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The Ohio State University

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MINIMUM COMPETENCY TESTING IN MATHEMATICS:
A CHRONICLE OF AN EDUCATIONAL MOVEMENT
OF THE 70S

DISSERTATION

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

By
Margaret Bledsue Kasten, B.A., M.S.

* * * * *

The Ohio State University
1981

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Approved by

F. Joe Crosswhite
Adviser
This dissertation is dedicated to my parents who provided happy yesterdays, firmly set in loving discipline,

to my husband, Donald, who makes each today richer and more exciting,

and to my daughter, Sarah, who brightens all my tomorrows.
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Finally, I want to thank my friends and family, especially my husband and daughter for their encouragement, support, and patience.

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PUBLICATIONS

Changes needed in the current direction of minimal competency
testing in mathematics. (with Robert E. Reys) Mathematics Teacher,

Assistant Editor:  Investigations in Mathematics Education. Columbus,
Ohio:  ERIC/SMEAC, 1979 to present.
Assessing mathematical achievement. (with Jon L. Higgins and Marilyn N. Suydam, Columbus, Ohio: ERIC/SMEAC, 1980.

The Role of Problem Solving in the Curriculum: A Report of the NCTM PRISM Project. (with Alan Osborne)

FIELDS OF STUDY

Major Field: Mathematics Education

Studies in Mathematics Education. Professors F. Joe Crosswhite, Alan Osborne, and Marilyn N. Suydam

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Chapter I
INTRODUCTION

Background and Significance of the Study

Minimum competency testing is a recent movement in which students are tested to determine if they can perform designated tasks at a designated level. Many variables occur from one testing situation to another. Competencies are different; minimums are different; passage of the test may or may not be tied to grade-to-grade promotion or high school graduation. The constant is that passage or failure of the test labels a student as competent or incompetent.

There can be little doubt that minimum competency testing is an important current issue in American education. The following quotations support this assertion:

Minimal competency testing for high school graduation and grade-to-grade promotion continues to be one of the most explosive issues on the educational scene today. (Pipho, cited in Haney and Madaus, 1978, p. 462)

In short, this kind of testing represents a major movement with serious implications for American education. (Haney and Madaus, 1978, p. 462)

The minimum competency movement could be the major school reform of the 20th century. (Neill, 1978, p. 5)

It is generally agreed that minimum competency testing can have a profound effect on American education. The nature of that effect, however, is a point of contention. A report of the National Academy
of Education said "any setting of statewide minimum competency standards for awarding the high school diploma...is basically unworkable, exceeds the present measurements of the teaching profession, and will create more social problems than it can conceivably solve" (Gonder, 1978, p. 5). At the same time, Rear Admiral H. G. Rickover called for "national scholastic standards" (Rickover, 1978).

Jennings and Nathan (1977, p. 316) concluded that "after years of experience with competency-based graduation requirements, the St. Paul Open School is convinced that such a system is both workable and valuable for students, parents and staff." However, Mitzman (1978, p. 1) reported, "In recent months a chorus of criticism from teachers, administrators, parents and students has forced Oregon to reconsider its commitment to competency based education.

National polls have added fuel to the controversy. A Gallup Poll indicated that 65 percent of the public felt that passing a test should be a requirement for graduation from high school and "...60% of the school board members responding to a query from the National School Boards Association said proficiency tests should be required for high school graduation" (Neill, 1978, p. 8). A study in Texas (Carnes, 1979) indicated that 79.8 percent of the superintendents surveyed supported the establishment of minimum competency testing in Texas.

However, in March 1979, the Association for Supervision and Curriculum Development adopted the recommendation that "States should not require that students earn a given score on a statewide
test" in order to graduate (ASCD, 1979). Other professional organizations, such as the National Council of Supervisors of Mathematics and the Ohio Council of Teachers of Mathematics, have also failed to support competency testing as a requirement for promotion or graduation.

Entire issues of educational journals have been devoted to the debate, including the February 1978 issue of *Mathematics Teacher*, the January 1979 issue of *The National Elementary Principal*, the June 1978 issue of *The Practitioner* (NASSP), the May 1978 issue of *Phi Delta Kappan*, and the November 1977 issue of *Educational Leadership*. In addition, the controversy has been widely reported in newspapers and such magazines as *Better Homes and Gardens* (Kaercher, 1980), *Parents Magazine* (Borger, 1978), and *Saturday Review* (Maeroff, 1978). Special reports, position papers, and conferences abound.

Despite all this discussion, minimum competency testing remains an unresolved issue. Although competency testing has been an established fact for nearly 20 years in some districts and for several years in some states, little hard data exist either to support or to negate the use of competency tests.

There have been few attempts to provide objective descriptions of the minimum competency movement. While Bossone (1978), Gonder (1978), and Neill (1978) each contribute significantly to an understanding of the status of minimum competency testing, their reports are dated and do not treat the place of mathematics in minimum competency testing in great depth.

This lack of formal study of minimum competency testing does not indicate that the education community fails to see the need for
research. One of the research studies concluded with a strong call for more research:

In working with minimum competency programs, the need for research is absolutely essential...this study should be considered as a definite call for additional research which will foster a more intelligent dialogue among all those who advocate minimum competency programs and testing. (Bossone, 1978, p. 162)

The conference report, Minimum Competency Testing: Report of Four Regional Conferences (Miller, 1977, p. 36), calls for "Study of the impact of specific legislation...Monitoring the process of implementation efforts throughout the states...Collection of longitudinal data of various programs." Furthermore, it notes that "A broader base of knowledge and information is needed to facilitate decisions at the state and local levels" (p. 36).

The lack of objective evidence has not stopped many state legislatures or state boards of education from mandating minimum competency testing programs. By January 1979, 36 states had taken some action toward state-mandated minimum competency testing programs. Nearly all of "the remaining states have legislature pending or state board studies under way" (Pipho, 1979, p. 1).

Federal involvement in minimum competency testing is also on the increase.

At the National Conference of Achievement Testing called by HEW Secretary Joseph A. Califano, Jr. on March 1, 2, 3, 1978, Harold Howe, II, Vice-President of the Ford Foundation and a former U.S. Commissioner of Education, gave the keynote speech. He said, "If anyone would have told me 10 years ago that such a meeting would come about, I would have bet 10 to 1 against it, because of the belief that testing in the schools was not the business of the federal government. But here we are—educators; parents; testing experts; civil rights advocates; and others." (Pipho, 1978, p. 586)
Problem Statement

This study provides a comprehensive and an in-depth look at the processes and consequences of minimum competency testing as related to mathematics. The inquiry was structured around a series of questions, formulated after an extensive literature review. Some of the questions were taken directly from the literature, while others were extrapolated.

Two types of questions were considered. The first type could be addressed with direct evidence, often numerical in nature. The second type could not be answered with facts or statistics. Rather, these questions addressed the opinions and value judgements of individuals and different groups. Such questions often did not have a single identifiable solution, but instead were questions for which persons in positions of responsibility found alternative resolutions. Because the answers call for opinion or value judgement, these questions cannot be answered in a way that is fully satisfactory to a scientific researcher. The literature reviewed was structured around five categories, two of these categories were collapsed to create category B below.

A. Questions relating to the goals of minimum competency testing:
   1. What are the goals claimed for minimum competency tests by its proponents?
   2. What are the results of minimum competency tests anticipated by its opponents?

B. Questions relating to the definitions and mandates of minimum competencies?
   1. Who should define competencies in mathematics?
   2. Who does define competencies in mathematics?
3. How should mathematics competencies be defined?

4. How are mathematics competencies being defined?

5. What should be the definition of minimum competency in mathematics?

6. What are the definitions of minimum competency in mathematics?

7. What should be the minimum competencies in mathematics for different populations (college-bound, job-bound, special students)?

8. What are the minimum competencies in mathematics for different populations (college-bound, job-bound, special students)?

9. Are there anticipated differences in legislative and state board mandates concerning minimum competency testing?

10. Are there actual differences in legislative and state board mandates concerning minimum competency testing?

C. Questions relating to the implementation of minimum competency testing:

1. What is the anticipated effect of minimum competency testing in terms of such factors as dropout rate, "early out," and class enrollment?

2. What is the actual effect of minimum competency testing in terms of such factors as dropout rate, "early out," and class enrollment?

3. What is recommended for dealing with those students who "fail"?

4. What is being done to deal with those students who "fail"?

5. How should minimum competencies in mathematics be measured?

6. How are minimum competencies in mathematics being measured?

7. When should minimum competencies in mathematics be measured?
8. When are minimum competencies in mathematics being measured?

9. How should passage standards be set, and justified?

10. How are passage standards being set and justified?

11. What steps should be taken to eliminate racial and cultural bias in competency tests?

12. What steps are being taken to eliminate racial and cultural bias in competency tests?

13. What is the anticipated relationship between standard-setting and a politically acceptable failure rate?

14. What is the actual relationship between standard-setting and a politically acceptable failure rate?

D. Questions relating to the impact of minimum competency testing:

1. What is the anticipated effect of minimum competency testing on learning as measured by "standardized tests" (e.g., NAEP, SAT)?

2. What is the actual effect of minimum competency testing on learning as measured by "standardized tests" (e.g., NAEP, SAT)?

3. What is the anticipated effect of minimum competency testing on students' readiness for the job market when they graduate from high school?

4. What is the actual effect of minimum competency testing on students' readiness for the job market when they graduate from high school?

5. What is the anticipated effect of minimum competency testing on student motivation?

6. What is the actual effect of minimum competency testing on student motivation?

7. What is the anticipated effect of minimum competency testing on teacher behavior?

8. What is the actual effect of minimum competency testing on teacher behavior?

9. What is the anticipated effect of minimum competency testing on the ability of educators to make judgments about teaching and learning?
10. What is the actual effect of minimum competency testing on the ability of educators to make judgments about teaching and learning?

11. What is the anticipated change in the mathematics curriculum resulting from minimum competency testing?

12. What is the actual change in the mathematics curriculum resulting from minimum competency testing?

13. What is the anticipated change in teaching methods resulting from minimum competency testing?

14. What is the actual change in teaching methods resulting from minimum competency testing?

15. What is the anticipated effect of minimum competency testing on remedial and regular program funding?

16. What is the actual effect of minimum competency testing on remedial and regular program funding?

The central purpose of this study was to examine the special relationship between mathematics and minimum competency testing. Blanton reports that of the 15 state programs requiring passage of a test for high school graduation, all require mathematics. While the areas of competencies tested vary from program to program, skills in reading, writing, and mathematics are requirements in the vast majority of the programs reviewed. There seems to be some feeling that mathematics is the easiest of these three areas to deal with. The feeling seems to be that determining a minimal level of reading is somewhat arbitrary and subjective, but mathematical competency can be measured in a way that is more objective and universally accepted.

In a study, Baines (1979) concluded that professional educators and the local school community did not differ
significantly in their ratings of the importance of minimum competencies in mathematics, and that mathematics for coping in society may be the generally acknowledged core of comprehension and application skills. Baines also reported that professional educators and local school communities differed significantly in their perceptions when rating the importance of minimum competencies in both reading and writing. However, among mathematics educators there is considerable debate about what is a basic skill in mathematics, as well as if and how basic skills relate to minimum competencies in mathematics.

While research on minimum competency testing is rare, research on minimum competency testing in mathematics is even rarer. The literature review indicated no studies with a primary focus on mathematics in minimum competency testing. This study will contribute information especially helpful to those individuals involved in any level of decision-making about mathematics education.

Description of the Study

This study had two major components. The first was a general literature review intended to reflect national trends in the minimum competency testing movement. The second component was an in-depth study of the minimum competency testing movement in four states.

The literature review reported in Chapter II records the development of the movement as a political and educational phenomenon. It examines the state of minimum competency testing in mathematics as it exists, and lists and analyzes some of the outcomes of minimum competency testing in places where it has been initiated.
The literature reviewed falls into four general categories: 1) position statements, 2) facilitating documents, 3) legal and political documents, and 4) research. The first category contains statements of individuals and organizations found in educational journals, the popular press, and other documents. The second category facilitating documents, encompasses a wide range of literature. It includes teachers' guides, information sent to parents, documents produced by state departments of education, journal articles describing specific state or district competency testing programs, and the tests themselves. The third category, legal and political documents, includes judicial decisions and copies of legislation enacted, pending, and defeated. The fourth category of literature to be reviewed was research. This included dissertation studies as well as research conducted by various organizations that was related specifically to minimum competency testing. In addition, research periferally related to the issues involved, such as reports on the National Assessment of Educational Progress data, was included.

The second major component of this investigation was an in-depth study of the minimum competency movement in mathematics in four states. Many documents were reviewed in the process of state selection. After reading widely and considering the matter carefully the following criteria for state selection was chosen:

1. the states should be different from one another in both type of minimum competency testing and degree of state control of education;

2. the states should be representative of a class of states and at the same time possess features that cause each to be included instead of another state in the same class (i.e., length of time involved in competency testing); and,
3. It should be essential that needed documents will be available or attainable.

Florida and Oregon were chosen as two states that have minimum competency requirements for high school graduation. Missouri, the third state chosen for study, does not have a minimum competency requirement for high school graduation, but does require that all eighth graders take BEST, the Basic Essential Skills Test. If students fail this test, they must take it every year until they pass it, or until they graduate from high school. Ohio was the fourth state chosen for study; it does not have mandated minimum competency testing.

The in-depth study of these four states included several activities: a literature review, a survey of teachers and school administrators, and on-site visits to the state department of education in each of the states. The literature review was similar in many ways to the general literature review, but also included copies of legislation, state board of education or state department of education press releases, guides for parents, guides for school districts, position statements of teacher organizations, and obtainable articles from newspapers in the state.

The survey was developed by the investigator after an extensive analysis of the literature. Results of other surveys (e.g., Bossone, 1978) and other documents (NCSM, 1978) were used to generate items for this survey. Faculty members of the College of Education of The Ohio State University reacted to two draft forms of the survey. In addition, a survey draft was sent or given to representatives from each of the State Departments of Education in the four states under
study. One of these individuals gave a lengthy and helpful reaction which resulted in several modifications.

The survey was sent to 100 elementary teachers, 100 secondary mathematics teachers, 30 elementary principals, and 70 secondary principals in each of the four states being studied. Survey recipients were randomly selected, but the method of selection varied somewhat from state to state, and is fully described in subsequent chapters. The data were analyzed using the cross tabulations subprogram of the Statistical Package for the Social Sciences Program. In most cases, analyses were limited to percentage data and the chi-square level of significance.

A third activity involved visiting the state departments in each of the four states and talking with the individuals most responsible for the development and/or administration of the competency program.

The general literature review is found in chapter II. Chapters III through VI contain the case studies of Florida, Oregon, Missouri, and Ohio, respectively. A cross-state comparison of the survey data is given in chapter VII. Summary conclusions and recommendations are found in chapter VIII.
CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The literature review for this study was structured around the five categories of questions given in the problem statement:

1) goals of minimum competency testing
2) mandates for minimum competencies
3) definitions of minimum competencies
4) implementation of minimum competency testing
5) impact of minimum competency testing.

Within each category, several types of literature were considered. Relevant position statements, facilitating documents, legal and political documents and research were the primary groupings within each category. Other groupings were used as appropriate. Preliminary to the main body of the literature review is a background section intended to provide working definitions, describe antecedents and precedents, and place the present minimum competency testing movement in historical context. Literature specifically related to one of the four states is usually discussed in the relevant chapter presenting the case study for that state. Exceptions to this occur for state literature also related to the competency testing movement as it evolved nationally.
Defining the Movement

...it is vital to note that, like cancer, competency testing is not a single entity but rather a single term used to refer to a rather diverse collection of separate procedures and ideas. (Appelbaum, 1978, p. 185)

Certainly Appelbaum's observation pertains to many other educational movements as well. Trying to differentiate the minimum competency testing movement from competency-based education, back-to-basics, accountability, or assessment movements is no small task - and probably cannot be done in a way that satisfies everyone. Yet the review of the literature indicated a comprehensive study of minimum competency testing requires that each of these other movements be briefly discussed and contrasted with minimum competency testing. The goal of this section is to examine various definitions found in the literature, arrive at a consensus definition to be used in the rest of the study, and reach an understanding of the relationships between and among the various educational movements.

Assessment Movement

It would seem that the assessment movement is only peripherally related to others, yet Buhl (1978) asserted:

Assessment is clearly related to, if not directly a part of, accountability. The American public, which financially supports education, wants proof from the education system that it is indeed doing what it is supposed to do. (p. 17)

The purpose of assessment is descriptive. Assessment differs from evaluation (called an "inherently political process" by Sroufe, 1977, p. 29) in that it does not purport to make value judgments,
but merely to describe existing conditions.

National and state assessments began in the 1960s and continue today. They exist sometimes without minimum competency tests and sometimes in conjunction with minimum competency tests; at times competency tests exist where no general assessment is conducted.

It is probably true that statewide and other assessments were begun as a response to accountability, yet their emphasis is very different from minimum competency testing. In most assessments not only is the purpose descriptive, but it is also to describe the situation without respect to individual students. Kaufmann (1979) reported that "The data are most frequently reported by legislatures and state boards of education and, in states where sampling is the method of assessment, students and parents are not informed of the results" (p. 3). Kaufmann also indicated that 21 of the states assess only a sample of the students, so that not every student is always tested in a statewide assessment.

Accountability Movement

Accountability is often cited as the movement which "fathered" the minimum competency testing movement (Miller, 1978; Neill, 1978; Carter, 1979). Certainly the movements seem to have some common cause:
Three recent developments appear to have influenced the current emphasis and concern with accountability; namely, the increasing proportion of the average family's income that is spent on taxes, the recognition that a considerable fraction of youth are failing to meet the standards of literacy now demanded for employment in civilian or military jobs, and the development of management procedures by industry and defense that have increased the effectiveness and efficiency of certain production organizations. (Tyler, 1971, p. 1)

Like minimum competency testing, the accountability movement is sometimes reflected in laws:

Accountability has been attempted - or at least talked about - in education since the 1960s. By late 1972, 23 states had passed legislature or joint resolutions featuring some aspect of accountability. The mandates, although diverse, require setting goals for education and for making someone accountable for teaching those goals. The competency movement uses some of the same language, specifies the setting of goals and holds schools accountable for providing the means to enable students to reach district or state goals. (Neill, 1978, p. 7)

And at least one definition of accountability published in 1971, bears remarkable similarity to some of the ideas espoused as a part of the minimum competency testing movement.

Accountability is the guarantee that all students, without respect to race, income, or social class, will acquire the minimum school skills necessary to take full advantage of the choices that accrue upon successful completion of public schooling, or we in education will describe the reasons why. (Porter, 1971, p. 42)

In simplest terms the accountability movement is a call for public education to be responsible for what students learn. That does not seem revolutionary unless one considers that not many years ago public education was to be responsible for providing the opportunity to learn. Students were to be responsible for what was learned. This is a subtle and important shift that reflects a basic
change in education. Gonder (1978) said "accountability is a close relative to competency" (p. 10) and Miller (1978) said minimum competency testing "can be used for accountability purposes" (p. 13) but accountability is a broader term and certainly not synonymous with minimum competency testing.

Competency Based Education Movement

In a widely quoted article Spady (1977) called competency-based education "a bandwagon that promises to be the great American Education Fad of the 1970s" (p. 9) and defines it as

A data-based, adaptive, performance-oriented set of integrated processes that facilitate, measure, record, and certify - within the context of flexible time parameters - the demonstration of known, explicitly-stated, and agreed-on learning outcomes that reflect successful functioning in life-roles. (p. 9)

While not giving an explicit definition of Competency Based Education (CBE), Olson and Cutting (1978) identified four components which "are consistent with the basic elements of most CBE definitions" (p. 4). These include:

Prespecification of the desired instructional outcomes in terms of observable student performance ....Materials and procedures for determining students' attainment of outcomes....Materials and procedures for promoting students' attainment of the stated outcomes....Materials and procedures for recording each student's progress toward the attainment of program outcomes. (p. 4)

Competency based education implies testing, but it also implies much more (Spady and Mitchell, 1977; Spady, 1978). Miller (1978) called it a "total learning system" (p. 12), and pointed out that unlike competency based education, minimum competency testing does not "specify a theory of learning, school organization, or a process for competency development."
Back-to-Basics Movement

Somewhat like the minimum competency testing movement the back-to-basics movement is many things to many people. Foshay (1977), explained that "The 'back-to-basics' movement has appeared and reappeared ever since the days of Progressive Education in the twenties and thirties" (p. 5). Brodinsky (1977), claimed the present back-to basic advocates have no spokesman, platform, or declaration of principles, and listed 12 items that have been demanded at various times and places. They include not only an "emphasis on reading, writing, and arithmetic" but "strict discipline" teaching methodology that includes "drill, recitation, daily homework, and frequent testing" as well as love for God and country (p. 522). Jencks (1978) said, "The 'back-to-basics' movement seems mainly concerned with restoring respect for persons in authority, like parents and teachers, and not for ideas." Back-to-basics programs and minimum competency testing programs both seek to "define basics for everyone to learn" (Miller, 1978, p. 12), but there the similarity ends. Minimum competency testing is embraced by many individuals who would reject all other components of back-to-basics programs.

Minimum Competency Testing Movement

Minimum competency testing has features in common with all of the other four educational movements but also has features which distinguish it from them. Relevant "minimum competency" definitions include descriptions of both the programs and the test themselves:
The many minimum competency testing (MCT) programs that have appeared in the past few years share two essential features. Each involves the use of a test, usually a standardized test, which is purportedly a measure of the minimum competencies or basic skills any person must possess if he is to be successful in life....The second essential feature of MCT programs is that they involve the application of sanctions to those who fail the test. (Coombs, 1979, p. 175)

If minimum competency testing programs have two essential features, the tests themselves also have several distinctive features.

A competency test is designed to determine an examinee's level of performance in relation to each competency being measured. Each competency is described by a well-defined behavior domain....There is nothing inherent in the definition of a competency test which requires test scores to be compared to standards....Since it is common, however, to interpret an examinee's test performance relative to standards (an examinee who scores equal to or above a standard set at 70 percent, say, on the set of items included in a competency test is described as a 'master' or 'competent'), it is necessary to introduce a new term, minimum competency test.

A minimum competency test is designed to determine whether an examinee has reached a prespecified level of performance relative to each competency being measured. (Hambleton and Eigner, 1980, p. 369)

After arriving at working definitions of the relevant educational movements and distinguishing them from each other, it is still necessary to establish the nature of the relationship between them.

Consider the following series of quotations, some of which are inconsistent with previously decided upon definitions.

Competency tests have now emerged as a strong focal point of the 'back-to-the-basics' movement to determine whether students gain minimum skills in our schools. (Huff, 1977, p. 108)
Public distrust of education and education (sic), manifested in the call for 'back to basics' and accountability, has spurred the competency movement as an offshoot. (ASCD News Exchange, 1976, p. 1)

As a part of the whole 'back-to-basics' movement minimum competency requirements are already having an immense impact on American Education. (Mitzman, 1979, p. 1)

Gonder (1978) discussed the confusing overlap by identifying "back-to-basics," "minimal competency" and "competency-based education" as proposed solutions for dealing with the concern over high school graduates incapable of functioning in American society.

One of the most specific manifestations of the back-to-basics trend is the rapidly growing movement to make some proven minimum proficiency a prerequisite for a high school diploma." (NASSP, 1978).

Plainly, minimal competency is the latest transformation of the 'accountability' spirit in public education. ("Those minimum competency tests", 1979)

Perhaps the most detailed analysis of the relationships was given by Wise (1979):

'In historical sequence, what came first was "accountability" what came next was "competency-based education." We are currently caught up in "minimum competency testing"... The generalized notion of accountability evolved into competency-based education because accountability did not have a sufficient technology to be usable. Competency-based education seems to provide the needed technological base and purports to accommodate all the goals of education — all the goals, not just reading, writing, and arithmetic. And therein lies one of the central problems: it is too comprehensive for the times.

We have moved instead to minimum competency testing for two reasons. First, because this is a state level activity there needs to be a statewide consensus on the objectives. Second, the objectives must be measurable — there must be tests available. Well, there is a general consensus that it is important to teach people how to read and do arithmetic, and reading and arithmetic tests have been around for a long time. (pp. 546-547)
The various movements can be summarized as follows:

• Assessment seeks only to describe

• Accountability seeks to hold public education responsible for what students learn

• Back-to-Basics seeks not only to re-emphasize basic skills, but to conduct school as it is perceived it was conducted in the past

• Competency-based Education is a total educational system necessitating, among other things, the statement of goals, certain instructional strategies, measurement, and remediation if necessary

• Minimum Competency Testing, in simplest terms is just testing in order to identify competent and incompetent students.

Antecedents and Precedents

While the claim is sometimes made that minimum competency testing is a recent development (Carter, 1979; Cohen and Haney, 1979), in fact it is a practice that is not without a history or existing counterparts in the United States (Ebel, 1978).

Many professions, including medicine, law, and engineering, have long given an examination that could be classified as a minimum competency test. Most states require passage of a written test to receive a driver's license. To be certified as a "life saver" by the Red Cross or an official for high school basketball, one must pass a test. Of course there are differences between these
examinations and school minimum competency tests. The body of knowledge required for the previous examinations is fairly well defined and those individuals taking the most of these tests comprise a well-defined group. A test that is well accepted and perhaps more relevant to a discussion on minimum competency testing is the high school equivalency General Education Development (GED) examination.

It is also the case that the present interest in the setting of standards for public education is not unique.

A law is passed. Schools will have to train pupils up to a standard of performance or suffer the consequences. And the consequences if they fail will be a loss of money to the school and a withholding of certification from the student. The law goes so far as to specify the standards. In mathematics:

1. the student must write from dictation the numbers 1-20;
2. the student must add and subtract orally the numbers from 1-10;
3. the student must add, subtract, and multiply correctly in writing all numbers from 1-10;
4. the student must perform in writing long division on numbers 1-1000;
5. the student must calculate correctly problems involving money;
6. the student must calculate correctly conversions and problems with measures of weight, length, and distance.

A system of external examiners is devised, and all final-year pupils are tested to ensure attainment of minimal levels of proficiency in reading, writing, and mathematics....The system was known as the Payment by Results plan. It was adopted as part of the British Revised Education Code of 1861. (Glass, 1978, p. 139-140).

Competency concerns were not limited to England in the 1860s.
Starting in 1865 teachers in New York developed tests to determine the competency of individual students in particular areas of study. The tests, known as the Regents Exam, are available in 25 subject areas. They are used to award Regents diplomas and to measure the performance of local school districts. (Neill, 1978, p. 7)

Predating this were: the requirement by the Massachusetts General Court in 1789 that the selectmen and others "shall inquire into the proficiency of scholars" in the schools; the development and administration of tests in history, astronomy, arithmetic, and geography by the Boston School Committee in 1845; and the introduction of a high school admissions examination in 1856 in Chicago that was later used in promotion (Britell, in Jaeger and Tittle, 1980, p. 28-29).

In many ways the educational climate of the late 1800s was not unlike that of today. "The public demand for evidence of educational competence continued. Written examinations at both the elementary and secondary levels proliferated" (Britell, in Jaeger and Tittle, 1980, p. 29). In the next several years many advances were made in the area of achievement and intelligence testing. Thorndike, Terman, and Binet were active during this time. The National Education Association established a committee on Tests and Standards of Efficiency in 1912. Intelligence testing enjoyed wide acceptance. Educators and lay public alike began to equate competence with intelligence. In fact, intelligence replaced competence as a criteria for success in many if not most areas of academia. At the same time "intelligence" was assuming this importance, educators began to see the need to find a substitute for individual examinations.

Democracy called for the instruction of the masses, and the increase of pupils required new methods for assessing knowledge and skills.
For several decades, various testing procedures were devised and new approaches were developed. Today testing is an accepted tool in education. (Kazalunas, 1978, p. 57)

During the 1930s, 1940s, and 1950s enrollment and length of time students stayed in school steadily increased. These were also times of change in other ways in American education. Dewey's progressive education was producing a "humanizing" effort in education. In the 1950s, there was a call for reform in American education not unlike the one today.

In the widely-read Educational Wasteland published in 1953, Bestor in effect made some of the same observations and called for some of the same remedies as today's minimum competency testing advocates.

What proved untenable was the assumption that credits and grades in high school courses were a reliable measure of the student's ability to use the intellectual skills he was supposed to have received. (Bestor, 1953, p. 154)

And further,

The spread of a uniform examination system would be highly desirable...state-wide examinations in the fundamental disciplines, administered at the ends of certain crucial segments of the twelve-year public school program would have a most vitalizing effect. (Bestor, 1953, p. 157)

The reform movement that occurred in the 1950s took the form of curricular innovation and, in the case of mathematics, an emphasis on rigor and pure mathematics and a turning away from "practical" or applied mathematics. Donmoyer (1979, p. 555) suggested that, while there are similarities in the movements, the first took place in an era of
new frontiers, an expanding economy, and primarily local control of education while the social climate is much different today.

There is some indication that the present call for minimum competency testing is also in some part a reaction to the emphasis on "humanizing" education that occurred in the 1960s advanced by educators typified by Neill, founder of Summerhill School.

Reasons for the Movement

The majority of publications listing reasons for the present public call for minimum competency testing point to fairly concrete, easily identifiable, and simplistic reasons. Lists of such reasons are not difficult to find (e.g., Gallagher and Ramsbotham, 1978; Howell, 1978; NAASP, 1976. A representative example was given by Shoemaker:

There seems to be growing public disenchantment with education in general, especially in the wake of test score declines and growing costs of schooling. Among the issues most often cited are: the highly publicized decline in college entrance examination scores; declines in performance on items administered through the National Assessment of Educational Progress; the rising costs of schooling and a growing mood of 'taxpayer revolt' associated with California's Proposition 13; complaints by employers and labor union officials about the lack of entry-level job skills of young employees, and about the difficulty young employees have in reading job manuals and in performing simple business arithmetic; the need to provide remedial coursework for college freshmen in writing and mathematics; the concern expressed by parents that their children are unprepared for jobs or college. (Shoemaker, 1979, p. 310)

Shoemaker reflects five categories generally included in the lists of reasons:

- test score declines
- increasing functional illiteracy
• financial reasons
• employer complaints
• college complaints

Each of these reasons will be discussed in some detail and then the views of a minority of authors who see the reasons as much more complex, obscure, and possibly sinister will be discussed.

Test Score Declines. At a conference held by the National Institute of Education (NIE) in June 1975, participants concluded that the general trends in test scores showed no decline in early primary grades, but a decline was present in upper primary and secondary scores (Neill, 1978). In a table compiled by NIE indicating test result trends from 1965 through 1975, declines were indicated on:

• American College Test (Composite)
• Composite Test of Basic Skills
• Iowa Test of Basic Skills
• Minnesota Scholastic Aptitude Test
• National Assessment of Educational Progress: Science and Functional Literacy
• Scholastic Aptitude Test.

By far the most widely discussed and studied decline has been on the Scholastic Aptitude Test (SAT). Between 1963 and 1977, average scores on the SAT fell 49 points on the verbal portion and 32 points on the mathematical portion. This drop has been the focus of several studies, the most comprehensive being headed by Wirtz. After a two-year study, his 21 member panel released its report, On Further Examination, in 1977. It concluded that the early drop could
be attributed partly to a shift in the test-taking population, but that since 1970 "the drop in scores has been virtually across the board." It also rejected the idea that lower scores were caused by the test changing in difficulty. In short, at least some real decline in the achievement as measured on the SAT appears to have occurred. Advocates of minimum competency testing apparently believe it can help halt or reverse the decline.

Several states or districts that have minimum competency testing and have reversed or not experienced the SAT score decline, point to the competency test as a reason (e.g. Turlington, quoted in Test Results Encouraging, 1979). This is questioned by several persons who point out that the material covered on the SAT, a college entrance examination would have little to do with the material in a minimum competency program. The most detailed analysis of this question to date, (Farr and Okalsky, 1980) provides convincing arguments that minimum competency testing is not an appropriate reaction to the SAT score decline.

Similar declines have been experienced on the American College Test (ACT), also a college entrance examination. It would seem that arguments made about the relationship of the SAT and minimum competency testing would also apply to the relationship of the ACT and minimum competency testing.

Another test decline that is often cited is that indicated by the National Assessment of Educational Progress (NAEP). Most relevant to this discussion is the decline noted between the 1973 and the 1978 mathematics assessments. Those responsible for interpreting these declines indicated that in general declines did not occur on whole
number computation (the areas most often mentioned in minimum competency testing programs) but rather on problem solving and other higher level skills. The panel interpreting the results implied that this may have been the result of the recent emphasis on a narrow definition of "basic skills."

In summary, advocates of minimum competency testing point to a variety of test score declines as evidence that schools are not teaching "the basics." The argument is countered by those who question that the decline is real (Hodgkinson, 1979); those who admit the decline is real but feel it is caused by a variety of things not related to schooling, like television, family structure, and changing values; and finally by those who feel the decline is real and the school is at least partly to blame but also feel that minimum competency testing is an inappropriate method of addressing the problem.

**Increasing Functional Illiteracy.** In a widely quoted study (Cawelti, 1977, p. 310) done at the University of Texas, 20 percent of the adults tested were "functionally illiterate." Senator McGovern is quoted as saying as much as 40 percent of our population may be illiterate. Partly because of widespread media attention given to these and other similar statements, the public feels that illiteracy is a rampant and growing condition in the United States. Educators and others question both of these contentions.

The first mass testing program to determine literacy was conducted by the Armed Forces during World War I. There was an astonishingly high rate of illiteracy. Many argue that when compared with 1917, our present illiteracy rate is much smaller. A large study done at the
University of Indiana in 1976 compared the reading ability of elementary students with their counterparts of approximately thirty years ago and found today's students superior on all measures (cited in Haney and Madaus, 1978, p. 474). Beal (1978) compared the mathematical achievement of Nebraska students of 1950 with those of 1975 and found the achievement of the 1975 students equal or superior. Educators point out there is no empirical evidence that the level of "functional illiteracy" is increasing.

A point that is agreed upon is that many more students are graduating from high school today than was formerly the case. Nationally, about 7 percent of the age cohort graduated from high school around the turn of the century. The number increased to approximately 50 percent by 1950 and 75 to 85 percent today. It is often noted that because of the increase and shift in population the average high school graduate of today may not be superior to those of 25 or more years ago.

Financial Reasons. The third commonly listed reason is financial. Even after taking inflation into account, per-pupil expenditure rose 49 percent in the ten-year period from 1965-66 to 1975-76 (Neill, 1978, p. 31). This coupled with the perceived decline in learning and a rise of consumerism in the United States has caused a call for cost effective education. To judge cost-effectiveness, it is necessary to have precise information about the outcomes of education. The most easily acceptable outcomes appear to be test scores.

Interestingly, when reflecting the reasons for the movements, educators rarely mention finances.
Employer Complaints. Often local or state minimum competency testing programs were begun at least partly to satisfy complaints of the business community (Gilman, 1978). Such is claimed to be the case in both Denver, Colorado and Gary, Indiana. Business and industry does not seem to have offered empirical evidence that their new employees are less well prepared than formerly, but it is true that that is the way the situation is perceived. Thompson (1978) reported the results of a survey taken by the American School Board Journal and concluded that "Business people say 'kids can't cope'." One of the long-term, vocal critics of American education, Rickover, also reported that the ability level of recent high school graduates joining the Navy has fallen considerably (Rickover, 1979).

College Complaints. Colleges are also complaining about the quality of recent high school graduates. In testimony before Congress, President Shriver of Miami University (Ohio) bemoaned the proliferation of remedial classes at nearly all institutions of higher learning (cited in Neill, 1978, p. 20).

Three Other Reasons. Besides the above reasons, believed rather widely and strongly by the American public, there exists several more complex analyses of why minimum competency testing is enjoying such popularity at this time. The first analysis was suggested by Kelley (1977) and mentioned in several other places (e.g., Bonham, 1977). It is related to the previously discussed financial reasons but is more complex and certainly more sinister:
We will not argue that standard-setting is not simply a program developed by educational professionals to improve the education of children and accountability in general. Rather, it is a response to particular political and fiscal stimuli. High real property and personal income tax levels for some groups and the problems some middle class kids have reading and getting into professional schools lie behind the cry for accountability. The latter problem is really that the middle classes cannot use the public schools for the purposes to which they are accustomed. Public schools, as a channel of mobility to professional training, are denied to poor achievers now more than to the poor per se.

The problem with American schools is not that fewer Americans can read as well as fifty years ago, or even that many people cannot read well enough to perform the mechanical tasks in our economy. Instead, the problem may be that the meritocracy is working and more middle class children are excluded from the rewards of advanced education. (pp. 3-4)

Some members of minority groups feel the minimum competency testing movement can only widen the gap between the haves and the have-nots of society. During a panel discussion at the 1979 Southeastern Regional Conference on Testing and Instruction, Burch, of the North Carolina Department of Public Instruction, tried to indicate some of the feelings of the black community:

It's another one of the white man's game (SIC) to insure a large pool of low-wage workers for business and industry. Also, to reduce the number of minorities who otherwise would be eligible for college entrance. It's a conspiracy contrived by politicians and businessmen. (p. 19)

While it is difficult to imagine either the educators or the majority of the lay public who support minimum competency testing doing so because it preserves an economic and racial caste system, the potential for doing just that may exist (Eckland, 1980). This is an argument that should not be discarded and calls for further study.
Like Kelley, Green (1977; 1980) the problem is not that American education has not worked; rather it has worked too well. Green explained that educational attainment (high school graduation) has leveled off at an almost universal level and because of this a high school diploma has lost its "credentialing" power. When nearly everyone has a high school diploma, there is in fact no special advantage to having one, though not having one is a real disaster. Public education worked for many years to raise the level of educational attainment and in doing so made that attainment in some ways less important. A high school diploma can no longer be used by employers and others for screening or filtering. This fact, not test decline or illiteracy, has led to a call to shift the emphasis in education from attainment to achievement (passage of a test). It is Green's thesis that this shift would again allow education to make a difference.

Related, but not identical to the two previous arguments is the idea advanced by Cohen and Haney (1980) that the minimum competency testing movement is an educational manifestation of two other popular ideas in American society: belief in minimum levels of acceptance and scientific management.

America's faith in principles of scientific management is mentioned in several places (e.g., Haney and Madaus, 1978) as being the key to understanding the push for minimum competency testing. As business and industry successfully adopted an input-output model to increase production, this model began to be applied to other areas, and especially to education. Somewhere along the line, schools stopped being responsible for what was taught and started being responsible for what was learned.
This fact, coupled with a unique American fascination with minimums (witness a variety of social programs—minimum income, minimum health care, etc.), led rather naturally to seeking to guarantee a minimum level of achievement in school.

