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An assessment of thinking skills instruction in Massachusetts schools.

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AN ASSESSMENT OF THINKING SKILLS
INSTRUCTION IN MASSACHUSETTS
SCHOOLS

A Dissertation Presented

By

NORMAND C. GIROUARD

Submitted to the Graduate School of the
University of Massachusetts in partial fulfillment
of the requirements for the degree of

DOCTOR OF EDUCATION

May 1991

School of Education

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SCHOOLS

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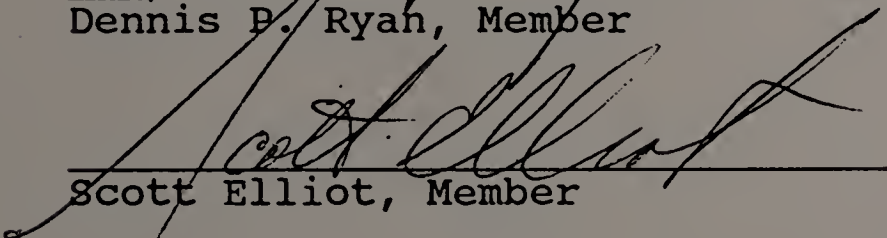
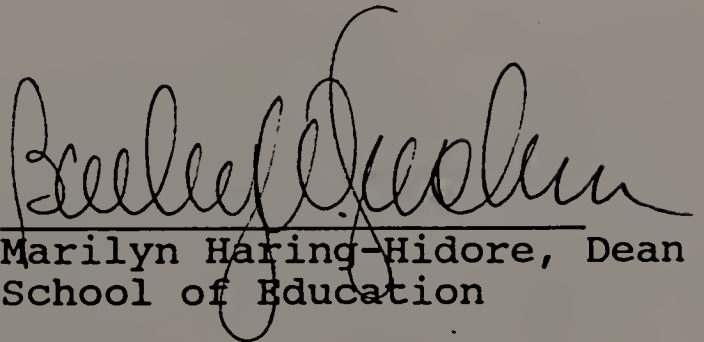Approved as to style and content by:

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DEDICATION

This work is dedicated to my wife,

EDNA

who never failed to support her

perennial student-husband, and

posthumously to my mother,

ROSA

who never lost faith that I would

accomplish this task.

ACKNOWLEDGEMENTS

The cooperation of many people served to assist me in the completion of this dissertation. First of all, to Mr. Herb Curry, Superintendent of Schools, and to the Chicopee School Committee for allowing me the luxury of a sabbatical to finalize this work.

And I extend my gratitude to Bill Wolf Jr., whose editorial skills and patient support, brought this document into focus and provided me with the guidance I sorely needed to accomplish this task.

I am also indebted to my dissertation committee members for their time and the kindness they afforded me during this process.

ABSTRACT

AN ASSESSMENT OF THINKING SKILLS
INSTRUCTION IN MASSACHUSETTS
SCHOOLS

MAY 1991

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Directed by: Professor William Wolf, Jr.

This research study assessed a sample of school
districts in Massachusetts who have curricula which
encompasses a thinking skills approach to instruction.

An exhaustive review of literature clearly points to
agreement among researchers and educators that this method
of delivering instruction produces a literate and
independent population. It is also an effective method for
dealing with an ever increasing pool of information, and
rapidly changing world events that cause textbooks to be
outdated before they are even printed.

By means of a survey questionnaire and an observation
instrument designed for on-site visits the quantity and

quality of available programs in Massachusetts schools was
evaluated. Also of interest was the method used to
implement such programs; that is, were they infused into
course content material or was the program separate and
distinct from the already established curriculum. Given the
extensive number of commercially prepared programs now
available that are designed to teach thinking skills, the
research depicted the number of school officials who are
using the prepared programs versus those who have opted to
design their own program.

The most recognizable and accepted thinking behaviors
were charted in the form of a frequency distribution and
polygons so that appropriate skills could be replicated in
school systems comtemplating the implementation of a
thinking skills curriculum.

The study examined, therefore, the number of school
districts who teach thinking skills, how they are taught,
and which behaviors displayed by both teachers and students
are common to this type of instruction.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure		Page

CHAPTER I
INTRODUCTION

A. Problem Statement

The inability of America's schoolchildren to demonstrate effective or even adequate thinking skills is evident when standardized test scores are analyzed. Officials affiliated with the National Commission on Excellence in Education who examined the test scores concluded that students in our schools do not think as skillfully and critically as is desired. They consider this deficiency to be a major weakness in American education. (A Nation at Risk, 1983)

Standardized achievement test results also suggest America's children are at a disadvantage when compared to students from many foreign countries in the areas of reading and math. An extended school year, a longer instructional day, familial committment to the educational process account for the foreign student advantage according to researchers and commission members. (The Nation's Report Card, 1987. Goodlad, 1984) Although rote learning is a fixture in the educational process throughout the world, many countries such as Japan, South Korea, Israel and Thailand, place great

emphasis on higher mental processes such as problem solving, application of principles, analytical skills and creativity. (Allen, ed. 1989)

Traditional approaches to instruction in the United States tend to focus upon mastery of specific basic skills and course content material, rather than focus upon higher-order activities such as reasoning, creative thinking and problem solving. (Nickerson, Perkins and Smith, 1985) Two primary reasons why higher-order activities receive low priority are "the abstract nature of thinking" and "the confusing array of proposed approaches to teaching thinking". (LaCounte 1987)
Hart (1986) points out a third reason for the skepticism toward thinking skills programs:

> We are far from having any agreement, or any substantive evidence to support a program for training in thinking skills. I would go further and say that we do not know that such skills as distinct from some moderately useful strategies even exist." (45-46)

Since thinking is said to be the healthy use of a child's intelligence, it seems reasonable that the development of thinking skills be included as part of educational curricula. (Furth and Wachs, 1975)

The above arguments serve to highlight a serious educational concern. That is, many students may be taught factual information and skills without learning how to analyze and translate the things learned into new idealogy. Since teachers do not teach so-called thinking skills routinely, the student deficiency persists. Beyer (1984) believes educators are unable to agree on what skills should be taught and even differ on the definitions of many of these skills. In those instances where higher-order thinking is taught, Beyer reports progress is hindered by what he terms "skills overload" - the peripheral exposure to many skills rather than in-depth coverage of a few.

Educational researchers in the last several years have focused on the development of a thinking skills strand throughout elementary and secondary curricula. (Goodlad, 1984., Ruggiero, 1988., Perkins, 1985.)   Varied practical applications of thinking skills training modus operandi have been made available to educators. Besides commercially prepared curricula, models and frameworks are emerging that assist school systems in the development of individualized programs. Educators and researchers are working on the identification, the definition and the classification of thinking skills in order to facilitate interest in thinking skills instruction. Such contributions ought to simplify

3

educators' attempts to plan and teach thinking skills curricula.

A decade or so ago, state legislatures and state education agency officials were unaware that thinking skills should be a concern of the public schools. By 1986, officials in nearly all states indicated they were "discussing", "studying", or "considering" the theme. (Pauker, 1987) Although Massachusetts legislators have not mandated teaching thinking skills specifically, a number of state legislatures, including those listed below have already done so:

Florida	1986
North Carolina	1985
Rhode Island	1985
South Carolina	1984
Texas	1984
Georgia	1976
Vermont	1975
New Mexico	1974
Tennessee	Not recorded
Virginia	Not recorded
Iowa	Under consideration

More state legislatures can be expected to join this group soon.

Consider the following definition of thinking skills as the basis for planning instruction and developing curricula.

Higher order thinking skills implies the ability to use and adapt knowledge effectively. It involves

analysis, evaluation and transformation, no matter
what the content area. Teaching for thinking
supposes that students are trained to employ
complex thinking processes in a variety of
situations. (Nickerson, et. al., 1985)

It seems reasonable to contend that school systems have not

adopted practices routinely that purport to incorporate a

thinking skills approach encompassing the above definition.

Much current literature supports this contention. For a

variety of reasons, which will be explored more fully in

Chapter Two, students are not being taught to use and adapt

knowledge effectively. (McTighe and Schollenberger, 1985)

Although most local education agencies aren't making

use of the resources, many thinking skills programs are

available. These programs e.g. the ODYSSEY CURRICULUM FOR

THINKING published by Mastery Education, LEARNING TO LEARN

published by Learning Skills Consultants, CREATIVE PROBLEM

SOLVING published by Creative Education Foundation and HOTS

(Higher Order Thinking Skills) produced by Dr. Stanley

Pogrow - can be obtained easily. Available programs like

these examples are analyzed by the researcher to ascertain

implementation problems apt to be encountered by potential

adopters in local education agencies.

This study focuses upon the range and caliber of

thinking skills curricula available and the extent to which

these resources are being utilized. Three questions are
addressed:

- What kinds of commercially-prepared and home-grown
programs are available to meet needs of educators at the
local level?

- How extensively are identified programs being
utilized by teachers at the local level?

- What impact are identified programs having upon the
development of thinking skills among targeted student
groups?

Answers to these questions put into perspective initiatives
of a small sample of educators situated in local education
agencies of one state to address a need to improve thinking
skills capabilities of their students.

Supporters of the incorporation of higher order
reasoning into the educational program include the Education
Commission of the States (1982), the College Board (1983)
and the National Commission on Excellence in Education
(1983) among others. The Association for Curriculum
Development has devoted entire copies of their _Educational
Leadership_ publication to this issue.

It is difficult to find opponents to a thinking process
application in education. Detractors of the movement cite

arguments ranging from - all teaching automatically assumes
a thinking approach - to - the over-crowded school day which
does not allow additional demands to be placed on it. Adler
(1986) argues that one of the most ill conceived concepts is
the current:

> mania to develop programs of instruction in critical
> thinking, using manuals and other how to devices
> as if thinking could be taught in and of itself as
> an abstract skill. (p. 28)

He further reports that since thinking in and of itself
does not exist, it is impossible to create an
isolated thinking program.

The study puts into perspective viewpoints offered by
the pro and con sources cited.

B.   Statement of Purpose

The overarching purpose of this study is to ascertain
relationships between the availability of thinking skills
programs/curricula and the utilization of these
programs/curricula at the local education agency level.
Specific objectives address:

- attributes of thinking skills programs/curricula apt
to impact upon their utilization by school officials...

-   local school and/or school system attributes apt to
impact upon the adoption/adaptation of thinking skills
programs/curricula...

-   effects of thinking skills programs/curricula upon
students' thinking skills behaviors...

It is hypothesized that no relationship exists between:

1) the acquisition of commercially prepared thinking
    skills programs and local education agency per
    pupil expenditures.

2) locally-prepared thinking skills programs and
    local education agency standardized test scores.

3) the utilization of either commercially-prepared
    or locally-prepared thinking skills programs and the
    direction of students' standardized test scores.

C. Limitations of the Study

As stated previously in this paper, the study focuses
on a random sample of Massachusetts school systems. Results
are restricted to data derived from only those communities
that the researcher found feasible to visit and evaluate.
Further limitations were dictated by the number of community
officials who took the time and effort to respond.

Although four types of responses were possible, namely:

(1) a positive response acknowledging a program in place, accompanied by an invitation to visit and evaluate...

(2) A positive response acknowledging a program in place but declining an offer for a visitation...

(3) A negative response indicating no thinking program exists in said community...

(4) no response...

only 1 and 3 will provide meaningful data. 2 will be suspect and allow for mere statistical information and 4 will allow for no interpretation.

Further if a school system did not formally evaluate its thinking curriculum, no hard data would be available to this researcher. Given the wide ranging nature of possible responses and the variable information that was possible to be gathered, this study is exploratory in nature. It is not designed nor is the intent to produce a statistical document detailing the educational gains derived from a comparison of systems modeling a thinking skills approach versus one that does not.

D. Significance of the Study

The emergence and importance of teaching students to think and to transfer knowledge across disciplines is

generally agreed upon by researchers and educators in this, the beginning of the 1990's. At least thirteen organizations have endorsed its inclusion at all levels of education (Ruggiero 1988) and many studies and articles cited previously suggest a clear-cut need for thinking instruction.

Issues surrounding the implementation of thinking skills programs in selected Massachusetts public schools are addressed in this study. Other issues related to the instructional frameworks adopted within these selected communities are most likely to emerge. An elaboration of these issues and steps taken to address them ought to enhance understanding of what it takes to incorporate thinking skills curricula. The availability of such information may encourage educators in local education agencies to consider utilization of thinking skills curricula.

This effort is a forerunner of research in Massachusetts dealing with an understanding of the implementation of thinking skills programs. Given that a review of commercially prepared programs will be incorporated into the study along with data regarding add-on or infused programs, the document may prove to be of use to community officials still in the planning stages of implementation.

The information gathered and reported will serve to corroborate or discount the allegation made in the Problem Statement section of this chapter, accusing many school officials of ignoring higher-order thinking instruction, despite the voluminous literature available detailing its necessity and importance in educational curricula. This researcher had hoped to examine standardized test scores in systems where a thinking curriculum is in place in an effort to correlate a rise in such scores with thinking skills instruction. This proved not to be possible.

Finally, the dissertation outcomes may serve to spur Massachusetts legislators to contemplate legislation mandating some sort of a thinking curriculum within the state's public schools. Eight state legislatures have taken action to date, and more are apt to do so soon.

B. Terminology

Certain terms inherent to thinking skills are explored in this section to assure that readers understand what the researcher intends to convey in the pages that follow. Various generic terminology takes on specified meanings when used in conjunction with thinking language.

For example, the words add-on and infused are commonly used when describing the application of a thinking skills curriculum. An add-on curriculum implies the addition of a

course concerned with the teaching of thinking to the already established course of study in a school. Infused would suggest that the teaching of higher-order skills are incorporated into one or several content areas such as reading, math, social studies, etc. An add-on program could conceivably be taught by an assigned teacher while regular classroom teachers would all be responsible for teaching thinking skills in the infused model. Arguments detailing the worth of both systems are outlined in Chapter Two.

