Chicago Press.

Lipman, M. (1991). Thinking in education. Cambridge: Cambridge University press.

Maples, M. F., & Webster, J. M. (1980). Thorndike's connectionism. In G. M. Gadza & R. J. Corsini (Eds.), Theories of learning (p. 1). Itasca, IL: Peacock.

Maslow, A. H. (1970). Motivation and personality (2nd ed.). New York: Harper & Row.

McCuen, G. E. (1988). Illiteracy in America. Hudson, WI: Gem Publications.

McPeck, J. E. (1981). Critical thinking and education. Oxford, England: Marten Robertson.

Mensh, E., & Mensh, H. (1991). The IQ mythology. Carbondale, IL: Southern Illinois University Press.

Merriam, S. B., & Caffarella, R. S. (1991). Learning in adulthood. San Francisco: Jossey-Bass.

Messick, S. (1984, Spring). The nature of cognitive styles. Educational Psychologist, 19(2), 59-74.

Meyers, C. (1986). Teaching students to think critically. San Francisco: Jossey-Bass.

Mezirow, J., & Associates. (1990). <u>Fostering critical reflection in adulthood: A guide to transformative and emancipatory education.</u> San Francisco: Jossey-Bass.

Naisbitt, J., & Aburdene, P. (1990). <u>Megatrends 2000: Ten new directions for the 1900's.</u> New York: Morrow.

National Center for Education Statistics. U.S. Department of Education. (1986). <u>Participation in adult education.</u> Washington, DC: Author.

National Commission on Excellence in Education. (1983). <u>A nation at risk: The imperative for educational reform.</u> Washington, DC: U.S. Government Printing Office.

Nicholson, G. (1984). <u>Seeing and perceiving.</u> Atlantic Highlands, NJ: Humanities.

Novak, J. D., & Gowin, B. D. (1984). <u>Learning how to learn.</u> Cambridge: Cambridge University Press.

Orem, R. (1989). English as a second language. In S. B. Merriam & P. M. Cunningham (Eds.), <u>Handbook of adult and continuing education</u> (pp. 490-501). San Francisco: Jossey-Bass.

Palincsar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. <u>Cognition and Instruction, 1,</u> 117-175.

Palladino. J. (1992). Project THISTLE. New Jersey: An evaluation study of teacher and supervisor perception. ERIC Document Reproduction Service.

Piaget, J. (1966). Psychology of intelligence. Totowa, NJ: Littlefield, Adams.

Piaget, J. (1972). Intellectual evolution from adolescence to adulthood. Human Development, 15, pp. 1-12.

Pogrow, S. (1990a, February). A Socratic approach to using computers with at-risk students. Educational Leadership, 47, 61-66.

Pogrow, S. (1990b). Pedagogical and curricular techniques for using computers to develop learning in at-risk students. New York: Scholastic.

Rachal, J. R. (1986, Spring). Assessing adult education research questions: Some preliminary criteria. Adult Education Quarterly, 36, 157-159.

Rachal, J. R. (1989). The social context of adult and continuing education. In S. B. Merriam & P. M. Cunningham (Eds.), Handbook of adult and continuing education (pp. 3-14). San Francisco: Jossey-Bass.

Resnick, L. B. (1987). Learning in school and out: The 1987 presidential address. Educational Researcher, 19(9), 13-19.

Resnick, L. B., & Klopfer, L. E. (1989). Toward the thinking curriculum. Current cognitive research. Alexandria, VA: Association for Supervision and Curriculum Development.

Rogers, C. R. (1983). Freedom to learn for the 80's. Columbus, OH: Merrill.

Rorty, R. (1979). Philosophy and the mirror of nature. Princeton: Princeton University Press.

Roueche, J. E., Baker, G. A., & Roueche, S. O. (1987). Open door or revolving door? Community, Technical, and Junior College Journal, 57(5), 22.

Rubenson, K. (1989). The sociology of adult education. In S. B. Merriam & P. M. Cunningham (Eds.), Handbook of adult and continuing education (pp. 51-69). San Francisco: Jossey-Bass.

Sampson, R. (1975). Thinking skills. Stamford, CT: Innovative Sciences.

Shearon, R., & Tollefson, T. (1989). Community colleges. In S. B. Merriam & P. M. Cunningham (Eds.), Handbook of adult and continuing education (pp. 316-331). San Francisco: Jossey-Bass.

Shor, I. (1987). Critical teaching and everyday life (2nd ed.). Chicago: University of Chicago Press.

Sternberg, R. J. (1985). Beyond I.Q.: A triarchic theory of human intelligence. Cambridge: Cambridge University Press.

Sternberg, R. J. (1986). Intelligence applied: Understanding and increasing your intellectual skills. San Diego: Harcourt Brace Jovanovich.

Sternberg, R. J. (1990). Metaphors of mind. Cambridge, England: Press Syndicate of the University of Cambridge.

Taylor, M. (1989). Adult basic education. In S. B. Merriam & P. M. Cunningham (Eds.), Handbook of adult and continuing education (pp. 465-477). San Francisco: Jossey-Bass.

Thorndike, E. L. et al. (1928). Adult learning. New York: Macmillan.

Trezise, R. L. (1972, April). The Hilda Taba teaching strategies in English and reading class. English Journal, 61, 577-850.

Troll, L. E. (1982). Continuations: Adult development and aging. Monterey, CA: Brooks/Cole.

The University of Southern Mississippi statistical profile. (1993). Hattiesburg, MS: Bureau of Institutional Research.

Upton, A. (1941/1960). Design for thinking. Palo Alto, CA: Pacific Books.

U.S. Bureau of Census. (1985). Statistical abstract of the United States. Washington, DC: U.S. Government Printing Office.

U.S. Bureau of Census. (1990). Statistical abstract of the United States. Washington, DC: U.S. Government Printing Office.

Verner, C., & Booth, A. (1964). Adult education. Washington, DC: The Center for Applied Research in Education.

Warren, J. (1985). The changing characteristics of community college students. In W. L. Deegan & D. Tillery (Eds.), Renewing the American community college (pp. 53-79). San Francisco: Jossey-Bass.

Wechsler, D. (1958). The measure and appraisal of adult intelligence (4th ed.). Baltimore: William & Wilkins.

Whimbey, A., & Lockhead, J. (1984). Beyond problem solving and comprehension. Hillsdale, NJ: Lawrence Erlbaum Associates.

Wittgenstein, L. (1953). Philosophical investigations (3rd ed.). New York: The Macmillan Co.