Frankly there is no definitive answer to the question "Why does the public want minimum competency testing?" One suspects that they may have it mixed up with minimum competency. It seems apparent that there is no single reason, not even a clearly definable set of reasons. Rather the public desire for minimum competency testing seems to have been brought about by a simplistic view of education and a variety of complicated and interrelated social conditions.

Goals of Minimum Competency Testing

Reasons given for the surge of interest in minimum competency testing vary with the person expressing the opinion. But regardless of the reasons, it is obvious that minimum competency testing is spreading rapidly, and not without controversy. Both advocates and opponents of minimum competency testing expound at great length about the potential effects of the testing. Proponents of minimum competency testing include professional educators as well as members of the lay public. These people vary in their perceptions of education as it is today and education as it should be. However, they all agree that minimum competency testing has potential to change favorably the educational system in the United States. Opponents of minimum competency testing are nearly all educators and they, too, see potential for change, but they do not regard the change as favorable. Both groups see minimum competency testing as having potential effects on
students, on schools, and on society in general.

Effects on Students

It is not difficult to find lists of the benefits to students of minimum competency testing. Fremer (1978) identified six potentially positive effects on students: early identification of needs, clear goals, provision of remediation, monitoring of progress, more attention to basic skills, and a meaningful diploma.

In an American Friends publication (AFSC, 1977) some of these points were developed more fully. An identified potential benefit for the students was: "Minimum competency programs will help those children who have the greatest educational needs." This idea is based upon the assumption that these testing programs will require schools to identify and respond to the needs of the underachiever. The same publication suggested that minimum competency programs will motivate students, provide certification that a given student possesses certain minimum competencies, and provide students with precise definitions of what skills they must learn.

A third enumeration of possible positive outcomes is found in a publication by the National Association of Secondary School Principals, Competency Tests and Graduation Requirements (1976). Their list, too, included the point: "Slow learners and underachievers will likely receive direct and immediate attention" (p. 14). They also include, "Alternatives and options not requiring attendance in class will likely be broadened" (p. 14), as an advantage for students not mentioned in other lists. Other lists including potential advantages for students of minimum competency testing can be found in

Other literature discusses the potential benefits to students without making explicit lists. Rickover (1979) felt that minimum competency testing would foster the "primary goal of education," the "intellectual development of the children." Feldmesser (1980) called competence "an individual right." Neill (1978) indicated that:

Perhaps the strongest argument in support of competency requirements is the potential for motivating students, school and districts. (p. 8)

Gilman (1978) saw several benefits for students:

One of the primary potential benefits of MCT (Minimum Competency Testing) and survival schools is that they cause students to be responsible for their learning. (Gilman, 1978, p. 60)

"Competency-based graduation requirements provide students with a meaningful diploma, reduce illiteracy, and provide a system of quality control for schools. (Gilman, 1978, p. 63)

A list of the perceived benefits to students might include:

1) identification of students needing remedial attention
2) motivation
3) assurance that students have a chance to learn specified "basic skills"
4) a high school diploma with meaning (elimination of social promotion)
5) guarantee that the student is ready for post secondary education or employment

Each of these "benefits" will be examined individually.

Proponents of minimum competency testing point to its potential for aiding students who are not competent by identifying them.
Opponents counter this argument by saying not only have teachers nearly always known who needs help but that diagnosis instruments already exist and can be used without labeling the student as incompetent. It is this "benefit" that has become a point of contention among some members of minority groups.

On the one hand, advocates recognize that too many minority children have been and continue to be victims of educational neglect and of educators' lack of accountability to parents. Advocates also understand that, because certain competencies are important prerequisites for employability and advancement, minority children can benefit if they are taught and master those competencies (Mizell, 1979, p. 1).

Mizell went on to point out the potential disadvantages to minorities—mainly resegregation. Lewis (1979) echoed Mizell in seeing the potential advantages for minorities, but pointed out that minorities "do not embrace the emergence of MCT in isolation from the responsibilities that should be borne by the total system" (p. 7).

The second benefit to students that has been identified is motivation. Advocates of minimum competency testing see it as causing students to settle down and try.

This theory is disputed on two points. First it does not work; second, even if it did work, it is rather like blackmail and not a "good" educational technique.

A single standard will be too easy to stimulate the more advanced learners and at the same time will discourage those with great difficulty in learning.
History bears out that assertion. In 1936, a study was made of the effects of requiring New York State students to make a specified score on the Regents Examination in order to graduate from high school. The study found that this requirement served as an incentive for more effort to only a fraction of the students. To the able students, the required score was too low and when they were sure they could earn it, many of them ceased to work on school assignments. For the slower students, the required score seemed too high to be attainable and they dropped out of school in the tenth or eleventh grade. We face the same danger today. (Tyler, in Airasian, et al. 1979, p. 28)

Otto and Melby (1935) investigated the relationship of the threat of failure to achievement. Their study indicated no difference in achievement gains between groups of students assured of passing and those threatened with failure. This lends support to educators who say failure is a poor motivator and more positive methods are available.

The third "benefit," assurance that students have a chance to learn specified "basic skills" is an important point to minimum competency testing advocates. Advocates feel that students are not taught basic skills, that too much time is spent on reading science fiction and creative writing, and not enough time spelling and learning parts of speech. Too much time is spent with a calculator and playing "math games" and not enough time memorizing multiplication tables and drilling on addition examples. Opponents counter that this just is not true, the basics have always been and continue to be taught (Neill, 1978; NSBA, 1979).

The fourth and fifth "benefits" are strongly related to one another; in fact, the difference is subtle, but important. The fourth "benefit" to students - a high school diploma with meaning -
has been acknowledged even by one of the movement's harshest critics, Wise (1979). He said it will separate students into two groups – those who can pass the test and those who cannot. The problem, argue the critics, is whether schools really want to define a high school education in terms of a test. An additional benefit implied by the fourth benefit is the elimination of social promotion. Any student who is promoted is certifiably able to do certain things. They think this would be a tremendous advantage to students. The debate over the advantages of social promotion is not a new one in American education. (Cunningham and Owens, 1977; Thompson, 1979)

At least some authors think social promotion may be the principle reason minimum competency testing is being mandated. Advocates of minimum competency testing feel students who know what they need to know before being promoted or graduated have a tremendous advantage over individuals less well-prepared. Detractors point to numerous studies that retention and even remediation do not improve achievement.

Why are so many state legislatures mandating minimum competency tests? It appears that it is to discourage schools from promoting all students and awarding high school diplomas based on school attendance only. (Hambleton and Eignor, in Jaeger and Tittle, 1980, p. 367)

The fifth "benefit" guaranteeing that the student possess skills necessary for life is also debated. Advocates say it is obvious that there are some things people need to know to get along in life. Detractors argue that nobody knows what they are and testing for them is inappropriate in any event.
"The advocates of minimum competency testing seek to guarantee that students are prepared for either post-secondary education or employment. Yet there is no indication that high test scores correlate with adult success." (Jennings & Nathan, 1977, p. 316)

Some evidence indicates that success in school does not seem to be a very good predictor of success in later life, at least as measured by social scientists (Henry and Madaus, 1978; Furr, 1978).

Opponents of minimum competency testing counter the benefits espoused by its opponents and say that in addition to not helping the students it would harm those not passing by labeling them as incompetent. Proponents counter this by explaining that if a student is in fact incompetent, it is important that that student be aware of the fact. Too long, they say, have students not been made aware of their own abilities and shortcomings. Surely, they say, helping a student have a true picture of his/her own abilities is a great benefit, regardless of what the true picture is.

Effects on Schools

Schools may feel the effect of minimum competency testing in several ways: through teachers, through curricular and instructional changes, and through changes in the general educational environment.

Teachers. Advocates of minimum competency testing point to many benefits for teachers. They say teachers will have clear goals instructional management information, and more opportunity to provide individual instruction. Detractors say teachers may be inappropriately judged by test scores, creative teaching will be stifled, and teachers will be given more paperwork.
Curriculum. While advocates of minimum competency testing claim it will focus attention on "basic skills" and thereby improve education, opponents see a grave danger of narrowing the curriculum both in terms of eliminating courses like art, music (although one study in Texas indicated Texans consider marching band "basic"), and some kinds of literature, and also in reducing and narrowing content - for instance, perceiving junior high school mathematics as "arithmetic" or computation and eliminating hard-won topics like geometry. Further, it has been pointed out that minimum competency testing does not necessarily imply any program change (Branch and Branch, 1978).

General Environment. Minimum competency testing advocates say it will provide a focus for learning, students will know they have a job to do and do it, discipline problems will be reduced, and an overall atmosphere of learning will prevail. Opponents see the educational atmosphere as becoming harsher, with less emphasis on the student as a unique being and instead an attempt to fit all students into the same mold.

Effects on Society

Advocates of minimum competency testing see tremendous benefits for society. We will be a nation of "competent" people. Our adult population - at least the high school graduates - will possess the skills necessary to function effectively in society. Detractors say tests do not guarantee learning, there will be a marked increase in lawsuits and school dropouts, and the funding of necessary remedial programs and the testing programs themselves will cause an additional tax burden on the public.
In summary, the proponents of minimum competency testing see many benefits to students, schools, and society. Opponents discount nearly all the perceived benefits and in addition have their own list of harmful effects. For the most part both sides speak from belief, not evidence. What evidence there is about the effects of minimum competency testing is discussed later.

Defining Minimum Competency

After a state or district or school has decided to institute minimum competency testing, there are several issues with which it must grapple. Most fundamental is what competencies will be tested.

A fundamental issue in the competency-testing movement, then, is whether to assess competencies that will be needed later in life or restrict testing to the more traditional school skills on the assumption that they have some relationship to success beyond school. (Haney & Madaus, 1978, p. 465)

Actually some individuals, most notably Brickell (1978, 1977), see more than two possibilities for defining the competencies to be on a test.

In several widely quoted publications, Brickell identified seven major questions that should be considered by individuals adopting minimum competency testing requirements. The first question is "What competencies?" Brickell identifies school skills, life skills, and basic skills (used in both school and life, Brickell's examples are reading, writing, and arithmetic) and says there are five possibilities for developing tests of competence:

1. Basic Skill
2. School Subject
3. Life Area
4. Basic Skill applied in each school subject
5. Basic Skill applied in each life area.

It should be obvious that each of the five areas could be defended or attacked.

The task of deciding what "competencies" are and what competencies should be tested may be the first task necessary for the implementation of a minimum competency testing program, but it is certainly not an easy task.

There is just not universal agreement on what necessary competencies are:

One of the real problems of the whole competency movement is the definition of the term. (Gourley, cited in Frahm & Covington, 1979, p. 7)

Indeed what passes for competency differs sharply from one school system to another. (Frahm, 1979, p. 7)

...the precise dimension of "competency" (is) as yet undefined by social discourse. (Burlingame, 1978, p. 2)

Defining basic education is impossible. What one individual needs and/or is able to accomplish is unique unto him....We can't even define survival, much less what we need to survive. (Monk, 1977, p. 28)

The competency movement is saying,

What is an educated person? You've had people do that intellectual exercise for a long time, starting with Socrates. (Cawelti, cited in Frahm Covington, 1979, p. 7)

...the traditional problem of the high school; that is, whether the high school is an academic or a socializing institution. (Beane, 1977, p. 128)
Schenck (1978) provided examples of several existing definitions of competencies found in the literature:

+ A competency is a cluster of related measurable skills necessary to perform a given task.

+ A competency is a learning outcome which a school system judges essential for students to attain in order to be prepared to meet successfully the requirements of extra-school life roles.

+ A competency is a statement of desired student performance representing demonstrable ability to apply knowledge, understanding and/or skills assumed to contribute to success in life role functions.

+ Competency refers exclusively to the ability to perform successfully in the patterned activities which constitute adult life roles. (p. 4)

Schenck went on to say that many implicit definitions of competency exist:

Some educators seem to believe that a competency is any goal or objective that all students must attain in grades 9 through 12 in order to graduate. Others believe that a competency is the ability to pass an examination in a basic area of the curriculum such as reading or computation. (p. 5)

He then proceeded to give the description of "the nature of graduation competencies" as determined by the program on which he is working:

+ A competency is a statement of an **intended student** outcome.

+ The outcome is generally **acceptable** as a graduation requirement.

+ The outcome is stated in language that is **sufficiently clear and concise**.

+ The outcome is **measurable** in that procedures for indicating its attainment appear plausible and practical.
The outcome refers to a relatively general domain of student behaviors.

The outcome statement describes an application of knowledge, skills or attitudes in ways perceived necessary to function successfully in adult like roles.

The outcome is stated in a uniform format, namely, "The student can...(transitive verb)...(predicate)." (p. 5, 6)

While educators cannot agree on definitions for competencies, this has not stopped proliferation of competency tests.

There have been several studies attempting to determine what competencies are considered important by different groups. On a survey made by the National School Board Association (1978), school board members were asked "Which of the following do you think should be included in any test of minimal competencies? (check all that apply)" with the following results:

<table>
<thead>
<tr>
<th>Competency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic arithmetic problems</td>
<td>99</td>
</tr>
<tr>
<td>Following written instructions</td>
<td>97</td>
</tr>
<tr>
<td>Following oral instructions</td>
<td>89</td>
</tr>
<tr>
<td>Reading a daily newspaper</td>
<td>88</td>
</tr>
<tr>
<td>Writing down a telephone number</td>
<td>87</td>
</tr>
<tr>
<td>Giving oral instructions others can follow</td>
<td>82</td>
</tr>
<tr>
<td>Reading a road map</td>
<td>80</td>
</tr>
<tr>
<td>Balancing a checkbook</td>
<td>80</td>
</tr>
<tr>
<td>Writing a business letter</td>
<td>69</td>
</tr>
<tr>
<td>Discussing the plot of a story</td>
<td>44</td>
</tr>
<tr>
<td>Reciting the rules of the road</td>
<td>44</td>
</tr>
<tr>
<td>Reading a novel</td>
<td>39</td>
</tr>
<tr>
<td>Drawing a map</td>
<td>35</td>
</tr>
<tr>
<td>Correctly completing an income tax form</td>
<td>31</td>
</tr>
<tr>
<td>Being compassionate</td>
<td>29</td>
</tr>
<tr>
<td>Discussing the plot of a TV story</td>
<td>27</td>
</tr>
<tr>
<td>Explaining the difference between political candidates</td>
<td>24</td>
</tr>
<tr>
<td>Writing a 4-line rhyming poem</td>
<td>13</td>
</tr>
<tr>
<td>Reciting the Ten Commandments</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>18</td>
</tr>
</tbody>
</table>

In a survey conducted at the University of Georgia, Schab (1979) attempted to determine the attitude of Georgians about minimum
competency testing. When asked about acceptable grade levels of reading, writing, listening, speaking, and arithmetic skills for the high school graduates, the following results were obtained.

<table>
<thead>
<tr>
<th>Percent of Respondents Accepting As Minimum Competence Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>8th Gr</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>Administrators</td>
</tr>
<tr>
<td>Teachers</td>
</tr>
<tr>
<td>Parents</td>
</tr>
<tr>
<td>Students</td>
</tr>
</tbody>
</table>

Bossone (1978) conducted a national survey using competencies identified by the authors of the Adult Performance Level (APL) test and determined twelve necessary competencies that received the highest rating from respondents. Only five of these were designated as ones which should be taught in school:

1. using words properly on employment applications and on the job;
2. writing letters to request applications and interviews;
3. filling out various employment forms;
4. registering to vote and following established voting procedures;
5. understanding the restrictions and protections afforded by the law.

Methods of identifying competencies follow the usual pattern associated with minimum competency testing - there is no pattern.
There are those who favor competencies being school skills and those who think competencies should be demonstrated abilities to survive, such as passing a swimming test or changing a tire.

Strike (1977) considered the whole idea of defining competencies in quite another way. He asked, "What kinds of knowledge and skills are of such import that the state has a right to apply coercion in order to get someone to acquire them?" (p. 94). A more commonly held view is voiced by Weber (1978), "First, let's say what we mean by basic skills. Most people, I think, mean reading, writing, and arithmetic" (p. 31).

It is necessary for the purposes of this study to adopt a pragmatic and intellectually unsatisfying definition of competency: anything that is referred to as a "competency" in the literature will be called a competency in this study.

Defining Mathematical Competencies

The place of mathematics in minimum competency testing programs is unique. Like reading and writing, it is specified as a subject to be tested in nearly all existing programs. Blanton (1979) reported that all 15 of the 15 states requiring passage of a minimum competency test for graduation included reading and mathematics. Studies indicate that there is nearly universal agreement not only that mathematics should be included (Gallop, 1979; NSBA, 1979) but also that there is less argument in this area than in others about the specific content that should be included (Baines, 1979).
Unfortunately in the eyes of mathematics educators, the content usually specified is seen as rather narrow. Program after program calls for arithmetic or computation. Taylor (1978) asserted:

Three of the things I think we should stop seeking are the fountain of youth, the pot of gold at the end of the rainbow, and a universally accepted definition of minimum competence in mathematics. The application of minimum competence to the mathematical skills necessary for survival does not appear to make sense. After all, whoever heard of a person who dropped dead from a lack of mathematical skills. (p. 89)

All of this causes mathematics educators to worry that had fought curriculum reforms (i.e. geometry in the junior high) may disappear and gives fuel to an old debate in mathematics education - "What are basic mathematical skills?"

Even if mathematics educators could reach agreement on this question - an unlikely occurrence - it would probably not broaden the definition used by many individuals developing minimum competency tests. Yet if some consensus could be reached by mathematics educators, this would at least be of some help to test developers.

The question of what constitutes mathematical basic skills, desirable skills for all members of a technological society wishing to call themselves educated, is not a new one.

In 1947 the Final Report of the Commission on Post-War Plans of the National Council of Teachers of Mathematics asked "How much mathematics is a 'must' for every citizen?" (p. 339). and provided a checklist of 29 items. In 1972, the National Council's Committee on Basic Mathematical Competencies and Skills published a list prefaced with the statement, "The following outline of content
gives some indication, under each heading, as to what minimum 'doing' skills are needed by the enlightened citizen" (p. 678). In a widely quoted article, Bell (1974) attempted to answer the question, "What does 'everyman' really need from school mathematics?" (p. 202). In the same vein the National Council of Supervisors of Mathematics published a list of "Basic Skills" areas in 1977.

The four lists just referenced are included in Appendix A. They range in time from 1947 to 1974. They were not directly related to minimum competency testing, but do reflect attempts to list necessary or basic mathematical skills. There are some big differences in the lists; for instance, the Post-War Plans list does not mention computers, an area included by both the Supervisors and Bell. While the Post-War Plans list included vectors, the Pythagorean 3-4-5 relationship, geometric constructions, and trigonometry, these were not found on the other lists under consideration. Each of the four lists mentions computation, measurement, geometry, and statistical topics. There are other intersections of two or three lists. These lists, developed by mathematics educators, are in marked contrast to the "computation" or "arithmetic" that are often indicated in mandated lists of necessary competencies.

Hill (1979) made the following relevant comments:
There are two dimensions along which much of today's dialogue about basics, as well as about the related minimal-competency testing program, is severely limited and dangerously inadequate. One of these is the pinched and narrow view of what life is. Too often the only criteria for defining the basic 'life' skills seem to be based on a view of the human being solely as a worker or consumer. The emphasis is narrowly vocational with a limited notion of what makes people truly productive in society. Even the definition of the consumer role appears to be confined to buying and selling and computing interest. Can anyone in a world where we are constantly bombarded with persuasive statistics seriously deny that the ability to deal intelligently with quantitative information is absolutely basic to good consumerism? And I mean more than the ability to interpret information and to be alert to misrepresentations, the ability to draw valid inferences from data....

The second dimension of limited viewpoint is shortsightedness. Education is inevitably a future-oriented enterprise. We should be talking not about what is needed basically in today's society, but about what will be essential a decade or two hence. Society is not static, and the basics are not eternal .... (Hill, 1979, p. 3)

Basic skills in mathematics are vital - everyone agrees. What everyone does not agree on is what those basic skills are.

Mandates (or Control) of Minimum Competencies

The mandates for minimum competencies have been at the state or local level. This section considers the federal role in minimum competencies, gives a brief overview of state activity and the legal issues involved in minimum competency testing.

A review of the literature indicates that despite a strong commitment to local control of education, federal agencies have played a role in minimum competency testing. The most comprehensive
description of federal activities is given by Shoemaker (1980). Much of what follows is a summary of her comprehensive overview of federal activity related to minimum competency testing.

**Federal Policies**

The federal government stance on minimum competency testing is based in large part on the belief that education is a function of state and local political divisions. Shoemaker (1980) identified four events instrumental in the development of the no-national-test policy. Those are: 1) an address by the then Secretary of the Department of Health, Education, and Welfare Califano on the occasion of the twenty-fifth anniversary of the College Entrance Examination Board (October 24, 1977); 2) the oversight hearings of the Senate Education Subcommittee on the Quality of Education, chaired by Senator Pell of Rhode Island; 3) the report of a special group empanelled by the National Academy of Education; and 4) the National Conference on Testing and the Basic Skills held in March, 1978.

Since each of these four can be considered basic to the formulation of federal policy, each will be discussed briefly.

**Califano's Address.** While saying competency tests are "useful and necessary" when "skillfully and sensitively used," Califano gave four reasons for his opposition to "tests and standards imposed from Washington":

1. potential lack of local commitment to a test developed in Washington;
2. no single test could be appropriate for every school district in the United States;
3. unanswered technical questions about competency test development still exist; and,

4. the issue of local control.

Califano considered his fourth objection the "most important." A potential for a national curriculum would be a result of a national test. Califano said:

In its most extreme form, national control of curriculum is a form of national control of ideas. We should be very wary of heading in that direction; the traditional role of federal support for education has been to encourage diversity - not rigid uniformity. (cited in Shoemaker, 1980, p. 316)

**Senate Sub-committee Hearings.** The idea advanced by Senator Pell was to develop standardized national competency tests in reading, writing, and arithmetic and make the tests available to states on a voluntary basis. Among those giving testimony on this idea were Assistant Secretary for Education Mary Berry, Admiral Hyman Rickover, Education Testing Service President William Turnbull, National Assessment Director Roy Forbes, and National Institute of Education Director Patricia Graham.

Rickover, who for years has advocated a national test, argued in favor of a mandatory national test to measure specific skills for various grade levels.... Berry, Forbes, Turnbull and Graham spoke against the idea of a national test, mandatory or voluntary. (Shoemaker, 1980, p. 317)

**Report of NAE Panel.** An influential and controversial report was made by a group of prominent educators (Stephen Bailey, John B. Carroll, Jeane Chall, Robert Glaser, John Goodlad, Diane Ravitch, Lauren Resnick, Ralph Tyler, and Robert Thorndike). The report was in a question-and-answer format. On the minimum competency issue the panel concluded:
...any setting of statewide minimum competency for awarding the high school diploma – however understandable the public clamor which has produced the current movement and expectation is basically unworkable, exceeds the present measurement arts of the teaching profession, and will create more social problems than it can conceivably solve.


The panel report was influential but was not universally accepted.

National Conference on Testing and the Basic Skills. This conference was a gathering of influential educational and political leaders. The educational leaders expressed great opposition to a national educational achievement test. The recommendations of conference participants were summarized in the conference proceedings:

About testing, it was widely agreed among conferees that the minimum competency movement is a manifestation of an age of consumerism and accountability in society at large; that tests are social dynamite and can do irreparable harm as well as good; that the issue should not be more testing or less testing but better testing and better test usage; and, most important, educational goals should set the agenda for testing and not the other way around. (Cited in Shoemaker, 1980, p. 319)

In 1979 then Assistant Secretary for Education Mary J. Berry noted that "A system of national examinations suggests a potentially negative effect" (Berry, 1979, p. 169). She then went on to examine a national standards proposal point-by-point and determined that

...we are not sure that national examinations would be appropriate for our Federal system. Americans want better education, but they do not agree on what better means. Their differences on such matters may best be reconciled at the state and local levels. (p. 172)
Federal Activities

Despite the fact that federal agencies oppose a single, national competency test, there is still federal activity in minimum competency testing. Shoemaker (1980) identified three areas of federal activity: support for programs, technical assistance, and research and evaluation. In addition, federal activity includes legislation introduced in the United States Congress.

Legislation. The bill that Senator Pell had intended to introduce calling for the development of a national, voluntary, minimum competency test was never introduced because of the concerns and negative reactions voiced at the previously mentioned hearings. However, in the House of Representatives Ronald Mottl from Ohio introduced several bills related to minimum competency testing. Mottl's initial bill called for making high school graduation contingent on passing a national competency test. Subsequent bills were less extreme, and the one that was ultimately passed as part of the Elementary and Secondary Act Amendments of 1978 (HR15) provided for grants and technical assistance to states implementing plans to establish "educational proficiency standards." This legislation authorized support of state, and under some circumstances local, programs attempting to aid students in attaining "educational proficiency standards." Legislation specifically outlines four provisions that must be included in the program.

Technical Assistance. The Elementary and Secondary Act Amendments of 1978 also authorized the Department of Health, Education,
and Welfare to provide technical assistance to state and local agencies in some minimum competency areas. In addition, the National Institute of Education prepared a series of resource booklets as part of a major study on minimum competency testing.

Research and Evaluation. One of the largest research studies concerning minimum competency testing is a four-year study currently being conducted by the National Institute of Education. The study began in December 1978 and will be conducted in two phases. Among the components of the study are: an exploration of the impact of minimum competency testing, a description of existing programs, and the production of the previously mentioned resource booklets.

In addition to the NIE study, the Educational Policy Research Institute is conducting a study on sex and racial bias with support from the National Advisory Council on Women's Educational Programs.

While many politicians totally reject the idea of a national minimum competency test, there is some support for the idea. Ohio Representative Mottl also introduced legislation which would have established a National Commission on Basic Education. The commission would have developed

minimum standards and tests designed to evaluate reading, writing, and mathematics skills of students at sixth-, eighth-, tenth-, and twelfth-grade levels. These standards and tests would be available to state and local educational agencies. (Mottl, 1978, p. 32)

Cawelti (1978) summarized the reasons for opposing a nationally developed competency test:
1) It would contribute to the proliferation of tests already administered....

2) ...under our constitution, education is the responsibility of the state and localities....

3) ...because of the proclivity to test the testable establishing such a national test can only further the likelihood of local curriculum imbalance....

4) ...little evidence...the information from such a national testing program (would be used) for any useful purpose....

5) ...a national test would further weaken local decision-making at a time when school administrators, teachers, and board members are already reeling under the impact of other federal regulations. (Mottl and Cawalti, 1978, p. 87)

Activity in the Fifty States

This section reports a review of minimum competency testing activities within each state. Three primary sources for the state overview are Update VIII: Minimum Competency Testing compiled by Chris Pipho; Minimum Competency Legislation in the Fifty States, Research Monograph, by James Olney; and Basic Skills Assessment Around the Nation, an information report by the Educational Testing Service. Additional sources are cited at the end of each state section.
Alabama

In 1977, the State Board of Education approved a Graduation Task Force Committee recommendation that a high school diploma should be contingent on passing an examination. At the same time, the state board appointed a "committee of 100" charged with the development of a master plan for minimum competency testing in Alabama. A year after the committee was appointed, it submitted a plan to the State Board of Education.

Included in those recommendations were: a year of piloting, regional conferences, a criterion-referenced test, a three-year phase-in period for high school graduation, use of the same statewide assessment instrument by all districts, remediation for those students not passing the test at all checkpoints, checkpoints at grades 3, 6, and 9 before the graduation test; and reading, writing, and computation skills identified initially, with other skills developed later. Work in implementing these recommendations, the Basic Competency Education (BCE) plan, included having several pilot systems develop standards and competencies. Test items were written by Alabama teachers with consultant services by the Educational Testing Service. Initial piloting was done in October 1979, with plans calling for the graduation requirement to be in place for the 1981 graduating class. (SRCP 1979).

Alaska

In 1977 the Alaska State Department of Education adopted new graduation requirements allowing local districts to use competency as a basis for high school graduation. In 1978, the State Education
Department surveyed the local districts regarding the status of competency-based education within each district. In the Winter of 1979, the following statement was issued.

The current position of the state board of education and the department of education is that the state should assist, at the request of districts, in implementation of competency-based education. (Pipho, 1979, p. 4)

**Arizona**

Often Florida and Oregon are regarded as the first states to tie high school graduation to passage of a test. In fact, the Arizona State Board of Education policy on reading adopted on July 26, 1971, implies that Arizona was the pioneer state.

Also, beginning with the 1971-72 freshman class, special instruction will be given in reading in order that high school graduates after 1974-75 shall, in addition to other regular graduation requirements, demonstrate ability to read at least at a ninth-grade level of proficiency as shall be established by the local district. (Pipho, 1979, p. 6)

In 1972 a bill mandated the establishment of a continuous uniform evaluation system (CUES) by directing the State Board of Education to cooperate with local school districts so that by June 30, 1975, they would develop, establish, and direct the implementation of a continuous uniform evaluation system of pupil achievements in relation to measurable performance objectives in the basic subjects...Basic Subjects shall be defined for these purposes as reading, writing, and computation skills. (ARS-15-102,26, cited in Pipho, 1979, p. 7)

The third minimum competency mandate in Arizona was a State Board policy, entitled "Skills in the Basic Subject Areas." This mandate directed that prior to receiving the eighth grade certification of
promotion a student shall show sixth-grade competency in reading, computation, and written communication skills. This mandate also restated the policy statement first issued in 1971, that students must demonstrate an ability to read at ninth-grade level prior to high school graduation.

Arkansas

In 1977, two bills were passed by the Arkansas legislature that are related to the minimum competency testing issue. Act 484 directed the state board of education to hold statewide hearings and then to establish goals of education for Arkansas and minimum performance education goals. In addition Act 514 was enacted calling for each school district to report results of annually administered standardized achievement tests. "The data is to serve as a basis for comparison by category" (Pipho, 1979, p. 9). The goals mandated by a committee of 91 people appointed by the Arkansas Department of Education was submitted to the State Board of Education in the spring of 1978. The Arkansas Department of Education has requested appropriations for statewide assessment programs intended to emphasize testing for diagnostic purposes. The Educational Assessment Act of 1979 mandated that districts administer a standardized test to a sample of students from at least the areas of reading and mathematics. In addition to repealing the previously mentioned Act 514 of 1977, this law also required districts to develop and periodically review minimum performance goals and develop criterion-referenced tests for these goals to be administered beginning in the 1981-82 school year to grades 3, 6, and 8. There is presently no promotion or
graduation requirement. (Neill, 1978; SRCP, 1979)

California

The California legislation related to minimum competency testing (or proficiency testing) is more complicated than that found in most states. There are two district programs, each of which is related to minimum competency testing. The first is California's highly touted "early-out" program, the first such program in the nation (Neill, 1978, p. 49). The California High School Proficiency Test is provided for by SB1112 of 1972 and SB1243 of 1975. The legislation allows an individual 16 years or older to take an examination, passage of which entitles that individual to certificate of proficiency, legally equivalent to a high school diploma. The test can be considered a "minimum competency test" for several reasons. The test was developed by the California State Department of Education drawing on such sources as the National Assessment of Educational Progress, the Adult Performance Level Study, Right to Read, locally developed tests, the California Assessment Programs and commercial standardized tests and item pools. Skills are measured by use of items and a short essay during a four-hour examination.

The second minimum competency program in California, also established by legislative mandate (AB3408 - the Hart Bill, amended by AB65), requires all school districts to adopt proficiency standards in reading, writing, and mathematics. School districts are required to assess student performance periodically, at least once in grades 4 through 6, once in grades 7 through 9, and twice in grades 10 through 11, to determine whether each student is meeting the required standards. In the case of a student who is having difficulty, the principal is to arrange a
conference, school officials are to describe the instructional program to be provided to assist the student. Starting in July 1980, school districts were not to award a high school diploma to any student not meeting proscribed standards of proficiency in the basic skills.

Colorado

Perhaps the oldest "minimum competency" program in the United States, Denver's Proficiency and Review Test, is found in Colorado. Despite this fact, there has been relatively little state-level activity. In 1975 the legislature enacted a bill which outlined the legal responsibilities of districts requiring passage of a proficiency test for graduation. Among other things the bill states that the test must be given twice each year with the initial testing in ninth grade and that any student not meeting the proficiency standards "shall be provided with remedial or tutorial services..." (SB180 of 1975, cited in Pipho, 1979, p. 16).

Connecticut

In 1976 legislation was passed requiring students to take a proficiency examination before graduation from high school, but it was not implemented because it was contingent upon unavailable funding. In 1978 legislation was enacted calling for local districts to develop a plan for educational evaluation and remedial assistance. The bill further stipulated that testing in the basic skills areas of reading, language arts, and mathematics must be conducted in grades 3, 5, and 7. Also, the State Board of Education was directed to give every ninth grader in the state a proficiency examination in the areas of reading, language arts, and mathematics. Results of
this test are to be used for instructional improvement and for identification of those students needing remediation.

**Delaware**

Minimum competency activity in Delaware has emanated from the State Board of Education rather than the state legislature. The initial focus of the activity in 1976 and 1977 was upon high school graduation. But in September 1977, this focus was shifted to an emphasis on instruction and promotion policies in the lower grades. The latter policy called for districts to review their promotion policies - for elementary students in 1977-78, for secondary students in 1978-79 - to make sure that students are promoted only after showing competence in basic skills. The State Board set performance levels in reading, writing, and arithmetic and the class of 1981 is to meet or exceed these levels before graduating from high school.

**Florida**

(See chapter III).

**Georgia**

The minimum competency program in Georgia, initiated by the State Department of Education, is modeled after Oregon's program. In November 1976, a study was undertaken with a potential for changing high school graduation requirements. The study included piloting various aspects of restructuring the requirements in nine local districts. In the fall of 1978, the State Department of Education adopted new high school graduation requirements which include
performance standards and minimum expectations for competency in adult life roles. As in Oregon individual school districts will set their own student performance objectives. (SRCP, 1979)

**Hawaii**

In Hawaii, both the legislature and the State Department of Education played a role in the formation of the minimum competency program.

While several bills specifically calling for minimum requirements for high school graduation failed during 1977, Act 187 created a citizens committee to advise the legislature on several issues related to minimum competency. The State Department of Education activity included appointment of a task force to study the minimum competency issue. The State Board of Education adopted several recommendations of this task force in August 1978, including:

the graduation requirements be expanded to include the demonstration of mastery of the identified 15 essential competencies effective with the graduating class of 1983. (Pipho, 1979, p. 30)

**Idaho**

In Idaho there is neither legislative mandate or state board ruling requiring minimum competency testing. However, in order for a student to get a State Board of Education seal on his or her diploma, that student must pass a state-level proficiency test in the areas of reading, writing, arithmetic, and spelling. Participation in the program is at the option of the school district, but those districts electing to participate in the program must provide remediation for students who do not pass the examination. The first graduating class affected by the program will be the 1982 class.
**Illinois**

After several minimum competency bills failed in 1976 and 1977, the Illinois legislature passed HB238 in 1978. The bill directs the State Board of Education to prepare materials to "encourage and assist local districts to develop minimum competency testing programs" (Pipho, 1977, p. 33).

**Indiana**

In Indiana, as in several other states, both the legislature and the State Department of Education have worked in the area of minimum competency testing. During 1977, the senate education committee studied both the area of testing and the area of competency requirements — and did not recommend any legislative action. In spite of this, legislation was introduced in 1978 that would have required districts to set up basic skills assessment programs. The bill failed. However, in 1978 the State Board of Education twice made amendments to an existing rule concerning educational improvements. While not requiring the establishment of performance objectives or passage of an examination for graduation, the rule requires each district to submit detailed plans to the State Department of Education. These plans include program goals and objectives as well as evaluation of student progress at four levels. The implementation schedule called for reading, composition, and spelling in 1978-79, social studies in 1979, mathematics in 1980, and science in 1981.
Iowa

A review of the literature indicates that while there was some activity concerning minimum competency by both the legislature and the State Department of Education, to date no official action regarding minimum competency has been taken. Legislation has been introduced but only one has passed and a joint interim subcommittee studied the issue of minimum competency testing but did not make formal recommendations. Likewise, the State Department of Education appointed a task force to study student achievement in Iowa, but no formal action has resulted.

Kansas

During 1976-77 at least 10 competency related bills were introduced in the Kansas Legislature, but none of these were enacted. However, in 1978, Sub. HB 3115 was passed. This bill calls for pilot, competency-based education programs. Legislated specifics of the program included: assessment activities focused on reading and mathematics at the 2nd, 4th, 6th, 8th, and 11th grades; pilot programs in the school years 1978-79 and 1979-80; and State Board distribution of items to include competency standards and sample test items. Results of this program will be studied during the 1980 interim and the 1981 session; further decisions by the legislature will be made at that time.

Kentucky

Several groups in Kentucky have studied the minimum competency testing issue. In 1976 the State Board of Education directed the State Department of Education to study the issue of minimum
competency testing and competency-based education. The result of this was a four-year plan for developing criterion-referenced tests for grades 3, 5, 8, and 11. This plan by the State Board was apparently supplemented by legislation enacted in 1978 calling for assessment of students in grades 3, 5, 7, and 10. Presently all students are tested using a standardized test given statewide. The results of this test are not at this time to be used for promotion or graduation. In addition to this test, districts are to be developing an educational improvement plan, utilizing evaluation data and information obtained at public hearings. (SRCP 1979)

**Louisiana**

Minimum competency activity was generated by the passage, in 1976, of HB810, Act 709, an accountability and assessment law that required both the establishment of minimum proficiency levels in communication and computation and the use of criterion-referenced tests. To facilitate implementation of this legislation, the State Department of Education appointed a committee. The recommendations of this committee resulted in the drafting and ultimate enactment of further legislation – HB275, Act 261. This bill does not specifically call for minimum competency testing but again requires the Superintendent of Education to establish minimum levels of proficiency in basic communication and computation skills. This statewide assessment program, not presently used for graduation or promotion, administers a criterion-referenced test to grades 4, 8, and 11 in the areas of reading and mathematics.
Maine

While rejecting one bill related to minimum competency in 1977, the Maine legislature enacted LD1810 that same year. LD1810 established an assessment of the basic skills, directed the State Board and Commissioner of Education to conduct public hearings and a survey, and formed a committee to study the data that were gathered. This committee prepared a report for the legislature which included a series of conclusions and recommendations that the legislature not enter into the establishment of competency requirements on a statewide basis for high school graduation and that the state's role should be to provide technical assistance to local districts rather than to impose standards. As a result of this committee's report, the legislature's Joint Committee on education recommended that policy on competency-based education be formed by the State Board of Education. In response to this the State Board passed a resolution that called for implementing, by July 1982, a plan for setting goals and objectives, establishing performance standards, and evaluating outcomes by each local school district.