Critical thinking and creative thinking are frequently used synonymously by teaching skills practitioners. These terms, however, have very different meanings and should not be used interchangeably. Critical thinking is not concerned with the mere critique of a given series of facts, theories, etc. It also assumes positive characteristics when used to promote reasonable and reflective thought that focuses on decision-making. Creative thinking, on the other hand, allows the thinker to form new ideas by studying and using information in an original manner.

The study of thinking skills also calls into play the word metacognition. This word connotes thinking about thinking. It provides for the establishment of a thinking plan that identifies and charts the process one uses in a thinking operation. Cognition more simply implies

information or knowledge that an individual may possess
and/or manipulate in the achievement of a higher order
thinking activity.

CHAPTER II
REVIEW OF LITERATURE

14

A. A Rationale for Teaching Thinking

Research pertaining to the development and utilization of thinking skills programs is summarized. Models and frameworks of thinking skills programs, ingredients of thinking skills instruction, and impediments to the utilization of thinking skills programs are highlighted. An overview of commercial programs, along with rationale pro and con for add-on or infused curricular options follows. Then a review of consequences of thinking skills programs concludes this chapter.

As far back as 1937 the National Education Commission listed as one of its ten imperatives the following statement: "all youth need to grow in their ability to think rationally, to express their thoughts clearly, and to read and listen with understanding." (1937) Since that time and more recently in the last ten years, educators have witnessed a surfeit of interest in the teaching of thinking. Is there any substance to the forces supporting this initiative? Are there specific contents or processes that a thinking skills curriculum should include? More important,

what has prompted this need to seek out other avenues to teach children?

Leaders in business and researchers in education were the driving force in the movement to teach our students to think, although not necessarily as a combined effort. In the 21st century according to economists, sociologists and industrialists, land, labor and manual skills will not constitute the basic values of our society. Instead the individual's ability to manage information will be the driving force guiding societal progress. Business leaders and economists such as Daniel Bell (1973) and John Naisbitt (1982) are among the initiators of the thinking movement.

In the field of education scholars and researchers such as Ernest Boyer (1983), John Goodlad (1984) and Mortimer Adler (1986), along with numerous commissions and committees including the National Academy of Education (1987) and the National Commission on Excellence in Education (1982), all produced documents that proclaimed the need to return to excellence in our educational efforts.

Bell sets the stage for a new direction in education when he outlines the three stages of our industrial metamorphosis. (1973) The first is the Pre-Industrial stage

which called for farmers, miners, fishermen and lumberjacks.
This era was followed by the Industrial stage whereby
manufacturing came into its own. The production and
processing of goods were the major occupations. The current
Post-Industrial stage has designated informational services
as its preeminent activity. Knowledge, data and information
constitute the capital of this stage. Scientists,
researchers, and technically-trained professionals dominate
the labor force.

A Nation At Risk: The Imperative For Educational Reform
set forth the following priorities for core subject areas:
(1982)

1. English instruction in schools should equip
students to comprehend, interpret, evaluate and be able to
write well organized effective papers. Students
should also be able to listen and discuss ideas
intelligently.

2. Mathematics instruction should teach students to
apply mathematics in everyday situations, and estimate,
approximate, measure and test the accuracy of their
calculations. At the high school level students would be
required to understand algebraic and geometric concepts, as
well as elementary probability and statistics.

3. Science instruction should require that learners be able to apply scientific knowledge to everydaylife, and as they progress through high school, they should understand the concepts, laws and processes of the physical and biological sciences.

4. Social studies should equip students to fix their places and possibilities within the larger social and cultural structure. Additionally, they shoul be able to understand the breadth of both ancient and contemporary ideas that have shaped our world.

5. High School students should be computer literate to the extent that they recognize the computer as an information, computation and communication device. They should be able to use the computer in the study of other basics as well as for other personal purposes.

These dictates could well form the philosophical base for instruction. While they set forth the goals that should be attained in all major subject areas, they also pre-suppose that thinking instruction will be a part of the educational program. Each statement suggests linkages that only can be achieved through instruction which incorporates higher order thinking approaches.

It is clear that if American schoolchildren are to

regain their educational stature and again be able to

compete with children from other nations, schools will need

to teach students to think and to use their minds to solve

complex problems. It is not sufficient that they continue

to follow the familiar path of passing on fragmented bits of

information that students memorize, but soon forget. The

National Assessment of Educational Progress assessment

results obtained for the State of Connecticut and the

findings of many other blue ribbon panels all support the

fact that students possess factual information and have the

ability to solve one step problems. However, when asked to

do more sustained thinking, performance drops off. This is

most in evidence when these students are asked to infer,

evaluate, synthesize, or seek new solutions to problems.

Students also exhibit an inability to defend a point of view

coherently supported by valid arguments and evidence.

(Baron and Kallick, 1985)

The conclusions of the State of Connecticut Assessment

Study (1984) tend to be optimistic in that they suggest

school systems are moving cautiously toward the adoption of

a thinking skills program. Some of the delay may be in part

attributed to administrators' desire to adopt and/or plan

programs which are consistent with their educational
philosophy and curricula.

The 1982 Eñucation Commission of the States report has
listed among its "basics for tomorrow" evaluation and
analysis, critical thinking, problem-solving, synthesis,
application, and decision-making, all major thinking
operations. (Education Commission, 1982) Some educators,
in fact, have even gone so far as to assert that the
teaching of thinking ought to be "the first order of
business for any school" (Quimby, Sternberg, 1985)

Beyer (1987) concurs that improving the thinking
abilities of American youth has taken on more significance
today than ever before. Since 1980 especially, "skillful
thinking" has been identified as a priority of instruction
in many American schools. Because skillful thinking does
not develop spontaneously, school officials should be
attending consciously and systematically to improving these
abilities in students. Beyer noted:

   Most individuals - especially novices, beginners, and the
         less able - if left to their own devices do not
         seem to develop to the fullest the skills of
         thinking of which they are capable. Effective,
         skillful thinking is neither an incidental outcome
         nor an automatic product of study in any
         particular subject area. (Beyer, 1987, p. 2)

Although there are differences of opinion on the nature
of higher order thinking and how to incorporate it into
teaching operations, three main arguments repeatedly rise to
the surface in support of this education concept. They are:

1) to participate as responsible, empowered citizens
in a democracy...

2)   to contribute as productive workers in an ever
increasing technological society...

3) to have rewarding personal lives which include
managing one's private affairs, and to be able to
continue to learn and benefit from culture and
society...(Newmann, 1990)

Arguments abound that as research and scholarly
writings continue and the parameters of thinking skills
curriculum and instruction are identified and refined, the
thinking movement will grow stronger. A belief exists that
the interest generated by this movement is unlike many past
unsupported educational programs and practices, which
produced forgettable results. The "something different" in
this instance could be the belief that thinking is the prime
requisite for the acquisition of all subject matter.
Because knowledge is multiplying at such a rapid pace, the
21st century may require learners to be able to manage and

analyze information rather than merely acquire and memorize
factual information. (Pauker, 1987)

    Some school systems have not veered from the goal of
producing a literate thinking student population from the
time of the recent resurgence of this educational movement.
For example, the John Marshall High School faculty of
Richmond, Virginia published a booklet entitled "Critical
Thinking" in 1963. While empirical research data was not
generated in conjunction with this work, many perceptive
theories were offered across academic disciplines that were
in accordance with the community's education standards in
most academic disciplines. Richmond's educators categorized
the ' Lazy Thinker' as that student who memorized rules and
the ' Critical Thinker' as the one who looked for reasons.
The 'Lazy Thinker' accepts facts whereas the 'Critical
Thinker' weighs the evidence and questions the conclusions.
(1963)

    As stated above, researchers and scholars are busy
studying methods to bring thinking skills curriculum and
instruction into every classroom. It is a healthy sign that
this movement is alive and well. In addition to intense
research activity on problem solving and creativity, there
is evidence of studies focused upon methods of developing

students' intelligent behavior in our schools and upon the production of relevant educational materials.

Another indicator of activity in the thinking skills sector is the multitude of books and articles that have surfaced since 1980. More than two-thirds of the books and articles dealing with thinking instruction have been authored in the last decade. As of 1986, 30 different curriculum packages were catalogued devoted to the teaching of thinking. It is estimated that nearly 2,000 scholarly articles have been registered in the Education Index over the past five years devoted to critical thinking and how it is taught from Kindergarten through college. (Pauker, 1987)

Presseisen (1986) and Nickerson (1985) attribute achievement problems to underdeveloped thinking skills. Aylesworth and Reagan (1969) fault children's ability to transfer training from the classroom to other contexts. It is disheartening to discover that in spite of persistent injunctions that schools teach reasoning, problem-solving, critical thinking and creative use of the mind, many studies confirm the conspicuous absence of attention to these goals in the classroom. (Goodlad, 1984, Newmann, 1990) It has been suggested that the failure to emphasize higher-order thinking may be due, in part, to multiple factors.

Newmann (1990) suggests some of these might include: difficulties in defining thinking skills and assessing students' ability to practice these skills. Curriculum guidelines and testing programs that require the coverage of vast amounts of material along with a system that favors the internalization of information and a requirement for 'correct answers' rather than an interpretation, analysis and evaluation of material, do nothing to further the cause of thinking skills instruction.

Beyer (1984) also found a problem with an inability to appropriately define thinking skills by school officials. Difficulties involve unclear or inaccurate definition of the skills. He cites as an example a prominent school system that listed on their continuum of skills, inquiry or recall as a thinking skill. To equate "remembering previously learned material" with a thinking skill "flies in the face of 80 years of thinking and research in education and psychology". This inability to agree on definitions and terminology is an obstacle to professional dialogue, research, teaching and testing in this area.

Meyers (1986) argues that the realities of cramped teaching schedules, large class sizes, limited class time and voluminous course content material do nothing to promote

environments that foster higher-order thinking processes. Researchers caution educators that it would be foolhardy to assume that teachers are teaching students how to think. It might be reasonable to assume that all good teachers pose interesting problems for students to ponder, and thus feed students' natural curiosity and stimulate their desire to learn. We could state from this argument that all good teachers encourage students to think. But that is not the same as teaching students how to think. (Ruggiero, 1988)

Contrary to Ruggiero's thoughts on this matter is the idea that thinking may occur unconsciously and without learning. (Baer, 1988) Baer theorizes that some thinking like some writing happens faster and much better when it is simply allowed to happen. He concedes that if students are unable to engage in skillful thinking, then it is not inappropriate for teachers to improve and refine their abilities. Asking students to defend their thinking is proper, but he insists that teachers would be out of line if they demand that students be able to explain and defend their thought processes. If this viewpoint is widespread, it could account for the foot dragging with regard to the utilization of thinking skills programs in LEAs..

A study conducted by the American Association of
School Administrators in 1987 revealed that 89 percent of
the respondents believed the teaching of thinking skills to
be 'very important'. Another 10 percent thought them to be
'probably important', and only a few respondents thought
other subject matter to be more important. With this strong
advocacy, one would assume that higher-order thinking
curricula would be evident in many of these communities.
When questioned about their thinking programs, an almost
unanimous majority admitted none were in place.

B.   What Constitutes Thinking Skills Instruction

Beyer (1987) constructs a model which helps define the
process of thinking. He believes that the thinking process
requires two kinds of operations, cognitive and
metacognitive. The cognitive domain consists of the
following operations: decision making, critical thinking,
processing, recalling and recording, reasoning, creative
thinking, problem-solving and conceptualizing.

Surrounding or encompassing this cognitive process are
the metacognitive areas which he labels: assessing,
planning and monitoring.

The goal of cognition is to make meaning out of something. An individual thinks in order to solve a problem, discover a new truth, arrive at a clearer understanding , elicit a judgement, etc. Beyer likens the metacognitive operations as a stationary ring surrounding a gyroscope keyed to a specific goal. The cognitive areas continually turn involving or calling into play several inner ring models proceeding in a specific direction toward the thinking goal. "The result is some meaning or truth that did not exist before." (Beyer, 1987)

Metacognition (that is, the thinking about thinking) attempts to control the meaning-making operations as described above by this author. It guides, corrects, adjusts and ultimately directs the cognitive operations. Based on this assumption, thinking skills instruction will necessarily include a focus on both metacognitive and cognitive skills. This can prove to be difficult and confusing for the novice; therefore, the more easily understood and concrete cognitive skills are usually introduced first.

Another outline of a thinking skills model is provided by Robert Marzano et. al. (1988) and is not unlike Beyer's but certainly more simplistic. The authors define the five

dimensions of thinking as follows: metacognition, critical
and creative thinking, thinking processes, core thinking
skills, and the relationship of content-area knowledge to
thinking skills. They do not view these categories as
hierarchical and admit that they overlap in some cases.
These researchers do concede that metacognition serves as
the core around which the other operations revolve.

Barbara Presseisen (1985) divides the thinking process
into two distinct models. The first, which she labels basic
processes, would include causation, transformations,
relationships, classification and qualifications. Causation
would assess cause and effect. Transformations would create
meanings relating to unknown characteristics and
relationships would detect operations and patterns.
Classification would determine common qualities while
qualifications would find unique characteristics. The
second stage or complex process model involves higher-order
skills. These steps call into play problem solving, which
has as its task to resolve a difficulty and yield a
solution. Another complex process identified by Presseisen
is decision making which requires that the practitioner
choose a best alternative and produce a response. Critical
thinking, the next operation, would be used to understand
particular meanings and in-depth idealogies. One practicing

a critical thinking procedure would uncover sound reasons, proofs, theories, etc. Finally comes creative thinking which according to this rearcher would provide for creative and unique ideas leading to new meanings.

It follows that if arguments are being offered for teaching thinking, some sort of consensus eventually ought to be reached pertaining to attributes of thinking skills operations. Key traits of any thinking operation might be knowledge, rules and procedure. (Beyer, 1987) Before beginning to teach a specific skill to novices, teachers should have a thorough understanding and feel competent in all aspects of what they are about to teach; they should know what guides to use and the proper application of the specific skills to be taught. It is critical that they recognize the major steps or procedures which govern the knowledge and rules criteria.