Maryland

In 1976 and 1977 the Maryland legislature enacted competency-type laws addressing only the area of reading. In 1977, State Superintendent David Hornbeck outlined "Project Basic" (Hornbeck, 1977). The plan, approved by the State Board of Education, called for the establishment of minimum competencies in five areas, including the basic skills areas of reading, writing, and
mathematics. The standards in reading will be one criterion for high school graduating starting with the 1982 class.

**Massachusetts**

Minimum competency activity in Massachusetts centers on a policy on basic skills improvement adopted by the State Board of Education. The policy statement reflected several years of study which included statewide hearings. The program adopted in August 1978 included mandates to each school committee to establish minimum standards for the basic skills areas of mathematics, reading and writing and to evaluate the basic skills competency of each student at three different times. The Board stated that it would not adopt a policy requiring that a high school diploma be contingent on test passage; rather the decision would be delayed until the impact of the minimum standards policy could be determined. In a study of the development of the Massachusetts basic skills improvement policy, May (1979) determined that this approach was agreed upon because it appeared to be sound educationally, would negate potential legal challenges and was harmonious with the positions taken by state educational organizations.

**Michigan**

Michigan, an acknowledged leader in the area of assessment, does not have minimum competency tests per se. Tests are given in mathematics and reading in grades 4, 7, and 10. These assessment tests are not intended to be used for grade-to-grade promotion. Minimum competency testing has been considered by both the legislature and State Department of Education but to date no action has been taken.
Minnesota

In 1975 the Minnesota State Board of Education appointed the Minimum Standards for Secondary Education Task Force. Their report, issued in the spring of 1978, resulted in the State Board of Education announcing that there would be no state program of minimum competency testing, that the decision of whether or not such testing was to be implemented would be left to local districts. Legislative activity in Minnesota has included the introduction of several bills but to date none has been enacted.

Mississippi

Minimum competency issues have been addressed by both the legislature and the State Department of Education. Several bills were introduced during the 1977 legislative sessions, but all died in committees. The State Department activity focused on a year-long study of graduation requirements. This study did not result in formal action.

Missouri

(See chapter V).

Montana

The literature indicated no legislative activity in Montana related to minimum competency testing. In 1978 the state superintendent issued a statement opposing federal and state-level minimum competency tests and advocating that local districts develop their own minimum competency tests.
Nebraska

Minimum competency activity in Nebraska appears to have its origin in the State Department of Education rather than the state legislature. Since 1975 the Nebraska Department of Education has required districts to identify minimum levels of performance in mathematics, reading, and writing. The students are tested, beginning in fifth grade and this testing continues until the individual student masters the skills being measured. The Department of Education developed a test, the Nebraska Assessment Battery of Essential Learning Skills (N-ABELS) that the districts may use to fulfill the mandate. This test is not to be used for grade-to-grade promotion.

Nevada

In 1977 the Nevada legislature enacted AB400, requiring local districts to administer a proficiency examination in mathematics, reading, and writing at the end of grades 3, 6, 9, and 12. While high school graduation is contingent on passage of the test, in the other grades students may be promoted to the next grade without passing the test, provided remedial work is available. The State Department of Education reacted to the directive given by AB400 by administering the Stanford Achievement Test to all third and sixth graders in April 1978. Testing began in the 1978-79 school year for ninth graders and will start in the 1981-82 school year for twelfth graders.
New Hampshire

As in numerous other states, minimum competency activity has taken place in both the legislature and the State Department of Education. At least a dozen minimum competency related bills have been introduced in the New Hampshire legislature, but none of these have been enacted. The State Department activities include work by a committee that established competency guidelines for local school districts assessing communication and mathematics in grades 4, 8, and 12. School districts must develop an assessment plan. While the state department mandate does not indicate that this assessment should be used for grade promotion or graduation, some districts are including this in their assessment plan.

New Jersey

New Jersey is a minimum competency state. The program that has evolved there has developed largely because of legislation enacted in 1976. This legislation directed the State Department of Education to set minimum standards in the areas of reading and mathematics and also directed local districts to provide remedial assistance to students not meeting the minimums. This legislation did not change graduation requirements. Tests for grades 3, 6, 9, and 11 were developed by the Educational Testing Service, with input from New Jersey educators and citizens. The New Jersey program has been the focus of several studies (Nadler, 1977; Nadler and Tucker, 1978; Robinson, 1979). The studies concerned both the development of local standards and a comparison of state and local standards. In New Jersey, the limited research indicates that the state standards
really are minimum, with most local districts opting for stricter or more difficult standards.

**New Mexico**

The minimum competency testing program in New Mexico is based on a basic skills plan approved by the State Board of Education. This plan includes testing at two points:

The first of these is an early assessment to be conducted according to a local district plan. A second checkpoint is a tenth-grade proficiency test battery which will be mandated for the fall of 1978 in which the graduating class of 1981 will receive a proficiency endorsement on their high school record if they have successfully passed the test battery. (New Mexico Basic Skills Plan, cited in Pipho, 1979, p. 77)

The proficiency test is a form of the Adult Performance Level Test and a sample of student writing.

**New York**

Long noted for the optional administration of a Regents Examination, New York also has a Regents competency testing program. The Board of Regents initially established the program in 1976 and made major changes in 1978. The program presently in place has detailed specific testing requirements for a high school diploma. Areas assessed are reading and comprehension, writing, and mathematics. Differentiated diploma standards have been formulated on the basis of scores on the various Regents competency test. Students can fulfill the competency test requirements by passing selected Regents Examinations. The April 1979 issue of *Phi Delta Kappan* (p. 555) reported that "New York Plans to Get Graduation Standards That Will Be Nation's Toughest."
North Carolina

The North Carolina competency testing program is the result of two separate pieces of legislation enacted in 1977. The first bill, HB204, established competency testing for high school graduation by requiring the State Department of Education to select a test and set standards. The second bill, HB205, created a total minimum competency testing program, for grades 1, 2, 3, 6, 9, and 11. As a result of these two pieces of legislation the state department of education has field-tested the program, developed competency goals K-12 in 10 program areas, and prepared for local districts "a descriptive statement of competency goals and performance indicators, a statement of policies governing exit documents and graduation diplomas, and a policy statement governing remediation of essential skills" (Pipho, 1979, p. 85).

North Dakota

To date, all legislation introduced relating to minimum competency testing has failed. In addition, an ad hoc committee appointed by the State Department of Education to study minimum competency issues rejected the idea of establishing a minimum competency testing program.

Ohio

(See chapter VI).

Oklahoma

Oklahoma does not have a minimum competency program. An assessment has been conducted in order to gather baseline data to
facilitate decisions regarding minimum competency testing.

Oregon

(See chapter IV).

Pennsylvania

Pennsylvania has responded to the public cry for minimum competency testing by the development of "Project 81." The project is in part a comprehensive curriculum review made up of several components: 1) statement of goals, 2) establishment of curriculum and graduation requirements, 3) determination of curriculum directions, 4) measurement of student performance, and 5) periodic review of programs. Pennsylvania's strategy has been to move slowly with much input from its citizens and to focus not only testing, but goals, regulations, and curriculum as well (Pennsylvania Response to Public Concern About Student Achievement, 1978). Project 81 defines competence as "the application of a process or skill to knowledge of a life situation" (Zaenglein, Kies, and Tardibuono, 1977).

Rhode Island

In 1974 the Rhode Island Department of Education's master plan for evaluation was developed. Components of the master plan include the formulation of the achievement of those objectives. In 1975-76 both norm-referenced and criterion-referenced tests were piloted. In 1977 the Department of Education presented to the State Board of Regents a draft policy statement concerning competency based diplomas. The following year the legislature passed a resolution asking that the governor appoint a commission to study basic skills
education. That same year the Board of Regents adopted a policy on educational achievement standards. It called for the establishment of standards and measures of progress at three levels: basic skills standards, minimum competency standards, and standards of excellence.

South Carolina

The literature indicates that both the state legislature and the State Board of Education conducted studies of the minimum competency issue. The ultimate mandate in the state came from the legislature in bill H2053. The provisions of this bill include the establishment of educational objectives and minimum standards of achievement in areas to include mathematics, communication skills, reading, and writing. The decision on whether or not to make graduation contingent on a test is being delayed until 1989, when sufficient baseline data will have been gathered.

South Dakota

The literature indicates that a South Dakota Legislature interim committee held hearings and conducted a study of minimum competency testing. Following this a statewide testing bill was defeated. The State Department of Education, while not advocating a single test score as the basis for promotion or graduation, has produced a series of minimum standards/competency guides in the five areas of language arts, reading, mathematics, science, and social studies.

Tennessee

There were several minimum competency bills introduced in the Tennessee legislature during 1977 and 1978, but none were enacted.
State Department activity in the area included a study of graduation requirements. In late 1977, the State Board of Education called for a basic skills proficiency test to be in effect for the graduating class of 1982. The test is to cover the areas of reading, mathematics, grammar, and spelling at approximately the sixth- to eighth-grade achievement level.

Texas

There have been no statewide minimum competency mandates in Texas from either the legislature or the State Department of Education. However, the State Department has worked both independently and with a consortium of seven urban school districts, on midpoint (6th grade) and exit level (12th grade) objectives for reading and mathematics.

Utah

Utah requires passage of a minimum competency test for graduation from high school. The requirement is the result of a 1977 State Board of Education change in the graduation requirement. This requirement, which went into effect with the 1980 graduating class, allows districts to choose the test to be used and set the cutoff or passage score. However, the areas to be tested – reading, writing, speaking, listening, arithmetic, democratic governance, consumerism, and problem solving – were specified by the State Board of Education.
**Vermont**

The Vermont "Basic Competencies" requirement for high school graduation will go into effect with the graduating class of 1981. This requirement is the result of a mandate by the Vermont Board of Education adopted in 1976. Mastery of competencies in the areas of reading, writing, speaking, listening, and mathematics are requirements for the 1981 graduates, with the addition of reasoning in 1983 (Vermont Department of Education, 1979).

**Virginia**

The 1981 graduating class in Virginia will have to pass a minimum competency test to graduate. In 1976 the legislature enacted a bill mandating the establishment of statewide educational objectives and tests in reading, communication, and mathematics skills. In 1977 the State Board of Education passed a resolution calling for minimum competency testing for high school graduation. In 1978 the legislature enacted HB402 which mandates the testing requirement for the 1981 class. There are those in the state that question the testing requirement in the area of mathematics (Ball, 1979).

**Washington**

Washington does have minimum competency tests for the purpose of high school graduation or grade promotion. However, there has been considerable activity related to minimum competency issues. In 1976, the legislature passed two important bills. The first, SB3026, required that school districts establish, with participation from the community, learning objectives for grades K-8. This program was extended to all subjects and all
grades in 1978, with student attainment to be assessed annually.
The second bill passed in 1976, HB1345, requires the administration
of a standardized achievement test to all fourth graders in the areas
of reading, mathematics, and language arts. In addition samples
of eighth and eleventh graders are to be tested. The specified
purpose of these tests is that:

...the results to be used by school districts
and parents to compare their children's achievement
level with those of other pupils in the district,
the state, and the nation. (Pipho, 1979, p. 110)

West Virginia

In 1977 the Department of Education worked on the establishment
of competency statements for each subject area in grades K-12. In
1978 work continued on curriculum guides for the identified essential
competencies but the state board of education determined after a
study of minimum competency testing not to continue formal action on
the issue. Legislation was introduced during 1978 but failed to be
enacted.

Wisconsin

Included in the Report on the Conference on Competency Based
Mathematics Education (Chambers, 1978) are statements by the State
Superintendent of Public Instruction in Wisconsin:

Competency based education should be a local
school district initiative and responsibility of
each individual school district (p. 35).

Also included are statements by the Acting Governor:

Local control will also be emphasized in my
annual review message in the areas of competency
testing...the responsibility for developing
proficiency standards and competency testing
should be with local districts. (p. 37)
The same publication includes an interview with the chairman of the State Assembly Education Committee who indicated that no legislation relative to competency based education was being considered.

**Wyoming**

In 1977, the State Board of Education approved a policy statement requiring that the issuance of a high school diploma be based partially on credits, partially on attendance, partially on proficiency in reading, writing, and computation, and partially on an understanding of democracy and free enterprise. Responsibility for verification falls to the local district working with the State Department of Education.

**Legal Issues Surrounding Minimum Competency Testing:**

Most of the literature about the general legal issues of minimum competency testing has been written by Merle McClung of the Center for Law and Education in Cambridge, Massachusetts or by Paul Tractenburg, a Law Professor at Rutgers University. While neither of these two acknowledged experts say that minimum competency tests are illegal, each explains grounds on which the tests could be challenged, offers suggestions for removing some of the more legally questionable aspects of a test, and advises school districts to proceed with caution in order both to implement a minimum competency test and to avoid litigation. Their concerns are considered in some detail in the following paragraphs. It is noteworthy that a vocal opponent of minimum competency testing, Gene Glass, defends the legality of the tests. In an article co-authored by attorney Jon Getz (Glass & Getz, 1979), Glass defends the legality and constitutionality
of the tests by presenting some of McClung's thoughts on potential legal problems with the test and then countering these arguments. Whether or not minimum competency testing will eventually be found illegal or unconstitutional, it would behoove districts considering the implementing of such tests to be aware of the issues involved.

Legal principles and the threat or actuality of litigation, may come to play an important role in the evolution of minimum competency programs.
(Tractenberg, 1980, p. 101)

There is some evidence that part of the impetus for minimum competency testing is found in legal cases such as the Peter Doe case. In that case, a California school district was sued by a young high school graduate and his parents because, although the district awarded the student a diploma, he could not read above fourth-grade level and was virtually unemployable. He and his parents instituted a "malpractice" suit against the school alleging the school routinely promoted the student from grade to grade and class to class and later graduated him despite the fact that he was unable to do the work satisfactorily. After high school graduation, Peter Doe was not prepared for either post-high school education or employment. In this case and other similar "educational malpractice" suits which have been decided to date, school districts have never lost. Nevertheless, districts have become very sensitive to the issue of promoting or
graduating students who function far below grade level. Some districts seem to feel a need to verify explicitly what "competencies" each student possesses. However what was originally intended, at least in some places, as a safeguard against litigation may spawn yet more law suits.

The most famous case is in Florida. Ten black students who initially failed the state's functional literacy test (on subsequent testings eight of the ten passed) filed suit alleging racial discrimination because of the disproportional number of black students failing the test. In 1977-78, 76 percent of the white students taking the mathematics portion of the test passed while only 23 percent of the black students passed. In 1978-79, there was a move toward closing the gap but a wide discrepancy still existed, 83 percent of the white students passed and only 40 percent of the black students passed. The judge hearing the case found for the students who brought suit and delayed the effective date on the test until 1983 when all graduates would have been in racially integrated schools for their entire school careers. The State of Florida is appealing this decision.

The area of discrimination - on racial, sexual, or other bases - holds one kind of potential for litigation. There are other areas: the tests themselves, whether they are valid and reliable in the psychometric sense, and whether they have validity in terms of the curriculum and in terms of the stated purposes of the testing program; the method of setting cutoff scores; and the failure of the school district to meet each of its many stated or implied responsibilities in regard to minimum competency testing.
In 1977, Tractenberg prepared a background paper concerning legal implications of performance testing. In this paper he posited that legal challenges to minimum competency tests could come on the

...equal protection and due process clauses of the Federal and State Constitutions, education clauses of state constitutions, general statutory provisions defining the powers and duties of state education authorities, and common law negligence theories. (p. 13)

Tractenberg noted several legal precedents where considerable leeway was afforded schools in policy determination.

...judges will surely be attracted by the arguments that they should not second guess the educational judgements of 'experts' even if those judgements might be imperfect on subject to question.... (p. 14)

Court challenges might be made on the grounds of overall illegality or on specifics of existing programs. In addition it is possible that a challenge could be made because a school district or state lacks a minimum competency test.

Implementation

Methods of implementation of minimum competency testing vary greatly. State mandates regarding minimum competency testing were examined in the previous section. As indicated minimum competency testing is sometimes implemented at the state level; the state is responsible for the development of the test and makes necessary administrative decisions regarding the test. Sometimes the implementation is conducted at the district level, either at the behest of the state or because of local district decision.

The implementation of a minimum competency test requires: the construction of a test which is probably based on student performance
objectives that may or may not already exist; the establishment of
criterion or cutoff scores and other administrative decisions;
and a decision about what to do with students who fail the test.

Technical Considerations Involved in the Development of a Minimum
Competency Test

There are numerous publications available which were designed
specifically to provide assistance to individuals responsible for
the development of a competency test. Some of these were developed
by states to help local districts.

Others are not designed for specific states but are intended to
give more general guidance - often just by raising issues to be
considered.

What follows in this section is a general discussion of
design considerations. The emphasis in the next section is
on technical considerations highlighted in the literature
rather than on the "how-to" techniques more often found in
the literature.

Designing a minimum competency test requires at least
three separate activities: selecting competencies to be
tested, developing the test instrument, and setting the
standard or cutoff score. The first of these, selection
of competencies, has been discussed at some length in a
preceding section. The other two will be discussed briefly
at this time, as will the costs involved.
Development of a Minimum Competency Test -

Hambleton and Eignor (1980, p. 372) give a 12-step model for test development and validation.

1. Preparation and/or Selection of Competencies.
2. Preparation of Test Specifications (for example, Specification of Item Formats, Appropriate Vocabulary, and Number of Test Items/Competency).
3. Writing Test Items "Matched" to Competencies.
4. Editing Test Items.
5. Determining Content Validity of the Test Items:
   a. Involvement of Content Specialists,
   b. Collection of Student Response Data.
6. Additional Editing of Test Items.
7. Test Assembly:
   a. Determination of Test Length,
   b. Test Item Selection,
   c. Preparation of Scoring Keys,
   d. Layout and Test Booklet Preparation.
9. Test Administration.
10. Collection of Reliability, Validity, and Norms Information.
This thorough outline indicates that the development of a minimum competency test is a time-consuming task. It is clearly intended to be an iterative process where the product produced at each stage is examined and reexamined. Many of the issues involved in the development of minimum competency tests are similar to those involved in the development of other types of tests.

The instrument by which competency is to be assessed will, in virtually all cases, be an example of a test of mental measurement and as a consequence most, if not all, of the standard theory of mental measurement will directly apply. (Appelbaum, 1979, p. 188)

The 12-step model above mentions some of the basic components of mental measurement including reliability and validity. The calculation of test reliability is an important factor to educators because consistency of test scores would be extremely important in cases where that single score is used to determine things like promotion, graduation, or tracking into a remedial class. Yet the issues of reliability, as they pertain to minimum competency testing, are "classical" issues which apply to all testing (Appelbaum, 1979, p. 188).

The issues of validity (mentioned in items 5 and 10 of the 12-step model) may present special concerns for minimum competency test developers.

These additional problems arise from the facts that (a) the consequences of a failure to establish a valid test are potentially greater than those resulting from problems of reliability, (b) a competency test is by its very nature a rather wide-band test while most validity theory arises from considerations of narrow-band tests, and (c) a competency test must clearly be a test of achievement and not one of potential ability. (Appelbaum, 1979, p. 188)
One type of validity, mentioned in item 5 of the model, is content validity - whether or not the test items sample the intended mathematical content or behaviors. The whole area of content validity does not seem to generate much concern among some testing experts.

Hambleton and Eignor favor determination of content validity by the judgement of content specialists. Appelbaum says:

If the items are clearly written to the objectives, generally with one objective per item, and if the items are clearly written, one can visually feel comfortable with the content validity of the test. (p. 188)

A related type of validity is construct validity. Like content validity, it is a check to see that what is purported to be measured is, in fact, what is being measured. It is more general than content validity and is defined as "the degree to which an instrument measures the more or less abstractive concept that its designers had in mind...." (Appelbaum, 1979, p. 18)

No discussion of design of a minimum competency test would be complete without reference to the work of Brickell (1977, 1978). He does not approach test design from a technical viewpoint; rather, he identifies seven "themes" necessary in a complete competency policy:

1. What competencies will you require?
2. How will you measure them?
3. When will you measure them?
4. How many minimums will you set?
5. How high will you set the minimums?
6. Will they be for schools or for students?
7. What will you do about the incompetents.

(Brickell, cited in Miller, 1977, p. 47)

Careful analysis of the seven questions should give an indication of the many things that should be considered by those establishing minimum competency programs. The design of the test can be facilitated by work already done by psychometricians. The policy question raised by Brickell require the breaking of new ground.

Methods of Setting Standards

The question of setting a standard, the criterion or cutoff score is debated among testing experts. What follows is an explanation of various methods (drawn principally from Hambleton and Eignor, 1980), followed by a critique of these methods (drawn principally from Glass) and concluding with a summary of the available literature.

There is general agreement among psychometricians that standard setting is arbitrary. What the experts differ on is the definition of arbitrary. Quoting Popham, Hambleton and Eignor, present both definitions:

Unable to avoid reliance on human judgement as the chief ingredient in standard-setting, some individuals have thrown up their hands in dismay and cast aside all efforts to set performance standards as arbitrary, hence unacceptable.

But Webster's Dictionary offers us two definitions of arbitrary. The first of these is positive, describing arbitrary as an adjective reflecting choice or discretion that is 'determinable by a judge or tribunal.' The second definition, perjorative in nature, describes arbitrary as an adjective denoting capriciousness, that is, 'selected at random and without reason.' In my estimate when people start knocking the standard setting
games as arbitrary, they are clearly employing Webster's second, negatively loaded definition.

But the first definition is more accurately reflective of serious standard-setting efforts. They represent genuine attempts to do a good job in deciding what kinds of standards we ought to employ. That they are judgemental is inescapable. But to malign all judgemental operations as capricious is absurd. (p. 379)

Hambleton and Eignor mention four models for setting standards: state, traditional, normative, and continuum. The state models consider mastery to be an all-or-nothing proposition and are typified by a standard of 100 percent for true score that is sometimes reduced after taking measurement errors into account. Some of the better known state models include the mastery-testing evaluation. Glass refers to this model for criterion setting as "counting backwards from 100%" and calls the method a "judgemental process ...subject to whim and idiosyncrasy." Even Hambleton and Eignor agree that "...state models are somewhat less useful than continuum models in elementary and secondary school minimum competency testing programs...." (p. 380).

A second possible model is the traditional method. This is the scale that is apparently used in many classrooms. Ninety to 100 percent is an A, 80 to 89 percent a B and so on. Hambleton and Eignor remark that "It appears that such methods have been used occasionally in setting standards for minimum competency tests" (p. 381). In fact, this appears to be the method used to set the cutoff score for the celebrated Florida Functional Literacy Test. Glass (1978) recounts a conversation with a representation of the Florida Department of Education.
Glass: How did you finally decide what score was passing?

DOE Representative:

Well, we worked with people at Florida State and Iowa City, and we spent a lot of time in workshops with local curriculum people. Of course, it's always going to be subjective; but we had to have political credibility in the state. We finally defined "mastery" as 70% of the items correct. We found that the vast majority of the schools in Florida regard 70% as passing. Of course it's somewhat subjective.
(p. 604)

Hambleton and Eignor finally discuss 19 methods of setting standards that have appeared in measurement literature and may be classified as being built on a continuum model "or in some other, unexpressed model" (p. 382). These 19 methods are classified as either empirical, judgemental, or combination models. The four empirical models are only briefly discussed because of the difficulty in implementing them, since they require a criterion variable upon which success and failure (or probability of success or failure) can be defined. "It would be difficult to gain agreement on external criterion variables which would be appropriate for validating high school certification tests" (p. 384).

The two other empirical models - a decision-theoretical procedure developed by Kriewall (1972) and a somewhat similar procedure developed by Berk (1976) - are also deemed difficult to use with minimum competency tests.
Hodges (1977) provided a general discussion of the difference between norms and standards. There appear to be several methods used that can be classified as normative. A somewhat commonly used method is that of using the scores of some external group to determine the cutoff score for school students. This can be done in several ways. In California, the "early-out" examination "passing" score is the 50th percentile of graduating seniors. Similarly, in Arizona the passing score is a 9.0 grade equivalent on a standardized test. But since grade equivalents are determined by the mean score of all those taking the test, this too is a normative situation. Still another example can be found in one Florida school district which determine the cutoff on the Adult Performance Level (APL) test by first giving it to a group of adults and using their performance levels to set the standard. Glass points to the inconsistency in testing theory of using "norm-referencing" to establish a "criterion" score. Even Hambleton and Eignor express reservations, saying that "such a procedure can be criticized on several grounds" and citing objectives raided by others in the field of testing such as: Standards based on adult performance may not be relevant to high school students...any normatively determined standard will immediately yield many counterexamples...relationships between skills in school subjects and later success in life are not readily determinable.

Another way of using normative data is to use it as a supplement to "expert" judgement. Glass (1977) raised some strong and convincing arguments against the "a priori" statement of performance
standards" (p. 5) even when done by experts. He supports his argument by considering results on the Stanford Reading Test and a New Jersey Department of Education assessment.

The first example illustrates the assessment of the objective: "the pupil will be able to discriminate the grapheme vowel combination 'vowel + r'" spelled 'ir' from other combinations. Two items were used to test the objective.

1) "Mark the word 'firm'" (Read by Proctor)
   - firm - form - farm

2) "Mark the word 'girl'" (Read by Proctor)
   - goal - girl - grill

The first item was answered correctly by only 56 percent of the second grade norm population, while the second item was answered correctly by 88 percent of that same population.

The New Jersey Assessment indicated that seventh graders averaged only 46 percent on horizontal addition, but averaged 40 percentage points higher or 86 percent on vertical addition.

Yet, the methods that Hambleton and Eignor feel hold the most potential for use with minimum competency tests are judgemental procedures in combination with some other procedures. The judgemental methods discussed are: Nedelsky, Modified Angoff, Ebel, and Jaeger. The combination methods are contrasting groups and borderline groups. Glass defines judgemental procedures:

   In this approach experts study a test or an item as an exercise and then declare that a "minimally competent" person should score such-and-so. (p. 20)
Despite technical advances in the areas of setting standards or cutoff scores, the fact is that the literature does not indicate a heavy reliance on these "scientific" methods. The method used in Florida to arrive at the 70 percent criterion has already been discussed. Other examples of rather "unscientific" methods also exist. For example, writing about the "establishment of a cutoff score" for the tests given in the Los Angeles Unified School District, Sallander (1980) reported a study of procedures suggested by Meskaukas with particular attention given to Ebel's method. However, two other considerations seem to have been ultimately more important.

First, since the competency-based tests are primarily instructional devices, the instructional division had to decide at what point students performed at an acceptable level....The instructional staff felt that success with 70 percent of the items on a test was a satisfactory level of competency, based on these instructional criteria. (Sallander, 1980, p. 360)

The second consideration was financial - the number of students the district could afford to remediate. It was decided prior to test administration that the district could provide "diagnostic, prescriptive" instruction for about 25 percent of the tenth graders, as well as the eleventh and twelfth graders who had not yet reached a desirable achievement level. Interestingly, "It just so happened that a raw cutoff score which failed 25 percent of the tenth graders also fell at approximately 70 percent of the items correct" (Sallander, 1980, p. 360).

The realities of setting politically acceptable cutoff scores sometimes circumvent the careful logic and hard work of the
psychometricians.

Not all psychometricians agree that fair and appropriate methods for establishing cutoff scores exist. However, much has been accomplished in this area (Jaeger and Tittle, 1980, p. 366) and those responsible for setting cutoff scores can find technical assistance in the literature. What is perhaps most disturbing is the fact that with some exceptions (New Jersey; Portland, Oregon), the literature does not indicate that the more developed and seriously thought-out methods of standard setting are being used. Rather, it appears that more commonly the scores are established in an arbitrary manner that is unsupported by research.

The New Jersey Department of Education conducted a study to determine the most appropriate method of setting standards or cutoff scores (Koffler, 1979). The study compared the Nedelsky method with the contrasting group method. Among the conclusions reached was that "there should not be a reliance on one standard setting procedure to determine cutoff scores" (Koffler, 1979, p. 25). However, Battiste (1979) found that the majority of competency programs in Illinois use only one standard or level for determining competency.

Cost

An important consideration in the implementation of a minimum competency testing program is determining the cost. Anderson has authored (1977) or coauthored (Anderson and Lesser, 1978) several documents concerned with the costs of minimum competency tests.
He identifies four kinds of costs specifically associated with minimum competency testing: test development, test administration, bureaucratic expenses, and compensatory programs.

**Test Development.** The cost of the first item varies greatly. There would be no cost if a district used an existing test or if teachers volunteered time to construct such a test. However, if districts opt to buy items from a commercial test company or pay teachers to write items and they do a field test and rewrite items, there is a very definite cost. Anderson says the cost per item ranges from $25 to $219, with an average of about $100.

**Test Administration.** The cost of the second item also varies greatly. Anderson found that the cost of administering Denver's proficiency test was about 15¢ for each student at each administration. In a statewide testing situation, the cost would vary according to whether or not an outside contractor is hired. If such a contractor is hired, costs range from $1 to $13 per student. If a state staff does the work, the cost ranges from $.050 to $1.55 per student.

**Bureaucratic Expenses.** Anderson found that the yearly costs of running a statewide program ranged from $65,000 to $945,000.

**Compensatory Programs.** This can, of course, be the largest expenditure of all.

**Impact**

Despite the fact that minimum competency testing has been an accomplished fact for many years in some places (over 15 years
in Denver) there is no empirical evidence that either supports or refutes the use of minimum competency testing. (Frahm and Covington, 1978). This implies that the impact of minimum competency testing is unknown. All the hopes and fears of the opponents and proponents are just that - hopes and fears. Until objective research is conducted, it will be impossible to determine how or even if education is effected by minimum competency testing. The literature gives little more than opinion and conjecture about the impact of minimum competency testing. These opinions and conjectures have been covered extensively in previous sections. Potential impact on several groups of special students has not been discussed in detail. To complete the survey of literature on minimum competency testing, this impact will be discussed.

The issues raised when considering minimum competency testing and handicapped students are complex and cannot be treated in detail in this document. However, a detailed treatment of minimum competency testing must include some discussion of these issues.

While it is known that the Florida minimum competency testing program has provisions for the handicapped, New York is developing guidelines to accommodate the handicapped in their programs and other instances of consideration of the handicapped exist in other states and programs. However,

...a compilation of state and local efforts in test accommodation for handicapped students is not available at this time." (Morrissey, 1980, p. 206)
Because of this void it is difficult to determine trends or even discuss the state of the art of dealing with handicapped students. Much of the literature related to minimum competency testing for handicapped students is concerned with legal aspects of the issue. (McClung and Pullin, 1979; Fenton, 1980; Morrissey, 1980)

Documents dealing with the handicapped and minimum competency testing often allude to Public Law 94-142, the Education of all Handicapped Children Act and Section 504 of the Rehabilitation Act of 1973. The former calls for an Individualized Educational Program (IEP) for each handicapped student. The law explicitly outlines the components of an IEP. It calls for

(a) A statement of the present level of educational performance of each child; (b) A statement of annual goals, including short term instructional objectives; (c) A statement of the specific special education and related services to be provided to the child and the extent to which the child will be able to participate in regular education programs; (d) The projected dates for initiation of services and the anticipated duration of the services; and, (e) Appropriate objective criteria and evaluation procedures and schedules for determining, on at least an annual basis, whether the short-term objectives are being achieved. (45 CRF, 42 Federal Register, 1977, p. 42491, cited in Fenton, 1980, p. 183)

Section 504 of the Rehabilitation Act of 1973 requires that schools not exclude handicapped students from educational programs solely on the basis of handicap.

While these laws are not exactly contradictory, compliance with both can cause some difficulties in the area of minimum competency testing - particularly if the tests are used for promotion or graduation purposes.
Fenton (1980) points out several questions for individuals developing IEPs in schools that use minimum competency tests.

1) Must the IEP goals and objectives reflect those of the regular educational program insofar as possible?

2) Will the schools have to develop a means to demonstrate that the child actually received the instructional program outlined in the IEP with regard to the competencies addressed in the testing program?

3) Will the school need to insure that instructional omission does not occur for mainstreamed children who participate in "pull-out" programs but who intend to participate in the regular competency testing program? (pp. 184-185).

There are other issues besides the legal ones that are relevant when considering minimum competency programs for handicapped. One of the most serious—redefinition of competencies—is discussed by Danielson (1980). He points out that "...a retarded adult's survival in a halfway house may be an appropriate level of functional competence" (p. 201). The point seems to be that what is minimally competent for the "typical" student would be inappropriate for a handicapped student. A case in point would be a requirement in Craig, Alaska that students be able to float for three minutes. This might present an insurmountable obstacle to some orthopedically handicapped students. Likewise, standard reading tests would be impossible for blind students.

So handicapped students present a unique problem for those responsible for minimum competency tests. On the one hand, they are to be placed in "the least restrictive environment" and
treated as much like non-handicapped students as possible.

McClung and Pullin (1979) have even suggested that excluding some handicapped students might invite a lawsuit. On the other hand, it is clearly unreasonable to expect all handicapped students even potentially to pass a minimum competency test designed for the non-handicapped school population. Rosewater (1979) has written an article examining many of the issues involving minimum competency testing and the handicapped student.

Many individuals feel that though it may not be a conscious goal of the proponents of minimum competency testing, a probable result is the resegregation of schools. In writing of the possible effects of minimum competency testing, Kelley (1977) suggests:

School dropouts could increase by half and a portion of those currently finishing high school could have their chances at finding any reasonable job reduced to close to zero. Again the poor, the unorganized, some minorities, are the likely losers. (p. 4)

Haney and Kinyanjui (1979) examine minimum competency testing and equal educational opportunity and conclude that:

If students who do not pass competency tests receive effective instruction to help them master basic skills or competencies, and hence proceed with their education, then the impact may be salutary. However, if that consequence does not follow, then the impact may be entirely detrimental. (p. 14)

Noted black leaders like Shirley Chisholm opposed minimum competency testing and in North Carolina minority leaders suggested a boycott of the statewide competency examination.

Robert Travis, the president of the Tallahassee (Florida) National Association for the Advancement of Colored People (NAACP),
expressed the opinion that the Florida test is racially and culturally biased and said, "We think it is a ruse to keep black kids out of college" (Frahm and Covington, 1979, p. 46). Likewise, Ron Bailey, head of the political science department at Florida A&M University also expressed serious doubts about Florida's test.

The way they are doing it, it becomes a new form of slavery, peonage, or separate but equal.... They put you in educable mentally retarded classes and optional classes and when you get to twelfth grade you flunk the exams....If you can't get to college, you certainly can't get to law school and medical school. (Frahm and Covington, 1979, p. 46)

There are also those who see minimum competency testing as providing real opportunity for minority students (Jordon, 1979). This group feels that because data on the test scores will be made public, schools will be forced to provide suitable instruction to students who have previously been allowed to "fall through the cracks" - often poor or minority students.

Scott (1979) addressed the issue of minority students and minimum competency tests and decided:

The conceptual deficiencies of MCT as well as the potential negative consequences which it may well engender are sufficient reasons for broad opposition within the education profession. MCT should not be allowed to become a black-white issue; destructive testing programs of this sort have adverse impact on all students irrespective of race. (p. 13)
Chapter III
FLORIDA CASE STUDY

Background

Education is more directly political in Florida than in many other states because the Commissioner of Education is elected and the State Board of Education is made up of the Florida Cabinet - six state department heads, all of whom are elected. The present Commissioner of Education was a member of the Florida House of Representatives for many years. Minimum competency testing became an issue in the last gubernatorial election and a position on it was incorporated into the platforms of several of the candidates. These things coupled with the broad support of minimum competency by the public in Florida have contributed significantly to the Florida educational system as it now exists. Education in Florida gives an example of high centralization. There is relatively more state and less local district control of education. Florida ranks seventh among the 50 states in degree of state control (Wirt, 1978).

Legislative and State Department of Education Activity

The Florida legislature has a history of mandating educational practice. Much of this relevant history is documented in several publications by the Florida department of education. These documents, entitled Development of the Florida Statewide Assessment Program: A
Chronology from 1971 and Chronology Addendum: 1976-78, 1978-79, and 1979-80, provide much of the information for the following chronology of assessment in Florida. As indicated in the general literature review, a call for accountability preceded the call for minimum competency testing. Such was certainly the case in Florida. In 1971 the "...State Legislature adopted the Commissioner's Plan for Educational assessment in Florida, enacting the Educational Accountability Act" (Development of the Florida Statewide Assessment Program, 1976, p. 3). The system of accountability called for establishing goals and objectives for education in Florida and a statewide assessment program. The first Florida reading assessment took place in 1971-72, less than a year after the Accountability Act was passed. This initial assessment relied heavily on items developed outside Florida. The second assessment, in the 1972-73 school year, involved more within-state educators; the areas assessed were reading, writing, and mathematics. Test items were reviewed by a commercial testing firm. The 1973-74 assessment, given in grades 3, 6, and 9, also involved reading, writing, and mathematics.

In 1974, the 1971 Accountability Act was amended. The 1971 Act indicated subject areas to be assessed without indicating grades where the assessment was to take place. The 1974 amendment specified that all students in grades 3 and 6 be tested in 1974-75 and all students in grades 3 through 6 be tested by 1976.

The fourth state assessment was developed by the Westinghouse Learning Corporation. This assessment was the first that tested all students instead of just a sample. The 1975-76 assessment was given in the fall instead of the Spring. This made data available for schools
to use in their annual reports. House Bill 1145 stipulated that a summary of school performance be included in Annual Reports.

It was during 1975-76 that a subcommittee to the Florida House of Representatives evaluated progress made by the Florida Department of Education in implementing the 1974 Accountability Act. This evaluation contributed to the passage of the 1976 Accountability Act that established Florida's comprehensive accountability program which includes "management information systems, evaluation procedures, student testing program, basic skills development, pupil progression, district planning, and cost accounting" (Chronology Addendum 1976-78, undated, p. 1).

The assessment program in Florida today is comprised of five separate tests, four statewide basic skills tests administered in grades 3, 5, 8, and 11, and the State Student Assessment Test, Part II (SSAT-II), also given initially in grade 11. It is passage of this test, SSAT-II, as a requirement for high school graduation that is the center of controversy in Florida. However, the other four tests are also forms of minimum competency tests and do not conform exactly to conventional definitions of assessments. First, these four tests are given to all students in the grade instead of to a sample. Second, the content tested is defined to be basic skills instead of a broad sampling of content from a given discipline.

The specific mathematics minimum performance objectives for each grade level are listed below:
Minimum Performance Standards - Grade 3

Mathematics

Count up to 100 objects.
Read and write numbers less than 100.
Indicate which number is larger or smaller.
Identify object's position (1st through 10th).
Add three 1-digit numbers (sum less than 19).
Add two 2-digit numbers (no carrying).
Subtract basic combinations (subtraction facts).
Subtract 1-digit from 2-digit numbers (no borrowing).
Subtract 2-digit numbers without borrowing.
Identify sets of coins equal in value.
Solve word problems involving addition.
Add to solve practical money problems under 50¢.
Subtract to solve practical money problems under 50¢.

Minimum Performance Standards - Grade 5

Mathematics

Count up to 1,000 objects.
Match numbers 100 to 9,999 to their word names.
Round whole numbers less than 100 to the nearest ten.
Put in order 3 numbers less than 1,000.
Match fractions to pictures showing fractional parts.
Add four 3-digit numbers without carrying.
Add four 3-digit numbers with carrying.
Subtract two 4-digit numbers without borrowing.
Subtract two 4-digit numbers with one borrowing.
Multiply a 1-digit and a 3-digit number.
Divide a 3-digit by a 1-digit number with no remainder.
Add two fractions with like denominators.
Subtract two fractions with like denominators.
Identify the date on a calendar.
Tell time on the hour, half-hour, and quarter-hour.
Identify equivalent amounts of money up to $5.00.
Solve word problems by adding 3-digit numbers.
Solve word problems by subtracting 3-digit numbers.
Solve purchase problems involving change from $1.00.
Find information in graphs.

MINIMUM PERFORMANCE STANDARDS - GRADE 8

MATHEMATICS

Read and write common fractions.
Round whole numbers less than 10,000.
Identify equivalent proper fractions.
Identify decimals and percents equal to proper fractions.
Add any three 4-digit numbers.
Subtract any two 5-digit numbers.
Multiply a 2-digit number by a 3-digit number.
Divide a 3-digit number by a multiple of 10 under 100.
Add 2 proper fractions with unlike denominators.
Subtract 2 proper fractions with unlike denominators.
Multiply two proper and/or improper fractions.
Add 3 numbers, each having under 3 decimal places.
Subtract 2 numbers, each having under 3 decimal places.
Multiply 2 decimals, both in tenths or hundredths.
Divide a decimal (10ths or 100ths) by a multiple of 10.
Identify temperature on Fahrenheit and Celsius thermometers.
Solve problems by adding or subtracting whole numbers.
Solve problems by multiplying two whole numbers.
Solve purchase problems involving change from $20.00.
Solve problems involving comparison shopping.
Add or subtract to solve linear measurement problems.
Find information in graphs.

MINIMUM PERFORMANCE STANDARDS - GRADE 11 - BASIC SKILLS

MATHEMATICS

Round numbers with three decimal places.
Round a mixed number to the nearest whole number.
Put three numbers in order through millions.
Identify an improper fraction equal to a mixed number.
Identify decimals and percents equal to common fractions.
Multiply two 3-digit numbers.
Divide a 5-digit number by a 2-digit number.
Add two mixed numbers.
Subtract a whole number and a mixed number.
Subtract two mixed numbers.
Multiply two decimal numbers.
Divide decimal numbers.
Multiply a decimal number by a percent.

These objectives can be found in any of several documents issued by
the Florida Department of Education: Minimum Student Performance
Standards for Florida Schools; A Guide to 1978-79 Statewide Assessment Results; State & District Report of Results 1978-79; Capsule Report 1977-78; A Guide to 1979-80 Statewide Assessment Results; and 1977-78 Technical Report. In addition, the department published several pamphlets designed to provide information to students and Florida citizens in general. These include: Everyone's Concern; Basic Skills Test Results 1978-79; Basic Skill Test Results 1977-78; Results 1976-77; The Test Some Highlights of the 1977-78 Florida Functional Literacy Test Results; State Student Assessment Test Part II; and State Student Assessment Test. Part II Answers to Your Questions....

It should be apparent that the Florida Department of Education works hard at disseminating information regarding student assessment. This is consistent with the high level of state control and with the political nature of education in that state.

The specific use of these four tests to determine grade-to-grade promotion was not mandated by the legislature. However, Pipho (1979) reported that Section 15 of CSSB 107 of 1976 required programs of pupil progression based upon performance by July 1, 1977 (designed to eliminate social promotion). Such programs must be based on local goals and objectives. More emphasis must be placed on performance in basic skills (on statewide tests) before students may progress from grades 3, 5, 8, and 11. Other factors for progression must be set by the school board. (p. 23)

Passage of the basic skills test administered in grade 11 is not a requirement for graduation (State Student Assessment Test - Part I). However, if a student does not pass the test, he or she is placed in a compensatory program until it can be certified by a
teacher that the student possesses the basic skills not passed on the test.

In addition to the legislation that resulted in the development of the tests, the legislature also passed the Compensatory Education Act which funds and sets some requirements for remedial programs. "The State of Florida has enacted a compensatory education program funded at a level of 26.5 million to provide remedial help for students" (1978-79, p. 1). Florida's ninth assessment (1979-80) included special procedures or modifications of the test for exceptional students. These included flexible scheduling, flexible setting, recording of answers, revised format, and audio presentations.

Attitudes of Florida Citizens

This Florida legislative and administrative activity did not take place in a vacuum. An important part of understanding the evolution of the minimum competency testing movement in Florida is to understand the attitudes of the citizens of Florida toward the movement.

All indications are that minimum competency testing enjoys wide popularity and strong support by the public in general and by many special interest groups.

Prior to the formation of the Task Force, individual members had heard rumors that there was widespread opposition to the concept of competency testing and that many citizens felt that the testing programs should be abolished. However, we did not find these rumors to be true. During our public hearings around the state, we heard testimony from interested persons that was overwhelmingly positive. We heard numerous reports of renewed public interest in education and greater attention to school by students. We were left with the distinct feeling that the implementation of the testing program has
provided an impetus for improving public education that is still gaining momentum and that, if taken advantage of in the way suggested here, can lead to unprecedented benefits for the children of Florida. (McCrary et al, 1979, p. 5)

Many of the publications by Florida officials point to the wide acceptance and popularity of their minimum competency testing program. The 1976 Educational Accountability Act was "passed unanimously due to the popularity around the state of its concepts" (Fisher, 1979, p. 1).

The Florida Department of Education developed a document called **Everyone's Interested**. The Department compiled a series of letters which they offer as "an example of the kinds of comments and requests received"; further these letters were considered "the most interesting and representative." Nearly all the letters indicate interest in and praise for the testing program in Florida.

Support for the program is indicated in several other places in the literature.

Many local boards and the Florida School Board's Association also support the functional literacy test. (Deane and Walker, 1978, p. 28)

Florida citizens have been supportive of the program also despite the large failure rates in some areas. One telephone poll taken by a newspaper chain revealed 88% of the respondents supported the use of a high school competency test. Even among minorities, support was expressed by 75% of the respondents. This support has continued even through the second round of testing in October, 1978. (Fisher, 1979, p. 6)

**Studies of the Program**

There have been several previous attempts to study the minimum competency testing program in Florida. The results of these studies provide valuable information for those making decisions about
minimum competency testing. The two most widely known are the study sponsored by the Florida Teaching Profession – National Education Association (FIP-NEA) directed by Ralph Tyler and a study commissioned by the Florida Board of Education directed by McCrary. These studies are of importance and will be discussed in some detail.

Tyler Study

In addition to Ralph Tyler, the FIP-NEA study panel included Stephen Lapan of Northeastern Illinois University; Judith Moore, a teacher from Maitland, Florida; L. Wendell Rivers from St. Louis University; and Donna Skibo, a teacher from St. Petersburg, Florida. The panel felt that the intentions of the program were praiseworthy, but

criticized both the strategy chosen by Florida for achieving accountability and the way it was put into effect. The strategy was faulty, according to the panel because it violated the legislature's own policy of school-based management. Not only that, but officials acted so hurriedly that those who were expected to make the plan work and those affected by it were not seriously involved. (Brandt, 1978, p. 99)

The report was highly critical of Florida's minimum competency testing program and seemed to imply that the education and welfare of Florida students are not advanced by the program.

It appears as if the current class of eleventh graders who are black and poor were sacrificed for the purpose of rapid implementation of the functional literacy segment of the Accountability Act. It is evident that there was little active concern for the appropriateness of the testing program for a large segment of the population (the black and poor). (p. 12)
If each child is to be challenged and encouraged to learn, the standards in a typical classroom will be different for different children. The institution of a single competency measure is appropriate for granting a credential but should not become a central practice of schools and teachers whose function is to increase student learning. (p. 4)

The Florida State Department of Education was straightforward in their rejection of the Tyler study. Thomas Fisher, Director of Assessment, presented their views:

Let me talk a little about the politics from the NEA side. NEA officials claimed that the five members of the panel would be objective and they had no idea what they would recommend. I think in all honesty that is probably true. But in these situations it is not necessary to know in advance what the panel members are going to say. All that is necessary is to select people who are known to have certain backgrounds and experiences, feelings and philosophies. You dramatically increase the probability that you are going to get a report that goes in the direction you wish it to go. I have no complaint about that, but one must take the findings with a grain of salt. (Fisher, cited in Brandt, 1978, p. 99)

Fisher expressed his doubts even more forcefully in another publication.

As with the House-Rivers-Stufflebeam study of the Michigan accountability system (1974), the NEA seems to have initiated the Florida study as a means of blasting achievement tests and accountability systems in general. The Florida report was entirely predictable in its conclusions. (Fisher, 1980, p. 223)

McCrary Study

The second major study of competency testing in Florida was done by a 15-member task force appointed by Commissioner of Education Turlington at the direction of the State Board of Education. The task force was chaired by former state legislator Jesse McCrary. Part I of the task force report was released in February 1979 and is referred to as the McCrary Report. Data for this report was gathered
from three sources: brief studies and surveys, expert testimony, and six public hearings. Oral testimony at the hearings was given by 78 parents, students, educators, school-board members, and other interested individuals. Invited expert testimony included, but was not limited to, that given by: Florida State Department of Education staff; Peter Airasian; Henry Brickell; E. L. Edwards, Jr.; John Fremer; Robert Gagne; Kenneth Henderson; and Shirley Hill.

The task force made a series of recommendations regarding the implementation of the test. The recommendations were grouped under four headings:

1) Eliminating Unfairness and Miscommunication

2) Promoting Early Learning and Testing of Communications and Mathematics Skills

3) Content and Form of the Florida State High School Competency Test

4) Remedial Instruction.

The most widely known was the recommendation to delay implementation of the graduation requirement for one year until 1979-80. The legislature voted against this recommendation. While in general supporting "the concept of the differentiated high school diploma" the task force made several suggestions for changes including:

- changing the name of the test (implemented);
- a change in the method of standard setting (not implemented);
- administration of the test earlier than eleventh grade (not implemented);
- broadening content of test (not yet implemented);
- a test given in eighth grade as a criterion for promotion to ninth grade (not implemented); and format change to
include other than multiple choice items (not implemented).

The McCrary task force carefully (albeit hastily) examined implementation issues surrounding the Functional Literacy Test. While voicing general support, they identified several areas of weakness and recommended various changes - most of which were not implemented.

In two studies commissioned by the Florida Department of Education, investigators found strong support for the statistical validity of the functional literacy test (Hills and King, 1978) and made specific recommendations regarding mathematics test development (Hills and Denmark, 1978).

Legal Activities

Most of the criticism of the Florida minimum competency testing program came from educators. The public reaction was generally favorable. However, there were some citizens who did not like the Functional Literacy Test. This dislike was occasionally manifested in law suits.

To date there have been four major legal challenges. The first was an action brought by the National Association for the Advancement of Colored People in Dade County which questioned the right of the Florida Department of Education to limit public access to the Functional Literacy Test. This case was subsequently dropped.

Both the second and third legal challenges were brought by Florida citizen John Brady. Brady was joined in his second suit by plaintiff Blout. Both suits involved questions about scoring. Both suits were ultimately decided in favor of the state department of
education, although the first suit may have caused the state board of education to adjust the scoring criteria.

The fourth court challenge to Florida's Functional Literacy Test was filed October 16, 1978. The suit, brought on behalf of ten black students who failed the test, was filed by the Bay Area Legal Services and the Center for Law and Education at Harvard University. The case sought to have the test declared unconstitutional on the grounds that it:

1) provided inadequate lead time, 2) covered material never taught, 3) stigmatized students who fail, 4) contained biased questions, 5) had not been checked for validity or reliability, and 6) did not apply to private schools. (Legal Challenges to the Program, undated, p. 1)

This case resulted in a court ordered delay. The Judge ruled that the 1979 implementation date did not provide sufficient lead time "nor time to correct the learning deficiencies of students, many of these deficiencies allegedly resulted from the former dual education system" (p. 2). This required moving the effective date of the graduation requirement to 1983.

Perceived Impact

In addition to empirical studies there have been several attempts to determine the impact of the Florida assessment program by more intuitive methods.

State Department of Education

While conceding that the long-term impact of the competency testing program is "unknown," Fisher (1980) nonetheless listed several outcomes of the program.
...the testing program has had a very direct impact in terms of public discussion of the purpose and goals of education... At the local school level, the impact of the test has been dramatic. Testimony is heard time and again to the effect that the students are working better now than in years previously. Discipline, problems in classroom are reported to be decreasing and students are more willing to sit still and learn. (p. 235)

Fisher goes on to relate that school officials from Hillsborough County report that scores on standardized tests have risen "dramatically" over the last several years. He cites the same kind of results from Dade and Pinellas counties. He then goes on to say:

Of course, there are many reasons why student performance could increase, but it appears that the increased attention to educational accountability given by teachers, administrators, and parents is showing signs of paying off for students.

Most importantly, students who otherwise would have received a high school diploma without having some minimum reading and math skills are now being given some additional instruction... The general feeling is that student's achievement in these areas is going to increase as was intended by the 1976 legislature. (Fisher, 1980, pp.235-36)

Basically Fisher identified four positive features of the impact of minimum competency testing:

1. Increased public discussion of education,
2. Improvement of student attitude and conduct,
3. Increases in scores on standardized tests,
4. Increased achievement of students in reading and mathematical skills.

The first positive impact - increased public discussion - he substantiated. The topic received attention in the media and became a political issue; Florida's program was discussed not only in Florida, but nationally.
The second positive impact - improvement of student attitude and conduct - was not substantiated by Fisher. He only pointed to "testimony" that "is heard time and time again." In fact, a perusal of journal and newspaper articles indicates that Fisher's was held by a substantial number of other individuals. However, it should also be pointed out that several authors (e.g., Blau, 1980) also pointed to the pressure and discouragement felt by students. They questioned whether "threatening" students is an appropriate way to achieve the willingness of students to "sit and learn."

Fisher's third positive impact - improvement of standardized test scores - also raises some questions. While indicating test score increases in three counties, nothing was said about the other 64 counties. Fisher indicated that there are many possible reasons for the score increases, but pointed to "the increased attention to educational accountability." One must consider the question of whether this "increased attention" was most appropriately brought about by a state-mandated test.

The fourth positive impact - increased achievement - should be carefully considered. There is no doubt that scores on the state tests are rising. Setting aside questions of test equivalency, the question still remains concerning whether test scores indicate the kinds of things generally supposed. Does passing a "functional literacy" test guarantee literacy or failing indicate illiteracy?

The positive impacts listed by Fisher hold merit but should be carefully examined.
Press

The press, at least, feels the test has had a positive impact on students.

Despite controversy over Florida's use of a statewide functional literacy test, the test is beginning to bear fruit in the form of more literate students. ("Literacy Test Pays Off", November 26, 1979)

Any remaining doubts about Florida's student assessment program can be put to rest. The students in state public schools are working harder and doing better as a result of the tests. This has been confirmed by improving the scores over the past three years. ("School assessment Test Has Enhanced Learning", September 10, 1979)

Students

The most immediate impact upon the students in Florida would be reflected in the number or percentage of students denied diplomas on the basis of their test scores on the Functional Literacy Test or State Student Assessment Test - Part II. Because of a court ruling in 1979, the implementation of the rule requiring passage of the test to graduate has been postponed until 1983. However, if the court ruling had not been made, about 4200 students, around 5 percent of Florida's senior class, would have been denied a diploma in 1979. Prior to the court ruling, the anticipated withholding of diplomas received wide coverage in the press. State Commissioner of Education Turlington was quoted as saying:

Of the 4200 who will not graduate because they've failed the state-mandated exam, 1500 will be white and 2700 will be black. ("4200 Fall Prey to Literacy Test", 1979)

High school graduation time is drawing near, but some 270 of approximately 6,600 seniors will not be getting diploma this June. ("270 Seniors Won't Get Diplomas", May 22, 1979)
At least 400 Palm Beach County school seniors have failed their last chance before graduation day to pass the state's functional literacy test. ("400 Seniors Fail Literacy Test", May 17, 1979)

More than 300 of Pinellas County's 5,500 seniors will not get a diploma in June because they failed to prove that they are functionally literate. ("300 Seniors Won't Get Diplomas", May 18, 1979)

On graduation day next month, 614 Dade County seniors will be among the first in the state who won't get their diplomas because they failed Florida's functional literacy test. (Aglesby, "Test Costs 398 Blacks Diplomas", May 19, 1979)

Dropouts

The question of whether the minimum competency test has increased the dropout rate in Florida is one that cannot be answered definitely. However, there are those who do feel "the test" will increase the dropout rate. A central Florida superintendent predicted that "the school system will give few certificates of attendance in 1979 because many of the students who fail the test will drop out of school." He added, "Students who drop out of school because of the tests probably would have dropped out anyway, because they are students who are unable or not interested in getting the diplomas." (Van Til, 1978, p. 556)

In 1977 Time magazine reported the results of the first administration of the Functional Literacy Test in an article entitled "Florida Flunks" and suggested that large numbers of Florida students would be going to Georgia where they apparently perceived they would have less difficulty obtaining a high school diploma. Fisher (1978)
flatly denied that a migration of this type occurred. Neither side in the argument presented statistical data.

DeLoach (1979) tried to find answers to the dropout question and reported the results of his search in an article entitled "Is Literacy Test Cause of Small Senior Class?" DeLoach reported

The class of high school juniors who first took Florida's functional literacy test is now the senior class. But the class is not the same.

A lot of its members didn't make it to the end of what would be their senior year. About 27,500 - or 27.500 - or 23 percent of the class - are missing.

(DeLoach, "Is Literacy Test Cause of Smaller Senior Class?, 1979)

It would seem simple enough to compare this 23 percent to previous dropout rates and arrive at some tentative conclusions. DeLoach tried to do this but met with difficulties. Over the last decade dropout rates have averaged 15 percent and his data could not be interpreted as conclusive evidence of an impact of the test.

DeLoach reports that when the first indication of more dropouts became apparent, officials of the state tried to find out why. Their studies indicated that the primary reason was that more students were taking the GED. Also a greater proportion of students failed their grade than had been the case in previous years. The number of students taking the option of the GED test would not completely explain the 5 percent drop occurring between October, 1978 and May, 1979. DeLoach quotes a state official as saying, "...much of the more recent drop can be attributed to students who graduate in the middle of the school year...that probably amounted to thousands of students statewide."
However, DeLoach goes on to point out that there is no data which indicated the numbers of students who graduated at mid-year, for "this year or the past." The article continues,

State Officials acknowledge that many of their statistics are vague and cannot be documented.

But they point to the opinions of high school guidance counselors who were interviewed throughout Florida.

"Counselors are, in fact, telling us that (the testing program) is keeping students in the schools because the remedial programs are on their level level and encouraging them to stay in school," one state official said. (DeLoach, "Is Literacy Test Cause of Smaller Senior Class?, 1979)

Neither this article nor other literature reviewed provided statistics from these interviews. It may well be the case that the safest statement regarding the relationship between dropping out and the Functional Literacy Test was made by Ferris Post, supervisor in Pinellas County: "I don't know whether the functional literacy test had anything to do with it." (DeLoach, "Is Literacy Test Cause of Smaller Senior Class", 1979)

Certainly the question of increasing dropouts is an important one and both state department of education and local school districts should be monitoring the question.

Remedial Education

In a study related specifically to Compensatory Education programs in mathematics, John W. Gregory of Florida State University gathered subjective data through on-site observations and discussions
with teachers and administrators from high schools and middle
schools in one Florida county and from a written survey. Gregory
(undated) identified several positive features of the program:

1) Children who have never succeeded before now have the chance.

2) Some children have shown growth in computational skill. (... some growth has been shown by almost every student.)

3) Class size has been reduced to an average of 15 students.

4) Attitudes of students have improved for some students. (Due to the extra attention and a mature realization of their need for help, most students think that the program is good, and thus, have better attitudes toward mathematics class and school.)

5) Preconceived notions of teachers toward these students have changed. (One teacher put it this way: "They aren't slow learners. They're just 'untapped' learners in need of special attention.")

6) Support for mathematical competence in all students is provided.

7) A need for changing curricular emphasis is being felt by some. (p. 1-3)

Gregory also identified points of weakness in the program under study:

1) A sound sequential curriculum does not exist for the program. Several points of weakness result from the absence of specific content guidelines for each grade level. They include:

A) Teachers have used the State's list of minimum objectives for the 8th or 11th grade test, whichever is of closest proximity to the grade level they teach, as maximums for achievement by the compensatory education students. This has led or will lead to the following:
1) Conceptual Mathematics is not considered viable or necessary content for these classes.

ii) Students will be locked into these classes for the remainder of their secondary education.

iii) The basic strategy for teaching is "show and tell plus drill."

B) Content and materials are the same at each grade level.

C) Criteria for achievement and evaluation of instruction are non-existent.

D) Teachers are more frustrated than they need to be.

2) Many teachers having less than adequate training have been employed to teach these classes.

3) A new Department of Compensatory Education, Math has been formed. (This feature is a weakness of the program due to the manner in which it was created.)

4) Providing inservice education is difficult.

5) Selection procedures and program inflexibility for the student assignment have caused problems. (p. 3-6)

Gregory's comments pertain to the compensatory education program in a single county and the results should not be generalized to the entire state. Yet his observations shed light on some of the outcomes in at least one district and provide useful information to districts wishing to avoid some common pitfalls.

In summary, Gregory's study lends support to the advocates of minimum competency testing who point to its potential to motivate, to identify students who need help and to improve the basic skills of students. However, the study also indicated that there can be real
problems with narrowing the curriculum (the minimum becomes the maximum) and with a narrowing of instructional techniques.

In another study involving Florida's compensatory programs, Dusenberry (1979) determined that twelfth-grade students remediated in both the State Compensatory and Individual Manpower Training System subsequently had higher scores than students enrolled in only the State Compensatory program.

Case Study

The background already given substantiates the view that Florida is an important minimum competency testing state. Indeed, those even slightly aware of the minimum competency testing movement in the United States are aware of the Florida Program. It was one of the first programs to take effect—with the 1979 graduating class. It has been written about more than most of the other programs (Brandt, 1978; Dean and Walker, 1978; Fremer, 1978; Glass, 1978; Pinkney and Fisher, 1978; Fisher, 1979; Van Til, 1979; Fisher, 1980). It was the first program to undergo scrutiny in the courts (resulting in a delay in implementation). Selection of Florida as the site of one of the case studies followed directly from its position as a pioneer in the minimum competency testing movement.

The Florida effort in competency based instructional programs in the basic skills was not the first such program in the U.S. However, it is the first system utilizing a state-controlled test to be implemented. (Fisher, 1979, p.8)
Case Study Components

The Florida case study had three principal components: 1) a literature review, 2) a visit to the state department of education, and 3) a survey.

Literature Review

The literature reviewed included articles in national journals, conference proceedings, state department of education documents of several types, support materials, technical reports of test data, research reports, copies of legislation, and newspapers. This review formed the basis for the discussion in the preceding sections of this chapter. For the convenience of the reader newspaper articles and unauthored state department documents cited in state literature reviews appear in the List of References following the state name.

Visit

The two-day on-site visit was conducted on March 23 and 24, 1980. During this time the investigator talked at length with Dr. Thomas Fisher, Director of Student Assessment, and briefly with several of his staff members. Dr. Fisher and the entire staff contributed immensely to the investigator's understanding of the unique political educational and social conditions that exist in Florida. The investigator examined documents on file in the department that were not available elsewhere. In addition, the investigator was given access to the state department's file of newspaper clippings concerning the state assessment programs.

The Florida Department of Education officials interviewed believe strongly in the minimum competency testing program in Florida, as was indicated in the preceding sections.
Survey

For Florida recipients, the survey specifically referred to the State Student Assessment Test (formerly Functional Literacy Test). Other than this reference, the survey form sent to Florida was identical to the ones sent to samples in the other three states being studied.

The 67 counties in Florida are coincident with the 67 Florida school districts. Census data from 1970 were used to determine the county-to-state population ratio. Then, using an appropriate conversion factor, the number of survey recipients from each county (or group of counties in small population areas) was determined to give the total number of recipients required from each county or group of counties. It was intended that 100 elementary teachers, 100 secondary mathematics teachers, 30 elementary principals, and 70 secondary principals be surveyed. Because of rounding slightly more than these numbers were sampled from each population (see Table 1). The Florida Educational Directory (1979) contains a list of all schools in a county. The schools were numbered and a random number table was used to select the specified number of schools.

The principals on the resulting list each received a survey form addressed to him or her. In the case of the teachers, it was necessary to include a cover letter asking the principal to give the survey form to a secondary mathematics teacher or an elementary teacher. (Copies of representative letters are in Appendix B.) The initial mailing was in February 1980, with a follow-up to
non-respondents in April 1980. It should be noted that only forms actually used in the analysis were counted as "returned." In reality, several more forms were returned but were deemed unusable.

**TABLE 1**

Florida Response Rate on Survey

<table>
<thead>
<tr>
<th>Sampled</th>
<th>Number of Surveys Mailed</th>
<th>Number of Surveys Returned</th>
<th>Percentage of Response</th>
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<td></td>
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</tr>
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<td>Elementary Teachers</td>
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<td>57</td>
<td>55%</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>104</td>
<td>79</td>
<td>76%</td>
</tr>
<tr>
<td>Elementary Principals</td>
<td>33</td>
<td>22</td>
<td>66%</td>
</tr>
<tr>
<td>Secondary Principals</td>
<td>71</td>
<td>46</td>
<td>64%</td>
</tr>
</tbody>
</table>

**Survey Results**

Table 2 indicated a fairly even distribution among respondents in terms of type of school setting. This result was somewhat unexpected because sampling procedures would seem to imply that large population centers would have been more heavily sampled than small towns or rural areas. However, it may be that since counties were the unit this caused the kind of distribution that occurred. That is, while a
particular county might have several large high schools in a major population center, it is also possible that it contains at least equal number of smaller high schools in the less densely populated areas of the county. This fairly even distribution allows consideration of data without having to be unduly concerned that results were skewed by a large number of respondents from a particular type of school setting.

**TABLE 2**

<table>
<thead>
<tr>
<th>Florida Respondent Characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Town or Rural</td>
<td>24.4%</td>
</tr>
<tr>
<td>Suburban</td>
<td>31.9%</td>
</tr>
<tr>
<td>Urban</td>
<td>32.4%</td>
</tr>
<tr>
<td>Other</td>
<td>4.4%</td>
</tr>
<tr>
<td>Missing</td>
<td>2.9%</td>
</tr>
</tbody>
</table>

An attempt was made to determine the kind of expertise and experience respondents had in the development, interpretation, and use of test results (see Table 3). Most teachers and administrators indicated that they had taken a course concerned specifically with tests and measurement. A large majority also indicated that they had received instruction in interpreting and using tests given by the state or district. It is interesting to note that 100 percent of the elementary principals reported having received such instruction. When asked to indicate whether they had been involved in the development of minimum competency tests, positive responses ranged from a high of 15.8 percent for elementary teachers to a low of 6.3 percent for secondary mathematics teachers. As might be expected, more of the principals indicated experience in minimum competency development than did the teachers.
<table>
<thead>
<tr>
<th></th>
<th>I. O.</th>
<th>10.9</th>
<th>23.9</th>
<th>82.6</th>
<th>84.8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.1</td>
<td>18.2</td>
<td>4.5</td>
<td>100.0</td>
<td>81.6</td>
</tr>
<tr>
<td></td>
<td>6.5</td>
<td>49.4</td>
<td>21.5</td>
<td>72.4</td>
<td>78.9</td>
</tr>
<tr>
<td></td>
<td>15.1</td>
<td>31.6</td>
<td>14.0</td>
<td>14.9</td>
<td>80.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Preprimary</th>
<th>Primary</th>
<th>Elementary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have been involved in the development of minimum competency tests at the state or local level.</td>
<td>82.5</td>
<td>90.0</td>
<td>96.0</td>
<td></td>
</tr>
<tr>
<td>I have not received instruction in interpreting and using tests results, but one member of our staff has and this person serves as a resource person for the rest of our staff.</td>
<td>57.1</td>
<td>64.0</td>
<td>70.0</td>
<td></td>
</tr>
<tr>
<td>I have not received instruction in interpreting and using tests given by state or district.</td>
<td>82.5</td>
<td>88.0</td>
<td>94.0</td>
<td></td>
</tr>
<tr>
<td>I have not received instruction in interpreting and using tests but documents are available to assist in test score interpretation and utilization.</td>
<td>57.1</td>
<td>64.0</td>
<td>70.0</td>
<td></td>
</tr>
</tbody>
</table>

Test Expertise of Florida Respondents

TABLE 3
The next item on the survey attempted to determine the personal familiarity of the respondents with minimum competency tests used for different purposes (see Table 4). The survey item may have caused some confusion because the question was asked in terms of "your school or district." It was obvious from the responses that some respondents answered in terms of their own schools, others in terms of the situation in the entire district. This limits somewhat the usefulness of the item, at least in terms of using the results in a chi-square analysis, but even with this limitation the data are still interesting and worth consideration. Only 5.3 percent of the elementary teachers and none of any of the other samples reported that no minimum competency test is given. More of the secondary principals (52.2 percent) reported that passage of a minimum competency test is a requirement for grade-to-grade promotion than did secondary teachers (38.0%). Whether this indicated that principals are more aware of policy within districts is open to conjecture.
<table>
<thead>
<tr>
<th></th>
<th>Princpate</th>
<th>Elementary</th>
<th>Teachers</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>74.7</td>
<td>58.2</td>
<td>38.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>54.5</td>
<td>61.4</td>
<td>66.7</td>
<td>5.3</td>
</tr>
<tr>
<td>Minimum competency testing is done for diagnostic and remedial purposes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passage of a minimum competency test is a requirement for grade-to-grade promotion.</td>
<td>71.7</td>
<td>52.2</td>
<td>71.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Passage of a minimum competency test is a requirement for high school graduation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No minimum competency test is given.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE 4

(1) In percent

In districts of Florida respondents

Minimum competency test usage
The next two items (see Tables 5 and 6) were designed to indicate the types of minimum competency tests that the respondents were familiar with and also to determine the way the standard or cutoff scores were determined. These two items also contained the unfortunate and previously discussed phrase "school or district" and again this limits interpretation of the items.

As evidence of this fact, note that only 91.1 percent and 84.8 percent respectively of secondary teachers and principals indicated that the State Student Assessment Test is given in their school or district. Since the test is given to all eleventh graders, it is given in any school containing an eleventh grade. The inference is that around 15 percent of the responding secondary principals and 9 percent of the responding secondary teachers teach in schools that do not contain an eleventh grade - for example, a junior high school. Yet, the data indicated that both the secondary principal and teacher samples contained more representation from junior high schools than this. Therefore these respondents were answering for the district level - and such is also obviously the case with the elementary principal and elementary teacher respondents.
<table>
<thead>
<tr>
<th>Test Type</th>
<th>Secondary Principals</th>
<th>Elementary Principals</th>
<th>Secondary Teachers</th>
<th>Elementary Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Student Assessment Test (formerly Functional Literacy Test)</td>
<td>84.8</td>
<td>90.9</td>
<td>91.1</td>
<td>77.2</td>
</tr>
<tr>
<td>Other tests developed by the State</td>
<td>34.8</td>
<td>27.3</td>
<td>22.8</td>
<td>38.6</td>
</tr>
<tr>
<td>Tests developed on the local level</td>
<td>56.5</td>
<td>50.0</td>
<td>53.2</td>
<td>59.6</td>
</tr>
<tr>
<td>Test prepared by a commercial test company to be used specifically as a minimum competency test</td>
<td>23.9</td>
<td>13.6</td>
<td>13.9</td>
<td>12.3</td>
</tr>
<tr>
<td>Test prepared by commercial test company that is a general achievement test (for example, the California Achievement Test)</td>
<td>45.7</td>
<td>40.9</td>
<td>40.5</td>
<td>52.6</td>
</tr>
<tr>
<td>Other</td>
<td>2.2</td>
<td>9.1</td>
<td>17.7</td>
<td>5.3</td>
</tr>
</tbody>
</table>
TABLE 6

Florida Educators' Responses Regarding the Establishment of Cutoff Scores (in percent)

<table>
<thead>
<tr>
<th></th>
<th>School Administration</th>
<th>A committee of school teachers and administrators</th>
<th>A committee that included parents or business people as well as professional educators.</th>
<th>The state department or state board of education.</th>
<th>Test Manufacturers.</th>
<th>Other.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>22.8</td>
<td>31.6</td>
<td>8.8</td>
<td>71.9</td>
<td>8.8</td>
<td>14.0</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>16.5</td>
<td>27.8</td>
<td>3.8</td>
<td>69.6</td>
<td>1.3</td>
<td>10.1</td>
</tr>
<tr>
<td>Elementary Principals</td>
<td>4.5</td>
<td>31.8</td>
<td>8.2</td>
<td>59.1</td>
<td>0.0</td>
<td>4.8</td>
</tr>
<tr>
<td>Secondary Principals</td>
<td>13.0</td>
<td>21.7</td>
<td>17.4</td>
<td>63.0</td>
<td>6.5</td>
<td>6.5</td>
</tr>
</tbody>
</table>
Table 7 indicates strong support for minimum competency testing among Florida respondents. Only 1.0 percent of the respondents across samples oppose minimum competency testing - and only 3.5 percent of the total respondents remain undecided about the issue.

Strongest support from all groups came when the test was used for diagnosis, but a majority of all samples, except elementary principals, also favor minimum competency testing as a graduation requirement and as a basis for grade-to-grade promotion. Secondary mathematics teachers are the most supportive with 83.5 percent favoring the testing for graduation and 72.2 percent favoring it for grade-to-grade promotion. Elementary principals were the least supportive of the samples for graduation and promotion, 52.4 percent and 36.1 percent respectively, but they were the most supportive of the samples for diagnosis, 95.2 percent.
TABLE 7

Feelings of Florida Respondents Toward Minimum Competency Testing

<table>
<thead>
<tr>
<th></th>
<th>% favoring for H.S. graduation</th>
<th>% favoring for grade-to-grade promotion</th>
<th>% favoring for diagnosis</th>
<th>% opposed</th>
<th>% undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>69.7</td>
<td>69.6</td>
<td>78.6</td>
<td>1.8</td>
<td>5.4</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>83.5</td>
<td>72.2</td>
<td>83.5</td>
<td>0.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Elementary Principals</td>
<td>52.4</td>
<td>36.1</td>
<td>95.2</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Secondary Principals</td>
<td>76.1</td>
<td>54.3</td>
<td>84.8</td>
<td>2.2</td>
<td>4.3</td>
</tr>
<tr>
<td>Total</td>
<td>74.3</td>
<td>63.9</td>
<td>83.7</td>
<td>1.0</td>
<td>3.5</td>
</tr>
</tbody>
</table>
Respondents also indicated their impressions of the attitudes of other groups. The results are summarized in Table 8. Possibly because of a "mind set" from previous survey questions, some survey respondents used more than one letter to label the identified group. When the data were originally coded onto computer cards, an attempt was made to code these different patterns of response. However, since by far the most commonly occurring double response was a with b, a logical inconsistency, it was ultimately decided to include in the table only the response of those who followed directions and used a single letter. Discussion of multiple responses is included as deemed appropriate for each individual set of data.

The Florida Department of Education is strongly supportive of minimum competency tests for high school graduation, as is the Florida Legislature. Survey respondents are aware of this. The majority of respondents also perceive local school boards as being supportive of these graduation tasks. The literature review indicates that these perceptions are correct. The articles reviewed from the print media would indicate that this group is more positive than the respondents seem to believe. The following comparison is instructive.