All three attributes should be afforded equal prominence. Under procedures, Beyer lists as sub-topics; a) steps, b) sub-ordinate steps, and c) sequence or pattern. These categories clearly suggest a diagram or model to guide the thinker who is required to make a decision in a problem-solving situation. Beyer defines the

rules criteria as follows: a) when to use, b) how to start, c) what to do in an emergency, and d) what to do next.

Again Beyer, with this model, provides for the teacher a framework to be used when seeking out a specific thinking skill. He likens the procedure to the use of a book index. One's ability to use an index starting with choosing a search word, finding a synonym if necessary, etc. are basically the rules to follow in the thinking operation.

Finally he further delineates a third component - knowledge - with these sub-topics: a) criteria, b) analytical concepts, and c) clues to look for. Each thinking skill he suggests is, therefore, distinguished by certain knowledge about the use of the operation. Specific criteria is usually applied in these thinking operations. Analyzing for certain purposes and looking for informational clues or principles constitutes how knowing about the thinking skill guides the teacher in the proper execution of the skill.

One method suggested by Meyers (1986) to restructure the curriculum allowing time to include thinking instruction is to ask the question "What do I want these students to know by the end of this course?" This enables the teacher to

pare the course down to its essentials by identifying the nesessary as well as the superfluous ingredients. He cautions, however, that once conscientious steps are taken to teach students the process for critical thinking and analysis, it usually means a significant decrease in the amount of course content formerly offered.

Although an avalanche of literature has emerged in the last ten years providing enlightenment on the nature of thinking and how it might be taught, most of it deals with thinking in general terms and not how it can be taught to a student population. When committing himself/herself to a thinking skills curriculum, a school official (or officials) must plan or design a framework which will help inventory operations apt to be used to construct a program. In general, the framework should define the thinking skills to be addressed. The tasks included in the program should be challenging and should serve to guide the learner in the skillful acquisition of the desired knowledge. According to Newmann (1990), this definition of thinking skills requires that the learner use previously learned information and use it to go beyond or acquire new information. He also raises an important issue when he refers to defining this process. Newmann believes that what will constitute a higher-order operation for one individual may be a simple task for

another depending upon their level of sophistication and training in this procedure.   He uses the understanding of a bus schedule as an example of what might be a complex thinking problem for one and a routine task for another.

The acquisition of factual information cannot be dismissed if knowledge is to be the ultimate goal of the thinking process. Meyers (1986) argues that critical thinking will vary among disciplines because the core ingredient will be foundational knowledge of that discipline. However, if this material is covered in such a way that the learner uses it, manipulates it, and interprets it , it will have relevance to a thinking operation.   A good thinker, therefore, should possess good general thinking skills as well as domain specific skills. Newmann (1990) suggests a good thinker must possess a disposition for higher-order thinking in addition to knowledge and skills. Some of the attributes he associates with this characteristic include: reflection and "the ability to take time to think", a questioning nature which will scrutinize the opinions of others, and a curiosity which will seek out flexible alternatives and original solutions to problems.

A few basic questions which should be answered by teachers or curriculum developers during this planning process might include:

a) Can the skill be used by the student on a regular basis in everyday life?

b) Will the skill or strategy be applicable across a number of subject areas?

c) Does the skill or strategy have a cumulative effect of building on previously learned thinking skills, or will it guide the learner to new more comfortable operations?

d) Is the subject matter chosen to teach the skill appropriate to the task?

e) Is the intended audience mature and/or experienced enough to master the skill/ strategy? (Beyer, 1987)

Thinking skills which answer most or all of the above questions will be the ones most likely to be included in the curriculum. It should be recognized, however, that it may not be possible to cover them all in classroom situations because of overcrowded curricular demands. Other queries which fit into this framework as educators plan and/or develop curriculum and more importantly as educators recruit staff could be:

1) To what extent will you feel comfortable in using a teaching for thinking approach?

2) Considering that certain required goals of content instruction must be mastered, what subject areas do you feel would lend themselves to experimentation with this approach?

3) Are there content areas that might be best suited to providing ample opportunities for higher order thinking activities? (Raths, et.al., 1986)

Choosing a limited framework in the beginning would allow the practitioner the opportunity to sharpen his/her skills. Above all, one should make sure the activities planned are appropriate to the enhancement of the particular operation. Beyer (1988) emphasizes the need for a scope and sequence in the planning and teaching of any subject and thinking skills are no exception. He cautions, however, against what he calls skills overload. Limiting the number of skills, since mastery of each takes considerable time, is crucial in the development of any framework.

C. Evidence of a Thinking Skills Classroom

Because the teaching of thinking must be properly nurtured to be effective, the contexts and environments in

which it is taught will shape the manner and proficiency by which the student learns to think. Some researchers/educators insist that the teaching of thinking should be evident continuously, in a setting where all activities require thinking and where students and teachers reflect on their thinking. (Beyer, 1987. Costa, 1985. Meyers, 1986.) This atmosphere is developed and maintained by careful attention to the physical arrangement of the room, and the selection of instructional materials which will enhance and complement the interactions and activities of the classroom. (Beyer, 1987) Teachers would pose problems, raise questions, value student responses, make time for them, allow for risk-taking, and encourage experimentation.

Teachers ought to understand that it is not enough to teach for thinking skills. Brandt (1987) argues that this is akin to trying to teach students to think without teaching them how to do it. He suggests that teachers teach directly the process of thinking. Teachers would communicate to students specific cognitive skills needed for a higher-order mental operation. Are they infering, synthesizing, evaluating, etc.?

Endemic to any assessment of thinking skills curricula
is a decision as to how these skills will be taught.
Frequently used terminology in this regard are add-on or
infused. Should a higher-order curriculum be taught as an
additional subject or should it be taught across all content
areas. Sentiment is fairly equally divided in this regard;
however, the pendulum is perhaps swinging toward an infused
process.

1. Rationale for an Add-On Curriculum

Ron Brandt (1987) suggests that if the skill is taught
separately it need not conflict with the goals and
objectives of the content areas. He also argues that staff
development would be easier to plan since it would not
require a complete revamping of the entire content
curricula. The disadvantage is that if it is a separate
and distinct course, only a limited number of teachers
will be involved. Will the skills taught in isolation be
transferred? If transfer is necessary, and all seem to
agree that it is, then it is imperative that all teachers be
involved in the process even though most may not teach the
actual skills.

Sternberg (1986) is a proponent who feels that this skill can be taught as a separate subject, somewhat isolated from the established curriculum. When confronted by strong opposition to this method, he does concede to an approximate fifty per-cent infusion with curriculum content. He insists that if thinking skills instruction is totally infused into an already established curriculum, the teaching would become uneven and sporadic depending on the competencies and interest of various teachers. It has already been pointed out that teachers are under pressure to cover a required amount of content material; hence, higher-order instruction probably would not get the necessary share of attention. If a somewhat separate program were to be established only teachers firmly committed to this concept ought to be assigned to the program. Thinking skills should be taught only by teachers who can think for themselves and who are capable of learning as well as teaching.

This subject-matter-free or isolated skills model is perhaps more prevalent in other countries than it is in the United States. deBono (1986) argues vehemently for this subject free approach. He concurs with Sternberg in the belief that thinking would not receive adequate attention if it were part of other courses. In an infused process the specific thinking skills would become muddled with subject

matter content. In a specialized course the specific skill
would be the focus of interest and both teacher and student
would be clear as to what is being taught. (Grice, Jones,
1989)   de Bono (1985) argues that generalizable thinking
skills exist even though there are differing opinions among
educational researchers. Some insist that these skills
cannot be taught using specific content material, and must
be taught in a separate and distinct program.   deBono
concludes, however, any attempt to teach them in content
areas will only serve to weaken training in thinking.

2. The Infusion Argument

Mortimer J. Adler (1986) derides the 'mania' to develop
critical thinking programs using a "how to" approach as if
such a thing as distinct thinking skills exists. Certainly
since 1986 much literature has been devoted to defining
thinking skills, and Mr. Adler seems to be in the minority
if he truly believes this statement. Nevertheless, he is
firmly committed to an infused approach. He infers that all
subject areas should be permeated with thinking activities.

Advocates of the integrated approach suggest that
teaching is an important component of all school activities.
The approach assumes that instruction in the intellectual

process and content is mutually reinforced. It allows for the application of thinking skills to a variety of contexts. (Grice, Jones, 1989) It would define higher-order processes more broadly and make them an expectation of the entire curriculum rather than in isolation.

Another position contends that thinking skills may actually be shaped by content material. This theory would logically call for the subject area teacher to guide the transfer of thinking to content. Beyer (1987) and Ruggiero (1988) believe that the interplay of these contexts actually motivates learning and produces better mastery of the subject. The basic assumption motivating all curricula is that there are certain skills or processes that are generally inherent in thinking regardless of person, place or purpose. (Adams, 1989)

3. An overview of Commercial Programs

What are the advantages/disadvantages to commercially prepared programs versus home-grown locally generated curricula? Since commercial programs usually are field tested in reasonably rigorous ways, they ought to achieve goals established and they ought to be effective. Because educational experts are the designers of these programs, the

activities should prove to be more challenging and less routine. Many brilliant philosophers, psychologists and researchers have devoted years in the creation and compilation of some of the current commercial higher-order thinking programs and some of the greatest benefits to these programs may be on the teachers who undergo some of this specialized training. Costa credits much of his teaching style to the residual effects he gained through the in-service he received in various thinking programs such as Instrumental Enrichment, CoRT, and Tactics. (Brandt, 1988) He does concede, however, that simply buying a program as an add-on with no committment from all staff members doesn't go far enough. It never becomes a core value in the school.

Of major concern to any adopters/adapters, however, is the confusing array of cross-program differences. Advocates of these programs do not agree upon either curricular frameworks or instructional approaches. Each program categorizes skills uniquely and the nomenclature used differs considerably from curriculum to curriculum. For example, one program refers to divergent thinking while another names the same process lateral thinking; one calls the skill sequencing and another calls it operational analyses, etc.

Another distinct disadvantage would be the ability to integrate a community's course content material into a commercially prepared program. The integration would require that each teacher review the prepared lesson and re-design it within the framework of the particular content of his/her subject area. To provide consistency from school to school and class to class, no doubt a curriculum coordinator would be required to accomplish this purpose.

A set of thinking skills programs has been drawn from the literature and summarized. Summaries of seven of these programs follows:

CoRT (Cognitive Research Trust)

Developer: Edward de Bono

Goal: To teach everyone to think whether they are in or out of school.

Intended Audience: Ages 8 to 22 ..all ability levels.

Process: Teachers present and monitor lessons that students must practice from lesson notes.

Time: One lesson (approximately 35 minutes in length) per week.

Publisher: Permagon Press

This program is direct instruction of thinking skills
and is free of subject matter material. Although de Bono is
aware of the gapless schedule of the school day, he insists
that formal recognition by teachers, parents, etc. that
these skills are being taught is essential.

Perhaps the biggest drawback to CoRT is the one lesson
per week dictated by the curriculum. It would seem to take
several years before any appreciable training would be
realized, and this scant schedule would not be condusive to
retention and carry-over.

Project IMPACT

Developer: S. Lee Wincour

Goal: The improvement of students' math and
                    language arts skills through the
                    improvement of thinking skills.

Intended Audience: Middle and Secondary Levels.

Process: A critical thinking component is
                    infused into the content lessons with
                    the intent of improving these math
                    and language arts basic skills. The
                    lessoons consist of:
                    1) a sequential and cumulative body of
                       critical thinking skills targeted at
                       improving reasoning.
                    2) a model lesson format
                    3) ten teaching behaviors that allow
                       teachers to label and reinforce
                       students' thinking abilities in an
                       interactive environment.

Time: 2 to 3 hours per week

Publisher: S. Lee Wincour
                        Project IMPACT

The program calls for an intense three day in-service program for teachers prior to implementation. While it is designed for use by all students in Orange County, California where it originated, it is also used in place of remedial reading and math. It is sponsored and funded by the National Diffusion Network as a model program in many states.

Odyssey: A Curriculum for Thinking

Developer: Researchers from Harvard University,
                        Bolt Beranek and Newman, Inc.,
                        Venezuelan Ministry of Education

Goal: To teach a broad range of thinking
                        skills.

Intended Audience: Middle level students.

Process: Involves introspection on own thought
                        processes, some paper and pencil
                        exercises, and an emphasis on
                        discussion and student involvement in
                        problem solving, reasoning, decision
                        making and creative activities.

Time: 3 to 5 - 45 minute lessons per week.

Publisher: Mastery Education Corporation

The program is designed for elementary and middle level students in a prepared curriculum of direct instruction of thinking skills. Of the 100 lessons in the program, several encourage the incorporation of course content material. A 1981-82 evaluation report found that gains made by classes using the Odyssey curriculum were greater than those made by control groups.

Learning To Learn

Developer: Marcia Heiman and Joshua Slomianko

Goal: The improvement of students' academic
                      performance in content areas by
                      improving reasoning, writing,
                      reading and listening abilities.

Intended Audience: Junior and senior high school
                      students

Process: LTL activities are incorporated into
                      classroom and homework assignments by
                      content area teachers. In senior
                      high there is a year long component
                      in which students learn to
                      incorporate LTL skills into all
                      content areas.

Time: Except for the year long course at
                      the senior high level, the publishers
                      insist that no additional time is
                      needed at other grade levels.

Publisher: Learning Skills Consultants

The lesson plans in this curriculum call for the material to be incorporated or infused into all content areas. It was originally designed to be used with remedial college students reading as low as the 6th grade level. In 1985 it was recommended for use at the junior and senior high levels, and has been approved for national dissemination by the Joint Review Dissemination Panel.

The basis for this curriculum was gathered by researchers from the University of Michigan, by asking good students to talk aloud about the processes their thinking took as they were engaged in problem solving activities.