Of the elementary teachers surveyed 69.7 percent favor minimum competency testing for high school graduation. Only 53.8 percent of these teachers judge teachers as favoring minimum competency testing for high school graduation. Analogous figures for secondary mathematics teachers are: 83.5 percent and 72.0 percent; for elementary principals: 52.4 percent and 23.8 for secondary principals: 76.1 percent and 69.0 percent. In nearly all cases, groups were more positive than group members perceived them as being.
<table>
<thead>
<tr>
<th>SP</th>
<th>EP</th>
<th>ST</th>
<th>ET.</th>
<th>Parents</th>
<th>Media</th>
<th>Students</th>
<th>Teachers</th>
<th>Administration</th>
<th>Local School Board</th>
<th>State Legislators</th>
<th>State Department of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>60.5</td>
<td>55.0</td>
<td>59.4</td>
<td>38.9</td>
<td>Parents</td>
<td>Media</td>
<td>Students</td>
<td>Teachers</td>
<td>Administration</td>
<td>Local School Board</td>
<td>State Legislators</td>
<td>State Department of Education</td>
</tr>
<tr>
<td>78.6</td>
<td>68.4</td>
<td>61.5</td>
<td>34.7</td>
<td>Parents</td>
<td>Media</td>
<td>Students</td>
<td>Teachers</td>
<td>Administration</td>
<td>Local School Board</td>
<td>State Legislators</td>
<td>State Department of Education</td>
</tr>
<tr>
<td>30.2</td>
<td>14.3</td>
<td>30.6</td>
<td>22.4</td>
<td>Teachers</td>
<td>Administration</td>
<td>Local School Board</td>
<td>State Legislators</td>
<td>State Department of Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>69.0</td>
<td>23.8</td>
<td>72.0</td>
<td>53.8</td>
<td>Teachers</td>
<td>Administration</td>
<td>Local School Board</td>
<td>State Legislators</td>
<td>State Department of Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>69.0</td>
<td>42.9</td>
<td>78.4</td>
<td>66.7</td>
<td>Administration</td>
<td>Local School Board</td>
<td>State Legislators</td>
<td>State Department of Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>93.0</td>
<td>66.7</td>
<td>78.7</td>
<td>72.0</td>
<td>State Legislators</td>
<td>State Department of Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>90.5</td>
<td>90.0</td>
<td>76.0</td>
<td>77.6</td>
<td>State Department of Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>97.6</td>
<td>95.0</td>
<td>85.1</td>
<td>86.3</td>
<td>State Department of Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Supportive of the minimum competency test as a criterion for high school graduation for identification of remedial students, program evaluation, and other purposes.
- Not supportive of minimum competency testing;
- This group neither supports nor opposes minimum competency testing; I don't know what this group's attitude is.
Since one reason often cited in the call for minimum competency testing is declining achievement, an attempt was made to determine whether or not teachers felt student achievement is actually declining. A majority of both elementary and secondary teachers felt that achievement was either the same or higher (see Table 9). The teachers were even more positive about trends in student attitudes (see Table 10).

While Florida Teachers indicated that students did not seem to be any "worse," the majority also indicated that teachers feel pressure and that this pressure is a direct result of minimum competency testing (see Table 11). The pattern of responses indicates that secondary teachers feel less pressure than the elementary teachers. This is somewhat unexpected because Florida's highly publicized minimum competency test is given at the secondary level.
### TABLE 9
Florida Teacher Perceptions of Entering Students' Mathematics Achievement (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Higher</th>
<th>Same</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>28.3</td>
<td>50.9</td>
<td>20.8</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>19.2</td>
<td>46.2</td>
<td>34.6</td>
</tr>
</tbody>
</table>

### TABLE 10
Florida Teacher Perceptions of Entering Students' Mathematics Attitudes (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Higher</th>
<th>Same</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>29.6</td>
<td>57.4</td>
<td>13.0</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>13.3</td>
<td>60.0</td>
<td>26.7</td>
</tr>
<tr>
<td>Statement</td>
<td>Elementary Teachers</td>
<td>Secondary Teachers</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>---------------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>The teachers in my school do not seem to feel the pressures you have described.</td>
<td>19.6</td>
<td>22.8</td>
<td></td>
</tr>
<tr>
<td>The teachers in my school seem to feel a general pressure to go back to the basics.</td>
<td>67.9</td>
<td>60.8</td>
<td></td>
</tr>
<tr>
<td>The teachers in my school seem to feel pressure as a direct result of minimum competency test that is given to our students.</td>
<td>73.2</td>
<td>57.0</td>
<td></td>
</tr>
<tr>
<td>Teachers in my school seem to feel pressure to have their students perform well on standardized tests, but this pressure is not directly a result of minimum competency testing.</td>
<td>37.9</td>
<td>29.1</td>
<td></td>
</tr>
</tbody>
</table>
The literature review revealed that the outcomes of minimum competency testing in Florida are basically the same as those expressed on a national level. Advocates hope students will be motivated, achievement will increase, the curriculum will become less frivolous, and society will reap the benefits of a literate population. The opponents in Florida issue the same warnings as opponents nationally.

When survey respondents were asked to identify the single most valid reason for supporting and the single most valid reason for opposing minimum competency testing, results were mixed (see Table 12). The reason considered most valid by the elementary and secondary teachers and also by the secondary principals was "To make sure students are prepared for jobs or post-high school education."

Thirty-five and six-tenths percent of all respondents indicated this as the most valid reason for minimum competency testing. A plurality of the elementary principals surveyed felt the most valid reason was "To identify remedial students."

The elementary principals were also different than the other groups when identifying the most valid reason for opposing minimum competency testing (see Table 13). Twenty-five percent of the elementary principals indicated "It will narrow the curriculum" and 25 percent indicated "It will be used to judge schools and teachers" as the most valid reason for opposing minimum competency testing. This second reason was considered most valid by 49.1 percent of the elementary teachers, 33.8 percent of the secondary teachers, and 40.9 percent of the secondary principals. Thirty-eight and nine-tenths percent of all survey respondents identified it as the major reason for opposing minimum competency testing.
<table>
<thead>
<tr>
<th>Reason</th>
<th>ET</th>
<th>ST</th>
<th>EP</th>
<th>SP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>To motivate students</td>
<td>0.0</td>
<td>13.9</td>
<td>9.5</td>
<td>6.5</td>
<td>7.9</td>
</tr>
<tr>
<td>To make sure schools do their jobs</td>
<td>10.7</td>
<td>6.3</td>
<td>4.8</td>
<td>13.0</td>
<td>8.9</td>
</tr>
<tr>
<td>To make sure students are prepared for jobs or post-high school education</td>
<td>46.4</td>
<td>40.5</td>
<td>14.3</td>
<td>23.9</td>
<td>35.6</td>
</tr>
<tr>
<td>To guarantee a focus on the basics in schools</td>
<td>14.3</td>
<td>1.3</td>
<td>14.3</td>
<td>8.7</td>
<td>7.9</td>
</tr>
<tr>
<td>To raise standardized test scores</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.2</td>
<td>0.5</td>
</tr>
<tr>
<td>To give meaning to the high school diploma</td>
<td>7.1</td>
<td>17.7</td>
<td>0.0</td>
<td>19.6</td>
<td>13.4</td>
</tr>
<tr>
<td>To identify remedial students</td>
<td>10.7</td>
<td>3.8</td>
<td>33.3</td>
<td>10.9</td>
<td>10.4</td>
</tr>
<tr>
<td>Other</td>
<td>0.0</td>
<td>5.1</td>
<td>14.3</td>
<td>4.3</td>
<td>4.5</td>
</tr>
<tr>
<td>More than one</td>
<td>10.7</td>
<td>11.4</td>
<td>9.5</td>
<td>10.9</td>
<td>10.9</td>
</tr>
<tr>
<td>Reason Given for Opposing MCT</td>
<td>ET</td>
<td>ST</td>
<td>EP</td>
<td>SP</td>
<td>Total</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-------</td>
</tr>
<tr>
<td>It will narrow the curriculum</td>
<td>23.6</td>
<td>17.6</td>
<td>25.0</td>
<td>9.1</td>
<td>18.1</td>
</tr>
<tr>
<td>&quot;Minimum competencies&quot; are not identifiable</td>
<td>9.1</td>
<td>5.4</td>
<td>15.0</td>
<td>4.5</td>
<td>7.3</td>
</tr>
<tr>
<td>Test development techniques are not good enough</td>
<td>7.3</td>
<td>10.8</td>
<td>5.0</td>
<td>6.8</td>
<td>8.3</td>
</tr>
<tr>
<td>The potential for racial or cultural discrimination is great</td>
<td>5.5</td>
<td>9.5</td>
<td>0.0</td>
<td>13.6</td>
<td>8.3</td>
</tr>
<tr>
<td>It will increase the high school dropout rate</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>6.8</td>
<td>1.6</td>
</tr>
<tr>
<td>It will stifle creative teaching</td>
<td>1.8</td>
<td>8.1</td>
<td>10.0</td>
<td>6.8</td>
<td>6.2</td>
</tr>
<tr>
<td>It will be used to judge schools and teachers</td>
<td>49.1</td>
<td>33.8</td>
<td>25.0</td>
<td>40.9</td>
<td>38.9</td>
</tr>
<tr>
<td>Other</td>
<td>1.8</td>
<td>13.5</td>
<td>10.0</td>
<td>2.3</td>
<td>7.3</td>
</tr>
<tr>
<td>More than one</td>
<td>1.8</td>
<td>1.4</td>
<td>10.0</td>
<td>9.1</td>
<td>4.1</td>
</tr>
</tbody>
</table>
It is not possible in a survey to measure directly the impact or results of an occurrence. What is measured is the perceptions of individuals regarding the impact or results of that occurrence. It is not possible to say there are more remedial classes primarily as a result of minimum competency testing using data from this survey. The correct interpretation is that 74.9 percent of those surveyed perceive that there are more remedial classes primarily as a result of minimum competency testing. This is an important distinction. Teacher and administrator perceptions are being reported. Yet the importance of their perceptions should not be minimized. The perceptions of those individuals most responsible for implementing education should tell us much about that education.

There were two questions on the survey concerned directly with the impact of minimum competency testing on mathematics education. The first question (see Table 14), for elementary and secondary teachers, asked them to classify 16 mathematical topics, materials, or instructional practices, which applied to things they taught, as receiving:

a) more class time as a direct result of MCT
b) more class time but not as a direct result of MCT
c) less class time as a direct result of MCT
d) less class time but not as a direct result of MCT
e) same amount of class time

Those topics where a majority of at least one of the teacher samples indicated more class time is being spent as a direct result of minimum competency testing are: basic facts (Elementary, 69.6%
### TABLE 14

Florida Teachers' Perceptions of MCT Impact on Mathematics Topics
(in percent)

<table>
<thead>
<tr>
<th>Topic Description</th>
<th>More Class Time Direct Result of MCT</th>
<th>More Class Time Not a Direct Result of MCT</th>
<th>Less Class Time Direct Result of MCT</th>
<th>Less Class Time Not a Direct Result of MCT</th>
<th>Same Amount of Class Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Basic Facts</td>
<td>69.6</td>
<td>15.1</td>
<td>1.8</td>
<td>0.0</td>
<td>12.5</td>
</tr>
<tr>
<td>2) Story or Word Problems</td>
<td>69.6</td>
<td>17.9</td>
<td>1.5</td>
<td>0.0</td>
<td>10.7</td>
</tr>
<tr>
<td>3) How to use a calculator</td>
<td>8.0</td>
<td>40.0</td>
<td>4.0</td>
<td>12.0</td>
<td>36.0</td>
</tr>
<tr>
<td>4) Problems requiring the use of a calculator</td>
<td>9.1</td>
<td>27.3</td>
<td>4.5</td>
<td>13.6</td>
<td>45.5</td>
</tr>
<tr>
<td>5) Number bases other than 10</td>
<td>11.8</td>
<td>13.7</td>
<td>25.5</td>
<td>27.5</td>
<td>21.6</td>
</tr>
<tr>
<td>6) Sets</td>
<td>11.8</td>
<td>15.0</td>
<td>6.8</td>
<td>0.0</td>
<td>46.6</td>
</tr>
<tr>
<td>7) Computation appropriate to course content (i.e., 77+44 for elementary school)</td>
<td>60.8</td>
<td>15.7</td>
<td>3.9</td>
<td>2.0</td>
<td>17.6</td>
</tr>
<tr>
<td>8) Geometry</td>
<td>20.5</td>
<td>15.9</td>
<td>18.2</td>
<td>11.4</td>
<td>34.1</td>
</tr>
<tr>
<td>9) Enrichment</td>
<td>15.1</td>
<td>23.8</td>
<td>24.5</td>
<td>3.8</td>
<td>28.3</td>
</tr>
<tr>
<td>10) Elementary computer topics</td>
<td>0.0</td>
<td>21.7</td>
<td>21.7</td>
<td>8.7</td>
<td>47.8</td>
</tr>
<tr>
<td>11) Consumer topics</td>
<td>23.7</td>
<td>47.4</td>
<td>7.9</td>
<td>2.6</td>
<td>18.4</td>
</tr>
<tr>
<td>12) Review of material from previous years</td>
<td>60.8</td>
<td>17.6</td>
<td>3.9</td>
<td>3.9</td>
<td>13.7</td>
</tr>
<tr>
<td>13) Practice</td>
<td>56.6</td>
<td>24.5</td>
<td>3.8</td>
<td>0.0</td>
<td>15.1</td>
</tr>
<tr>
<td>14) Individual Projects</td>
<td>8.6</td>
<td>25.4</td>
<td>27.7</td>
<td>6.4</td>
<td>34.0</td>
</tr>
<tr>
<td>15) Diagnosis of individual differences using manipulatives</td>
<td>80.4</td>
<td>9.8</td>
<td>0.0</td>
<td>0.0</td>
<td>9.8</td>
</tr>
<tr>
<td>16) Activity Lessons</td>
<td>36.0</td>
<td>28.0</td>
<td>4.0</td>
<td>0.0</td>
<td>32.0</td>
</tr>
</tbody>
</table>

(top numbers—elementary, bottom numbers—secondary)
Secondary, 78.1%); story or word problems (Elementary, 69.6%; Secondary 70.3%); computation appropriate to course content (Elementary, 60.8%; Secondary, 31.5%); consumer topics (Elementary, 23.7%; Secondary, 59.2%); review of material from previous years (Elementary, 60.8%; Secondary, 63.2%); practice (Elementary, 56.6%; Secondary, 48.6%); diagnosis of individual differences (Elementary, 80.4%; Secondary, 72.1%).

Fewer respondents identified items receiving less class time as a direct result of minimum competency testing. In only one case did a majority of either population sample indicate this category. Fifty-five and four-tenths percent of the secondary teachers indicated that they spend less class time on "number bases other than ten" as a direct result of minimum competency testing.

A further attempt to determine the impact of minimum competency testing was found in the survey item which asked all respondents to judge whether a thing was occurring partially or primarily as a result of minimum competency testing, occurring but not as a result of minimum competency testing, not occurring, or the respondents could not judge. Table 15 indicates that the majority of educators believe the following are occurring partially or primarily as a result of minimum competency testing: more frequent testing, more remedial classes, more drill and memorization, stricter grading, more students failing courses or grades, and more individualized instruction.
<table>
<thead>
<tr>
<th>Activity</th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower enrollments in elective courses</td>
<td>7.3</td>
<td>12.3</td>
<td>0.0</td>
<td>16.7</td>
<td>11.2</td>
</tr>
<tr>
<td>Fewer field trips</td>
<td>7.7</td>
<td>7.7</td>
<td>0.0</td>
<td>2.4</td>
<td>3.7</td>
</tr>
<tr>
<td>More frequent testing</td>
<td>63.0</td>
<td>59.5</td>
<td>33.3</td>
<td>42.4</td>
<td>52.4</td>
</tr>
<tr>
<td>More remedial classes</td>
<td>72.7</td>
<td>69.6</td>
<td>42.1</td>
<td>58.9</td>
<td>54.9</td>
</tr>
<tr>
<td>More homework</td>
<td>26.5</td>
<td>16.2</td>
<td>11.1</td>
<td>9.5</td>
<td>15.9</td>
</tr>
<tr>
<td>Few mini-courses</td>
<td>5.1</td>
<td>4.3</td>
<td>7.1</td>
<td>4.9</td>
<td>4.9</td>
</tr>
<tr>
<td>More drill and memorization</td>
<td>39.2</td>
<td>40.6</td>
<td>10.5</td>
<td>15.7</td>
<td>36.1</td>
</tr>
<tr>
<td>stricter grading</td>
<td>44.0</td>
<td>31.9</td>
<td>10.5</td>
<td>12.0</td>
<td>31.7</td>
</tr>
<tr>
<td>More students failing courses or grades</td>
<td>40.4</td>
<td>30.7</td>
<td>11.1</td>
<td>19.0</td>
<td>30.1</td>
</tr>
<tr>
<td>More individualized instruction</td>
<td>39.6</td>
<td>47.4</td>
<td>21.1</td>
<td>31.6</td>
<td>43.5</td>
</tr>
</tbody>
</table>

**Table 13**

Florida Educators' Perceptions of MCT Impact on Selected Activities (in percent)

- Occurring primarily
- Occurring partially
- Occurring but not MCT
- Not occurring
- I cannot judge
In 1977 the National Council of Supervisors of Mathematics (NCSM) published a Position Paper on Basic Mathematical Skills. The paper calls for an expanded definition of basic skills, reasoning that:

The present technological society requires daily use of such skills as estimating, problem solving, interpreting data, organizing data, measuring, premeasuring, predicting, and applying mathematics to everyday situations. The changing needs of society, the explosion of the amount of quantitative data, and the availability of computers and calculators demand a redefining of the priorities of basic mathematical skills. (p. 1)

The ten areas listed by the NCSM are:

- Problem solving
- Applying mathematics to everyday situations
- Alertness to reasonableness of results
- Estimation and approximation
- Appropriate computational skills
- Geometry
- Measurement
- Reading, interpreting, constructing tables, charts and graphs
- Using mathematics to predict
- Computer literacy.

These ten "basic skill" areas have gained wide acceptance by many mathematics educators. A comparison of these areas with the survey responses and with the areas covered in the Florida test is appropriate. The literature concerning the Florida test states
plainly that the test items are "real world problems." While the test itself is secure and not generally available for inspection, it can probably be assumed that most of the mathematics items are "word or story" problems. Eleven areas are included. The mathematics skills found in State Student Assessment Test, Part II, (undated) are:

Determine the solution to real world problems involving:

1. Comparison shopping
2. Simple interest
3. Discount
4. 1 or 2 whole number operations
5. Decimals and fractions
6. Percents
7. Length, width, height, capacity, and weight using metric or customary units
8. Area of rectangular region using metric or customary units
9. Elapsed time between two events
10. Equivalent amounts of money
11. Line graphs, circle graphs, and tables. (p. 1)

The first three areas are clearly identifiable as "consumer topics." The fourth area is clearly computation of whole numbers. The fifth and sixth areas may or may not be computation of percents and fractions. Areas seven through ten are measurement and eleven corresponds with "Reading, interpreting, construction tables, charts, and graphs" on the NCSM list.

Since these are the topics covered on Florida's test, a comparison of these items with topics judged by Florida educator respondents to be
appropriate for inclusion on a test for high school graduation is instructive. The topics have, when possible, been arranged to correspond to the NCSM basic skills areas.

Florida respondents overwhelmingly supported the inclusion of computation on a mathematics test for high school graduation (see Table 16). Computation of whole numbers ranked number one with all population samples except secondary principals. Elementary principals unanimously supported the inclusion of decimals as well as whole numbers. Computation with fractions was not as strongly supported, especially by the elementary samples.

**TABLE 16**

<table>
<thead>
<tr>
<th>Florida Respondents's Inclusion of Computation Skills (in percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>Computing with whole numbers</td>
</tr>
<tr>
<td>Computing with decimals</td>
</tr>
<tr>
<td>Computing with fractions</td>
</tr>
</tbody>
</table>
While problem solving is defined as something broader than conventional word problems by many mathematics educators, certainly word problems would be included, as would using mathematics to solve consumer problems. Consumer problems and many conventional word problems also provide instances of applying mathematics to everyday situations. Both consumer problems and word problems were strongly supported by Florida respondents for inclusion on a high school graduation test (see Table 17).

**TABLE 17**
Florida Respondents' Inclusion of Problem Solving and Applying Mathematics to Everyday Situations (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using mathematics to solve consumer problems</td>
<td>96.4</td>
<td>94.9</td>
<td>90.0</td>
<td>84.8</td>
<td>92.5</td>
</tr>
<tr>
<td>Solving word problems</td>
<td>96.4</td>
<td>91.1</td>
<td>90.0</td>
<td>80.4</td>
<td>90.0</td>
</tr>
</tbody>
</table>

Although estimation is not specifically on the SSAT, Part II given in Florida, the Florida respondents strongly support estimation and estimation techniques on a high school graduation test (see Table 18). Elementary samples are slightly less supportive of both "Estimating" and "Rounding off numbers" than their secondary counterparts.
TABLE 18
Florida Respondents' Inclusion of Estimation and Approximation (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimating</td>
<td>83.9</td>
<td>86.1</td>
<td>75.0</td>
<td>80.4</td>
<td>83.1</td>
</tr>
<tr>
<td>Rounding off numbers</td>
<td>83.9</td>
<td>92.4</td>
<td>70.0</td>
<td>84.8</td>
<td>86.1</td>
</tr>
</tbody>
</table>

A majority of teacher respondents support inclusion of the basic properties of geometric figures (see Table 19). Although principals seemed less supportive, the differences in support were not statistically significant. The other geometric topics received very little support.

TABLE 19
Florida Respondents' Inclusion of Geometry (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing basic properties of geometric figures</td>
<td>57.1</td>
<td>53.2</td>
<td>35.0</td>
<td>41.3</td>
<td>49.8</td>
</tr>
<tr>
<td>Doing simple geometric proof</td>
<td>23.6</td>
<td>6.3</td>
<td>5.0</td>
<td>15.2</td>
<td>13.0</td>
</tr>
<tr>
<td>Solving problems using right triangle trig.</td>
<td>5.5</td>
<td>5.1</td>
<td>0.0</td>
<td>8.7</td>
<td>5.5</td>
</tr>
</tbody>
</table>
There is strong support for including measuring with the standard system and moderate support for both measuring with the metric system and the calculation of areas and volumes (see Table 20).

**TABLE 20**

*Florida Respondents' Inclusion of Measurement (in percent)*

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring with the metric system</td>
<td>73.2</td>
<td>74.7</td>
<td>70.0</td>
<td>63.0</td>
<td>71.1</td>
</tr>
<tr>
<td>Measuring with the standard system</td>
<td>85.7</td>
<td>91.1</td>
<td>90.0</td>
<td>89.1</td>
<td>89.1</td>
</tr>
<tr>
<td>Calculating areas and volumes</td>
<td>67.3</td>
<td>58.2</td>
<td>60.6</td>
<td>65.2</td>
<td>62.5</td>
</tr>
</tbody>
</table>

Despite all that is known about the emerging importance of computers, Florida educators reject the topic for inclusion on a graduation test (see Table 21). They are slightly more favorable toward using calculators, but a majority of each sample is opposed to their inclusion on a graduation test.
TABLE 21

Florida Respondents' Inclusion of Computer Literacy and Other Technology (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing what computers can and cannot do</td>
<td>25.0</td>
<td>22.8</td>
<td>25.0</td>
<td>17.4</td>
<td>22.4</td>
</tr>
<tr>
<td>Using a calculator</td>
<td>43.6</td>
<td>43.0</td>
<td>30.0</td>
<td>43.5</td>
<td>42.0</td>
</tr>
</tbody>
</table>

There was only minimal support for the inclusion of probability topics (see Table 22). This despite the use of the words "elementary notions" in the survey item.

TABLE 22

Florida Respondents' Inclusion of Probability (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding elementary notions of probability</td>
<td>44.6</td>
<td>26.6</td>
<td>15.0</td>
<td>28.3</td>
<td>30.8</td>
</tr>
</tbody>
</table>

Groups gave moderate support to making and interpreting graphs, but were not supportive of the determination of specific statistical measures (see Table 23). The secondary samples were less supportive of "Determining the mean, median, and mode.." than were the elementary samples.
TABLE 23

Florida Respondents' Inclusion of Statistical Topics (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making &amp; interpreting graphs</td>
<td>76.8</td>
<td>81.0</td>
<td>60.0</td>
<td>71.7</td>
<td>75.6</td>
</tr>
<tr>
<td>Determining the mean, median, &amp; mode of a group of numbers</td>
<td>34.5</td>
<td>17.7</td>
<td>20.0</td>
<td>17.4</td>
<td>22.5</td>
</tr>
</tbody>
</table>

The respondents were strongly supportive of including "Reading a map" on a high school graduation test, but (sensibly) opposed including the square root algorithm (see Table 24).

TABLE 24

Florida Respondents' Inclusion of Miscellaneous Topics (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determining the square root of a number using the square root algorithm</td>
<td>9.4</td>
<td>5.1</td>
<td>5.0</td>
<td>4.3</td>
<td>6.0</td>
</tr>
<tr>
<td>Reading a map</td>
<td>92.7</td>
<td>96.2</td>
<td>90.0</td>
<td>95.7</td>
<td>94.5</td>
</tr>
</tbody>
</table>
Five of the survey items involve Algebra I content. Only one of the five topics in algebra received even minimal support (see Table 25). It is clear that the majority of Florida respondents do not consider standard Algebra I content appropriate material for a graduation requirement. In fact, the content that is supported for high school graduation requirement is clearly elementary mathematics content.

**TABLE 25**

Florida Respondents' Inclusion of Algebraic Topics (in percent)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solving first degree equations</td>
<td>29.1</td>
<td>26.6</td>
<td>5.0</td>
<td>15.2</td>
<td>22.5</td>
</tr>
<tr>
<td>Solving systems of equations with two unknowns</td>
<td>16.4</td>
<td>5.1</td>
<td>10.0</td>
<td>2.2</td>
<td>8.0</td>
</tr>
<tr>
<td>Solving second degree equations</td>
<td>1.8</td>
<td>1.3</td>
<td>0.0</td>
<td>2.2</td>
<td>1.5</td>
</tr>
<tr>
<td>Deriving the quadratic formula</td>
<td>3.6</td>
<td>1.3</td>
<td>0.0</td>
<td>4.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Factoring polynomials in the second degree</td>
<td>1.8</td>
<td>3.8</td>
<td>0.0</td>
<td>0.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Conclusions

Careful consideration of the information that has been presented leads to the impression that minimum competency testing in Florida has changed educational practice in that state. The nature of that change is perhaps not so apparent. During the on-site visit to the Florida Department of Education, there was every indication that the individuals in the assessment section believed in their tests with almost a religious fervor. The collective opinion seemed to be that these tests were the way to restore public confidence in education and to make students learn more and teachers teach better.

The public in the state of Florida is generally very supportive of the tests. Less support was found among some members of minority groups and some teacher organizations. Dr. Fisher expressed the opinion that nearly all of the negative reaction to this came from outside Florida. It is certainly true that much of the negative opinion about the testing program has been expressed by educators - often not from Florida. The survey responses indicate several things about the opinions of public school educators from within Florida. The majority of these educators favor minimum competency testing for high school graduation. A majority of the teachers also report feeling pressure as a direct result of minimum competency testing. A plurality of respondents felt the single most valid reason for supporting minimum competency testing was "to make sure students are prepared for jobs or post-high school education." The single best reason for opposing minimum competency testing was "it will be used to judge schools and teachers." Overall more than twice as many
respondents chose this than the alternative "it will narrow the curriculum." And yet responses on several of the items designed to ascertain the opinion of the educators regarding the impact of minimum competency testing indicate the respondents feel that such a narrowing may be taking place.

In Florida, minimum competency testing is as much a political movement as an educational movement. Educators in Florida feel that, unlike many recent educational movements, it has changed what goes on in the schools and mathematics classrooms of the state.
Chapter IV  
OREGON CASE STUDY  

Background  
The political structure of education in Oregon differs markedly from that in Florida. While the chief state school officer is elected (as in Florida), those individuals who have recently held the position have come from the field of education. The state School Board is appointed by the governor. Historically the legislature has delegated educational responsibilities to the Oregon Department of Education. Despite the fact that Wirt (1978) ranked Oregon as high in level of state control, Department of Education officials feel that there is a strong, permeating tradition of local control of education in that state.

Legislative and State Department of Education Activity  
Although Oregon has a much written about program (e.g., Nance, 1977; Savage, 1978; Taylor, 1978), it is generally considered a pioneer in the area of minimum competency testing. Department of Education officials avow that Oregon is not a "minimum competency testing state." Rather, the state has addressed the issue of minimum competency testing by altering state requirements for high school graduation. Present graduation requirements are based on attendance, Carnegie Units, and local district certification of competency in areas prescribed by the Oregon

Herron (1980) identified five factors that affected the revision of graduation requirements in Oregon:

1) needs assessment
2) Town Hall meetings
3) Oregon Association of Secondary School Principals' Study
4) legislative activity
5) Dale Parnell.

The needs assessment was conducted in 1968-69 because of an amendment to the Elementary and Secondary Education Act (ESEA) of 1965 which made receiving federal funds contingent on a states' assessing its educational needs. The Oregon Department of Education felt, "The needs assessment study was one of the first indicators that a sizable portion of the people in the state of Oregon felt that current student needs were not being met by the schools" (Herron, 1980, p. 263).

The second factor was a series of "Town Hall meetings" held between October 1969 and January 1970. The Department of Education felt the concerns expressed at these meetings were similar to those identified in the needs assessment. In addition, these meetings gave indication of the State Board of Education's intent to "audit educational programs as a means of accountability" and to "review current high school graduation requirements in terms of their effectiveness in meeting individual student needs" (Herron, 1980, p. 263).
Concurrent with these meetings, the Oregon Association of Secondary School Principals was studying high school graduation requirements. This group's report, issued in April 1970, criticized the existing graduation requirements. The series of recommendations made by the group included one that indicated minimum standards for graduation should include a passing score on the GED or equivalent. They also criticized the heavy reliance on the Carnegie Unit of credit as a determiner of graduation.

The fourth factor identified by Herron is legislative activity. In a departure from tradition - the Oregon Legislature has historically delegated authority for education to the State Board of Education - in 1972, two competency-type bills were introduced in the legislature. Both of these were criticized by Oregon educators and eventually died during 1973. Yet they served as a catalyst to the development of new graduation requirements by the State Department of Education.

The fifth factor listed was Dale Parnell, then Superintendent of Public Instruction in Oregon. Parnell is seen as a driving force behind the competency movement in Oregon (Herron, 1980; Oliver, 1976). He was a strong advocate of career education and this often manifested itself in an emphasis on relevance to real life, measurement skills, and accountability. Parnell campaigned in 1968 on competency issues and was later to reflect that:

During the campaign, I outlined competency-based proposals, including a revision of the high school graduation requirements and career education emphasis in the schools. It was no secret that my election would mean that Oregon schools would move in the direction of competency-based education. My election, therefore, was
interpreted to mean that Oregonians expected a modernization of the high school requirements and movement toward a performance-oriented curriculum. (Parnell, 1978, p. 32)

The conditions existing in Oregon in the late 1960s and early 1970s do not seem much different than those found in other states. The public was indicating a desire for accountability from schools and this was beginning to be manifested in legislative activity. The State Department and State Board of Education became aware of the climate, desired to be responsive to the wishes of the public and desired not to lose designated authority from the legislature. These things coupled with the leadership of Dale Parnell made Oregon's venture into minimal competency testing just another step in a logical progression. Thus in 1974, the Oregon State Board of Education adopted the Elementary-Secondary Guide for Oregon Schools. Revised minimum standards, having the effect of law, are found in the guide. The guide established a "goal-based" educational program as opposed to a competency-based educational program. Thus while much of the nation considers Oregon to be the pioneer in minimum competency testing, state officials are careful to point out that Oregon does not have state mandated minimum competency testing. Rather, competency verification is called for.

The 1974 minimum standards contain both a four-step instructional planning standard (OAR-581-22-208) and a definition of graduation requirements in Oregon (OAR-581-22-231). The instructional planning standard calls for:

1) A locally adopted system of local district goals supporting six state-established goals
Conceived and endorsed by Oregon Citizens the statewide goals are designed to assure that every student in the elementary and secondary schools shall have the opportunity to function effectively in six life roles: INDIVIDUAL, LEARNER, PRODUCER, CITIZEN, CONSUMER, and FAMILY MEMBER. Each goal suggests the knowledge skills, and attitudes needed to function in these life roles. (p. 6)

Goals, to be written in terms of student outcomes, must be for each component of the program, such as art, social studies, and mathematics and are to be at two levels of specificity-program goals and course goals.

2) Periodic assessment to determine the degree to which students are attaining specified goals.

3) A comparison of assessed status and stated goals.

4) Program improvement based upon findings from previous steps.

The instructional planning standard reflects components of competency-based education, but it is the graduation requirements in Oregon that are usually considered to contain the minimum competency testing component. Yet, "testing" is not spelled out in the requirements. Rather, diplomas are to be granted on the basis of "credit, competency, and attendance requirements set by the state and local districts." While most districts are using tests to verify competency, it is sometimes done with required course work. There is apparently much less concern with a "THE TEST" phenomenon than in Florida.

The 1974 graduation requirements were a result of an iterative process begun several years earlier. In the fall of 1971, the State Department of Education presented the State Board of
Education with a draft of proposed changes in the graduation requirements. In late 1971 the Board asked that the draft be given wide circulation in Oregon and this was done. In early 1972 two more drafts were completed. Public hearings on the third draft were held in the summer of 1972. The fourth draft was approved by the State Board of Education in September 1972 to go into effect no later than the 1978 graduating class.

State Department officials report that the graduation requirements changed substantially between the first and fourth drafts. The first draft listed 44 competencies in a very specific manner. For example, the student was to be able to:

- Accurately compute the difference in cost per unit between small and large quantity purchases,
- Accurately balance a checkbook,
- Change an automobile wheel.

The final draft contained much more general guidelines. Implementation of the graduation requirements included establishment of six pilot writing projects in local districts. These districts were funded beginning in November 1972 to develop sample minimum competency statements and performance indicators for the areas of personal development, social responsibility, and career development. The work was synthesized in May 1973 and eventually released to school districts in the form of four booklets. Some of the booklets were intended to provide sample program goals, minimum competencies, and performance indicators.

The Oregon Department of Education felt that the materials produced by the pilot projects did not adequately represent the
intention of Parnell or others who understood competencies to be skills necessary for "survival" in a complex society. Competencies were described as being equivalent to "course goals" written at a minimum performance level. They were defined as "possession of skills, knowledge and understandings to the degree they can be demonstrated" (Herron, 1980, p. 270).

While the implications in this shift were apparent to the staff of the Oregon Department of Education, the decision was made to go ahead with the implementation of the new graduation requirements with the hope that an emphasis on life roles could be added later. These not entirely satisfactory samples were distributed throughout the state. Although it was clearly stated that they were to serve as samples and to suggest guidelines to local districts, it often happened that districts simply copied the samples in total and intact. Egge (1979) calls the years 1969-1974 "The Mission Phase" of the Oregon experience. It was the time when the State Department of Education, State Board of Education, and Oregon legislators became aware of public dissatisfaction with education. Egge says that it "was a period of setting goals, identifying needs and setting priorities" (Egge, 1979, p. 5). It was apparent that Oregonians wanted a change in their educational system. They wanted more "relevance" in the curriculum. This was addressed through new minimum state standards calling for "goal-based" education and through new graduation requirements including the traditional unit and attendance requirements and a competency requirement.
Despite the fairly recent adoption of standards, the State Board of Education has continued studies of needed changes. The most recent action taken in Oregon was the adoption, in February 1980, of the revised standards for schools by the State Board of Education. The new competence requirements for graduation call for each student to demonstrate competence in six areas, one of which is mathematics. They further stipulated:

(b) Student competence:

(A) Shall be verified by measurement of student knowledge and skills or measurement of student ability to apply that knowledge and skill;

(B) May be verified through alternative means to meet individualized needs; however, the school district's standard of performance must not be reduced; and,

(C) When verified in courses, shall be described in planned course statements; challenge tests and/or other appropriate procedures for verification of competencies assigned to courses must be available.

(c) In developing curriculum and criteria for verification school districts should be guided by levels of performance required in life roles.

(d) Competence in reading, writing, mathematics, speaking, listening and reasoning shall be recorded on students' high school transcripts. Competence, when verified prior to grade 9, shall be recorded on high school transcripts. (Oregon Revised Standards, 1980, p. 7)

Note that competencies can be verified by a test of skills or a test of application of skills; they can be verified as a routine part of course work, and they can be verified prior to ninth grade.
The competency verification requirement in Oregon became effective with the graduating class of 1978. In early 1980 Oregon Department officials knew of no law suits involving that state's competency requirement. This was attributed to the fact that competencies are locally determined and generally have community support. It may be that local control is both a major strength and a major weakness in Oregon's program. Local control provided for community input into the specific competencies to be verified. It allowed districts to be responsive to the specific needs of the local communities. Since there is much local involvement, there is also likely to be local commitment to the competencies. On the other hand, when each district determines competencies independently of one another there is likely to be wide disparity among district competencies. This is indeed the case in Oregon. The original lists of competencies to be verified for graduation varied in length from nine in one district to 312 in another district. Essentially this implies that the meaning of a high school diploma varies from one district to another. However, this is probably no more true than it was before the competency verification requirement was established.

**Attitudes of Oregon Citizens**

While apparently causing less furor than the minimum competency test in Florida, the graduation requirement in Oregon was not without detractors. In November 1977, the Joint Interim Task Force on Minimum Competencies/Graduation Requirements of the Oregon Legislature, chaired by State
Senator Clifford Trow, released twelve recommendations. This task force voiced "serious reservations about the utilization of minimum competencies as graduation requirements." They suggested detailed study of the graduating class of 1978 and a delay in the scheduled implementation of the additional competencies to take effect in 1981. The Oregon Education Association also sponsored a teacher task force which conducted an independent investigation of the competency program. This investigation resulted in recommendations for "a simple scaled-down plan that could be administered easily statewide". (Durbin, "OEA Competency Goals", 1979) The OEA plan called for competencies in reading, writing, and computation to be met by the end of eighth grade. The plan called for evaluation in basic skills areas that will be measured objectively. It would also move the emphasis away from graduation to a level the OEA feels is more appropriate for the kinds of skills being tested. Even the present State Superintendent of Public Instruction, Verne Duncan, is calling for some changes in the graduation requirements, both in competency requirements and required courses.

Oregon officials have been and continue to be candid about the problems with the competency graduation requirement. Not only have they pointed out that original sample guidelines missed the mark in conveying the "survival skills" idea, but they often point to the pioneering nature of the project when identifying some of the problems:
Massive and complex record keeping systems and significant commitments of time from the classroom teachers (Herron, 1980, p. 272).

Excessive variation of local responses inhibit communication and transfers among systems.

Excessive emphasis is placed on minimums.

Competency definition is unclear and leads to wide disparity among districts as to content and numbers of competencies.

Local options on policies for certification, waivers, etc. lead to charges of unfair practice among numbers of competencies.

Implementation is fragmented.

(Joint Boards Task Force, 1978, p. 11)

An impact study conducted by the Center for Educational Policy and Management of the College of Education at the University of Oregon indicated that:

Although public school educators are experiencing some difficulties in implementing the new graduation requirements and the instructional planning requirements, they seem to feel that, on balance, the overall impact has been modestly positive. (Rands and Walker, 1979, p. 9)

The investigators further concluded from the results of their survey that:

the establishment of minimum competency requirements for graduation has not had the effect of increasing the number of students who fail to graduate....The new graduation requirements have not resulted in changes in school district staffing patterns....Most of the districts indicated that there were only minor changes in their curricular programs due to the new graduation requirements....The actual outlay of funds due to the implementation of the requirement has been negligible. (Rands and Walker, 1979, pp. 6-8)
These results may be somewhat over-simplified as stated. For example, while reporting no change in staffing patterns, it is also reported, "In effect, the impact has been to give additional duties and responsibilities to existing staff in order to plan and implement the requirements" (Rands and Walker, 1979, p. 7). While it was reported that actual outlay of additional funds was "negligible," it was also the case that:

The superintendents indicated that an average of seventy-three days of faculty time was devoted to the preparation of the planned course statements above. Another 55 days were required on the average to complete the district statements.

The implications are important. If externally imposed requirements take a lot of additional time and effort to implement, either additional resources will have to be made available for implementation or some existing activities will have to be sacrificed. In the case of the minimum standards, requirements dealt with in this study, district responses appear to have been to neglect or abandon some of their on-going instructional activities in order to be able to implement the new requirements. (Rands and Walker, 1979, p. 9)

Press

Newspaper media treatment of minimum competency testing in Oregon seems generally favorable, although perhaps somewhat more neutral than that in Florida. Editorials indicate approval.

Oregon's program of requiring high school students to demonstrate certain "competencies" should not be delayed or scrapped. ("Keep the Competency Tests", 1977).

Used constructively, the competency requirements can help more students reach their goals...The competency tests should not be an end in themselves, but should provide a point of view that will be beneficial to the students and those whose
responsibility it is to organize their education. ("Competency Tests Should Come Early", 1978).

Newspaper coverage in Oregon of the issues surrounding minimum competency indicated some controversy regarding these issues but general approval and acceptance for competency issues.

'Bob Cornell, a representative of the Eugene Education Association, presented a survey of 106 high school teachers which, he said, indicates teacher dissatisfaction with the current graduation and competency requirements. On the other hand, the idea of requiring students to demonstrate their competency was lauded by others who spoke. (Boyd, "Graduation Standards Hearing Topic", 1978).

'...a member of the audience said establishment of competencies could result in "a bookkeeping nightmare." (Eardley, "Competency Requirement Called Bookkeeping Nightmare", 1979)

'Requiring too many competencies for graduation can place too much stress on high school students. ...the existing program is fraught with problems... he personally would prefer to drop all competency requirements other than those for reading, writing, and computing.' (Hallmark, "Ashpole Raps Oregon's system of competencies", 1978)

'It is no longer a big issue mainly because students, teachers and administrators and the rest of us have noticed that those competency requirements really are no big problem. Last spring mid-valley school officials told the Democrat-Harold that virtually all their graduating seniors had acquired the competencies expected of them, and nobody was kept from graduating with a diploma only because of failure to meet competencies. ("Whatever Happened on 'Competencies?'", 1979)

The media also gave an indication of another type of impact of the competency requirement.
As many as 65 of the red-and-blue-robed high school seniors here may leave their graduation ceremonies because they haven't passed state competency requirements... Last year, only one senior at each high school reached graduation with enough credits to graduate but without the required competencies. That number is fairly typical of schools in the state, according to Paul Egge, assistant superintendent for the state. (Jobs, "65 Corvallis Seniors Lack Competencies," 1979)

Case Study

The background already given substantiates the view that Oregon, like Florida, has played a major role in the minimum competency movement. It was a pioneer in the movement in the sense that the competency verification requirement became effective with the 1978 graduating class.

Case Study Components

The Oregon case study had three principal components: 1) literature review, 2) State Department of Education visit, and 3) a survey.

Literature Review

Literature reviewed included publications in national journals, State Department of Education documents of several types, support materials, research reports, and newspaper articles.

Visit

The two-day on-site visit was conducted on April 14 and 15, 1980. During this time the investigator talked at length with several Oregon Department of Education officials, including Assistant Superintendent Donald Egge, Director of Program
Coordination Marshall Herron, and Coordinator in Planning and Evaluation Robert Clemmer. The personnel at the Department of Education contributed immensely to the investigator's understanding of the unique political, educational and social conditions that exist in Oregon. The investigator examined documents on file in the Department of Education that were not available elsewhere. In addition the investigator was given access to the State Department's file of newspaper clippings and viewed a film describing the state's graduation requirements.

The Oregon Department of Education officials interviewed seemed supportive of the competency verification program. They discussed limitations of the program candidly and expressed optimism about the eventual effect of the program on education in Oregon.

Survey

Selection of the survey sample in Oregon differed significantly from procedures used in other states - with somewhat unfortunate results. In telephone communication it was determined that the Oregon Department of Education could provide computer-generated random samples of the desired populations on address labels for a nominal fee. So labels were ordered for 100 elementary teachers, 100 secondary mathematics teachers, 30 elementary principals, and 70 secondary principals. When the labels arrived, the number far exceeded the number ordered. So, for each population sample the labels were numbered and a random number table was used to select the correct sized sample.
When the surveys began to be returned, it became apparent there was another problem with the elementary teacher sample. The vast majority of respondents were seventh- or eighth-grade teachers. During the on-site visit, it was possible to check with the Computer Services Division to determine what caused this anomaly. It was determined that the actual sample selected had been "elementary mathematics teachers." Apparently the few respondents who were not seventh- or eighth-grade teachers were mathematics specialists. When this discovery was made, it was decided that obtaining another sample was imperative. The Oregon Department of Education Computer Services Division generated another sample of "elementary teachers."

It was decided to report the Oregon data in terms of the results of five population samples rather than the four used in other states. In the other states, seventh- and eighth-grades were most often considered secondary - but since these teachers were identified as elementary in Oregon it was felt that these respondents were part of an elementary school organization. As a result of the delay and the additional expense, no follow-up mailing was done for either the elementary or the elementary mathematics sample. These were the only samples of the 17 drawn which did not receive a follow-up mailing - with the rather predictable result that the poorest return rate was found with these two samples.

**Survey Results**

The return rates are indicated in Table 26. Sample characteristics are given in Table 27. The majority of the respondents from Oregon classified themselves as being from a small town or rural area.
### TABLE 26

Oregon Response Rate on Survey

<table>
<thead>
<tr>
<th>Population</th>
<th>Number of Surveys Mailed</th>
<th>Number of Surveys Returned</th>
<th>Percentage of Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Elementary Teachers</td>
<td>100</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>*Elementary Math Teachers</td>
<td>100</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>100</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>Elementary Principals</td>
<td>36</td>
<td>17</td>
<td>51</td>
</tr>
<tr>
<td>Secondary Principals</td>
<td>67</td>
<td>56</td>
<td>83</td>
</tr>
</tbody>
</table>

*No Follow-Up Mailing

### Table 27

Oregon Respondent Characteristics

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Town or Rural</td>
<td>63.3%</td>
</tr>
<tr>
<td>Suburban</td>
<td>23.3%</td>
</tr>
<tr>
<td>Urban</td>
<td>11.2%</td>
</tr>
<tr>
<td>Other</td>
<td>1.4%</td>
</tr>
<tr>
<td>Missing</td>
<td>0.9%</td>
</tr>
</tbody>
</table>
Given the population distribution in Oregon, this result was not surprising.

An attempt was made to determine the kind of expertise and experience respondents had in test development, interpretation, and use of test results (see Table 28). The majority of all samples except the elementary teachers indicated they had a course specifically concerned with tests and measurements. The most surprising information yielded by this item was the relatively low number of respondents indicating they had personal experience in the development of minimum competency tests. And more involvement is indicated by elementary personnel than by their secondary counterparts—surprisingly because of Oregon's graduation requirement.

The next item on the survey attempted to determine the personal familiarity of the respondents with minimum competency tests used for different purposes (see Table 29). As was previously noted when discussing survey results from Florida, this item may have caused some confusion because the question was asked in terms of "your school or district." It was obvious some respondents answered in terms of their own school, others in terms of the situation in the entire district. This somewhat limits the usefulness of the item at least in terms of using the results in a chi-square analysis, but with this limitation the data are still interesting and worth consideration.

As was expected in Oregon, the majority of respondents in each sample reported that passage of a minimum competency test is a requirement for high school graduation. There may be several reasons why some respondents did not indicate this was the case. It is
<table>
<thead>
<tr>
<th></th>
<th>Primary</th>
<th>Secondary</th>
<th>Elementary</th>
<th>Elementary</th>
<th>Elementary</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.4</td>
<td>52.9</td>
<td>69.6</td>
<td>83.9</td>
<td>69.9</td>
<td>82.4</td>
</tr>
<tr>
<td>17.6</td>
<td>62.1</td>
<td>30.3</td>
<td>74.7</td>
<td>53.3</td>
<td>64.4</td>
</tr>
<tr>
<td>7.6</td>
<td>65.6</td>
<td>33.3</td>
<td>40.9</td>
<td>32.3</td>
<td>35.1</td>
</tr>
<tr>
<td>13.3</td>
<td>32.3</td>
<td>32.3</td>
<td>31.1</td>
<td>31.3</td>
<td>41.9</td>
</tr>
</tbody>
</table>

I have taken a course concerned* specifically with tests and measurements.

I have received instruction in interpreting and using tests given by state or district.

I have received instruction in interpreting and using tests given but documents are available to assist in test score interpretation.

I have not received instruction in interpreting and using test results, but one member of our staff has and this person serves as a resource for the rest of our staff.

I have been involved in the development of minimum competency tests at the state or local level.

*In percent

Table 28
<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Mathematics</th>
<th>English</th>
<th>Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>85.0</td>
<td>71.4</td>
<td>87.3</td>
</tr>
<tr>
<td>Secondary</td>
<td>92.2</td>
<td>86.4</td>
<td>90.6</td>
</tr>
<tr>
<td>High School</td>
<td>98.1</td>
<td>94.1</td>
<td>97.4</td>
</tr>
</tbody>
</table>

Passage of a minimum competency test is a requirement for high school graduation.

No minimum competency test is given.

Minimum competency testing is done for diagnostic and remedial purposes.

*In percent (in districts of respondents)*
possible that elementary personnel were answering in terms of their school instead of their districts. There may be another reason for secondary respondents. Despite all the publicity Oregon has received as a pioneer in minimum competency testing, State Department of Education officials clearly indicated during the visitation that Oregon is not a minimum competency testing state - rather, it has competency-based graduation requirements. That is, a district may have competencies that are verified as routine part of coursework.

Of those respondents reporting the use of a minimum competency test, the majority of all samples reported the test was developed on the local level (see Table 30). Table 31 indicates that the most frequent method of setting a cutoff score was by a committee of teachers and administrators. Whether these committees used some of the psychometric measures described in Chapter III was not determined.
<table>
<thead>
<tr>
<th>Percent</th>
<th>Prinicipal's</th>
<th>Prinicipal's</th>
<th>Elementary</th>
<th>Elementary</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1</td>
<td>5.0</td>
<td>87.5</td>
<td>0.0</td>
<td>3.0</td>
</tr>
<tr>
<td>0.0</td>
<td>23.5</td>
<td>94.1</td>
<td>5.9</td>
<td>87.9</td>
</tr>
<tr>
<td>9.1</td>
<td>3.0</td>
<td>87.9</td>
<td>0.0</td>
<td>3.0</td>
</tr>
<tr>
<td>6.7</td>
<td>8.9</td>
<td>82.2</td>
<td>6.7</td>
<td>56.7</td>
</tr>
<tr>
<td>6.7</td>
<td>13.3</td>
<td>6.7</td>
<td>6.7</td>
<td>16.7</td>
</tr>
</tbody>
</table>

*Tests prepared by a commercial test company that is a general achievement test (for example, the California Achievement Test).

*Tests prepared by a commercial test company to be used specifically as a minimum competency test.

*Tests developed on the local level.

*Tests developed by the State.

**TABLE 30**

178
<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secondary</td>
<td>7.3</td>
<td>7.8</td>
<td>11.8</td>
<td>9.5</td>
<td>5.4</td>
</tr>
<tr>
<td>Prekindergarten</td>
<td>3.3</td>
<td>6.3</td>
<td>6.3</td>
<td>37.3</td>
<td>37.3</td>
</tr>
<tr>
<td>Elementary</td>
<td>31.2</td>
<td>60.0</td>
<td>2.2</td>
<td>3.9</td>
<td>15.0</td>
</tr>
<tr>
<td>Elementary</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Other</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

A committee that included parents or business people as well as professional educators.

The state department of education.

A committee of school teachers and administrators.

The Benton County Court.

Oregon Educators, Response to Revisions.

TABLE 31
An important part of understanding the evolution of minimum competency testing in Oregon is to understand the attitudes of citizens and special interest groups in Oregon. Clearly another important group in this consideration would be educators. Survey results showed that the majority of all samples favored passing a test as a criterion for high school graduation - and only a small number of respondents were opposed to minimum competency testing for any reason (see Table 32).

### TABLE 32

Feelings of Oregon Respondents Toward Minimum Competency Testing

<table>
<thead>
<tr>
<th></th>
<th>% favoring for H.S.</th>
<th>% favoring for grade-to-grade promotion*</th>
<th>% favoring for diagnosis</th>
<th>opposed</th>
<th>undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>67.7</td>
<td>29.0</td>
<td>67.7</td>
<td>9.7</td>
<td>12.9</td>
</tr>
<tr>
<td>Elementary Mathematics Teachers</td>
<td>75.6</td>
<td>64.4</td>
<td>82.2</td>
<td>0.0</td>
<td>6.7</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>63.6</td>
<td>34.8</td>
<td>57.6</td>
<td>6.1</td>
<td>10.6</td>
</tr>
<tr>
<td>Elementary Principals</td>
<td>87.5</td>
<td>18.8</td>
<td>75.0</td>
<td>0.0</td>
<td>12.5</td>
</tr>
<tr>
<td>Secondary Principals</td>
<td>62.5</td>
<td>23.2</td>
<td>62.5</td>
<td>5.4</td>
<td>8.9</td>
</tr>
</tbody>
</table>

*p < .01
In only one instance—the percentage favoring minimum competency testing for grade-to-grade promotion—was there a statistical difference in the response pattern by sample.

One survey item attempted to determine the educators' perceptions of the attitudes of other groups (see Table 33). The data indicate that the educators perceived most groups as being fairly positive about minimum competency testing. In no population did the majority perceive any of the groups as not supporting minimum competency testing. There was a wide range in responses indicating which groups were perceived as supporting minimum competency testing for graduation. Over 70 percent of all groups except elementary principals thought the Oregon Department of Education supported testing for graduation. As might be expected, few of the groups thought students supported minimum competency tests for graduation. The educators seemed to perceive some groups as being less positive than they actually were. Sixty-two and seven-tenths percent of elementary teachers favored minimum competency testing for graduation, but only 37.9 percent thought teachers supported minimum competency testing as a criterion for high school graduation. Corresponding figures for the other respondents were: elementary mathematics teachers—75.6 percent supportive, 48.8 percent thought teachers supportive; secondary teachers—63.3 percent supportive, 47.5 percent thought teachers supportive; elementary principals—87.5 percent supportive, 46.7 thought administrators supportive; and secondary principals—62.5 percent supportive, 55.4 percent thought administrators supportive. Data suggest that these groups are more positive toward minimum competency testing than they perceive each other to be.
<table>
<thead>
<tr>
<th>Perception of Attitudes</th>
<th>Secondary Principals</th>
<th>Elementary Principals</th>
<th>Secondary Teachers</th>
<th>El Ch Meta Math Teachers</th>
<th>Elementary Teachers</th>
<th>Parents</th>
<th>Media</th>
<th>State Legislators</th>
<th>State Department of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63.6</td>
<td>57.1</td>
<td>37.7</td>
<td>55.8</td>
<td>37.9</td>
<td>Parents</td>
<td>Media</td>
<td>State Legislators</td>
<td>State Department of Education</td>
</tr>
<tr>
<td></td>
<td>46.4</td>
<td>53.3</td>
<td>35.5</td>
<td>32.6</td>
<td>31.0</td>
<td>Media</td>
<td>Media</td>
<td>State Legislators</td>
<td>State Department of Education</td>
</tr>
<tr>
<td></td>
<td>25.0</td>
<td>13.3</td>
<td>14.0</td>
<td>14.8</td>
<td>14.8</td>
<td>Student</td>
<td>Student</td>
<td>State Legislators</td>
<td>State Department of Education</td>
</tr>
<tr>
<td></td>
<td>42.9</td>
<td>35.7</td>
<td>47.5</td>
<td>48.8</td>
<td>37.9</td>
<td>Teachers</td>
<td>Teachers</td>
<td>State Legislators</td>
<td>State Department of Education</td>
</tr>
<tr>
<td></td>
<td>55.4</td>
<td>46.7</td>
<td>73.8</td>
<td>60.5</td>
<td>58.6</td>
<td>Administration</td>
<td>Administration</td>
<td>State Legislators</td>
<td>State Department of Education</td>
</tr>
<tr>
<td></td>
<td>72.7</td>
<td>73.3</td>
<td>69.4</td>
<td>58.1</td>
<td>62.1</td>
<td>Local School Board</td>
<td>Local School Board</td>
<td>State Legislators</td>
<td>State Department of Education</td>
</tr>
<tr>
<td></td>
<td>50.9</td>
<td>57.1</td>
<td>45.6</td>
<td>46.5</td>
<td>48.1</td>
<td>State Legislators</td>
<td>State Legislators</td>
<td>State Department of Education</td>
<td></td>
</tr>
<tr>
<td></td>
<td>74.1</td>
<td>57.1</td>
<td>72.9</td>
<td>74.4</td>
<td>77.8</td>
<td>State Department of Education</td>
<td>State Department of Education</td>
<td>State Department of Education</td>
<td></td>
</tr>
</tbody>
</table>

The table above shows Oregon Educators' Perceptions of the Attitudes of Others, measured in percent. Each row represents a different group of attitudes perceived by secondary principals, elementary principals, secondary teachers, elementary teachers, and specific groups such as Parents, Media, State Legislators, and State Department of Education. The data provides insights into how different educational stakeholders perceive the attitudes of others, with varying percentages indicating levels of support or opposition for specific educational policies or initiatives.
Another attempt to determine attitudes was found in the two items asking teachers to compare the attitudes and achievement levels of students presently entering their classes with those entering several years ago. Results are summarized in Tables 34 and 35. In most instances, the majority of teachers felt that both the attitude and achievement levels were the same. There is an interesting pattern in that many more elementary teachers reported higher achievement and attitudes than reported lower achievement and attitudes, while that pattern is reversed for secondary teachers.

| TABLE 34 |
|-----------------|-----|-----|
| Oregon Teacher Perceptions of Entering Students Mathematics Attitude |
| (in percent) |

<table>
<thead>
<tr>
<th></th>
<th>Higher</th>
<th>Same</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>29.0</td>
<td>67.7</td>
<td>3.2</td>
</tr>
<tr>
<td>Elementary Mathematics Teachers</td>
<td>19.0</td>
<td>52.4</td>
<td>28.6</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>11.7</td>
<td>63.3</td>
<td>25.0</td>
</tr>
</tbody>
</table>
Yet another measure of teacher attitude can be found by considering responses to items addressing pressure felt by teachers. Table 36 summarizes responses to the following item:

Classroom teachers have often felt pressured to change either the content of the courses they teach or the methods by which they teach. Which of the following statements reflect your feelings about the pressures felt by teachers (check all that apply):

<table>
<thead>
<tr>
<th></th>
<th>Higher</th>
<th>Same</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>32.3</td>
<td>61.3</td>
<td>6.5</td>
</tr>
<tr>
<td>Elementary Mathematics Teachers</td>
<td>20.0</td>
<td>47.5</td>
<td>32.5</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>11.7</td>
<td>55.0</td>
<td>33.3</td>
</tr>
</tbody>
</table>


TABLE 36

Oregon Teachers' Feelings Concerning Pressures (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Elementary Mathematics Teachers</th>
<th>Secondary Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teachers in my school do not seem to feel the pressures you have described</td>
<td>38.7</td>
<td>31.1</td>
<td>56.1</td>
</tr>
<tr>
<td>The teachers in my school seem to feel general pressure to go back to the basics</td>
<td>58.1</td>
<td>53.3</td>
<td>43.1</td>
</tr>
<tr>
<td>The teachers in my school seem to feel pressure as a direct result of a minimum competency test that is given to our students</td>
<td>19.4</td>
<td>17.8</td>
<td>20.0</td>
</tr>
<tr>
<td>*Teachers in my school seem to feel pressure to have their students perform well on standardized tests, but this pressure is not directly a result of minimum competency testing</td>
<td>58.1</td>
<td>42.2</td>
<td>23.1</td>
</tr>
</tbody>
</table>

*p < .01

The responses indicate that the majority of the Oregon teacher sampled did not feel pressure as a direct result of minimum competency testing. The elementary teacher and elementary mathematics teacher samples indicated feeling more general pressure than the secondary mathematics teacher sample.
Respondents were asked to indicate the single most valid reason for supporting minimum competency testing (see Table 37). Responses between samples were statistically different. A plurality of the elementary samples felt the reason was "To make sure students are prepared for jobs or post high school education. The secondary samples were split, with teachers indicating "To give meaning to the high school diploma" and principals indicating "To guarantee a focus on the basics in school." Given the focus on "life-skills" in Oregon, the answer given by the elementary samples was the expected one.

When asked to determine the single most valid reason for opposing minimum competency testing (see Table 38), there was no statistical difference in response. A plurality of all samples except secondary principals indicated "It will be used to judge schools and teachers." The response is certainly a pragmatic one. Although this reason received much less attention in journals than most of the others listed, it seems to be the one school people worry about.

In an attempt to judge teacher perception of the impact of minimum competency testing, teachers were asked to indicate for 16 topics or activities whether they spent: more class time as a direct result of minimum competency testing, more class time but not as a result of minimum competency testing, less class time as a direct result of minimum competency testing, less class time but not as a direct result of minimum competency testing, or the same
<table>
<thead>
<tr>
<th>Reason</th>
<th>ET</th>
<th>EMT</th>
<th>ST</th>
<th>EP</th>
<th>SP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>To motivate students</td>
<td>9.7</td>
<td>2.2</td>
<td>7.8</td>
<td>6.3</td>
<td>7.1</td>
<td>6.6</td>
</tr>
<tr>
<td>To make sure schools do their jobs</td>
<td>6.5</td>
<td>13.3</td>
<td>1.6</td>
<td>0.0</td>
<td>5.4</td>
<td>5.7</td>
</tr>
<tr>
<td>To make sure students are prepared for jobs or post-high school education</td>
<td>38.7</td>
<td>46.7</td>
<td>15.6</td>
<td>50.0</td>
<td>14.3</td>
<td>27.8</td>
</tr>
<tr>
<td>To guarantee a focus on the basics in schools</td>
<td>12.9</td>
<td>6.7</td>
<td>3.1</td>
<td>18.8</td>
<td>30.4</td>
<td>13.7</td>
</tr>
<tr>
<td>To raise standardized test scores</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>To give meaning to the high school diploma</td>
<td>12.9</td>
<td>13.3</td>
<td>25.0</td>
<td>6.3</td>
<td>17.9</td>
<td>17.5</td>
</tr>
<tr>
<td>To identify remedial students</td>
<td>6.5</td>
<td>8.9</td>
<td>10.9</td>
<td>0.0</td>
<td>10.7</td>
<td>9.0</td>
</tr>
<tr>
<td>Other</td>
<td>0.0</td>
<td>4.4</td>
<td>17.2</td>
<td>12.5</td>
<td>5.4</td>
<td>8.5</td>
</tr>
<tr>
<td>More than one</td>
<td>12.9</td>
<td>4.4</td>
<td>18.8</td>
<td>6.3</td>
<td>8.9</td>
<td>11.3</td>
</tr>
</tbody>
</table>

*p < .01
<table>
<thead>
<tr>
<th>Reason</th>
<th>ET</th>
<th>EMT</th>
<th>ST</th>
<th>EP</th>
<th>SP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>It will narrow the curriculum.</td>
<td>16.7</td>
<td>9.1</td>
<td>4.9</td>
<td>18.8</td>
<td>21.8</td>
<td>13.1</td>
</tr>
<tr>
<td>&quot;Minimum competencies&quot; are not identifiable.</td>
<td>6.7</td>
<td>11.4</td>
<td>21.3</td>
<td>6.3</td>
<td>18.2</td>
<td>15.0</td>
</tr>
<tr>
<td>Test development techniques are not good enough.</td>
<td>20.0</td>
<td>27.3</td>
<td>11.5</td>
<td>12.5</td>
<td>9.1</td>
<td>15.5</td>
</tr>
<tr>
<td>The potential for racial or cultural discrimination is great.</td>
<td>6.7</td>
<td>2.3</td>
<td>1.6</td>
<td>6.3</td>
<td>9.1</td>
<td>4.9</td>
</tr>
<tr>
<td>It will increase the high school dropout rate.</td>
<td>0.0</td>
<td>6.8</td>
<td>1.6</td>
<td>6.3</td>
<td>5.5</td>
<td>3.9</td>
</tr>
<tr>
<td>It will stifle creative teaching.</td>
<td>3.3</td>
<td>6.8</td>
<td>4.9</td>
<td>0.0</td>
<td>9.1</td>
<td>5.8</td>
</tr>
<tr>
<td>It will be used to judge schools and teachers.</td>
<td>30.0</td>
<td>29.5</td>
<td>32.8</td>
<td>31.3</td>
<td>14.5</td>
<td>26.7</td>
</tr>
<tr>
<td>Other.</td>
<td>6.7</td>
<td>6.8</td>
<td>18.0</td>
<td>18.8</td>
<td>12.7</td>
<td>12.6</td>
</tr>
<tr>
<td>More than one</td>
<td>10.0</td>
<td>0.0</td>
<td>3.3</td>
<td>0.0</td>
<td>0.0</td>
<td>2.4</td>
</tr>
</tbody>
</table>
amount of class time (see Table 39). This item was answered only by the three populations. There were no statistically significant differences on any of the 16 items. In no case did a clear plurality, much less a majority, indicate that either more or less time was spent as a direct result of minimum competency testing. The data do indicate that a majority of all samples felt they were spending more time on basic facts, problems requiring the use of a calculator, computation appropriate to content, and consumer topics. One could infer that the back-to-basics movement has hit Oregon, but survey respondents do not feel that it is a result of minimum competency testing. The data indicate that some teachers felt minimum competency testing has had an impact in class time on topic, but this is never a majority of respondents.
<table>
<thead>
<tr>
<th>Category</th>
<th>Direct</th>
<th>Class</th>
<th>Not Direct</th>
<th>Class</th>
<th>Same Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Basic Facts</td>
<td>28.6</td>
<td>39.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>35.0</td>
<td>42.5</td>
<td>0.0</td>
<td>5.0</td>
<td>17.5</td>
</tr>
<tr>
<td></td>
<td>33.9</td>
<td>23.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>2) Story or Word Problems</td>
<td>7.7</td>
<td>38.5</td>
<td>3.8</td>
<td>0.0</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>15.0</td>
<td>30.0</td>
<td>0.0</td>
<td>10.0</td>
<td>45.0</td>
</tr>
<tr>
<td></td>
<td>11.9</td>
<td>33.9</td>
<td>8.5</td>
<td>3.4</td>
<td>42.4</td>
</tr>
<tr>
<td>3) How to use a calculator</td>
<td>0.0</td>
<td>41.7</td>
<td>0.0</td>
<td>25.0</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>9.7</td>
<td>51.6</td>
<td>0.0</td>
<td>6.5</td>
<td>32.3</td>
</tr>
<tr>
<td></td>
<td>6.0</td>
<td>60.0</td>
<td>2.0</td>
<td>4.0</td>
<td>28.0</td>
</tr>
<tr>
<td>4) Problems requiring the use of a calculator</td>
<td>0.0</td>
<td>60.0</td>
<td>0.0</td>
<td>20.0</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>10.0</td>
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<td>0.0</td>
<td>6.7</td>
<td>36.7</td>
</tr>
<tr>
<td></td>
<td>6.0</td>
<td>50.0</td>
<td>0.0</td>
<td>6.0</td>
<td>38.0</td>
</tr>
<tr>
<td>5) Number bases other than 10</td>
<td>0.0</td>
<td>14.3</td>
<td>14.3</td>
<td>35.7</td>
<td>35.7</td>
</tr>
<tr>
<td></td>
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<td>8.1</td>
<td>64.9</td>
<td>21.6</td>
</tr>
<tr>
<td></td>
<td>2.0</td>
<td>8.0</td>
<td>10.0</td>
<td>48.0</td>
<td>32.0</td>
</tr>
<tr>
<td>6) Sets</td>
<td>4.2</td>
<td>12.5</td>
<td>12.5</td>
<td>25.0</td>
<td>45.8</td>
</tr>
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<td>0.0</td>
<td>2.7</td>
<td>5.4</td>
<td>62.2</td>
<td>29.7</td>
</tr>
<tr>
<td></td>
<td>1.9</td>
<td>11.1</td>
<td>11.1</td>
<td>38.9</td>
<td>37.0</td>
</tr>
<tr>
<td>7) Computation appropriate to course content</td>
<td>21.7</td>
<td>39.1</td>
<td>0.0</td>
<td>0.0</td>
<td>39.1</td>
</tr>
<tr>
<td>(i.e., 77444 for elementary school, (2x+y)(4x-y) for algebra)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21.6</td>
<td>24.3</td>
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<td>2.7</td>
<td>48.6</td>
</tr>
<tr>
<td></td>
<td>24.6</td>
<td>21.1</td>
<td>0.0</td>
<td>0.0</td>
<td>54.4</td>
</tr>
<tr>
<td>8) Geometry</td>
<td>9.5</td>
<td>19.0</td>
<td>0.0</td>
<td>9.5</td>
<td>61.9</td>
</tr>
<tr>
<td></td>
<td>12.5</td>
<td>15.0</td>
<td>2.5</td>
<td>10.0</td>
<td>60.0</td>
</tr>
<tr>
<td></td>
<td>5.7</td>
<td>24.5</td>
<td>5.7</td>
<td>1.9</td>
<td>62.3</td>
</tr>
<tr>
<td>9) Enrichment</td>
<td>4.3</td>
<td>26.1</td>
<td>6.7</td>
<td>8.7</td>
<td>52.2</td>
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<td>7.7</td>
<td>25.6</td>
<td>7.7</td>
<td>5.1</td>
<td>53.8</td>
</tr>
<tr>
<td></td>
<td>3.8</td>
<td>30.2</td>
<td>7.5</td>
<td>7.5</td>
<td>50.9</td>
</tr>
<tr>
<td>10) Elementary computer topics</td>
<td>0.0</td>
<td>33.3</td>
<td>0.0</td>
<td>11.1</td>
<td>55.6</td>
</tr>
<tr>
<td></td>
<td>3.4</td>
<td>51.7</td>
<td>0.0</td>
<td>6.9</td>
<td>37.9</td>
</tr>
<tr>
<td></td>
<td>0.0</td>
<td>55.3</td>
<td>2.6</td>
<td>5.3</td>
<td>36.8</td>
</tr>
<tr>
<td>11) Consumer topics</td>
<td>33.3</td>
<td>33.3</td>
<td>0.0</td>
<td>0.0</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>25.0</td>
<td>33.3</td>
<td>0.0</td>
<td>5.6</td>
<td>36.1</td>
</tr>
<tr>
<td></td>
<td>21.2</td>
<td>48.1</td>
<td>0.0</td>
<td>7.7</td>
<td>23.1</td>
</tr>
<tr>
<td>12) Review of material from previous years</td>
<td>22.7</td>
<td>13.6</td>
<td>0.0</td>
<td>0.0</td>
<td>83.6</td>
</tr>
<tr>
<td></td>
<td>27.5</td>
<td>25.0</td>
<td>2.5</td>
<td>5.0</td>
<td>40.0</td>
</tr>
<tr>
<td></td>
<td>21.2</td>
<td>19.2</td>
<td>1.9</td>
<td>7.7</td>
<td>50.0</td>
</tr>
<tr>
<td>13) Practice</td>
<td>29.2</td>
<td>29.2</td>
<td>0.0</td>
<td>8.3</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>29.2</td>
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<td>0.0</td>
<td>8.3</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>23.0</td>
<td>23.0</td>
<td>5.1</td>
<td>2.6</td>
<td>46.2</td>
</tr>
<tr>
<td></td>
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<td>21.4</td>
<td>0.0</td>
<td>1.8</td>
<td>51.8</td>
</tr>
<tr>
<td>14) Individual Projects</td>
<td>6.7</td>
<td>13.3</td>
<td>20.0</td>
<td>6.7</td>
<td>53.3</td>
</tr>
<tr>
<td></td>
<td>0.0</td>
<td>11.4</td>
<td>5.7</td>
<td>17.1</td>
<td>65.7</td>
</tr>
<tr>
<td></td>
<td>6.4</td>
<td>14.9</td>
<td>12.8</td>
<td>17.0</td>
<td>48.9</td>
</tr>
<tr>
<td>15) Diagnosis of individual differences</td>
<td>28.0</td>
<td>44.0</td>
<td>0.0</td>
<td>4.0</td>
<td>24.0</td>
</tr>
<tr>
<td></td>
<td>32.4</td>
<td>27.0</td>
<td>5.4</td>
<td>2.7</td>
<td>32.4</td>
</tr>
<tr>
<td></td>
<td>32.0</td>
<td>23.5</td>
<td>3.9</td>
<td>2.0</td>
<td>33.3</td>
</tr>
<tr>
<td>16) Activity Lessons using manipulatives</td>
<td>8.7</td>
<td>34.8</td>
<td>6.3</td>
<td>0.0</td>
<td>52.2</td>
</tr>
<tr>
<td></td>
<td>0.0</td>
<td>28.6</td>
<td>5.7</td>
<td>8.6</td>
<td>57.1</td>
</tr>
<tr>
<td></td>
<td>12.2</td>
<td>22.0</td>
<td>4.0</td>
<td>8.0</td>
<td>54.0</td>
</tr>
</tbody>
</table>

(top numbers—elementary; middle numbers—elementary mathematics; bottom numbers—secondary)
Most respondents felt that minimum competency testing is not having a great effect, at least in terms of the items considered on the survey. Respondents were asked to indicate if 10 things were occurring either: primarily, partially, or not because of minimum competency testing, or that they are not occurring, or that the respondents cannot judge the occurrence (see Table 40). Forty-two and seven-tenths percent indicated "more frequent testing" is occurring either primarily or partially as a result of minimum competency testing, but 16.8 percent said it is occurring but not as a result of minimum competency testing, while 26.4 percent said the phenomenon is not occurring. There was a statistical difference in the responses of different populations on this item. Administrators were more likely than teachers to feel that "more frequent testing" was occurring.

One item where responses between samples did not differ significantly was: "more remedial classes." Forty-two percent of respondents indicated that there were more remedial classes either primarily or partially as a result of minimum competency testing. However 31.3 percent indicated that while there are more remedial classes it is not the result of minimum competency testing and 14.1 percent indicated there are not more remedial classes. Thirty-three percent of the respondents indicated that there was "more drill and memorization" either primarily or partially as a result of minimum competency testing. But again, 43.8 percent indicated either that it is not occurring because of minimum competency testing or simply that it is not occurring.
### Table 40

Oregon Respondents' Perception of the Impact of MCAT (in percent)

<table>
<thead>
<tr>
<th>Enrollments in Elective Courses</th>
<th>Occurring Partially as a Result of MCAT</th>
<th>Occurring Partially as a Result of Not MCAT</th>
<th>Not Occurring</th>
<th>I cannot judge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fewer*</td>
<td>Elementary Teachers</td>
<td>5.3</td>
<td>3.3</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Elem. Math Teachers</td>
<td>2.8</td>
<td>8.3</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>Secondary Teachers</td>
<td>3.3</td>
<td>4.9</td>
<td>14.8</td>
</tr>
<tr>
<td></td>
<td>Elementary Principals</td>
<td>0.0</td>
<td>0.0</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>0.0</td>
<td>5.7</td>
<td>24.5</td>
</tr>
<tr>
<td>Total</td>
<td>Elementary Teachers</td>
<td>2.2</td>
<td>5.5</td>
<td>14.8</td>
</tr>
<tr>
<td></td>
<td>Elem. Math Teachers</td>
<td>0.0</td>
<td>0.0</td>
<td>32.0</td>
</tr>
<tr>
<td></td>
<td>Secondary Teachers</td>
<td>0.0</td>
<td>2.6</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Elementary Principals</td>
<td>0.0</td>
<td>1.7</td>
<td>30.5</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>0.0</td>
<td>7.1</td>
<td>42.9</td>
</tr>
<tr>
<td>Total</td>
<td>Elementary Principals</td>
<td>4.5</td>
<td>37.2</td>
<td>21.8</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>16.2</td>
<td>32.7</td>
<td>26.4</td>
</tr>
<tr>
<td>More remedial classes</td>
<td>Elementary Teachers</td>
<td>2.1</td>
<td>4.7</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Elem. Math Teachers</td>
<td>2.6</td>
<td>5.4</td>
<td>53.9</td>
</tr>
<tr>
<td></td>
<td>Secondary Teachers</td>
<td>17.7</td>
<td>24.2</td>
<td>27.4</td>
</tr>
<tr>
<td></td>
<td>Elementary Principals</td>
<td>3.1</td>
<td>14.3</td>
<td>35.7</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>7.1</td>
<td>14.3</td>
<td>35.7</td>
</tr>
<tr>
<td>Total</td>
<td>Elementary Principals</td>
<td>10.4</td>
<td>32.7</td>
<td>30.4</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>18.2</td>
<td>32.7</td>
<td>26.4</td>
</tr>
<tr>
<td>More homework</td>
<td>Elementary Teachers</td>
<td>2.1</td>
<td>4.7</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Elem. Math Teachers</td>
<td>5.1</td>
<td>2.6</td>
<td>15.4</td>
</tr>
<tr>
<td></td>
<td>Secondary Teachers</td>
<td>0.0</td>
<td>6.6</td>
<td>21.0</td>
</tr>
<tr>
<td></td>
<td>Elementary Principals</td>
<td>0.0</td>
<td>14.3</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>0.0</td>
<td>5.7</td>
<td>24.5</td>
</tr>
<tr>
<td>Total</td>
<td>Elementary Principals</td>
<td>2.1</td>
<td>4.7</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>18.2</td>
<td>32.7</td>
<td>26.4</td>
</tr>
<tr>
<td>More drill and memorization</td>
<td>Elementary Teachers</td>
<td>2.1</td>
<td>4.7</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Elem. Math Teachers</td>
<td>2.6</td>
<td>5.4</td>
<td>53.9</td>
</tr>
<tr>
<td></td>
<td>Secondary Teachers</td>
<td>17.7</td>
<td>24.2</td>
<td>27.4</td>
</tr>
<tr>
<td></td>
<td>Elementary Principals</td>
<td>3.1</td>
<td>14.3</td>
<td>35.7</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>7.1</td>
<td>14.3</td>
<td>35.7</td>
</tr>
<tr>
<td>Total</td>
<td>Elementary Principals</td>
<td>10.4</td>
<td>32.7</td>
<td>30.4</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>18.2</td>
<td>32.7</td>
<td>26.4</td>
</tr>
<tr>
<td>Stricter* grading</td>
<td>Elementary Teachers</td>
<td>2.1</td>
<td>4.7</td>
<td>15.0</td>
</tr>
<tr>
<td></td>
<td>Elem. Math Teachers</td>
<td>2.6</td>
<td>5.4</td>
<td>53.9</td>
</tr>
<tr>
<td></td>
<td>Secondary Teachers</td>
<td>17.7</td>
<td>24.2</td>
<td>27.4</td>
</tr>
<tr>
<td></td>
<td>Elementary Principals</td>
<td>3.1</td>
<td>14.3</td>
<td>35.7</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>7.1</td>
<td>14.3</td>
<td>35.7</td>
</tr>
<tr>
<td>Total</td>
<td>Elementary Principals</td>
<td>10.4</td>
<td>32.7</td>
<td>30.4</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>18.2</td>
<td>32.7</td>
<td>26.4</td>
</tr>
<tr>
<td>More students* failing courses or grades</td>
<td>Elementary Teachers</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td>Elem. Math Teachers</td>
<td>5.3</td>
<td>7.9</td>
<td>39.5</td>
</tr>
<tr>
<td></td>
<td>Secondary Teachers</td>
<td>8.5</td>
<td>10.2</td>
<td>16.9</td>
</tr>
<tr>
<td></td>
<td>Elementary Principals</td>
<td>0.0</td>
<td>21.4</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>3.3</td>
<td>3.8</td>
<td>21.2</td>
</tr>
<tr>
<td>Total</td>
<td>Elementary Principals</td>
<td>14.3</td>
<td>30.8</td>
<td>25.6</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>18.0</td>
<td>8.0</td>
<td>26.2</td>
</tr>
<tr>
<td>More individualized instruction</td>
<td>Elementary Teachers</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td>Elem. Math Teachers</td>
<td>5.3</td>
<td>7.9</td>
<td>39.5</td>
</tr>
<tr>
<td></td>
<td>Secondary Teachers</td>
<td>8.5</td>
<td>10.2</td>
<td>16.9</td>
</tr>
<tr>
<td></td>
<td>Elementary Principals</td>
<td>0.0</td>
<td>21.4</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>3.3</td>
<td>3.8</td>
<td>21.2</td>
</tr>
<tr>
<td>Total</td>
<td>Elementary Principals</td>
<td>14.3</td>
<td>30.8</td>
<td>25.6</td>
</tr>
<tr>
<td></td>
<td>Secondary Principals</td>
<td>18.0</td>
<td>8.0</td>
<td>26.2</td>
</tr>
</tbody>
</table>

*p < .01
There were statistical differences in responses between samples on six of the ten items. These differences seem for the most part to hold little educational significance. Occasionally these differences may have been caused by the large percentage of a teacher sample indicating they could not judge the occurrence. (e.g., lower enrollments in elective courses, more students failing grades or courses).