HOTS (Higher Order Thinking Skills)

Developer: Stanley Pogrow

Goal: The improvement of basic skills and
                        social confidence by focusing on the
                        the development of higher order
                        thinking activities.

Intended Audience: Chapter I (remedial) students grades
                        3-6

Process: Computers play an integral role in
                        this curriculum. Students visit a
                        computer lab on a regular schedule
                        and work withcomputer programs that
                        challenge the reasoning process and
                        promote linkage activities to content

44

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                     material.
Time:                Replaces traditional remedial
                     services.
                     Students participate in four 35
                     minute lessons per week.

Publisher:           Stanley Pogrow
                     College of Education
                     University of Arizona
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Dr. Pogrow alludes to an interesting by-product of his
program, by placing equal importance on the improvement of a
student's self-esteem and social confidence with the
achievement of grade level status in basic skills.

The concept of the program is an addition to an academic
curriculum; however, since it is aimed at remedial students,
it replaces the traditional pull-out remediation program.
There are lessons that promote linkage to specific content
areas and classroom teachers are expected to work with the
HOTS teachers to effect the transfer.

There is a demanding five day staff development program
for the teachers who will conduct these classes. He makes a
case for using the program with regular ability youngsters
on an every other week schedule.

Creative Problem Solving

Developer:	Sidney J. Parnes, based on Alex Osborn
Goal:	The improvement of abilities and attitudes necessary for creative learning and problem sensing and solving.
Intended Audience:	Gifted middle students and all secondary students.
Process:	Both independent and group study activities combined with practice exercises from a workbook form the curriculum. Transfer of learning is at the core of all materials.
Time:	Individual lessons require approximately one hour blocks of tome. The number of lessons students engage in varies based on the teachers' and/or system's committment.
Publisher:	Creative Education Foundation

Problem solving activities form a vital portion of this curriculum. Students are frequently encouraged to attempt solving some of their own personal problems either in self or group situations.

The program allows much of the decision making as to the amount of time devoted to these activities to the teacher. This would account for an an uneven and disparate amount of time devoted to Creative Problem Solving from teacher to teacher.

Talents Unlimited

Developer: Carol Schlicter
(Mobile, Alabama Public Schools)

Goal: Proponents of this program believe
that by nurturing students' abilities
in the five 'Talent' areas, namely,
productive thinking, communication,
forecasting, decision making and
effective planning,
their academic proficiencies will
improve along with chances for future
success.

Intended Audience: Elementary and Secondary students

Process: Infused throughout the curriculum at
both the elementary and secondary
levels.

Time: At the middle school level
three or four opportunities per week
are guaranteed for students to
participate in guided thinking
practice. This schedule varies
somewhat at the
elementary and secondary levels.

Publisher: National Diffusion Network

The Talents Unlimited program was developed from June
1971 through June 1974 by staff from the Mobile, Alabama
County Public Schools under the direction of Carol
Schlicter. The development was funded by the govermnent
with monies from the Elementary and Secondary Education Act
(E.S.E.A.). It soon became a nationally validated program

and is now one of the most widely disseminated programs of the National Diffusion Network.

While the above review is not comprehensive in relation to the number of programs available, it does highlight the major components of some of the prevailing curricula. It also serves as an outline of the various grade levels and audiences these programs seek to reach. Many of the curricula seem to have overlapping goals, however; some are more intent on improving basic skills and academic performance while others are designed purely to enhance thinking skills.

One glaring difference is the varying degree of teacher in-service required by these programs. The range appears to be from three to five days of intense staff development to little more than a perusal of the teachers' guides.

D. **An Assessment of Classroom Thoughtfulness**

When using the term assessment, which is used repeatedly in educational language today, it will be necessary to have a clear understanding of what is being assessed, by whom, and for what purpose. Brandt (1988) in an interview with Art Costa reports that the term assessment is more accurate and appropriate when used in the context of thinking

instruction. He suggests that it has a broader meaning than the word test, and is also free from the sometimes political connotations associated with this word.

Rather than identifying specific characteristics to be assessed, this section identifies general qualities found in a classroom setting where students are encouraged and guided toward higher-order thinking activities. What constitutes the major differences between teachers who promote this teaching challenge? Do they have different goals and do they view their subject matter unlike other teachers? Do these less traditional teachers relate differently to their colleagues and to their students and are they supported by their schools and/or departments in a manner that promotes this type of instruction.

If a framework is to be developed which will assist educators in recognizing and evaluating appropriate thinking skills instruction, it will be necessary to identify the parameters and the behaviors that should be present in classroom situations. Newmann (1990) suggests that the dimensions be readily observable. They should require a way both to observe and to measure teacher and student interaction. The schema should not be limited unnecessarily by rules in the beginning stages but rather allow for an

unhampered approach to the design. Regulations could be established as the process unfolds and can be evaluated. Finally the procedures that emerge should be conceptualized in such a way that teachers are able to reflect on the thinking process.

This researcher suggests three areas to be considered when designing the framework in question. Firstly, an evaluator would address general characteristics of thinking skills curriculum and instruction that would be apparent. An evaluator would determine if thorough coverage of a few topics was generated rather than superficial coverage of many. Secondly, an evaluator could ascertain the degree to which classroom instruction was substantive and coherent. Finally, an evaluator could determine whether or not sufficient amounts of "wait time" was planned to encourage students to think about appropriate and original answers. These three characteristics form the foundation for any thinking curriculum whether commercial or locally produced. (Newmann, 1990., Adams, 1989)

Newmann (1990) believes that evaluators also focus upon certain teacher behaviors. For instance, teachers should provide challenging tasks and questioning techniques and be prepared to consider all reasons that students may offer for

the conclusions that they have reached.   Teachers should

encourage originality in the solutions rendered and require

that students be able to justify their assertions. This

author would add that teachers should create a classroom

atmosphere which allows and encourages students: 1 to

question authoritative sources, 2 to refer to personal

experiences when relevant, and 3 to become "models of

thoughtfulness".

    Student behaviors which should be demonstrated if the

assessment model is to have validity include many of the

same teacher behaviors. Do students offer explanations for

their conclusions; do they generate original concepts and

ideas, and do they frequently act as questioner and critic?

Are the learners producing answers which are relevant? How

many are active participants? Finally, are students given

an opportunity to discuss various options among themselves,

and do they display genuine involvement in the activity?

    Ruggiero (1988) makes a case for assessing classroom

discussion based on the relevance of the contributions made

by students. He argues that consideration be given to the

varying abilities of the students. Since all will not bring

to the classroom discussion the same degree of background

information and because some will more fluently engage in

the exchange, the evaluator must judge the quality of each student's contribution. An intent listener or a participant who only volunteers an idea when he/she is sure it is relevant can add as much to a high-order thinking operation as the volatile extrovert.

According to Robert Ennis, a director of the Illinois Thinking Project, there is no comprehensive test on the market at the present time that will do a thorough job of assessing all thinking skills. That is not to say that current commercial tests presently available have no merit. This commentary is merely meant to warn the user that no one test will be an effective measure of all skills.

Some school officials design their own tests, choosing the best of the objective test format and the inherently expressive nature of the essay test. This task is formidable, however, and not much evidence exists to suggest viable tests are generated by these persons. Perhaps this complex challenge accounts for why most school officials rely upon standardized test scores of content material to measure student growth. If test scores reveal growth, and teachers subscribe to a thinking skills approach to instruction, then these teachers may infer that part of the gain can be attributed to the thinking skills curricula

adopted. Drawing these types of conclusions would not stand up under scrutiny, of course.

There are ways other than tests to measure what is taking place in the classroom fortunately. An appropriate arrangement of and atmosphere in the classroom, that allows students to see and hear each other and also one that promotes effective discussions among all students is desired. The teacher should serve as facilitator for these classroom discussions rather than be the main speaker.

Some effective techniques to measure thinking in the classroom include:

1. Observations: Keeping track of classroom activities by means of a log or journal allows the teacher to record differences in the quality of student responses. Is there evidence that they are able to deal with new situations using thinking skills or strategies?

    Do classroom discussions take longer as students become better questionners ?

    Themes or patterns will become evident to the teacher as she reviews her journals.

2. Tape Recordings. This device also allows teachers to compare the quality of responses and

interactions over time. The teacher should also
be able to determine the quality of his/her
questionning technique. Does it promote
higher-order thinking on the student's part?

3. Interviews: When students have become familiar
with thinking techniques using the interview
method, they will be able to question classmates
in an effort to compare thinking strategies.
Teachers will also be able to interview
students, thus allowing them to reflect upon and
critique their thinking decisions.

4. Student work: A portfolio maintained by the
student that would include a variety of works
such as writings, drawings, etc. that could be
examined from different perspectives. The
greater the degree of variety would be an
indication of the student's capacity for
thinking.   (Baron and Kallick, 1985)

The material cited in this chapter provided the impetus
for this researcher to look more closely at thinking skills
instruction as a means of improving overall student
performance in their academic development. Recognizing that
the current overriding and popular method of individualized
and basic skills instruction was not producing the literate

population we desired, it was evident that other measures were needed if this trend were to be reversed.

The researchers and educators who provided the background material and data for this chapter were convincing in their promotion of a thinking approach to instruction. Studies cited and frameworks suggested were fodder that encouraged further research in this field. Impediments to implementation not withstanding, advances have been made by communities who chose to adopt this approach, and observations in these school districts became a priority.

These visits were planned with an eye toward measuring the degree of committment to thinking skills on the part of school officials. How the staff was recruited in the planning and implementation, what grade levels were involved, and the method of presenting instruction, be it add-on, infused, locally-prepared or home-grown, all necessitated study in order to draw conclusions. Were curriculum specialists influenced by the various models and frameworks available in planning their programs or did they adapt commercial programs to meet their individual needs?

The communities visited were drawn from the initial

survey already cited. Material and ideas generated by

Newmann (1990) and Goodlad (1984) were used to produce the

observation and survey documents.

CHAPTER III
RESEARCH METHODOLOGY

A. Overview

The pilot study design involves randomly sampling Massachusetts communities, surveying members of selected communities, and analyzing data obtained using both quantitative and qualitative methods. The independent variable of the study is thinking skills programs/curricula, whereas the dependent variables are a) adoption or adaptation of thinking skills programs/curricula within local practice; b) preference for locally generated or commercially prepared thinking skills programs/curricula; and c) effects of thinking skills programs/curricula upon local communities' educational operations.

An initial survey of officials situated in fifty Massachusetts local education agencies provided data pertaining to thinking skills curricula. These data were used to frame the dissertation study. Based upon the initial survey data, the researcher drew the following inferences about the sample to be studied as part of the dissertation:

- that approximately one-quarter of the community officials responding will describe thinking skills programs/curricula in place;

- that close to fifty-percent of the community officials responding will describe thinking skills programs/curricula in place which have been commercially prepared;

- that thinking skills programs/curricula may be most difficult to observe during site visits;

- that fewer than ten percent of community officials responding will describe evaluation results pertaining to thinking skills programs/curricula in place.

The above inferences are based on a response rate of sixty-two percent.

B.   The Sample

The study sample was drawn from a publication provided by the Massachusetts Secretary of State's office.   The publication, in addition to identifying each local education agency in the state, provides information pertaining to each school operated within the LEA.   A sample of these systems, $N = 100$, which represents 28% of the school systems in the publication, was selected for study.   Attention was paid to choose systems that would reflect all socio-economic stratas

of the population.   The method of selection was random,
aiming at large city systems, such as Boston, Lynn,
Lawrence, etc. which have substantial minority populations,
mid-sized communities including Chicopee, Somerville, etc.
that have student populations between six and ten thousand
students,   and finally small suburban townships like
Longmeadow, Concord, Marblehead, etc. which are primarily
bedroom communities to larger cities.

Once sample group membership was established, names of
100 school officials were obtained. The school officials
preferred were curriculum coordinators; however, not all
local education agencies employ curriculum coordinators.
So, other central office administrators were contacted in
some of the local education agencies. Of the 100 persons
contacted, 62 (or 62%) responded. These responses revealed
18 local education agencies that have in place some sort of
thinking skills program. The eighteen programs are located
in the following communities:

Name of System	Student Population	Grade Levels
Boston	59,445	K-12
Brocton	14,991	K-12 **
Fall River	12,098	K-12 ***
Framingham	7,542	K-12
Chicopee	6,812	K-12

Somerville	6,537	K-12 ***
Taunton	**6,185**	**K-12**
Westfield	5,754	K-12
Needham	3,768	K-12
Randolph	3,755	K-12 ***
No. Andover	3,392	K-12
Shrewsbury	3,261	K-12
Somerset	2,940	K-12 ***
Belmont	2,878	K-8 *
Bedford	1,818	K-8 * ***
Sudbury	1,699	K-8 *
Holden	1,628	K-8 * ***
Concord	1,544	K-8 *

* denotes membership in a regional district for grades
    9 - 12.

** program eliminated for the 90-91 school year due to
    budget constraints.

*** unable to establish an observation schedule.

The first five communities would be classified as
substantial sized urban school systems with a significant
multi racial population.   Somerville and Westfield are
considered mid-size urban systems and Randolph, No. Andover
and Somerset would be labelled larger suburban districts.

The remaining systems are smaller suburban communities
possessing a varied socio-economic climate.

C. Data Acquisition Instruments

Two survey instruments are utilized by the researcher.
The first was designed to obtain basic information from
local education agency officials pertaining to thinking
skills program work. The second was designed to elicit
specific thinking skills program details through on-site
observations. Details of both tools follow.

Once the communities were chosen as described in the
previous section, a survey form was devised to solicit
certain required information. For example, it was necessary
to know if the system being polled had any type of thinking
skills instruction in place. If the system did, was it a
commercial program or was the curriculum locally developed.
Also of major interest was information about the local
education agency officials' philosophy regarding infusing
the curriculum into all or some content areas or adding it
to their already established curricula.