Respondents were asked to indicate whether each of the 25 topics was appropriate for inclusion on a minimum competency test for graduation. As in the preceding chapter, the areas have been grouped into the basic skills areas defined by the NCSM.

There was overwhelming support for the inclusion of whole number and decimal computation (see Table 41). There was overall strong support for the inclusion of computation with fractions, but less support than the other two. The secondary samples were not supportive of fractions than the elementary samples, but this difference was not statistically significant.
<table>
<thead>
<tr>
<th></th>
<th>Elem. Teachers</th>
<th>Elem. Math Teachers</th>
<th>Sec. Teachers</th>
<th>Elem. Principals</th>
<th>Sec. Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computing with whole numbers</td>
<td>96.8</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>98.2</td>
<td>99.1</td>
</tr>
<tr>
<td>Computing with decimals</td>
<td>90.3</td>
<td>100.0</td>
<td>98.5</td>
<td>94.1</td>
<td>96.4</td>
<td>96.7</td>
</tr>
<tr>
<td>Computing with fractions</td>
<td>77.4</td>
<td>80.0</td>
<td>92.4</td>
<td>70.6</td>
<td>89.3</td>
<td>85.1</td>
</tr>
</tbody>
</table>
Consumer problems received more support than solving word problems from all groups except elementary teachers (see Table 42). Secondary teachers were less supportive of consumer problems but not at a statistically significant level.

TABLE 42

Oregon Respondents' Inclusion of Problem Solving and Applying Mathematics to Everyday Situations (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elem. Teachers</th>
<th>Elem. Math Teachers</th>
<th>Sec. Teachers</th>
<th>Elem. Principals</th>
<th>Sec. Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solving word problems</td>
<td>87.1</td>
<td>75.6</td>
<td>66.7</td>
<td>64.7</td>
<td>57.1</td>
<td>68.8</td>
</tr>
<tr>
<td>Using mathematics to solve consumer problems</td>
<td>87.1</td>
<td>88.9</td>
<td>74.2</td>
<td>88.2</td>
<td>82.1</td>
<td>82.3</td>
</tr>
</tbody>
</table>
Taken as a total group, Oregon educators showed moderate support for the inclusion of both rounding and estimating (see Table 43). There were no statistical differences between groups on either topic.

### TABLE 43

Oregon Respondents' Inclusion of Estimation or Approximation (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elem. Teachers</th>
<th>Elem. Math Teachers</th>
<th>Sec. Teachers</th>
<th>Sec. Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rounding off numbers</td>
<td>80.6</td>
<td>64.4</td>
<td>80.3</td>
<td>88.2</td>
<td>89.3</td>
</tr>
<tr>
<td>Estimating</td>
<td>80.6</td>
<td>73.3</td>
<td>72.7</td>
<td>76.5</td>
<td>73.2</td>
</tr>
</tbody>
</table>
Both the topics of "proof and "trigonometry" received virtually no support by any sample (see Table 44). There was a statistical difference among sample responses on "Knowing basic properties of geometric figures." The teacher samples gave moderate support to the topic, but the principal samples were much less supportive.

**TABLE 44**

Oregon Respondents' Inclusion of Geometry (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elem. Teachers</th>
<th>Elem. Math Teachers</th>
<th>Sec. Teachers</th>
<th>Elem. Principals</th>
<th>Sec. Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing basic properties of geometric figures</td>
<td>74.2</td>
<td>53.3</td>
<td>63.6</td>
<td>41.2</td>
<td>37.5</td>
<td>54.4</td>
</tr>
<tr>
<td>Doing simple geometric proof</td>
<td>25.8</td>
<td>8.9</td>
<td>9.1</td>
<td>5.9</td>
<td>7.1</td>
<td>10.7</td>
</tr>
<tr>
<td>Solving problems using right triangle trigonometry</td>
<td>3.2</td>
<td>6.7</td>
<td>3.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.8</td>
</tr>
</tbody>
</table>
There were no statistical differences between sample responses on any of the measurement items (see Table 45). In general, both the metric and standard systems received moderate to strong support by all samples. Standard system was more positively received by all groups except secondary teachers. Area and volumes were weakly to moderately supported.

<table>
<thead>
<tr>
<th></th>
<th>Elem. Teachers</th>
<th>Elem. Math Teachers</th>
<th>Sec. Teachers</th>
<th>Sec. Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring with the</td>
<td>67.7</td>
<td>71.1</td>
<td>80.3</td>
<td>64.7</td>
<td>74.9</td>
</tr>
<tr>
<td>metric system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring with the</td>
<td>87.1</td>
<td>86.7</td>
<td>75.8</td>
<td>82.4</td>
<td>85.1</td>
</tr>
<tr>
<td>standard system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calculating areas and</td>
<td>64.5</td>
<td>51.1</td>
<td>60.6</td>
<td>52.9</td>
<td>56.3</td>
</tr>
<tr>
<td>volumes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Despite the pervasive presence of computers in our society, Oregon educators did not feel that knowing the limitations and capabilities of a computer should be on a test for high school graduation (see Table 46). They were somewhat more favorably disposed toward calculators, there was weak support for including "using a calculator."
TABLE 46

Oregon Respondents' Inclusion of Computer Literacy and Other Technology (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elem. Teachers</th>
<th>Elem. Math Teachers</th>
<th>Elem. Teachers</th>
<th>Sec. Principals</th>
<th>Sec. Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing what computers can and cannot do</td>
<td>35.5</td>
<td>20.0</td>
<td>27.3</td>
<td>23.5</td>
<td>19.6</td>
<td>24.7</td>
</tr>
<tr>
<td>Using a calculator</td>
<td>51.6</td>
<td>51.1</td>
<td>48.5</td>
<td>41.2</td>
<td>66.1</td>
<td>53.5</td>
</tr>
</tbody>
</table>

The inclusion of elementary probability topics was not supported (see Table 47). Elementary teachers were most favorable, but a majority of all samples would not include the topic on a test for high school graduation.

TABLE 47

Oregon Respondents' Inclusion of Probability (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elem. Teachers</th>
<th>Elem. Math Teachers</th>
<th>Elem. Teachers</th>
<th>Sec. Principals</th>
<th>Sec. Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding elementary notions of probability</td>
<td>48.4</td>
<td>20.0</td>
<td>21.2</td>
<td>23.5</td>
<td>30.4</td>
<td>27.4</td>
</tr>
</tbody>
</table>
The inclusion of measures of central tendency was not supported (see Table 48). However, graphs were weakly to moderately supported. Strongest support came from the elementary teachers.

**TABLE 48**

<table>
<thead>
<tr>
<th></th>
<th>Elem. Teachers</th>
<th>Elem. Math Teachers</th>
<th>Elem. Principals</th>
<th>Sec. Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making and interpreting graphs</td>
<td>74.2</td>
<td>57.8</td>
<td>66.7</td>
<td>64.7</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>61.4</td>
</tr>
<tr>
<td>Determining the mean, median, and mode of a group of numbers</td>
<td>38.7</td>
<td>26.7</td>
<td>24.2</td>
<td>23.5</td>
<td>16.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24.7</td>
</tr>
</tbody>
</table>

As one would hope, the square root algorithm received virtually no support (see Table 49). "Reading a map" was supported moderately to strongly by all groups.
TABLE 49
Oregon Respondents' Inclusion of Miscellaneous Topics (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elem. Teachers</th>
<th>Elem. Math Teachers</th>
<th>Elem. Principals</th>
<th>Sec. Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determining the square root of a number using the square root algorithm</td>
<td>6.5</td>
<td>2.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Reading a map</td>
<td>93.5</td>
<td>84.4</td>
<td>68.2</td>
<td>94.1</td>
<td>73.2</td>
</tr>
</tbody>
</table>

Five of the items concerned algebraic content (see Table 50). Of the five only "Solving first degree equations" received any level of support at all. Even it was not supported for inclusion on a test.
<table>
<thead>
<tr>
<th></th>
<th>Elem. Teachers</th>
<th>Elem. Math Teachers</th>
<th>Elem. Principals</th>
<th>Sec. Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deriving the quadratic formula</td>
<td>9.7</td>
<td>0.0</td>
<td>0.0</td>
<td>1.8</td>
<td>1.9</td>
</tr>
<tr>
<td>Factoring polynomials in the second degree</td>
<td>3.2</td>
<td>0.0</td>
<td>3.0</td>
<td>0.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Solving first degree equations</td>
<td>29.0</td>
<td>28.9</td>
<td>12.1</td>
<td>23.5</td>
<td>19.1</td>
</tr>
<tr>
<td>Solving systems of equations with two unknowns</td>
<td>16.1</td>
<td>2.2</td>
<td>7.6</td>
<td>0.0</td>
<td>5.6</td>
</tr>
<tr>
<td>Solving second degree equations</td>
<td>12.9</td>
<td>2.2</td>
<td>1.5</td>
<td>0.0</td>
<td>3.7</td>
</tr>
</tbody>
</table>
As a whole, the responses on the topics suggest some observations. First, there was a statistically significant difference in responses on only one item. This suggests that when it comes to content for a minimum competency test for high school graduation, teachers, administrators, and elementary and secondary teachers in Oregon think pretty much alike. Second, the content deemed appropriate for the high school graduation test was, without exception, elementary school mathematics.

Conclusions

Oregon differs significantly from Florida in many ways. Part of these differences may explain why the two states responded so differently to the minimum competency testing movement. The high degree of local control in Oregon's competency verification program differs markedly from the situation in Florida where a single, state-developed test is given.

The literature review and the survey indicate that the impact of minimum competency testing at the level of the mathematics classroom may be considerably less in Oregon than in Florida. It may be that, because competencies were established at the district level, there was a better "curriculum-fit" and it was not necessary for teachers to alter content or emphasis in order to "match" a test. Certainly the study by Rands and Walker (1979) indicates the impact on teachers in terms of time spent working with competencies is great. Yet this impact does not seem to be as directly manifested in the classroom. The lack of standardization of competencies from district to district means that survey respondents work under very different situations from one another.
Chapter V

MISSOURI CASE STUDY

Background

Political Structure

The educational political structure in Missouri differs markedly from that in both Florida and Oregon. The Commissioner of Education in Missouri, Arthur Mallory, was appointed, not elected, to this nonpartisan position. Wirt (1978) calls Missouri a high local control state and ranks it 47th in degree of state control of education. There are 556 school districts in the state, each of which established much of its own educational policy. Despite the strong belief in local control of education, the State Board of Education, perhaps partly to forestall legislative mandate, required the Missouri State Department of Education to develop a competency test. Many of the issues surrounding minimum competency testing apparently remain unresolved. Bills are still being introduced in the legislature (HB2408, HB305) while several groups, such as the Missouri Council of Teachers of Mathematics (MCTM Position Paper, 1979) and the Missouri National Education Association (NMEA), are unenthusiastic about the idea.

In testimony before a United States Senate Subcommittee in 1979 Tony Rollins, president of the Missouri National Education
Association commented on Missouri's minimum competency test, the Basic Essential Skills Test (BEST).

The approach is incredibly simplistic. Ninety percent of the students are expected to pass - and teachers can tell you before the test who will comprise the ten percent that fail. It's a waste of money. (Rollins cited in Mannies, "U. S. Hearing Held in Florissant On Basic Education in Schools", 1979)

The same newspaper article indicated that testimony by Katherine Cormack, president of the Missouri Federation of Teachers also opposed BEST.

Not all teachers' organizations seem to be opposed to the test. At the November 1977 state convention of the Missouri State Teachers Association, largest of the state's three teacher organizations, the Delegate Assembly, was asked to adopt a proposal opposing "any minimum test score as a graduation requirement. (Burgess, "Test for Graduation supported Here", 1977). The proposal was soundly defeated in a voice vote.

**Test Development**

Much of the information for the following section was obtained from an unpublished paper by Charles G. Foster (Director of Testing), entitled **BEST - Background and Rationale**.

The same pressures for educational accountability that had been felt elsewhere in the United States were present in Missouri in 1976. The State Board of Education, in reaction to increased concern about the achievement of students in Missouri, called for the development of a competency test
to provide an objective measurement of each student's knowledge of certain basic information in arithmetic, reading, government, and economics, and the application of such knowledge to the solution of practical everyday problems. (cited in Foster, 1977, p. 1)

As a result of the board's action, the Missouri Commissioner of Education appointed a committee of seven Missouri Department of Education staff members to study the issues involved and make recommendations to the State Board of Education.

Beginning in the spring of 1976, this committee engaged in varied activities designed to facilitate the development of the test the state board desired. These activities included inspection of materials developed by other states, review of pertinent articles in the news media, meetings with subject matter specialists, representatives of business, industry, labor, agriculture, colleges and universities and with students. An advisory group representing many segments of Missouri's population met in the summer of 1976 to review objectives developed by the committee. In addition Missouri held eleven regional educational conferences during October and November 1976. Over 3,000 Missouri citizens attended these conferences and besides raising questions and discussing issues, conference participants answered a short survey which indicated a majority supported both the concept of a basic skills test (83%) and requiring all schools to administer such a test (67%). However, only 21 percent favored requiring a student to pass a test before permitting the student to graduate from high school. This result may have been instrumental in the state board's decision not to require the test for graduation.
During the late spring and summer of 1976 the State Department of Education committee, with input from many others, developed objectives. These were reviewed by representatives from many walks of life. In September of 1976 subject matter specialists met to develop test items. These items were field tested in November and December. In January 1977 subject matter specialists met to assist in the analysis of data from the field test and to select items for the pilot test. Schools were randomly selected and invited to participate in the field test of Missouri's competency examination, the Basic Essential Skills Test (BEST), in March and April of 1977. The test was given on a voluntary basis in April 1978 and required for all eighth graders in 1979. The test is not presently tied to graduation or promotion but any eighth grade student who "fails" the test is required to retake it until he or she passes the test or graduates from high school. Passing the test or "mastery" requires correctly answering at least two of the three items per objective and at least 80 percent of the total number of items. A rationale for the cutoff score or standard is not given in the surveyed literature. The mathematics portion of BEST consists of 39 items, 3 items for each of 13 objectives. Those 13 objectives are:

1. The student will demonstrate mastery of the basic facts for addition and subtraction of whole numbers by solving sample problems involving real like situations.

2. The student will demonstrate mastery of the basic facts for multiplication and division for whole numbers by solving sample problems involving real life situations.
3. The student will demonstrate mastery of the basic facts for addition and subtraction of common and decimal fractions involving real life situations.

4. The student will demonstrate mastery of the basic facts for multiplication and division of common and decimal fractions by solving sample problems involving real life situations.

5. The student will demonstrate the ability to solve sample problems involving business and consumer situations.

6. The student will demonstrate the ability to solve problems involving measures of length, area, and volume.

7. The student will demonstrate the ability to solve problems involving measures of time and temperature.

8. The student will demonstrate the ability to correctly interpret information from charts, graphs, tables, maps and scale drawings.

9. The student will demonstrate the ability to solve sample problems by applying the concept of ratio and proportion.

10. The student will demonstrate the ability to correctly interpret simple probability and statistical statements relating to common situations such as weather reports and opinion polls.

11. The student will demonstrate the ability to determine the average for given numerical data.

12. The student will demonstrate the ability to correctly identify horizontal, vertical, parallel, and intersecting lines.
13. The student will demonstrate the ability to identify simple plane and solid geometric figures.

In addition to these 13 objectives which are tested on a single statewide test, there are two mathematics objectives to be tested at the local level.

14. The student will use standard measuring devices to measure length, area volume, weight, time and temperature in common English and metric units.

15. The student will estimate results and judge the reasonableness of answers to computational problems.

According to an official at the Missouri Department of Education, districts vary a great deal in the methods used to verify mastery of these last two items.

Attitudes

An important part of developing an understanding of the evolution of the minimum competency testing movement in Missouri is to understand the attitudes of the citizens of Missouri toward the movement. All indications are that minimum competency testing enjoys the sometimes qualified support of the newspaper media. Public support for competency testing—though not necessarily for graduation purposes—also seems strong. Foster (1979) included a report by P. J. Newell that summarizes a survey given to individuals attending the regional conferences on the BEST. The first three survey questions and results are:
1. Do you favor the concept of a basic skills test? Yes 83%  Undecided 9%  No 9%

2. Do you favor requiring all schools to administer the test? Yes 67%  Undecided 12%  No 19%

3. Do you favor requiring a student to pass the test before graduating from high school? Yes 21%  Undecided 20%  No 56%

It should be pointed out that this survey was taken after presentations by staff members of the Missouri Department of Education and small group discussions of the "pros and cons" of such a test. This may explain why these results are less positive toward testing for high school graduation than most survey results on this question.

An earlier survey by Craig (1978) indicated that while 79 percent of Missouri counselors and principals supported the Basic Essential Skills Test (BEST) given to eighth graders, only 48 percent supported the test as a requirement for high school graduation.

A key source of information utilized during the Missouri case study was newspaper articles.

The investigator was able to thoroughly examine the treatment that was given the general issue of minimum competency testing and the specific issues concerning the BEST by Missouri newspapers. This thorough examination was made possible because of access given to the clippings file of the Missouri Department of Education,
access to the newspaper collection at the Missouri Historical Society (the most complete such collection in the United States), and the assistance of an employee of one of the major St. Louis newspapers - who searched copies of that newspapers' files. The examination was enlightening in several ways. There was a classic example of what some educators feared. After the first statewide administration of BEST in 1978, the St. Louis Post Dispatch printed a list of the results telling "how school districts in the metropolitan St. Louis area performed on the state's Basic Essential Skills Test" (Zoeckler, "City, 7 County Districts Flub Test," 1978). Some of the results of the article were apparent in another article appearing a week later (Zoeckler, "Skills Test Marks Rattle Parents, School Officials," 1978). The following lengthy quote from that article gives an indication of the influence newspapers might have on education.

The publication of the district-by-district test scores - the Post-Dispatch published the scores last Sunday - raised questions whether schools should "teach the test" to raise their scores and enhance their academic reputations. Some parents even said that preparation would enhance property values because the districts would be considered good areas in which to live.

Despite its low overall showing among 17 city and suburban St. Louis districts, administrators in Normandy were hesitant to begin a crash program to upgrade scores. The test becomes mandatory statewide next spring. But several angry parents had different ideas at Wednesday night's Board of Education meeting.

"There are three things that are important to most families," said Grant Welland of 7349 Woodland Way, "and that's children, money and winning."
He said the test asked good questions and he thought "it would be better if we did better on the BEST sooner."

Arthur Busekist, a teacher in the Parkway District but a Normandy district resident, urged the administration to "push harder for this year."

And board member Hugo Selinger said that the 1979 BEST results were crucial for the district. "We will have to start doing something now," he said, responding to the administration plans to wait until 1980 to make curriculum changes geared toward the test.

In some school districts, administrators were angered over the publication of the district-by-district results, but this did not stop residents from complaining about their district's performance.

Danny Franklin, the St. Louis school official in charge of testing, said that city children performed about as well as he had expected but much lower than others had expected. But publicizing the results was placing schools in a position "in which we must look good." He said the city schools did not rank high and "we're catching H-E-double-L for it."

At a parents-teachers meeting at Hixson Junior High School in Webster Groves Tuesday night, several parents expressed concern over the district results even though they were above the state average.

One parent said that school officials would find the results "hard to explain when we go for the tax increase."

The article indicates clearly that test results are misunderstood and perhaps misused by the public. To discuss the effect of test scores or property values, or link test scores to tax increases, or to feel that low test scores in a district are examples of not "winning" suggests that educators have not communicated just what the scores mean.

The reporting of test scores in such a competitive manner was not limited to St. Louis. The Kansas City Times carried
an article entitled "Outlying Schools Score Better" on May 1, 1979. That article also included the following:

Wheeler, (Superintendent of Kansas City Schools) in passing out the results to board members, said he believed that comparing how students at each of the schools scored was a misuse of the test. 'It causes great anxiety on the part of those of us that understand test scores," he said.

The test, he said is criterion-referenced, not normed-referenced, meaning that the scores show how each student handled the materials, not how he scored in relation to everyone else taking the test. (Fox, "Outlying Schools Score Better", 1979)

There was a different tone to the editorial treatment of minimum competency testing in Missouri than in Florida and Oregon. While the editorials reviewed were generally supportive of the idea of minimum competency testing there appeared to be some caution in some of them.

Students should learn how to read, write, do mathematics and know how to use these skills in their daily lives. But testing should not hang one more stigma of failure around the neck of a child. It should, instead, guide officials to change educational methods or goals where necessary. More than a politically popular idea or catchy phrase is needed to ensure a literate population. ("Testing as a Tool", 1979)

Missouri school administrators now hold in their hands a fresh tool for education with the results of the Basic Essential Skills Test....It's not heartening to see the American passion for competition rearing a noisy head over the results of BEST scores. The notion that someone is doing well only if someone else is doing poorly seems counterproductive in the classroom. The multiplication of variables in schools, to say nothing of districts, makes it difficult, if not impossible, to compare numerical percentages of score results between districts, concluding that some flunked while others achieved brillantly....The BEST scores provide too valuable a tool for anyone to waste as a political football. ("Means to an End", 1979)
Despite caution exhibited in some editorials, it is still the case that very many of the editorials were extremely supportive of minimum competency testing and typified by those found in the St. Louis Globe-Democrat.

"Such a test (for high school graduation), being considered by educators in Missouri, is overdue." ("State Board on Target", 1976)

Passing a minimum competency test should be a requirement for graduation from Missouri High Schools. ("Testing for Graduation", 1977)

The Basic Essential Skills Test is an excellent idea because it gives school districts a good means of evaluating the effectiveness of their teaching.... There will probably be some opposition to this. But if a student can't pass a test in basic skills why should he be given a diploma? A diploma is supposed to certify that a student has mastered these basic skills. But too often diplomas are awarded to those who can't perform simple mathematics or write a sentence. ("St. Louis Drags Down the Average", 1978)

Legislators - All available evidence suggests that the Missouri Legislature is supportive of minimum competency tests. In addition to the fact that bills continue to be introduced and hearings continue to be held, legislators continue to be very vocal in their support. In the "Legislative Report" newspaper column, the State Representative from District 155 asserts:

There has been much interest in testing of students by the State Department of Education in recent years in the Missouri General Assembly. As a result monies have been appropriated for testing and the proposal is finally becoming a reality.

There have been many complaints that students are graduating or not finishing school, and they do not have the ability to read, spell, comprehend,
etc. and as a result are not prepared for real adult life.

The legislature has thought for a number of years that the schools are not getting the proper education over to the students and as a result students are graduating without the basic skills needed. (Proffer, "Legislative Report," 1976)

Further evidence of legislative support is given by another newspaper article about the then "proposed" competency test in Missouri.

"I think this is something the public wants" said Heflin, who is chairman of the House Appropriation subcommittee on Education, "and I know that a test of this nature is something which the legislature wants in Missouri. ("Competency Tests Needed Says Heflin", 1976)

Educators - Missouri newspapers also printed the concerns and objectives of educators. In a typical article ("Competency tests hit", 1976), four different superintendents were cited as voicing objections to the test.

"...We have children who can't learn to read and write. We need to accept this fact and then do what we can for every child."...."We're expected to take students to school with IQs below 50...and then to expect us to bring them up to a certain level of competency in reading or math is ridiculous. It's asinine!"...."I'm not sure we can determine what a person should know to be competent in this day and age."...."the emphasis should be on keeping students in school and providing for them "as best we can."

While the tone set by the newspaper media is generally favorable regarding minimum competency testing and BEST there are more reports of dissent and dissatisfaction with the state's
minimum competency tests than were found in the examination of the newspapers in Florida. This may indicate something about the reporting done in these states. However, it is more likely that it reflects the fact that educators in Florida are more favorably disposed to minimum competency testing than educators in Missouri.

Missouri Department of Education - Officials in the Missouri Department of Education do not support the establishment of a single statewide test as a criterion for high school graduation. After the mandate by the State Board of Education, officials supported the BEST test but tried to put its importance in perspective.

It is an important step forward for our total state testing program and improvement of our curriculum in the basic skills. (Mallory cited in Burgess, "Missouri Public Schools to use competency tests," 1976)

It became clear during the on-site visit that the official position of the department is to oppose the use of a BEST as a graduation requirement. However, they defend the test as one of several tests used in the Missouri testing and assessment program.

The purpose of BEST is listed in a department publication.

To identify the strengths and weaknesses of eighth-grade students on objectives in reading/language arts, math, and government/economics related to living skills and to assist the teacher in planning a developmental program appropriate to individual student needs. (Missouri Testing and Assessment Program, 1979, p. 7)

Department officials worry about misuse of test results. They have developed materials to explain BEST (Questions & Answers about the BEST; Examples of Test Items from the Basic Essential Skills
Test (BEST)) and to aid Missouri educators (Activity Book For The Missouri Basic Essential Skills Test - Mathematics Objectives; Guide for the Basic Essential Skills Test; Curriculum Memo Supplement).

The Department also published a document entitled Basic Math Skills for Missouri Students. (1978). The document, which lists objectives for each grade level, also includes the statement

The challenge of defining the minimal mathematics competencies or the basic skills that are needed by a citizen in contemporary society is probably impossible. (p. 1)

The Missouri Department of Education has conducted a Statewide Assessment Project for several years and has developed several publications in connection with the project: Educational Objectives for the State of Missouri; Educational Goals for the State of Missouri; Performance Indicators for Educational Objectives for the State of Missouri - Grade 12; A Guide for Interpretation and Utilization of Assessment Data; Interpretive Report Grade 12 Assessment I Fall 1975; and, Interpretive Report Grade 6 Assessment I 1976-1977. The Department feels that BEST is but one component of a total testing program that it has been working on for several years. And while they have published support materials for BEST, the above list indicates that other tests in the program also had support materials.
Case Study

Case Study Components

Literature and Visit

The preceding sections have drawn upon a literature review and the on-site visit to Missouri's Department of Education in describing the evolution and status of minimum competency testing. It was in this context that the survey concerning minimum competency testing was conducted in 1980.

Survey

For Missouri recipients the survey did specifically refer to the Basic Essential Skills Test (BEST). Other than this, the survey sent to Missouri was identical to those sent to the other three states being studied. Sampling techniques used for Missouri are as follows.

There are 114 counties in Missouri plus the city of St. Louis which is not considered to be in any county. 1970 census data were used to determine a county-to-state and St. Louis City-to-state population ratio. Then using an appropriate conversion factor (30 elementary principals, 70 secondary principals, and 100 each secondary mathematics teachers, and 100 elementary teachers were to be chosen) the number of survey recipients from each county or group of counties in small population areas, or St. Louis was determined. The Missouri Department of Education supplied a printout of all secondary mathematics teachers by county. Therefore, recipients in this population were determined by numbering the teachers within each county and then using a random number chart to select recipients. For the other three populations, the Missouri Education
Directory was used and samples were selected in a manner identical to the one used with Florida samples. Data regarding the return rate is found in Table 51.

Table 51

Missouri Response Rate on Survey

<table>
<thead>
<tr>
<th>Population</th>
<th>Number of Surveys Mailed</th>
<th>Number of Surveys Returned</th>
<th>Percentage of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>108</td>
<td>76</td>
<td>70%</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>104</td>
<td>74</td>
<td>72%</td>
</tr>
<tr>
<td>Elementary Principals</td>
<td>33</td>
<td>23</td>
<td>70%</td>
</tr>
<tr>
<td>Secondary Principals</td>
<td>73</td>
<td>54</td>
<td>75%</td>
</tr>
</tbody>
</table>

Survey Results

Table 52 indicates that a plurality of survey respondents were from small towns or rural areas. Given the state characteristics - only two urban centers - this is not surprising.
Table 52
Missouri Respondent Characteristics

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Town or Rural</td>
<td>47.3%</td>
</tr>
<tr>
<td>Suburban</td>
<td>31.7%</td>
</tr>
<tr>
<td>Urban</td>
<td>19.2%</td>
</tr>
<tr>
<td>Other</td>
<td>1.3%</td>
</tr>
<tr>
<td>Missing</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

An attempt was made to determine the kind of expertise and experience respondents had in the development, interpretation, and use of test results (see Table 53). A majority of both teachers and administrators indicated that they had taken a course concerned specifically with tests and measurements. About half the elementary teachers and secondary principals had received instruction in interpreting and using tests given by the state or district. About three-fourths of the elementary principals and one-fourth of the secondary mathematics teachers indicated that they had received this same instruction. There is also a wide disparity among the population's involvement in developing minimum competency tests at the state or local level - ranging from nearly one-third of the secondary mathematics teachers to only 4.3 percent of the elementary principals.

The next item on the survey attempted to determine the familiarity of the respondents with minimum competency tests used for different purposes (see Table 54). The survey item may have caused some confusion because the question was asked in terms of
<table>
<thead>
<tr>
<th>Test Participants</th>
<th>24.5</th>
<th>9.3</th>
<th>31.5</th>
<th>46.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>91.3</td>
<td>73.9</td>
<td>21.7</td>
<td></td>
</tr>
<tr>
<td>Principals</td>
<td>30.4</td>
<td>7.0</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Teachers</td>
<td>55.4</td>
<td>23.0</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>32.4</td>
<td>16.2</td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19.2</td>
<td>0.0</td>
<td>9.2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Participants</th>
<th>50.7</th>
<th>71.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>11.2</td>
<td></td>
</tr>
<tr>
<td>Principals</td>
<td>32.9</td>
<td></td>
</tr>
<tr>
<td>Teachers</td>
<td>5.7</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>71.2</td>
<td></td>
</tr>
</tbody>
</table>

- I have been involved in the development of minimum competency tests at the state or local level.
- I have not received instruction in interpreting and using test results, but one member of our staff has and this person serves as a resource for the rest of our staff.
- I have not received instruction but documents are available to assist in test score interpretation and utilization.
- I have received instruction in interpreting and using tests given by state or district.

Test Experctise of Measurement Respondents

| TABLE 53 |

221
<table>
<thead>
<tr>
<th>Other.</th>
<th>Minimum Competency Testing is done for diagnostic and remedial purposes.</th>
<th>Passage of a minimum competency test as a requirement for grade-to-grade promotion.</th>
<th>No minimum competency test is given.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>37.0</td>
<td>9.4</td>
<td>13.2</td>
</tr>
<tr>
<td>52.8</td>
<td>1.9</td>
<td>4.4</td>
<td>17.4</td>
</tr>
<tr>
<td>65.8</td>
<td>8.2</td>
<td>9.2</td>
<td>19.2</td>
</tr>
<tr>
<td>62.1</td>
<td>4.3</td>
<td>4.7</td>
<td>28.4</td>
</tr>
<tr>
<td>27.0</td>
<td>7.4</td>
<td>3.4</td>
<td>2.7</td>
</tr>
<tr>
<td>17.8</td>
<td>6.2</td>
<td>11.3</td>
<td>12.3</td>
</tr>
</tbody>
</table>

Districts of Missouri Respondents

<table>
<thead>
<tr>
<th>Minimum Competency Test Usage in (in percent)</th>
</tr>
</thead>
</table>

TABLE 5A

222
"your school or district." It was obvious from the responses that some respondents answered in terms of their own schools, others answered in terms of the situation in the entire district. This somewhat limits the usefulness of the item, at least in terms of using the results in a Chi-square analysis, but even with this limitation, the data is still interesting and worth consideration. Those respondents reporting that no minimum competency test is given ranged from 2.7 percent for secondary teachers to 17.4 percent for elementary principals. Apparently, the vast majority of Missouri respondents felt that a minimum competency test is given.

The next two items (Tables 55 and 56) were designed to indicate the types of minimum competency tests respondents were familiar with and also to determine the way the standards or cutoff scores were determined. These two items also contained the unfortunate and previously discussed phrase "school or district" and again this limits interpretation of this item.

As evidence of this confusion, the responses on the item that asked if BEST was given in the "school or district." The positive responses were overwhelming - over 90 percent for all samples. Yet, the test was given in all districts - and only those elementary schools only if they included an eighth grade.
<table>
<thead>
<tr>
<th>Secondary Principals</th>
<th>Elementary Principals</th>
<th>Secondary Teachers</th>
<th>Elementary Teachers</th>
<th>BEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>98.1</td>
<td>91.3</td>
<td>93.2</td>
<td>91.8</td>
<td></td>
</tr>
<tr>
<td>11.1</td>
<td>17.4</td>
<td>5.4</td>
<td>27.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other tests developed by the State.*</td>
<td></td>
</tr>
<tr>
<td>24.1</td>
<td>17.4</td>
<td>18.9</td>
<td>15.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tests developed on the local level.</td>
<td></td>
</tr>
<tr>
<td>9.3</td>
<td>13.0</td>
<td>1.4</td>
<td>9.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Test prepared by a commercial test company to be used specifically as a minimum competency test.</td>
<td></td>
</tr>
<tr>
<td>44.4</td>
<td>43.5</td>
<td>14.9</td>
<td>54.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Test prepared by a commercial test company that is a general achievement test (for example, the California Achievement Test).*</td>
<td></td>
</tr>
<tr>
<td>3.7</td>
<td>8.7</td>
<td>2.7</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other.</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 56

Perception of the Establishing Cutoff or Passing Scores in Missouri (in percent)

<table>
<thead>
<tr>
<th></th>
<th>School Administration</th>
<th>A committee of school teachers and administrators</th>
<th>A committee that included parents or business people as well as professional educators.</th>
<th>The state department or state board of education</th>
<th>Test Manufacturers</th>
<th>Other.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>6.9</td>
<td>12.5</td>
<td>5.6</td>
<td>56.9</td>
<td>13.9</td>
<td>6.9</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>4.1</td>
<td>13.5</td>
<td>1.4</td>
<td>71.6</td>
<td>5.4</td>
<td>6.8</td>
</tr>
<tr>
<td>Elementary Principals</td>
<td>8.7</td>
<td>21.7</td>
<td>21.7</td>
<td>60.9</td>
<td>4.3</td>
<td>4.3</td>
</tr>
<tr>
<td>Secondary Principals</td>
<td>3.7</td>
<td>14.8</td>
<td>5.6</td>
<td>83.3</td>
<td>1.9</td>
<td>5.6</td>
</tr>
</tbody>
</table>

*p < .01
The Missouri educators responding to this survey were also asked about their attitudes toward minimum competency testing (see Table 57).

**TABLE 57**

| Missouri Educators' Perceptions of Appropriate Use for Minimum Competency Tests |
| % favoring | % favoring | % favoring | % opposed | % undecided |
| for H.S. graduation* | for grade-to grade promotion* | for diagnosis | |
|----------------------|--------------------------|---------------|----------|-----------|
| elementary teachers  | 43.8 | 31.5 | 67.1 | 0.0 | 16.4 |
| secondary teachers   | 64.9 | 43.2 | 70.3 | 5.4 | 9.5 |
| elementary principals | 26.1 | 21.7 | 82.6 | 4.3 | 13.0 |
| secondary principals | 33.3 | 14.8 | 75.9 | 3.7 | 18.5 |

*p < .01

Rows do not total 100 because survey respondents checked more than one response. It is interesting to note that in general teachers were more positive than administrators, and secondary personnel more positive than elementary personnel toward using a test for high school graduation. There were significant differences in population responses at the .01 level on both the high school graduation and promotion item. Strongest support from all samples was found for diagnosis. Very few respondents were opposed to minimum competency testing "for any reason." A relatively large percentage of the
Samples were undecided.