Other points of interest included an evaluation of the
program if available, the number of years the program had

61

been in operation, and most important of all, would

observations be allowed. A letter of introduction and an

explanation of the purpose for the study accompanied the

mailing. The survey instrument which follows was used to

gather this information.

SURVEY OF THINKING-SKILLS PROGRAMS
IN MASSACHUSETTS SCHOOLS

1. Does your school-system have a formal program for teaching thinking-skills?

	Yes	No	Infused	Add-On
Elementary	____	____	____	____
Middle Sch./Jr. High	____	____	____	____
High School	____	____	____	____

2. Does your school system conduct a formal evaluation of your thinking skills program?

Yes	No
____	____

3. If the program is commercially produced please name the producer/publisher on the space provided below.

_____

_____

4. Would you welcome a visit to your community in order that I may observe your thinking program in action?

a) If yes: _____
             Name of School System

             _____
             Address

             _____
             City, State, Zip

             _____
             Contact Person

5. Signature: _____ (Optional)

The design of the observation instrument takes into account characteristics of thinking instruction on the part of the teacher, characteristics of learning thinking skills on the part of the student, and characteristics of the curricular format (e. g. fused in place). Recognition of the most common thinking activities engaged in by students and teachers in the areas of critical and creative thinking by authorities cited in Chapter Two helped frame the observation tool. The three basic forms of thinking complement each other according to Swartz (1987) and are utilized in most of the ordinary thinking tasks we perform, such as making decisions, solving problems, planning activities, etc. Thinking classrooms should exemplify lesson plans, behaviors, patterns, etc. which advance these philosophies. Brandt (1988) reports in his interview with Art Costa, that we should establish a plan of action regarding the behavior we expect students to exhibit. How would we determine if they follow directions well, and what kinds of problem-solving behaviors would we like to see? Is material available to advance these desired behaviors? Is the classroom arranged appropriately and do teachers behave in a manner that will further higher-order thinking?

Data generated by the survey and observation instruments identified:

1)   communities that have adopted a critical thinking
approach to instruction...

2)   commercially prepared and/or a locally produced
curricula in place...

3)   results of local evaluations (if available) on
thinking skills program effects...

4)   communities that have no thinking skills program in
place.

5)   teacher behaviors which promoted student thinking...

6)   student interaction that fostered thinking
behaviors...

7)   classroom design, atmosphere and layout which was
conducive to higher-order activities...

8)   type of in-service training and the method of
teacher selection engaged in by the system prior to
implementation...

The observation instrument which follows has been
designed to assure consistency and non-evaluative procedures
of information gathering. The instrument was used by the
observer during on-site visits to the school systems in
question. This effort accounted for objective and non-
judgemental data which was consistent from school to school
and system to system.

The initial instrument required the researcher to mark
a "yes" or "no" response to each item in the METHODOLOGY
section. This proved unsatisfactory because it did not
allow for any distinction to be made between infrequent and
sporadic behaviors displayed by the teacher or by the
student versus consistent and intended actions exhibited by
either party. The present format allowed the researcher to
draw conclusions and establish hypotheses between
happenstance occurences in the classroom to management
techniques which call for sustained higher-order thinking
abilities.

The instrument was field tested in two settings within
the Chicopee Public School System, which is where the
researcher is employed. Field test feedback facilitated
instrument adjustments and revision of the format.
Additional on-site observations continued until the tool met
the needs of the researcher meaningfully. Because teachers
in Chicopee are familiar with the researcher and know of the
dissertation project, these additional monitoring sessions
were not threatening.

On the following pages is included the revised and
modified data gathering and observation instrument.

School System_____

City (Town) _____

Name of Person Completing Observation_____

PROGRAM CHARACTERISTICS

1.   Is the thinking skills program commercially prepared or locally produced?

    a)   Locally produced..._____

     b)   If it is a commercial program, which one are you using?   _____

      _____

2.   Are the goals of the program clear and understood by the practitioners...

    _____

    _____

    _____

3.   In this community, the program is intended for:

    a) the above average student_____
    b) the average student_____
    c) the below average student_____
    d) all students_____

4.   The program operates at the following grade levels:

    a)   Elementary _____
    b)   Junior High _____
    c)   High School _____

5.   The program has been in operation for_____ year(s).

6.   When the program was introduced was the staff composed of:

     a) volunteers _____
     b) draftees _____
     c) other   _____

7.   Describe briefly the in-service program (if any) conducted by this community in order to prepare staff:

_____

_____

_____

8.   Does the thinking skills program require the system to distance itself from strict reliance on basal texts to form the core of all curricula?

     yes_____   no _____

9.   Is the thinking skills program affiliated with a college or university?

     yes_____   no_____

10.   Is the program formally evaluated?

     a)   No. of years for which evaluation results are available? _____

     b)   Name of the test(s) used_____

11.   Please add any comments, explanations etc. which you feel would enhance any of the above answers.

METHODOLOGY

69

	Never Observed	Observed at least once	Observed often

In the thinking skills
classrooms is there evidence of:

   a) intense, sustained
examination of a few selected
topics rather than superficial
coverage of many...

   b) lessons that display
substantive coherence and
continuity...

   c) appropriate 'wait time' by
teachers, thus allowing students
time to think before answering...

   d) the teacher asking
challenging questions...

   e) the teacher pressing for
reasons for conclusions and
explanations reached by students...

   f) the teacher encouraging
original and unconventional ideas,
solutions, etc. ...

   g) a teacher that shows an
awareness that not all assertions
emanating from authoritative
sources are absolute or certain...

   h) the students' personal
experiences, when relevant, being
integrated into the lesson...

69

i)   the **teacher conducting**
himself/herself as a model of
thoughtfulness...

j)   students offering
explanations for their
conclusions...

k)   students generating original
and unconventional ideas,
explanations, hypotheses ...

l)   students assuming the role
of questioner and critic...

m)   students displaying thoughtful
discourse with one another ..

D. Data Analyses

Survey instrument responses identified communities that have and have not adopted thinking skills instructional programs. Of those school systems which are teaching thinking, the survey requested that they identify the source of their program, e.g. commercially prepared or home-grown. Cost effectiveness has also been researched and documented in an effort to determine if one method is more prohibitive than the other, or are both too costly in this period of reduced budgets.

The observation data has sought to document local evaluation procedures. In one instance where a specific testing program designed to test thinking skill abilities was in use, such results have been reported.   Because it became evident that most communities do not test specifically for thinking skills, comments regarding increased standardized achievement scores were solicited. The data collected, however, has been aggregated to focus primarily upon teaching behaviors, classroom design, pupil interaction and overall commitment to the program, which has proven effective in the teaching of thinking skills.

The characteristics of the various programs were reported in such a manner that local versus commercial programs were charted. Because the number of communities reporting thinking programs was not large, these results are perhaps not statistically significant, but could denote overall preferences. Other data merited evaluation and discussion but did not lend itself to statistical significance; however, comparing and contrasting the results demonstrates trends and possible causality. The quality of in-service training for teachers, for example, and the level of understanding of the goals could account for a program's success or failure. Based on the number of communities visited, the grade levels where thinking programs were concentrated was also of interest and was documented.

The data gathered as a result of these observations was used to detect common threads and behaviors which are indicative that thinking instruction produces a more literate student population. The frequency with which the behaviors in the METHODOLOGY section of the observation instrument are observed has been charted. These characteristics have been classified as desirable and necessary if thinking skills instruction is to occur. (Newmann, 1990 Costa, 1985) The behaviors were charted on a blank instrument in the form of a frequency distribution.

It was expected that most, if not all, would be evident in the classrooms being observed. Another point of interest was to determine if certain of these items were more prevalent depending on the age and/or grade level being observed.

It was noted in Chapter Two, that language among the various thinking programs, whether commercial or local, is very often not cohesive nor consistent. While this did not pose a problem to this observer, it was frequently necessary to transfer lables used in certain communities to their more common generic counterparts. For example, a given school system may use the terms "compare and contrast" to teach similarities and differences, while another may consider this process to be a part of "analysis". "Inference" in one system may be taught under the guise of "application synthesis" in another.

Of significant interest when observing students in these thinking classes was to take note of the length and quality of student responses, the variety of answers, and the number of students involved in the lesson.

After a few years of thinking skills instruction, could teachers:

- detect increased perserverance and varying strategies as students attempt to solve problems?

_ notice if students are less impulsive and more inclined to reflection as they seek answers to questions?

- report a more flexible student when expressing an opinion, or weighing another person's point of view?

- students becoming more concerned with checking for accuracy, and becoming more precise in their use of language?

- determine if students were becoming meta-cognitive. That is, were they able to describe what was going on in their heads when they think. (Costa, 1983)

Consideration of these items varied from system to system and depending on the age of students and the type of program being reviewed, it was not possible to chart or diagram these incidents statistically. Notes and comments have been provided in the SUMMARY section of Chapter Four signifying their relevance and importance in the evaluation and observation process.

In summary this dissertation study attempts to explore, report on and measure the following program characteristics and traits which corroborate past research pointing to causality between higher-order thinking activities and a

bet___ _ educated student population. (Thomas, 1980 Rosenshine and Furst, 1971)

1. At the local level, what kinds of programs are presently being used by educators?

Based on the results of consultations with school systems visited on-site as well as those responding to the initial survey request, the percentage of commercial versus local programs was reported. This data was recorded and aggragated in the PROGRAM CHARACTERISTICS section of the observation instrument. It was secured through interviews of school officials, teachers, specialists, etc. in each of the respective communities.

The percentage of grade levels and type of populations serviced by thinking programs as noted in this same section of the instrument is reported upon, documenting when possible, those grades where the greatest concentration of programs was found. A range was utilized to plot the number of years programs in question have been in operation.

Relationships focusing on costs as the reason for choice between local versus commercial programs is addressed.

2.   How extensively are identified programs being utilized by teachers at the local level and what effect are these programs having on thinking skills of targeted student groups?

While on-site visits to the eleven school districts in the survey revealed virtually no formal evaluation data of the thinking component in their curricula, a frequency distribution has again been used to chart identified behaviors that are recognized as measuring successful higher-order processes. The polygon was again used to plot these findings.

Causality can only be estimated between the frequency of expected behaviors and higher-level thinking skills. The researcher had to take into account the large number of variables that surrounded this study. For example, the range of grade levels observed had to be considered. The variety of programs being utilized was another factor, given that data was gathered in only eleven communities. The relative effectiveness of teachers observed was difficult to estimate on a long range basis. The type of program e.g. infused or add-on, home-grown or commercial must also be viewed as a significant factor in the relative success of each program.

The data, therefore, can only point to possible correlations between increased standardized test scores, more observable thinking behaviors exhibited by both teachers and students and the zeal with which thinking skills are taught in these communities.

CHAPTER IV
RESEARCH FINDINGS

A. Introduction

Observations of thinking programs in the aforementioned Massachusetts Schools took place over a three month period during the Fall of 1990. A total of 25 classrooms were visited in 11 school districts. The programs had a grade level range of Grade 1 through grade 12. Many of the programs were commercially produced or derivatives thereof, while others were locally-planned. Most were infused into various subject areas, but many were taught in addition to the already established curriculum.

It is a tribute to the educational climate in these systems that so many school officials were courteous enough to invite the researcher into their schools to view what they had to offer. It is even more exciting to report that most of the programs observed appeared educationally sound and worthy of replication and dissemination.

Certainly observing to assess thinking behaviors is not the same as observing a gymnast or a ballerina as one seeks to qualify the degree to which they perform with style and grace. However, although thinking is hard work, like precision of movement a person's thought processes can become more broadly applied, and certainly more precisely focused. He/she can be judged to be more spontaneous, more intricate and more abstract. As with the gymnast or the ballerina, this thinking refinement requires rehearsal, concentration and coaching. Because this thinking process takes place inside the head, it becomes more illusive to assess. A keen observer, however, is able to detect thinking instruction that is capable of producing a literate, reasoning population. (Costa, 1983)

In light of the above, the observation instrument was designed to focus the observer's attention on the identification of similarities and frequency of occurence of pre-determined behaviors that are common to thinking programs and operations. It should be noted that they are desired teaching behaviors in any curriculum. The instrument also served to categorize the various programs observed by type, grade level(s), staff recruitment and associated in-service, and the identified intended audience.

Code numbers will be used when characteristics of specific communities are discussed so that they may remain anonymous. A demographic breakdown of these communities will be found in the Appendix .

B. Dominant Program Characteristics

One of the questions this study addressed as outlined in Chapter I was to review the types of thinking skills programs available to educators at the local level.

1. Commercial vs. local

Classification of thinking skills programs according to origin was an initial concern of the observer. Of the 11 school systems included in this study, 7 had adopted commercial models and 5 had opted to prepare their own curriculum locally. System no. 85 had two programs, a local program for all students and a commercial one for gifted youngsters.

Pre-packaged programs that the researcher observed included:

Talents Unlimited

CoRT

Catalyst

The Padeia Model

H.O.T.S. (higher-order thinking skills)

Instrumental Enrichment

Barry Beyer Model

One of the locally produced programs was admittedly based on Talents Unlimited, but the format had been considerably altered to better suit local needs.

2. In-service and thinking coordinators

Only two of the systems visited had thinking coordinators to provide on-going in-service, continuity and consistency through the district. Some school systems reported having had such a position but budget cutbacks in recent years had forced its elimination. Without a director many thinking programs did not appear to operate in a consistent manner from school to school nor even from grade level to grade level in the same school. The disparity ranged from moderate to severe. That is, in some systems the entire program is held together by a few interested teachers, while in others the building principal continues

with appropriate training and encouragement for all teachers in his/her school.

The absence of a thinking skills coordinator could also account for the fact that of the systems visited, none attempted to measure outcomes of thinking skills instruction. This result meant that two of the hypotheses set forth in Chapter One, which suggested that no relationship exists between thinking skills instruction and standardized test scores among locally produced and/or commercial programs, could be tested. A perception exists among educators that such a relationship is documented, which is why the two hypotheses were pursued. No current documentation was found.

System 40 had conducted such a testing program on a pilot basis for one year only. The purpose of this pilot test was to measure changes in thinking skills after the implementation of the H.O.T.S. program within selected Chapter I classes. Experimental and control groups were established as part of the pilot test, which was conducted in the 1987-88 school year. Cost and time constraints caused the testing to be abandoned after one year. Evaluation reports made available to this researcher show students, who received remedial instruction via the

H.O.T.S. program, made significant increases in the areas of reading and math as measured by comparing pre and post test scores in these two areas. These increases were judged to be statistically significant when compared to pre and post test scores of the control groups who received traditional remedial instruction. Additional testing would need to be conducted with larger numbers of students before causality could be established.

3. Staff recruitment

Volunteers were solicited within most school systems and then trained to teach the thinking skills program adopted. All teachers in certain schools were provided with such training; however, this practice was atypical. School principals appeared to influence both the involvement of teachers and the implementation of thinking skills instruction within a given building; unfortunately, this influence could not be documented during the time spent by the observer within each school.

4. Basal texts

Teaching higher-order thinking provides a natural vehicle for incorporating a variety of materials into the educational process. Nevertheless, textbooks were used as the basis for the general curricula in many classroom

observed. 55% of school officials interviewed in on-site
visits confessed to relying heavily on basal textbooks, even
though they recognize that these books are unable to keep
pace with today's rapidly changing pool of information. The
remaining 45% of school officials indicated they were using
more current items such as periodicals, literature,
newspapers, etc.; however, the level of usage varied greatly
from classroom and community to classroom and community.

The Hartford Public Schools is an example of an entire
system in the process of developing a curriculum that won't
be dependent on textbooks. Information will be generated
from government documents, diaries, and other primary source
material. (Spfld. Union 1990.) Recent events such as the
crumbling of the Berlin Wall, the reasons for Gorbachev
being chosen the recipient of the Nobel Peace Prize, etc.
will take countless years before they appear in print in a
textbook. Because changes are occurring so rapidly whole
chapters in textbooks are outdated before they are even
published.

Yet, teachers are comfortable using basals as the
anchor of their teaching content. Also, school officials
can measure learning with a degree of predictability by
using textbook unit tests. Reliance on these materials
still remains the predominant mode of instruction.

Another question posed in Chapter I involved the extent to which identified programs are being utilized.

5. Results

62% of the 100 districts surveyed responded to the questionnaire.

Of the respondents:

N = 18
29% had thinking programs..

N = 11
61% of these systems were visited on-site by the researcher.

Of the systems visited:

N = 5.5
50% of the programs were locally produced...

N = 5.5
50% were commercially prepared...*

N = 5
45% of the programs were add-ons (additional to the established curriculum)...

N = 6
55% were infused into the regular curriculum...

N = 8
73% offered these programs to all students..

N = 3
27% had programs for gifted or advanced students
only... (3 systems had special programs for remedial
students.)

N = 2
18% of the programs were found at the elementary
level...

N = 8
73% were discovered in the middle grades...

N = 1
09% were observed at the high school level...

* A few systems had a local program at one grade level

span and a commercial program at another. Attributing a

count of one for each local program reported and one for

each commercial program reported, a 50/50 split occurred.

The number of years these programs were in existence

ranged from 2 years to 10 years. The actual range can be

plotted as such:

NUMBER OF YEARS

```
              _2__3__3 _3__3___4_____5 _5_____6_____10_10__
System No.    11 40 87 95 55  85      31 47       52        24 14
```
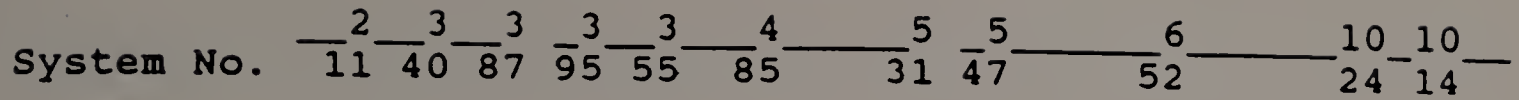
Figure 1. Range of Number of Years in Operation

It is interesting to note that most programs began three to five years ago, with a mean of approximately five years, a median time of four years and a mode of three years. The infusion of Chapter 188 monies for the purpose of pursuing new educational initiatives may account for the relationship noted between the start-up time of these programs and this legislation.

A review of the above analyses proved to be meaningful to this researcher. They served to answer questions posed in the first two pages of the observation instrument dealing with numbers and types of thinking skills programs found in the systems polled. While 61% of the systems responding was

significant, the number of these communities dealing with thinking instruction was less than one-third.

These percentages also highlight the following points:

1) that virtually no difference exists between the number of commercial versus local programs...

2) that no significant difference exists in the number of add-on versus infused programs...

3) that the number of systems offering thinking skills instruction to all students, rather than to the gifted population only, is significant...

4) that there is a significant difference in the number of thinking skills programs offered in the middle grades as opposed to the lower elementary or high school levels...

Figure I shows an amazing disparity between the time some school systems first started with thinking instruction versus those most recently involved with this concept. Even more startling is the fact that some of the systems polled have been promoting higher-order instruction for ten years and most systems have not yet begun dealing with this teaching strategy.

C. Observed Behaviors

The final question outlined in Chapter I resolved to chart the effect these thinking programs had on the

development of thinking skills in targeted students.

Arthur Costa and Fred Newmann have been previously cited in this paper as having documented desirable thinking behaviors which are conducive to the learning process. The following frequency distribution highlights the number of times these behaviors were observed by the researcher during on-site visits.

TABLE 1. Methodology Frequency Distribution

METHODOLOGY

	Never Observed	Observed at least once	Observed often
a) intense, sustained examination of a few selected topics rather than superficial coverage of many..	1	1	23
b) lessons that display substantive coherence and continuity...	1	2	22
c) appropriate 'wait time' by teachers thus allowing students time to think before answering...	1	9	15
d) the teacher asking challenging questions...	1	4	20

e) the teacher pressing for reasons for conclusions and explanations reached by students...   3   8   14

f) the teacher encouraging original and unconventional ideas, solutions, etc...   3   8   14

g) a teacher that shows an awareness that not all assertions emanating from authoritative sources are absolute or certain...   6   9   10

h) the students' personal experiences, when relevant, being integrated into the lesson...   5   8   12

i) the teacher conducting himself/herself as a model of thoughtfulness...   1   4   20

j) students offering explanations for their conclusions...   1   10   14

k) students generating original and unconventional ideas, explanations, hypotheses...   4   4   17

l) students assuming the role of questioner and critic..   5   13   7

m) students displaying thoughtful discourse with one another...   3   12   10

The polygon charted below graphically depicts the frequency of those behaviors that are most desirable, as they were observed repeatedly in classrooms by this researcher.

Figure 2. Polygon of Most Frequently Observed Behaviors

Behaviors g, l and m did not register especially high even in Figure 2. Letter g, which deals with certainty and authoritative sources was frequently not a relative issue in the lessons observed. That is, the idea of questioning the validity of a published opinion was not pertinent to the subject as it was being presented.

Letters l and m deal with student behaviors such as encouraging them to be the questioner and critic and also to openly conduct a discourse with one another. Although these behaviors were readily apparent when observing upper elementary and secondary classes, they are not as appropriate for lower elementary students. Course material in the early grades visited on-site simply did not require students to engage in these activities.

Figure 3 charts the frequency that desirable behaviors were observed at least once. That is, for the observer there was evidence that the teacher recognized the behavior and introduced it into his/her lesson although sparingly. At times the behavior might not have been appropriate for the grade level involved in the activity, which accounts for its absence.
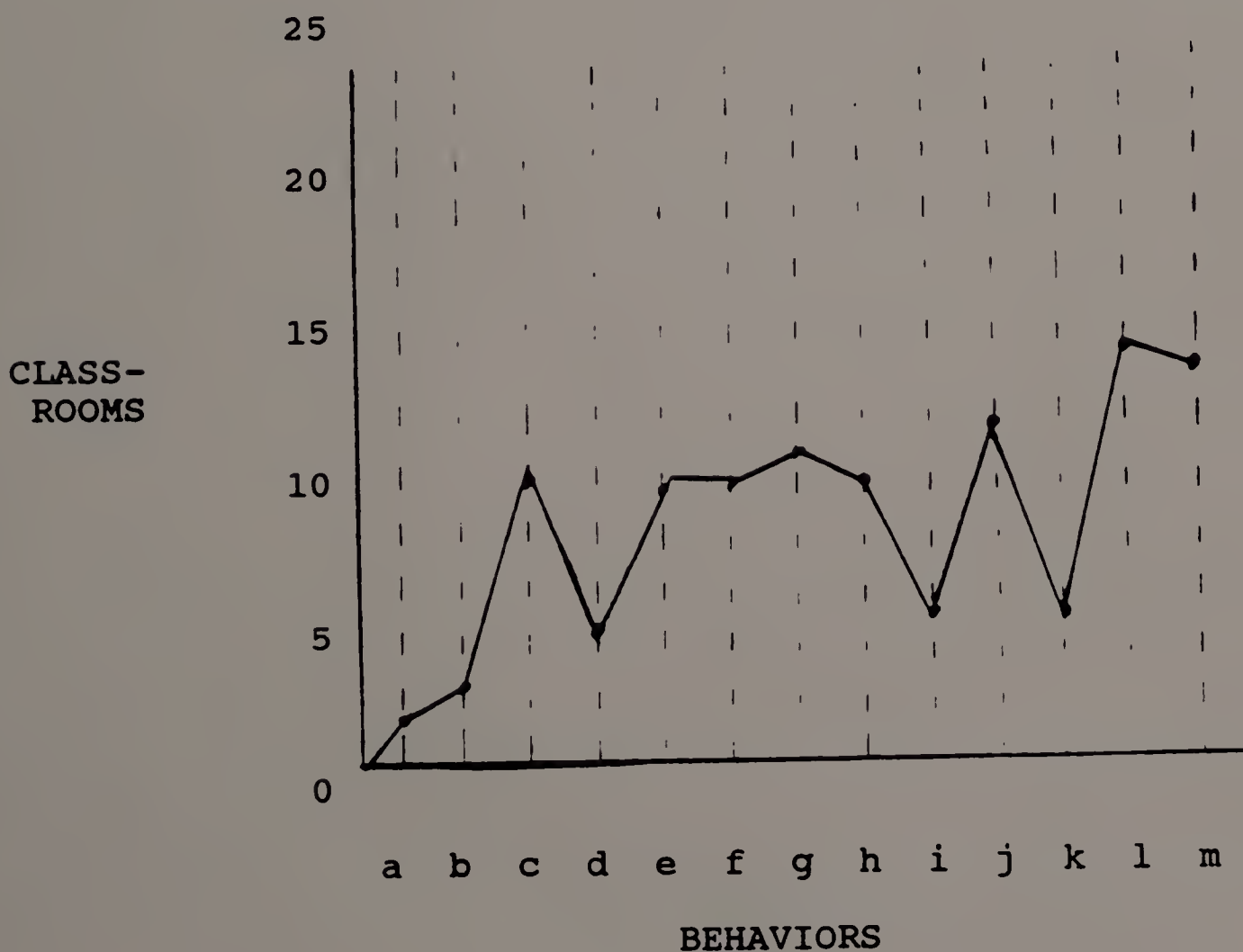
Figure 3. Polygon of Behaviors Observed at Least Once

Figure 4 depicts desired behaviors that were rarely
seen, again at times because they were not conducive to the
lesson. During some of these observations, however, it was
apparent that the teacher made no effort to pattern them,
although they would have proved a valuable addition to the
lesson at hand. It can only be concluded that that
particular teacher did not include this skill in his/her
repertoire.
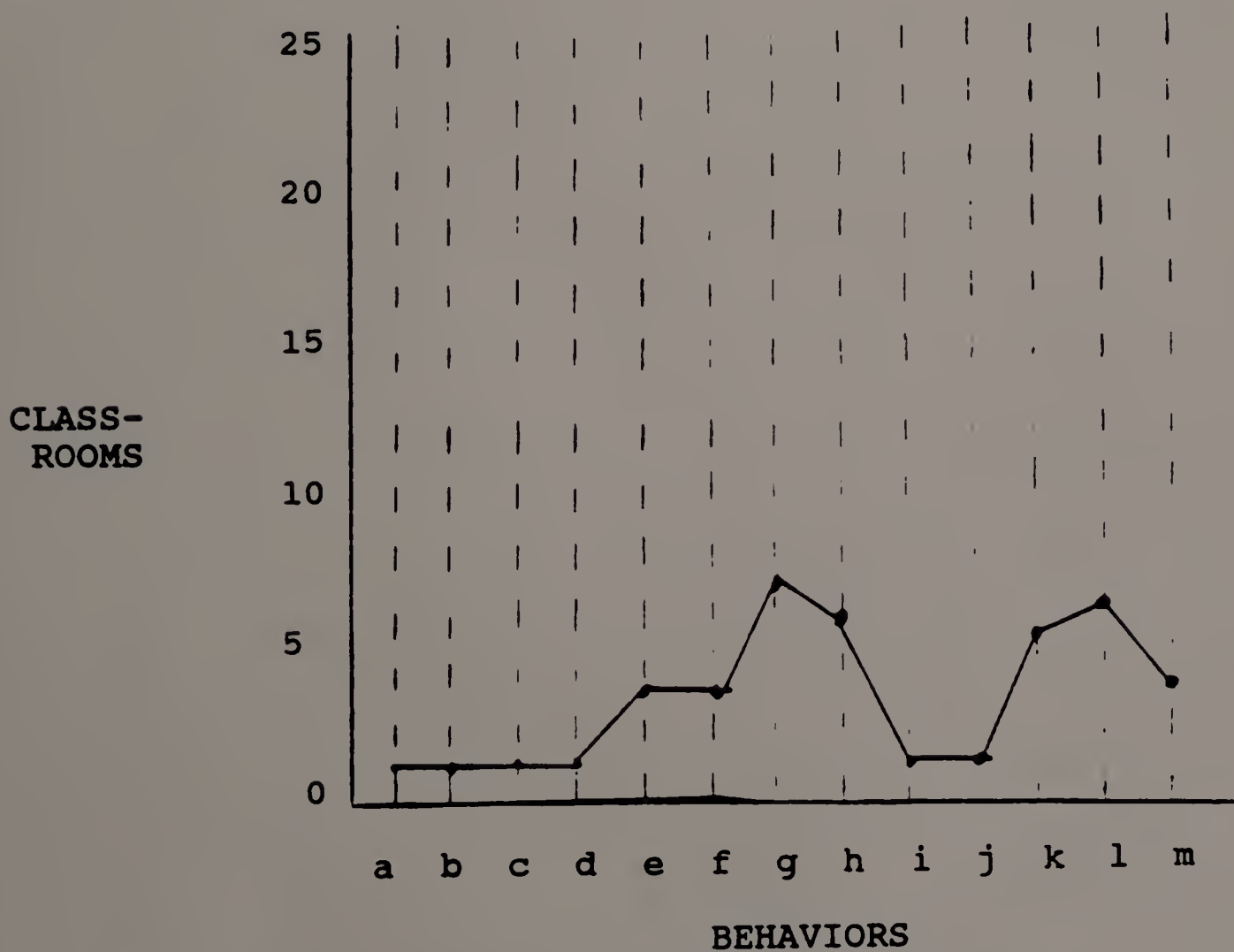
Figure 4. Polygon of Behaviors Never Observed

Next, the observation data is summarized by classrooms/school districts. These data depict the frequency of desired thinking behaviors observed within each of the participating local education agencies. Table 2 provides an overview of the data obtained.

The percentage figures reported are indicative of the number of times desired behaviors were observed on average compared with the total number of possible desired behaviors (13). These percentages were arrived at by adding those behaviors observed at least once and those observed often. These totals were then divided by the number of classrooms visited. This total was subsequently divided by the number 13, which is the total number of possible desired behaviors. Because sample numbers are small any extreme figures should be examined with caution.

TABLE 2. Percentages by Classrooms Visited

Classrooms Visited	Total No. of Minutes Observed
N = 25	N = 1,100 (18 hrs. 33 min.)

DESIRED BEHAVIORS

System # 11	No. Of Min. Observed	Never Observed	Observed At Least Once	Observed Often
Grade 2	45	2	10	1
Grade 4	45	13		
Total	90	15	10	1

N = 5.5 divided by N = 13 = 42%

System # 31

Grade 7	45		1	12
Grade 8	45		10	3
Grade 8	45		3	10
Total	135		14	25

N = 13 divided by N = 13 = 100%

System # 24

Grade 1	45	1	3	9
Grade 4	45		3	10
Grade 6	45		2	11
Total	135	1	8	30

N = 12.67 divided by N = 13 = 97%

System # 40

Grade 4	40		5	8
Grade 5	40	1	7	5
Total	80	1	12	13

N = 12.5 divided by N = 13 = 91%

System # 87

Grade 5	45	6	4	3
Total	45	6	4	3

N = 7 divided by N = 13 = 54%

System # 47

Grade 1	45	1	6	6
Total	45	1	6	6

N = 12 divided by N = 13 = 91%

System # 95

Grade 5	45		3	10
Total	45		3	10

N = 13 divided by N = 13 = 100%

System # 52

Grade 3	30		4	9
Total	30		4	9

N = 13 divided by N = 13 = 100%

System # 14

Grade 4	45	5	3	5
Grade 4	45		6	7
Grade 4	45		8	5
Total	135	5	17	17

N = 11.33 divided by 13 = 87%

System # 55

Grade 4	45	6	4	3
Grade 10	50		2	11
Grade 12	50			13
Grade 12	50			13
Total	195	6	6	40

N = 11.5 divided by N = 13 = 88%

Grade 6	45	2	11
Grade 7	45	2	11
Grade 8	45		13
Total	135	4	35

N = 13 divided by N = 13 = 100%

Recommended thinking behaviors were observed between 42 and 100 percent of the time in the school systems visited. The mean of the set is 86, the median is 91, and the mode is 100.

Certain characteristics of the data summarized is worthy of comment since they serve to reinforce certain assumptions. Because sample sizes are small, the following observations should not be generalized.

Commercial programs were charted most often with perfect 13 scores. For example,

1)   one Grade 12 lesson plan in System 55 was drawn from the Padeia Model. This program encourages the teacher to guide the students into managing and conducting the discussions themselves. The teacher becomes the facilitator.

2)   a Grade 8 teacher in System 85 using the Catalyst program displayed a well planned lesson, conducive modelling as well as students who were age appropriate. This made it

possible for both the teacher and students to utilize all desired behaviors.

On the minus side for commercial programs, it should be noted that System 87 scored only 54%. Although this is based on a single observation, this figure represents the only costly program observed by this researcher.

A locally produced program in System 11 had the distinction of producing the extreme score of 13 in the "Never Observed" column. The teacher did not model appropriate behavior, nor was there evidence of thinking skills instruction taking place. The lesson was totally inappropriate for the purpose of this study.

On the plus side for a local program, System no. 52 rated 100% in the observation of desired behaviors; however, this is based on a single 30 minute observation of one class.

The length of each observation was scheduled for a minimum of 45 minutes per class or lesson. In a few instances, as noted, the lessons ended sooner; therefore, the decreased time was so noted.

The distinction between commercial versus local
programs blurs if Table 2 is judged from the perspective of
those communities scoring between 90% and 100% when the
"Observed Often" and the "Observed at Least Once" columns
are combined. Using this scenario there is little
difference between the type of program used. It cannot be
discounted, however, that commercial programs produced the
greatest number of "Observed Often" desired behaviors. This
could be attributed to the fact that the curriculum serves
as continual reinforcement and recalls students and
teachers to the planned lesson.

Table 3 offers a comparison of desired behaviors as
documented when observing commercial versus local programs:

TABLE 3. Percentages by Program Type

			DESIRED BEHAVIORS		
				Observed	
Type of Prog.	No. of Classes	Total No. of Min. Obs.	Never Obs.	at Least Once	Obs. Often
Locally produced	N=14	600 (10 hrs.)	27	61	94
Total			27	61	94

N = 11.07 divided by N = 13 = 85%

	N	Minutes			
Barry Beyer Model	N=1	45	1	6	6
CoRT	N=1	45		2	11
Catalyst	N=2	90		2	24
Padeia Model	N=3	150		2	37
Talents Unlimited	N=1	45		3	10
Instrumental Enrichment	N=1	45	6	4	3
H.O.T.S.	N=2	80	1	12	13
Total	N-11	500 (8 hrs. 33 Min.)	8	31	104

$$N = 12.27 \text{ divided by } N = 13 = 94\%$$

Again differences between the commercially prepared programs and local thinking curricula do not appear to be significant. While there were a large number of desired behaviors that were not apparent during the observations of local programs, the total of those behaviors 'observed at least once' and of those 'observed often' should be noted..

Commercial programs exhibit the fewest 'never' observed and the most 'observed often' desired behaviors. As previously noted, this could be attributed to the existence of a formal curriculum in place, which continually causes the teacher and the lesson to return to task. That is,

strict observance to the lesson plan does not allow the class to veer too far from the expected course, and focuses the attention of teacher and students on the appropriate thinking skills.

Data obtained were also compared from a demographic standpoint. The purpose of this analysis was to determine if the configuration of a community as well as its economic status could play a role in determining the effectiveness of a thinking skills program. The following breakdown of communities is based on the demographic grouping used by the State Department of Education, denoted as 'Kind of Communities', which clusters cities and towns of like characteristics for the purpose of assessing state assessment curriculum testing.

TABLE 4. Percentages by Kind of Community   KOC

Urbanized Centers

	No. of Classrooms	Average Positive Behaviors Observed	Total Positive Behaviors
System # 14	N = 3	11.33	13
System # 40	N = 2	12.1	13
System # 95	N = 1	13	13
System # 87	N = 1	7	13
Total		43.43	52

N = 10.75 divided by 13 = 83%

Economically-Developed Centers

System # 31	N = 3		13	13
System # 11	N = 2		5.5	13
System # 52	N = 1		13	13
System # 47	N = 1		12	13
System # 55	N = 4		11.5	13
System # 24	N = 3		12.67	13
Total			68	78

N = 11 divided by 13 = 85%

Residential Suburbs

System # 85	N = 3		2	11
Total			2	11

13 divided by 13 = 100% *

* This represents one observation in a single classroom; therefore, results are inconclusive.

Tables 5, 6 and 7 provide a synopsis of observation data obtained which allows for easier comparison of outcomes.

TABLE 5.   Recap by Classrooms Visited

	Desired Behaviors Observed	Total Possible Desired Behaviors	Percent of Desired Behaviors Observed
System # 11	5.5	13	42%
System # 31	13	13	100%
System # 24	12.2	13	92%
System # 40	12.1	13	91%
System # 87	7	13	54%
System # 47	12	13	91%
System # 95	13	13	100%
System # 52	13	13	100%
System # 14	11.33	13	87%
System # 55	11.5	13	88%
System # 85	13	13	100%

TABLE 6.   Recap of Results by Program Type

	Desired Behaviors Observed	Total Possible Desired Behaviors	Percent of Desired Behaviors Observed
Locally Produced	11.07	13	85%
Commercial Programs	12.27	13	94%

TABLE 7. Recap by Demographic Breakdown

Urbanized Centers KOC #1	10.75	13	83%
Economically - Developed Suburbs KOC #2	11.20	13	86%
Residential Suburbs	13	13	100%

These recaps suggest desired teaching behaviors are being implemented regardless of program type, type of community, and socio-economic status of community. Differences observed (with the exception of a few instances already noted) appear to be inconsequential. How instruction in the classrooms observed differs from instruction in all classes with regard to thinking skills instruction would be a most interesting follow-up study.

An observer is quick to recognize a more involved student population in a classroom where a thinking focus to teaching is practiced. Students are active participants in the lesson; they display the ability to work cooperatively with the teacher and their peers, and they ultimately guide the direction of their instruction.

A teacher committed to this approach will ensure that students actually process information, not merely memorize it. He/she will ask broad open questions, and provide

appropriate 'wait' time before calling on students. Student
responses will be followed up with requests to clarify,
elaborate and even ask them to explain their thinking
process as they arrived at their answer. The teacher should
have a clear idea of what they are attempting to accomplish
and provide the appropriate sequence of learning activities.

Based on this researcher's observations, it is
difficult, and perhaps impossible, to identify a best way to
present thinking skills instruction from the data gathered
in this study. Fine examples of teaching these skills were
observed in both commercial and locally produced programs.
Discussions with school personnel revealed that cost was not
necessarily a factor in the implementation of such programs.
An exception has already been made for one of the
communities visited. Certainly if a thinking coordinator is
hired for this purpose a monetary impact will be evident;
however, most commercial programs are not costly to
implement. Much of the cost can be attributed to teachers
manuals and/or in-service training. Very often teams of
teachers from each building receive the training and then
become trainers for other teachers. This finding is
consistent with the first hypothesis contained in Chapter
One; that is, an increase in a community's per pupil

expenditure need not occur simply to implement thinking skills instruction.

Systems # 24 and # 31 represent outstanding examples of in-house programs and not surprisingly both of these communities employed a Thinking Skills Coordinator. Of interest to this observer, however, is the fact that one of the programs was infused into the curriculum while the other consisted of providing additional classes to elementary students. Thinking skills lessons were consistently offered throughout the district at selected grade levels, many classroom teachers and/or specialists were involved and higher-order instruction appeared to be a curricular priority based on interviews with school officials.

System 55 displayed exemplary teaching at the secondary level using a commercial program that the teacher infused into her instruction. She had so absorbed the tenets of this program that she adopted this model as her style of teaching. Again, after speaking with school officials, it was evident that this teacher's commitment was a somewhat isolated occurrence, and thinking instruction varied greatly in intensity and consistency in the school.

While the above situations are examples of the best that was observed, the few instances that were previously described as having produced poor observation findings should be viewed as unfortunate. Both were locally produced programs with a very loose curriculum in place and no thinking coordinator to provide support and guidance. Both programs required the teacher to infuse thinking instruction into the curriculum.

In one instance in System 55, the site of the exemplary secondary observation , the 4th grade class monitored by this researcher had not been properly prepared to engage in the lesson that had been planned. This resulted in a chaotic science experiment situation. The other class, which produced a negative observation, was that of a 5th grade in System 11 where the teacher really had no concept of what constituted good thinking instruction. She had heard the terminology but had certainly not had appropriate in-service training. The lesson consisted of a discussion of recent independent reading assignments with no thought given to eliciting appropriate thinking behaviors.

The only community that represented a disappointment was System # 87. The school system was committed to an expensive commercial, add-on program and the findings were

not as expected. Although a disclaimer has already been presented indicating a relatively short stay and only a single class representing the experimental group, it was evident that the abstract nature of the program and the method of inquiry generated by the teacher's manual did not elicit many of the desired thinking behaviors.

CHAPTER V
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A. Summary

This project was undertaken in part because educators
continually attempt to upgrade the educational process and
to make schools better places to learn. As a former
department director and currently as an elementary
principal, this researcher/educator was also interested in
making the climate in his school more appropriate and
conducive to quality education.

Attendance at seminars, extensive reviews of literature
and publications by the Association for Supervision and
Curriculum Development pertaining to thinking skills
instruction all suggest more needs to be done at the
classroom level. Recognizing that little, if any,
attention was paid to this process in local schools, the
idea of discovering what districts were doing on a state-
wide basis became an issue worthy of pursuit.

Since it was not feasible to enter into contact with
each system in Massachusetts, a random sample of 100

districts was chosen to be representative of the state. This number accounts for nearly one-third of all school systems in Massachusetts. A response rate of more than fifty per-cent was considered a successful return, although only a relatively small number of respondents indicated a thinking skills program in place.

Upon receipt of these responses and an invitation to visit the school districts by individual school officials, a more formal observation instrument was developed. This document was constructed to elicit specific and appropriate information from each system. Part of it was designed to chart the number of times certain established thinking behaviors were observed in the respondents' classrooms.

Each district planned for the researcher's visits on an individual basis. A few scheduled only one class to be monitored while others planned for a series of classroom observations. Two of the districts in question invited the researcher to participate in their in-service workshops dealing with thinking instruction. School officials in one of the systems provided these seminars each year to new teachers in the building and included all practice teachers from a nearby college if they were affiliated in some way with the school.

While some responding school officials reported offering higher-order instruction to their "gifted" students, most included programs for the entire student body at selected grade levels. Three of the sample communities also offered special thinking programs specifically aimed at the remedial population. It is noteworthy to report that many school officials now recognize that all students profit from thinking instruction, contrary to early efforts, which targeted such programs for gifted and talented students only.

Higher-order thinking skills instruction in target schools was found to be taking place at virtually all grade levels but generally with little consistency. Interviews with school officials suggest that the principal and the curriculum director, if the district employed such a person, play a vital role in the promotion of this instruction. Thinking Skills Coordinators, although more abundant in prior years, have all just about been eliminated due to receding budgets. Many districts now employ a head teacher to coordinate these activities for the "gifted" population.

1. In-Service

In-service education for the teaching staff also appeared to be related to the implementation of thinking

skills instruction. The thinking skills coordinators in

Systems 24 and 31 are available to provide continuous

training as needed to the teaching staff. They frequently

model lessons and assist in planning appropriate thinking

curricula.

The principal in System 52, himself a proponent of

thinking instruction, provides yearly workshops to both new

and veteran teachers. This researcher was invited to the

two day session held in November, 1990, and was impressed

with the degree of enthusiam generated by in-house staff who

were commissioned to train other teaching faculty members.

The researcher was also invited to attend two days of

training in September and November, 1990, planned by a

department head in System 95. Although the quality of

instruction was high, it was conducted by a consultant and

only included teachers who had signed up for the in-service.

Based on an interview with this department head, teachers

were not required to infuse thinking instruction into their

lessons.

This is consistent with the overall pattern uncovered

during the study, which brought to light uneven and variable degrees of teaching these skills.

2. Cost

Also discovered in this study was the suggestion that, over-all, cost did not appear to be a significant factor in a district's decision to implement such a program. With one exception, most of the expense was contained in the amount and quality of the staff training. Because this educational concept is primarily one of philosophy and style, minimal consideration had to be given to expensive consumable material. The Instrumental Enrichment program system no. 87 uses, however, has been reported to cost $40,000 per year, primarily for the consumable materials needed. The assistant principal who coordinated the program reported that it was beginning to be a problem to fund on a yearly basis.

3. Evaluation

Although many state assessment tests now attempt to include questions that measure thinking skills, there is not yet a really good commercial test on the market that

measures all aspects of this complex process well. (Quinby, 1985.) This is one of the reasons cited by education officials for virtually no evidence of testing and evaluation results available in these communities. Also considered by many to be reasons for the sparse information available is the lack of trained personnel to coordinate this process and the exhorbitant cost of testing entire student populations.

Teachers interviewed were still quite attached to the basal texts as the basis of the general curricula, which a thinking approach is said to modify. A few had made significant strides in departing from strict reliance on such basals, and were involved in exciting literature based and/or whole language instruction in their classrooms. These educational concepts feed nicely into a thinking approach to instruction.

Although system no. 52 was affiliated with a nearby college, it was not in conjunction with their thinking program. Other districts employed college/university staff to conduct in-service training, but it did not appear that a relationship was established for the purpose of on-going thinking training. And there was no thinking evaluation or testing engaged in by the school districts visited. Similar

findings are documented in an article recently printed in the New York Times and reprinted in the Springfield Union. It reports that there is little statistical evidence to support the claims made by thinking skills program publishers that their programs work. But, the article goes on, their continued expansion is an indication that educators believe these programs improve students' thinking abilities. (DePalma, 1991.) System no. 40 had used a thinking skills test a few years back, but because of costs and time considerations it is no longer utilized.

Most school officials interviewed referred to an increase in standardized test scores as the rationale to promote and foster thinking skills instruction; however, they realized that they did not have available to them statistical justification for this assumption. Excepting for system 40 no other system visited had made any effort, at this point, to conduct valid research to substantiate these assertions.

Another reason often cited by educators to continue with a thinking skills approach is to experience the excitement and enthusiam that is generated when students are taught to think and finally to become self-learners. The observer could find:

1.   no discernable difference in the amount or
frequency of thinking instruction, whether commercial or
local programs were utilized...

2.   systems # 24 and # 31 displayed a high percentage
of observable desired thinking behaviors.   Interestingly,
one had an infused program and the other an add-on, although
both communities employed thinking coordinators...

3.   system # 55 was a model for secondary programs...

4.   the relatively few instances where poor teaching
was apparent stemmed from the situation observed and the
lesson itself, and was not the apparent fault of the
particular program being observed. (system #87 excepted)

The frequency distribution and succeeding Likert Scales
found in Chapter Four illustrated the following:

1) thinking skills instruction is found to take place
in classrooms where there is commitment to this concept...

2) the degree to which it takes place is not
necessarily due to a particular program...

3) the demographic make-up of a community is not the
determining factor as to the extent of the teaching of
thinking that takes place...

4) virtually little difference in the number of desired thinking behaviors is found in both local and commercial programs ...

5) commitment to this effort varies greatly from community to community and even from classroom to classroom within a school...

6) evaluation of the results of thinking instruction is not found to be a priority among communities teaching thinking skills...

7) cost is not an apparent factor which would hinder the adoption of a thinking skills approach to instruction...

This observer found, however, that whether the program be infused or an add-on, time is made in the day/week for the teaching of thinking. It is planned and deliberate, and both teachers and students are conscious of what is taking place. It is evident that thinking classrooms are filled with trust, and students do not hesitate to respond out of fear that their answer may be incorrect. An observer would readily recognize a teacher modeling the behavior he/she wished to instill in the students. He/she listens to all ideas presented, remain non-judgemental and provide the opportunities for open-ended problem solving activities.

B. Conclusions

The overriding purpose of this study was to ascertain the relationship between the availability of thinking skills programs/curricula and the utilization of these programs by local education agencies. It can be concluded on the basis of data obtained, that relatively few school systems are actively pursuing a thinking skills approach to education. Based on percentages already reported, Massachusetts schools sampled have not made thinking skills instruction a priority.

Although 29% of the respondents indicated having a thinking program in operation, based on on-site visits, the level of commitment ranged from intense to barely moderate. Lack of appropriate personnel, e.g. thinking skills coordinators, precludes proper staff support and continued in-service training. The principal of an elementary school in district no. 52 was a notable exception. His belief in higher-order instructional strategies prompted him to foster the educational approach to all members of his staff. Staff training was on-going and teachers in this school were committed to the process. Again, while the program was active and healthy in this school, it was not necessarily so in other schools in the same district.

There was consistency in educational philosophy in this building, and in districts nos. 24 and 31, where Thinking Skills Coordinators are on board. Teachers in most other schools visited were left to their own devices in terms of whether or not to teach higher-order strategies. This is not to suggest that this observer did not see outstanding teaching practices and extraordinary teachers. The conclusion is simply that it is not evident many thinking skills programs are available in Massachusetts schools and those observed are primarily inconsistent from school to school and from grade level to grade level.

Three specific purposes were addressed by the researcher. Each purpose is reiterated and appropriate conclusions are drawn in the following paragraphs.

1. attributes of thinking skills programs/curricula apt to impact upon their utilization by school officials...

Observations did not reveal any specific attributes of programs that appeared to promote their adoption over other programs. Commercial program users were allied with specific programs for various reasons. Perhaps the most compelling factors included cost and ease of implementation.

Cost did not seem to be a significant factor in most school systems, since consulting fees for staff training was often the only expense. This training could be paid for through various state grants usually. One often-mentioned source of funds was the Commonwealth In-Service Institute grant program. As was previously mentioned in Chapter Four, System no. 87 required approximately $40,000 per year to purchase the needed consumables for their commercial program. School officials in this community indicated that this now posed a problem. The other commitment systems could no longer make to thinking instruction was that of a coordinator, whose responsibility it would be to coordinate curricula and properly prepare staff. Systems no. 24 and 31 were notable exceptions.

    2. local school and/or school systems attributes apt to impact upon the adoption/adaptation of thinking skills programs/curricula...

The preponderence of thinking programs occurred in suburban communities having an ample tax base to fund education. This is not to say that fine programs were not observed in large cities or rural areas; however, the bulk of the programs were not found elsewhere.

Due to ease of implementation, most programs were
located at the elementary and middle school levels even in
the communities that the State Department of Education lists
as Economically Developed Suburbs. Relatively few thinking
programs were found in secondary schools. There are
specific reasons for this. Because departmentalization
takes place usually from 7th grade on, any add-on program
must be specifically scheduled. Since there are virtually
no open periods, this becomes an insurmountable handicap.
Again, system 87 provides the example by not being able to
go beyond 5th grade with the Instrumental Enrichment
program. Starting in 6th grade departmentalization takes
place in this system and teaching the program would be an
additional teaching period for teachers.

It has been suggested that thinking instruction could
be handled as an elective at the high school level, if the
program is a separate subject. Otherwise commercial
programs do not fit into a departmentalized schedule. The
few programs observed in grades 7 through 12 consisted of
either special programs for gifted students only, or infused
higher-order teaching by a teacher who had taken appropriate
in-service training.

3. effects of thinking skills programs/curricula upon students' thinking skills behavior...

        In schools or classrooms where thinking instruction is a priority, desired thinking behaviors are observed with frequency and regularity.

        Where thinking skills programs are found, with few exceptions the consistency of thinking instruction and that of the content material utilized is above average. This is so whether the program is designed by administrators and teachers in a community or if the program is commercially prepared. If teachers are committed to the concept and have been adequately prepared through appropriate in-service, thinking skills instruction is evident as accounted for by the impressive numbers of desired thinking behaviors observed.

C. Recommendations

        Given the quality of teaching and the significant level of student involvement in the classrooms visited where a thinking approach was used, this researcher's recommendations follow:

1)   to incorporate this process in all schools and at all grade levels.

Students, even in the grade 1 classes observed, demonstrated repeated and prolonged abilities to stay with a topic until all avenues had been explored. Students in grade 12 engaged in discussion efforts that were comparable to what could reasonably be expected in an advanced college level class.

2)   to select a framework that is compatible with educational curricula in the district.

What emerges when reviewing observation data and what recurs frequently in educational literature is the importance of cohesion and common language when school officials contemplate a thinking skills program. The design and adoption of a framework would provide the necessary continuity and commonality when staff write the curriculum, plan for assessment, appraise instruction and schedule staff development.

3)   to develop a rationale which would justify and legitimize teaching thinking skills.

Plans for the implementation of a thinking curriculum should begin with a rationale, e.g., why teach higher-order thinking, is there strong commitment from the teaching staff

and from committees, administrators, etc. A natural follow-up, once the philosophy and commitment are in place, would be to research the writings and opinions of experts so that a decision can be made regarding a commercial program or one that will be developed in-house. Another avenue that this researcher highly recommends is to visit other systems and to adopt what is best and appropriate from each. If a commercial program is under consideration, monitoring its operation in another community will save countless hours of assessment after it has been purchased.

4) to compile an inventory of techniques and methods that promote thinking skills, which are already in place.

The development of a framework, as already recommended, will allow for the setting of goals and a definition of actions and behaviors that promote higher-level thinking. An inventory of current instructional processes that are conducive to a thinking approach will help to formalize them into the new curriculum. Many school systems will discover that they are already practicing many venues that are compatible with such curricula. Some of the desired behaviors will include: teacher actions that encourage thinking, as well as school climate and structure.

5)   to compile a list of current teaching practices
that discourage the teaching of thinking.

Just as important as discovering what is being done to
promote thinking, will be to study what that system is doing
that actually discourages the thinking process. Again as
often as teaching style may foster a thinking climate, many
times teachers may unwittingly inhibit it. Superficial
coverage of an entire textbook rather than an indepth
coverage of selected topics, expectations that a student
will have memorized the correct answer and respond
immediately are some of the behaviors that will have to be
modified.

6)   to plan and implement a K-12 curriculum, and to
include appropriate evaluation measures.

Two final areas that will require attention are; first,
to plan for a K - 12 program and not allow it to fall apart
at the secondary level. It will be important to infuse the
process at these levels so that additional discretionary
periods are not tacked on to the school day, nor will the
program violate already established provisions in teachers'
contracts. Second, an evaluation procedure should be
developed that is more appropriate and more valid than what
has been observed to date in Massachusetts communities by
this researcher. The evaluation of thinking skills as well

as of the program adopted will allow educators to make informed decisions regarding modifications, which may enhance the process and be more conducive to the educational philosophy of the school system.

Because cost need not be a significant consideration, it would be in the best interest of the Massachusetts Department of Education to direct its efforts, as other states have done, in mandating thinking skills curricula in all communities in the state. In the past the State Department of Education has been severely criticized for the creation and implementation of legislation that has nearly bankrupted some local school systems. As we have seen, this would not be the case here, and the future of our student population in this highly technological and rapidly changing world depends on such a mandate.

APPENDIX
KINDS OF COMMUNITY

To assure that the communities visited for the purposes of this study have commonality, a breakdown had to be devised that would assure appropriate comparisons.

In 1985 the Department of Education conducted a study that had as its goal to place all communities in the State in appropriate comparison bands.   The seven groupings outlined below are derived on the basis of minority population, industry and educational background of the inhabitants.   This same breakdown was deemed appropriate for the purposes of this study.

The seven Kind of Communities (KOC) are:

1. Urbanized centers

2. Economically - Developed suburbs

3. Growth communities

4. Residential suburbs

5. Rural economic centers

6. Small rural communities

7. Resort/retirement/artistic communities

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