Survey respondents were also asked about their opinions of the attitudes of other groups. Results are given in Table 58. Several interesting things emerge when studying this table. While 64 percent of secondary teachers responding to the survey favored minimum competency testing for high school graduation only about 38 percent of this sample thought that teachers supported testing for graduation. Similar patterns exist for the other samples.

Another finding is that while the State Department of Education in Missouri does not support testing for high school graduation only the secondary principals seem to know that, for each of the other samples at least 70 percent of the respondents either think the department does support such a test, or they report they do not know the attitude of the Missouri Department of Education.

Two other survey items attempted to gauge attitudinal positions of the teachers. Teachers were asked if the achievement and attitudes of students were higher, the same, or lower than those of students in previous years. Results are in Tables 59 and 60. Results indicate that most teachers, both elementary and secondary, perceive students' attitudes toward mathematics and achievement to be the same as formerly. However, on both items more secondary than elementary teachers see students as being "lower".

One might conjecture that teachers who felt achievement or attitude was lower might more likely favor minimum competency
Missouri Educators' Perceptions of the Attitudes of Other Groups Toward Minimum Competency Testing (in percent)

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Secondary Principals</th>
<th>Elementary Principals</th>
<th>Secondary Teachers</th>
<th>Elementary Teachers</th>
<th>Parents</th>
<th>Media</th>
<th>Students</th>
<th>Teachers</th>
<th>Administration</th>
<th>Local School Board</th>
<th>State Legislators</th>
<th>State Department of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supportive of the minimum competency testing</td>
<td>26.4 10.5 11.3 7.2</td>
<td>Parents</td>
<td>28.3 31.6 18.3 14.1</td>
<td>Students</td>
<td>3.8 0.0 2.9 3.0</td>
<td>Administration</td>
<td>1.9 0.0</td>
<td>State Legislators</td>
<td>1.9 0.0 0.0 1.5</td>
<td>State Department of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supportive of the minimum competency testing, only</td>
<td>34.0 21.1 31.0 14.1</td>
<td>Teachers</td>
<td>13.5 21.1 16.9 9.0</td>
<td>Local School Board</td>
<td>0.0 0.0</td>
<td>State Legislators</td>
<td>3.8 0.0 0.0</td>
<td>Education</td>
<td>19.2 22.2 37.1 30.3</td>
<td>State Department of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supportive of the minimum competency testing for high school graduation purposes (i.e., remedial students identification)</td>
<td>22.6 10.5 4.2 7.5</td>
<td>Parents</td>
<td>11.3 15.8 8.6 3.0</td>
<td>Administration</td>
<td>7.5 16.7 2.8</td>
<td>Local School Board</td>
<td>0.0 0.0</td>
<td>State Legislators</td>
<td>1.9 0.0 0.0 1.5</td>
<td>State Department of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supportive of the minimum competency testing for program evaluation only</td>
<td>32.1 42.1 25.0 32.8</td>
<td>Secondary</td>
<td>19.2 21.1 36.6 28.4</td>
<td>Teachers</td>
<td>3.8 0.0</td>
<td>5.7 5.6</td>
<td>1.4 1.5</td>
<td>State Legislators</td>
<td>9.4 31.6 40.8 39.1</td>
<td>State Department of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not supportive of the minimum competency testing</td>
<td>3.8 5.3 1.4 3.0</td>
<td>Secondary</td>
<td>13.5 21.1 16.9 9.0</td>
<td>Teachers</td>
<td>3.8 0.0</td>
<td>5.7 5.6</td>
<td>1.4 1.5</td>
<td>State Legislators</td>
<td>9.4 31.6 40.8 39.1</td>
<td>State Department of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>This group supports the attitude</td>
<td>15.1 0.0 19.4 13.4</td>
<td>Media</td>
<td>28.3 31.6 18.3 14.1</td>
<td>Students</td>
<td>11.3 5.3 7.0 0.0</td>
<td>Teachers</td>
<td>3.8 0.0 2.9 3.0</td>
<td>Administration</td>
<td>1.9 0.0 0.0</td>
<td>State Department of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neither supports nor opposes the attitude</td>
<td>26.4 10.5 11.3 7.2</td>
<td>Parents</td>
<td>28.3 31.6 18.3 14.1</td>
<td>Students</td>
<td>11.3 5.3 7.0 0.0</td>
<td>Teachers</td>
<td>3.8 0.0 2.9 3.0</td>
<td>Administration</td>
<td>1.9 0.0 0.0</td>
<td>State Department of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I don't know the attitude</td>
<td>24.5 42.1 50.0 43.3</td>
<td>Media</td>
<td>11.3 31.6 23.9 45.3</td>
<td>Students</td>
<td>0.0 10.5 11.3 10.4</td>
<td>Teachers</td>
<td>1.9 10.5 22.9 21.2</td>
<td>Administration</td>
<td>9.4 10.7 40.8 43.9</td>
<td>Local School Board</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I oppose the attitude</td>
<td>9.4 31.6 40.8 39.1</td>
<td>Parents</td>
<td>24.5 42.1 50.0 43.3</td>
<td>Media</td>
<td>11.3 31.6 23.9 45.3</td>
<td>Students</td>
<td>0.0 10.5 11.3 10.4</td>
<td>Teachers</td>
<td>1.9 10.5 22.9 21.2</td>
<td>Administration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data not available</td>
<td>44.2 27.8 57.7 60.6</td>
<td>State Legislators</td>
<td>19.2 22.2 37.1 30.3</td>
<td>State Department of Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
testing for graduation or grade-to-grade promotion. Such was not the case. Analysis indicated no statistical difference between groups on this question.

**TABLE 59**

Missouri Teachers' Perceptions of Entering Students Mathematics Achievement  (in percent)

<table>
<thead>
<tr>
<th></th>
<th>higher</th>
<th>same</th>
<th>lower</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elementary Teachers</strong></td>
<td>13.0</td>
<td>65.2</td>
<td>21.7</td>
</tr>
<tr>
<td><strong>Secondary Teachers</strong></td>
<td>9.7</td>
<td>45.8</td>
<td>44.4</td>
</tr>
</tbody>
</table>

**TABLE 60**

Missouri Teachers' Perceptions of Entering Students Mathematics Attitudes*  (in percent)

<table>
<thead>
<tr>
<th></th>
<th>higher</th>
<th>same</th>
<th>lower</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Elementary Teachers</strong></td>
<td>23.9</td>
<td>66.2</td>
<td>9.9</td>
</tr>
<tr>
<td><strong>Secondary Teachers</strong></td>
<td>13.7</td>
<td>53.4</td>
<td>32.9</td>
</tr>
</tbody>
</table>

*p < .01
Another type of teacher attitude was also covered on the survey. The item and the results are given in Table 61. Columns do not total 100 percent because some respondents indicated more than one response. In general, it appeared that elementary teachers felt less "pressure" as a result of BEST than did secondary teachers. This is interesting because in Missouri the statewide competency test - BEST - was initially given at the end of the eighth grade - and the content was elementary mathematics. Elementary teachers did indicate more pressure to go "back-to basics" and to have their students perform well on standardized tests than did secondary teachers. The difference was statistically significant at the .01 level.
## TABLE 61

**Missouri Teachers' Feelings Concerning Pressures**
*(in percent)*

<table>
<thead>
<tr>
<th>Perception</th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teachers in my school do not seem to feel the pressures you have described.</td>
<td>34.2</td>
<td>27.4</td>
</tr>
<tr>
<td>The teachers in my school seem to feel a general pressure to go back to the basics.</td>
<td>63.0</td>
<td>56.2</td>
</tr>
<tr>
<td>The teachers in my school seem to feel pressure as a direct result of minimum competency test that is given to our students.</td>
<td>24.7</td>
<td>39.7</td>
</tr>
<tr>
<td><em>Teachers in my school seem to feel pressure to have their students perform well on standardized tests, but this pressure is not directly a result of minimum competency testing.</em></td>
<td>52.1</td>
<td>19.2</td>
</tr>
</tbody>
</table>

*<sup>p < .01</sup>
Respondents were asked to choose the single most valid reason for supporting minimum competency testing from a list of eight such items found in the literature. There was a statistically significant difference between the responses of the various population samples. (see Table 62). A majority of both teacher samples selected the reason "To make sure students are prepared for jobs or post-high school education." This differed markedly from the principal sample responses. A plurality of the elementary principals felt the most valid reason for supporting minimum competency testing was "To identify remedial students." While a plurality of the secondary principals selected the same reason as a majority of the teacher samples, the percentage of secondary principals selecting that reason was only 24.5. The data indicates that secondary principals did not reach consensus on this item.

There was a great deal more agreement among the four samples when they were asked to indicate the single most valid reason for opposing minimum competency testing (see Table 63). There was no statistical difference between the answers of the various sample populations. A plurality of all samples indicated "It will be used to judge schools and teachers" was the most valid reason for opposing minimum competency testing. This reason is not discussed in the literature as frequently as some of the others listed, but may be the most pragmatic answer for the individuals to whom "accountability" is not an abstract concept, but rather a personal obligation that has been given them.
<table>
<thead>
<tr>
<th>Reason</th>
<th>ET</th>
<th>ST</th>
<th>EP</th>
<th>SP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>To motivate students</td>
<td>5.8</td>
<td>6.8</td>
<td>4.5</td>
<td>3.8</td>
<td>5.5</td>
</tr>
<tr>
<td>To make sure schools do their jobs</td>
<td>4.3</td>
<td>2.7</td>
<td>4.5</td>
<td>3.8</td>
<td>3.7</td>
</tr>
<tr>
<td>To make sure students are prepared for jobs or post-high school education</td>
<td>59.4</td>
<td>53.4</td>
<td>18.2</td>
<td>24.5</td>
<td>44.7</td>
</tr>
<tr>
<td>To guarantee a focus on the basics in schools</td>
<td>0.0</td>
<td>0.0</td>
<td>22.7</td>
<td>15.1</td>
<td>6.0</td>
</tr>
<tr>
<td>To raise standardized test scores</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>To give meaning to the high school diploma</td>
<td>7.2</td>
<td>17.8</td>
<td>4.5</td>
<td>15.1</td>
<td>12.4</td>
</tr>
<tr>
<td>To identify remedial students</td>
<td>11.6</td>
<td>9.6</td>
<td>36.4</td>
<td>18.9</td>
<td>15.2</td>
</tr>
<tr>
<td>Other</td>
<td>0.0</td>
<td>1.4</td>
<td>4.5</td>
<td>1.9</td>
<td>1.4</td>
</tr>
<tr>
<td>More than one</td>
<td>11.6</td>
<td>8.2</td>
<td>4.5</td>
<td>17.0</td>
<td>11.1</td>
</tr>
</tbody>
</table>

*p < .01
<table>
<thead>
<tr>
<th>Reason</th>
<th>ET</th>
<th>ST</th>
<th>EP</th>
<th>SP</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>It will narrow the curriculum</td>
<td>11.8</td>
<td>14.9</td>
<td>4.5</td>
<td>7.4</td>
<td>11.0</td>
</tr>
<tr>
<td>&quot;Minimum competencies&quot; are not identifiable</td>
<td>8.8</td>
<td>6.8</td>
<td>18.2</td>
<td>13.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Test development techniques are not good enough</td>
<td>13.2</td>
<td>9.5</td>
<td>18.2</td>
<td>14.8</td>
<td>12.8</td>
</tr>
<tr>
<td>The potential for racial or cultural discrimination is great</td>
<td>8.8</td>
<td>1.4</td>
<td>0.0</td>
<td>7.4</td>
<td>5.0</td>
</tr>
<tr>
<td>It will increase the high school dropout rate</td>
<td>5.9</td>
<td>4.1</td>
<td>0.0</td>
<td>5.6</td>
<td>4.6</td>
</tr>
<tr>
<td>It will stifle creative teaching</td>
<td>4.4</td>
<td>1.4</td>
<td>4.5</td>
<td>3.7</td>
<td>3.2</td>
</tr>
<tr>
<td>It will be used to judge schools and teachers</td>
<td>41.2</td>
<td>54.1</td>
<td>45.5</td>
<td>38.9</td>
<td>45.4</td>
</tr>
<tr>
<td>Other</td>
<td>1.5</td>
<td>5.4</td>
<td>9.1</td>
<td>0.0</td>
<td>3.2</td>
</tr>
<tr>
<td>More than one</td>
<td>4.4</td>
<td>2.7</td>
<td>0.0</td>
<td>9.3</td>
<td>4.6</td>
</tr>
</tbody>
</table>
There were two questions on the survey designed to determine the perception of education regarding the impact of minimum competency tests. The first of these items asked educators to indicate whether a specific thing was occurring primarily as a result of minimum competency testing; occurring partially as a result of minimum competency testing; occurring, but not as a result of minimum competency testing; not occurring; or that the respondent could not judge. Results are given in Table 64. Several things are readily apparent. In no case does a majority of any population sample indicate something is occurring primarily or partially as a result of minimum competency testing. Since the Missouri test is given in eighth grade and is not a requirement for high school graduation, it is not surprising that elementary teachers sometimes seem more likely to feel things are happening primarily or partially as a result of minimum competency testing. Examples of this are:

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stricter grading</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25.4</td>
<td>11.3</td>
</tr>
<tr>
<td>More students failing grades or courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20.0</td>
<td>8.4</td>
</tr>
<tr>
<td>More frequent testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>45.3</td>
<td>31.0</td>
</tr>
<tr>
<td>More homework</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22.2</td>
<td>12.8</td>
</tr>
</tbody>
</table>
TABLE 64  
Missouri Educators' Perceptions of MCT Impact of Minimum Competency Testing  
(in percent)  

<table>
<thead>
<tr>
<th>Impact Area</th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>lower enrollment in elective courses</strong></td>
<td>5.4</td>
<td>3.6</td>
<td>3.6</td>
<td>14.3</td>
</tr>
<tr>
<td><strong>fewer field trips</strong></td>
<td>0.0</td>
<td>6.8</td>
<td>30.5</td>
<td>39.0</td>
</tr>
<tr>
<td><strong>more frequent testing</strong></td>
<td>21.9</td>
<td>23.4</td>
<td>9.4</td>
<td>23.4</td>
</tr>
<tr>
<td><strong>more remedial classes</strong></td>
<td>17.2</td>
<td>29.7</td>
<td>34.4</td>
<td>9.4</td>
</tr>
<tr>
<td><strong>more homework</strong></td>
<td>11.1</td>
<td>11.1</td>
<td>17.5</td>
<td>27.0</td>
</tr>
<tr>
<td><strong>fewer mini-courses</strong></td>
<td>0.0</td>
<td>5.4</td>
<td>5.4</td>
<td>25.0</td>
</tr>
<tr>
<td><strong>more drill and memorization</strong></td>
<td>15.6</td>
<td>21.9</td>
<td>31.3</td>
<td>14.1</td>
</tr>
<tr>
<td><strong>stricter grading</strong></td>
<td>15.9</td>
<td>9.5</td>
<td>15.9</td>
<td>20.6</td>
</tr>
<tr>
<td><strong>more students falling courses or grades</strong></td>
<td>10.0</td>
<td>10.0</td>
<td>6.7</td>
<td>26.7</td>
</tr>
<tr>
<td><strong>more individualized instruction</strong></td>
<td>0.0</td>
<td>15.8</td>
<td>68.4</td>
<td>10.5</td>
</tr>
<tr>
<td><strong>lower enrollments</strong></td>
<td>2.0</td>
<td>2.0</td>
<td>26.0</td>
<td>66.0</td>
</tr>
<tr>
<td><strong>fewer field trips</strong></td>
<td>2.0</td>
<td>2.0</td>
<td>36.7</td>
<td>57.1</td>
</tr>
<tr>
<td><strong>more frequent testing</strong></td>
<td>21.9</td>
<td>23.4</td>
<td>9.4</td>
<td>23.4</td>
</tr>
<tr>
<td><strong>more remedial classes</strong></td>
<td>17.2</td>
<td>29.7</td>
<td>34.4</td>
<td>9.4</td>
</tr>
<tr>
<td><strong>more homework</strong></td>
<td>11.1</td>
<td>11.1</td>
<td>17.5</td>
<td>27.0</td>
</tr>
<tr>
<td><strong>fewer mini-courses</strong></td>
<td>0.0</td>
<td>5.4</td>
<td>5.4</td>
<td>25.0</td>
</tr>
<tr>
<td><strong>more drill and memorization</strong></td>
<td>15.6</td>
<td>21.9</td>
<td>31.3</td>
<td>14.1</td>
</tr>
<tr>
<td><strong>stricter grading</strong></td>
<td>15.9</td>
<td>9.5</td>
<td>15.9</td>
<td>20.6</td>
</tr>
<tr>
<td><strong>more students falling courses or grades</strong></td>
<td>10.0</td>
<td>10.0</td>
<td>6.7</td>
<td>26.7</td>
</tr>
<tr>
<td><strong>more individualized instruction</strong></td>
<td>0.0</td>
<td>15.8</td>
<td>68.4</td>
<td>10.5</td>
</tr>
<tr>
<td><strong>lower enrollments</strong></td>
<td>2.0</td>
<td>2.0</td>
<td>26.0</td>
<td>66.0</td>
</tr>
<tr>
<td><strong>fewer field trips</strong></td>
<td>2.0</td>
<td>2.0</td>
<td>36.7</td>
<td>57.1</td>
</tr>
<tr>
<td><strong>more frequent testing</strong></td>
<td>21.9</td>
<td>23.4</td>
<td>9.4</td>
<td>23.4</td>
</tr>
<tr>
<td><strong>more remedial classes</strong></td>
<td>17.2</td>
<td>29.7</td>
<td>34.4</td>
<td>9.4</td>
</tr>
<tr>
<td><strong>more homework</strong></td>
<td>11.1</td>
<td>11.1</td>
<td>17.5</td>
<td>27.0</td>
</tr>
<tr>
<td><strong>fewer mini-courses</strong></td>
<td>0.0</td>
<td>5.4</td>
<td>5.4</td>
<td>25.0</td>
</tr>
<tr>
<td><strong>more drill and memorization</strong></td>
<td>15.6</td>
<td>21.9</td>
<td>31.3</td>
<td>14.1</td>
</tr>
<tr>
<td><strong>stricter grading</strong></td>
<td>15.9</td>
<td>9.5</td>
<td>15.9</td>
<td>20.6</td>
</tr>
<tr>
<td><strong>more students falling courses or grades</strong></td>
<td>10.0</td>
<td>10.0</td>
<td>6.7</td>
<td>26.7</td>
</tr>
<tr>
<td><strong>more individualized instruction</strong></td>
<td>0.0</td>
<td>15.8</td>
<td>68.4</td>
<td>10.5</td>
</tr>
<tr>
<td><strong>lower enrollments</strong></td>
<td>2.0</td>
<td>2.0</td>
<td>26.0</td>
<td>66.0</td>
</tr>
<tr>
<td><strong>fewer field trips</strong></td>
<td>2.0</td>
<td>2.0</td>
<td>36.7</td>
<td>57.1</td>
</tr>
</tbody>
</table>

*Figures are rounded to one decimal point.*
On six of the ten possible occurrences there were statistical differences between the responses of population samples. Sometimes this may be the result of the differences in elementary and secondary activities primarily or partially as a result of MCT. An example would be "fewer mini-courses." However other times the differences may reflect differences in perceptions of teachers and administrators. Witness "more homework" twenty-seven percent of elementary teachers felt that was not occurring — but 57 percent of elementary principals felt it was not occurring. A similar split occurred on the secondary level where 69.4 percent of the secondary principals reported "not occurring" for "more students failing" — and 28.2 percent of secondary teachers reported not occurring for the same item. It should be noted that a sizable majority of all samples indicated more remedial classes were occurring. Principals were more likely than teachers to feel that this was not attributable to minimum competency testing. However this difference was not statistically significant. While students who do not pass BEST must continue to take the test until they pass it or graduate, there is no state mandate to require districts to provide remediation for students who do not pass. There was some indication that some districts do provide special remediation for these students. One newspaper article reported that in St Charles new teachers hired included "three instructors to teach classes for students who do not pass the BEST". (Kurtz, "St. Charles Board Oks hiring 13 More Teachers", 1978)
The data from this item seemed to indicate that minimum competency testing had not greatly impacted on the ten areas listed.

The second item designed to determine the impact was only on teacher surveys. The item listed sixteen mathematical topics and areas and asked teachers to indicate whether they spent more class time as a direct result of minimum competency testing; more class time but not as a direct result of minimum competency testing; less class time as a direct result of minimum competency testing; less class time but not as a direct result of minimum competency testing; or the same amount of time (see Table 65). At the .01 level there was no significant difference between the answers of the elementary teachers and those given by the secondary teachers. This may be a result of the fact that many of the items were not clearly identifiable as elementary or secondary content. Again in no case did a majority of either sample indicate more or less class time as a direct result of minimum competency testing. A plurality of both elementary and secondary teachers did indicate that more class time is being spent on "Story or Word Problems" as a direct result of minimum competency testing. A plurality of secondary teachers indicated more class time on the following topics as a direct result of minimum competency testing; Basic Facts; Review of Material from Previous Years; and Diagnosis of Individual Differences. Data suggested there were topics which the majority of teachers felt are receiving more class time regardless of the reason. For elementary teachers these included:
<table>
<thead>
<tr>
<th>Activity Description</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>4th Year</th>
<th>5th Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Facts</td>
<td>24.6</td>
<td>27.9</td>
<td>1.5</td>
<td>1.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Story or Word</td>
<td>30.7</td>
<td>35.7</td>
<td>2.9</td>
<td>2.9</td>
<td>0.0</td>
</tr>
<tr>
<td>How to use a calculator</td>
<td>0.0</td>
<td>1.8</td>
<td>0.0</td>
<td>4.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Problems requiring the use of a calculator</td>
<td>0.0</td>
<td>1.9</td>
<td>12.3</td>
<td>37.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Number bases other than 10</td>
<td>4.4</td>
<td>6.7</td>
<td>13.3</td>
<td>66.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Sets</td>
<td>7.5</td>
<td>13.1</td>
<td>38.8</td>
<td>38.8</td>
<td>0.0</td>
</tr>
<tr>
<td>Computation appropriate to course content</td>
<td>20.3</td>
<td>39.0</td>
<td>0.0</td>
<td>1.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Geometry</td>
<td>12.3</td>
<td>26.1</td>
<td>13.3</td>
<td>36.8</td>
<td>62.4</td>
</tr>
<tr>
<td>Enrichment</td>
<td>6.9</td>
<td>44.8</td>
<td>10.3</td>
<td>34.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Elementary computer topics</td>
<td>0.0</td>
<td>31.8</td>
<td>13.6</td>
<td>45.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Consumer topics</td>
<td>26.2</td>
<td>47.6</td>
<td>7.1</td>
<td>16.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Review of material from previous years</td>
<td>22.6</td>
<td>42.9</td>
<td>7.1</td>
<td>45.2</td>
<td>0.0</td>
</tr>
<tr>
<td>Practice</td>
<td>31.8</td>
<td>34.8</td>
<td>1.5</td>
<td>28.8</td>
<td>0.0</td>
</tr>
<tr>
<td>Individual Projects</td>
<td>6.9</td>
<td>13.6</td>
<td>15.9</td>
<td>54.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Diagnosis of individual differences</td>
<td>31.1</td>
<td>45.9</td>
<td>0.0</td>
<td>19.7</td>
<td>0.0</td>
</tr>
<tr>
<td>Activity Lessons using manipulatives</td>
<td>20.4</td>
<td>33.3</td>
<td>3.7</td>
<td>60.7</td>
<td>0.0</td>
</tr>
</tbody>
</table>

(top numbers-elementary, bottom numbers-secondary)
Basic Facts
Story or Word Problems
How to Use a Calculator
Computation Appropriate to Course Content
Enrichment
Consumer Topics
Review of Material from Previous Years
Practice
Diagnosis of Individual Differences
Activity Lessons Using Manipulation

It is not apparent what these teachers may be omitting to accommodate more time on these topics because "number bases other than 10," was the only topic on which a majority of elementary teachers reported spending less time.

A majority of secondary teachers indicated more time being spent on:

Basic Facts
Story or Word Problems
How to Use a Calculator
Consumer Topics
Review of Materials from Previous Years
Practice
Diagnosis of Individual Differences
A majority of secondary teachers reported that less time was being spent on:

**Number Bases Other Than 10.**

One survey item listed 25 topics and asked respondents to indicate which should be included on a high school graduation test. As in the previous chapters, for purposes of discussion, the topics were grouped under the basic skills areas identified by the NCSM. The results will be compared to the 15 topics on the mathematics portion of the BEST. These topics were listed previously in this chapter. No statistical differences occurred between population samples on any of the 25 items. The first four topics listed on the BEST list were concerned with computation of whole numbers, decimals, and fractions (see Table 66).

The survey results indicated strong support for computation. Three of the respondent samples gave 100 percent support to whole computations. There was slightly less support for computation with decimals though secondary teachers strongly supported this topic.
TABLE 66
Missouri Respondents’ Inclusion of Computation Skills (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computing with whole numbers</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>94.6</td>
<td>98.6</td>
</tr>
<tr>
<td>Computing with decimals</td>
<td>91.7</td>
<td>100.0</td>
<td>90.5</td>
<td>98.1</td>
<td>95.9</td>
</tr>
<tr>
<td>Computing with fractions</td>
<td>80.6</td>
<td>97.3</td>
<td>85.7</td>
<td>83.3</td>
<td>87.3</td>
</tr>
</tbody>
</table>

The fifth objective on the BEST involves business and consumer problems. And again survey results indicate Missouri educators are also supportive of these topics (see Table 67).

TABLE 67
Missouri Respondents’ Inclusion of Problem Solving and Applying Mathematics to Everyday Situations (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solving word problems</td>
<td>88.9</td>
<td>79.7</td>
<td>81.0</td>
<td>72.2</td>
<td>81.0</td>
</tr>
<tr>
<td>Using mathematics to solve consumer problems</td>
<td>90.3</td>
<td>89.2</td>
<td>95.2</td>
<td>87.0</td>
<td>89.6</td>
</tr>
</tbody>
</table>
BEST objective 6 involves solving problems using measures of length, areas and volumes and objective 14 involves making measurements in metric and English units. The survey results indicate that measuring with the standard system enjoys relatively strong support while the other two items, also on BEST, are less strongly supported (see Table 68).

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with the metric system</td>
<td>77.8</td>
<td>75.7</td>
<td>61.9</td>
<td>55.6</td>
<td>70.1</td>
</tr>
<tr>
<td>Measuring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with the standard system</td>
<td>90.3</td>
<td>79.7</td>
<td>76.2</td>
<td>92.6</td>
<td>86.0</td>
</tr>
<tr>
<td>Calculating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>areas and volumes</td>
<td>65.3</td>
<td>68.9</td>
<td>52.4</td>
<td>66.7</td>
<td>65.6</td>
</tr>
</tbody>
</table>
BEST objective 8 discussed charts, tables, graphs, maps and scale drawings, while objective 11 was the ability to determine an average. Map reading was deemed an appropriate skill by the majority of all respondents. The inclusion of graphs and tables was only moderately supported. This despite the fact that it was included on many basic skills lists (NCSM) and on the BEST itself. The mean, median, and mode were very weakly supported (see Table 69).

**TABLE 69**

*Missouri Respondents' Inclusion of Statistical Topics (in percent)*

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making and interpreting graphs</td>
<td>69.4</td>
<td>59.5</td>
<td>42.9</td>
<td>57.4</td>
<td>60.6</td>
</tr>
<tr>
<td>Determining the mean, median, and mode of a group of numbers</td>
<td>37.5</td>
<td>29.7</td>
<td>14.3</td>
<td>35.2</td>
<td>32.1</td>
</tr>
<tr>
<td><em>Reading a map</em></td>
<td>95.8</td>
<td>77.0</td>
<td>90.5</td>
<td>88.9</td>
<td>87.3</td>
</tr>
</tbody>
</table>

*p < .01*
Objective 13 on BEST asked students to identify simple plane and solid geometric figures. This received some support from survey respondents though teachers were more supportive than principals. The other two "geometric" items received virtually no support (see Table 70).

<table>
<thead>
<tr>
<th>Missouri Respondents' Inclusion of Geometry (in percent)</th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing basic properties of geometric figures</td>
<td>54.2</td>
<td>58.1</td>
<td>38.1</td>
<td>35.2</td>
<td>49.3</td>
</tr>
<tr>
<td>Doing simple geometric proof</td>
<td>18.1</td>
<td>6.8</td>
<td>19.0</td>
<td>11.1</td>
<td>12.7</td>
</tr>
<tr>
<td>Solving problems using right triangle trigonometry</td>
<td>5.6</td>
<td>4.1</td>
<td>4.8</td>
<td>3.7</td>
<td>4.5</td>
</tr>
</tbody>
</table>

BEST objective 10 related to interpretation of "simple probability and statistical statements." Again there was very weak support for including this item on a graduation test (see Table 71).
TABLE 71
Missouri Respondents' Inclusion of Probability (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding</td>
<td>34.7</td>
<td>24.3</td>
<td>19.0</td>
<td>22.2</td>
<td>26.7</td>
</tr>
<tr>
<td>elementary notions of probability</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BEST objective 15 involves alertness to reasonableness of computation answers. The items, only a part of such alertness, received moderate to strong support, with elementary teachers being most supportive (see Table 72).

TABLE 72
Missouri Respondents' Inclusion of Estimation and Approximation (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rounding off numbers</td>
<td>86.1</td>
<td>81.1</td>
<td>71.4</td>
<td>81.5</td>
<td>81.9</td>
</tr>
<tr>
<td>Estimating</td>
<td>86.1</td>
<td>77.0</td>
<td>71.4</td>
<td>75.9</td>
<td>79.2</td>
</tr>
</tbody>
</table>
While fewer than 50 percent of the total respondents felt using a calculator should be included on a high school graduation test, support was relatively strong when compared with other data indicating calculator acceptance. The acceptance of the computer item was extremely important given projections about life in the future where daily interaction with computers was a virtual certainty for most people (see Table 73).

### Table 73

<p>| Missouri Respondents' Inclusion of Computer Literacy and Other Technology (in percent) |
|---------------------------------|---------------------------------|----------------------------------|---------------------------------|---------------------------------|---------------------------------|</p>
<table>
<thead>
<tr>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing what computers can and cannot do</td>
<td>22.2</td>
<td>18.9</td>
<td>9.5</td>
<td>25.9</td>
</tr>
<tr>
<td>Using a calculator</td>
<td>41.7</td>
<td>40.5</td>
<td>42.9</td>
<td>51.9</td>
</tr>
</tbody>
</table>

The results show virtually no support for the inclusion of these topics. Since these topics are found in Algebra I, these results verify the contention that high school graduation tests usually contain only elementary school mathematics content (see Table 74).
<table>
<thead>
<tr>
<th>Topic</th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deriving the quadratic formula</td>
<td>5.6</td>
<td>1.4</td>
<td>0.0</td>
<td>3.7</td>
<td>3.2</td>
</tr>
<tr>
<td>Factoring polynomials in the second degree</td>
<td>5.6</td>
<td>2.7</td>
<td>0.0</td>
<td>3.7</td>
<td>3.6</td>
</tr>
<tr>
<td>Solving first degree equations</td>
<td>29.2</td>
<td>31.1</td>
<td>9.5</td>
<td>22.2</td>
<td>26.2</td>
</tr>
<tr>
<td>Solving systems of equations with two unknowns</td>
<td>18.1</td>
<td>2.7</td>
<td>9.5</td>
<td>11.1</td>
<td>10.4</td>
</tr>
<tr>
<td>Solving second degree equations</td>
<td>6.9</td>
<td>2.7</td>
<td>4.8</td>
<td>5.6</td>
<td>5.0</td>
</tr>
</tbody>
</table>
It is rather ironic that inclusion of this topic was supported more strongly than some of the previous algebraic topics. This is generally considered an obsolete topic. Its inclusion may be a manifestation of the phenomenon that nearly everyone's list is a subset of what they themselves know. Therefore if the respondents were required to learn this — formerly a rather standard arithmetic topic — it may be that they felt it was appropriate for everyone to have to learn (see Table 75).

**TABLE 75**

Missouri Respondents' Inclusion of Miscellaneous Topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determining the square root of a number using the square root algorithm</td>
<td>11.1</td>
<td>10.8</td>
<td>14.3</td>
<td>5.6</td>
<td>10.0</td>
</tr>
</tbody>
</table>
Conclusions

Despite the tradition of local control of education, the State Board of Education mandated a statewide minimum competency test administered in eighth grade. The test was not a requirement for high school graduation. The test was apparently highly regarded by much of the lay public and by some educators. There were, of course, some educators who questioned the value of BEST. While the survey indicated BEST may have had impact in some Missouri schools or classrooms by changing content or activities, the majority of educators rarely felt change was directly attributable to the test. The educators generally exhibited a conservative and somewhat dated trend when selecting topics to be included on a high school graduation test. There was not always a high correlation between what respondents deemed appropriate for such a test and what was on the BEST.

While BEST was perceived as having impacted on education in Missouri, Missouri respondents did not perceive that impact to be as strong as Florida respondents.
Chapter VI

OHIO CASE STUDY

Background

Wirt (1978) ranks Ohio 23rd in degree of state control. This is far behind Florida and Oregon, 6th and 7th and far ahead of Missouri, which ranked 47th. Despite the relatively moderate ranking given by Wirt, Ohio is in fact a state with a long and strong tradition of local district control of education. While no state agency is ever entirely depoliticized, the Ohio Department of Education seems less political than the departments of education in some of the other states studied. The State Superintendent of Public Instruction, Franklin Walter, is appointed by the State Board of Education and does not serve on the Governor's cabinet as do other department heads. The State Board of Education is elected, one member from each congressional district, in a nonpartisan election. There are 615 school districts in Ohio, and each district has considerable control over the education that takes place in that district.

Case Study Components

The case study of Ohio included three major components, a review of state specific literature, meeting with representatives of the Ohio Department of Education, and a survey which was
sent to randomly selected samples of elementary teachers, secondary mathematics teachers, elementary principals, and secondary principals.

Literature Review

The literature review in Ohio was in some ways a much less complicated procedure than in other states (there was less literature) and in some ways a more difficult procedure (it was harder to find). Florida, Missouri, and Oregon all have developed support materials, an "official" chronology of the events leading to the implementation of minimum competency testing, and some sort of evaluation of the program. The topic was discussed extensively in the press in each of the three states and it was not difficult to obtain sample press clippings. There is not nearly as much literature existing in Ohio relative to minimum competency testing. Statewide assessment was conducted for only a few years during the 1970s and then funding for the project was rescinded. The reports of these assessments were included in the literature review. State level literature also included: a Report and Recommendations on Minimum Competencies made to the legislature; summaries of thirteen forums held on the minimum competency issue, including some of the position statements made at the forums; an Ohio Department of Education document intended to help school districts interested in setting up a minimum competency testing program and results of a stratified random sample telephone survey that included questions about minimum competency testing.
Unlike the other states being studied, none of the major newspapers in Ohio were indexed during the seventies and the Ohio Department of Education did not furnish the investigator a clipping file related to minimum competency testing. For this reason it was necessary to choose a major newspaper in each of seven cities and request information regarding past articles concerning minimum competency testing in Ohio. Four of the seven responded - and a limited number of articles were identified. During the state department visit state officials indicated that only two districts were at that time giving minimum competency tests and identified Rocky River and Berea. Some of the work done by the Berea system is included in the ERIC System and was reviewed. In addition a position statement by the Ohio Council of Teachers of Mathematics was included.

State Department Visit

The state department visit in Ohio included an official interview with Assistant Superintendent Roger Lulow and Special Assistant Arlene Baker; perusal of documents collected by Ohio committees investigating minimum competency testing, and informal conversations with staff members of the Elementary Secondary Division of the Ohio Department of Education, including Director Mary Poston and Assistant Director Doyle Shumaker.

As was the case in every state, members of the State Department of Education made every effort to be helpful and facilitate the investigators' understanding of not only minimum competency testing within the state but the peculiar historical and political
conditions affecting education. As was also the case in every state, valuable insight was gained through interaction with these individuals and through the documents that were examined.

Survey

The sampling procedures in Ohio were identical to those used in Florida. It would have been possible to obtain computer generated mailing labels of random samples of the relevant populations in Ohio. However, the cost was prohibitive. Therefore, using 1970 census data the proportion of the state population residing within a county was determined then the number of survey recipients within a county (or cluster of counties in some cases) was determined by multiplying by the number of desired survey recipients in each population to be sampled - 100 for elementary and secondary teachers, 30 for elementary principals and 70 for secondary principals. The Ohio Education Directory was then used. The schools within each county were numbered and a random number table was used to select schools. As in Florida, the principal's name was available for each school so it was possible to address envelopes with the name of the survey recipient in these cases. In the case of the teachers, it was necessary to include a letter to the principal asking that the survey be given to a teacher who would take the time to "thoughtfully" complete the survey. Since the principals in each school chose the teacher to receive the survey some of the "randomness" of the sample was lost. An alternative - asking the principal to make a random selection of a teacher on the basis of specified criteria - was considered and rejected on the basis that additional steps might cut
considerably the return rate and there would be no way to verify if the procedure was carried out correctly or carried out at all. The introduction of this "bias" did not seem to affect the results. There is still a marked difference on many of the items between classroom teachers and administrators.

Legislative and State Department of Education Activity

The pressures for minimum competency testing that permeated much of the educational activity in many of the states was also present in Ohio. Yet, one of the reasons that Ohio was chosen to be studied was because there was neither legislative or administrative mandate to implement minimum competency testing. The Ohio Department of Education established a Task Force on Minimum Competency Expectations in April 1977. In August of that same year the Ohio General Assembly directed the Ohio Assessment and Annual Report Advisory Committee to make recommendations on minimum competency issues to the State Board of Education.

These two groups, the Task Force and the advisory committee worked together in the formulation of recommendations.

Five major activities were undertaken:

1) a survey of other states regarding minimum competency practices;
2) a symposium with representatives from states active in minimum competency testing;
3) thirteen regional forums to solicit the opinions of Ohioans about minimum competency testing;
4) a survey of the status of minimum competency testing
in Ohio; and,

5) the development of a resource booklet to aid those implementing competency testing.

A summary of the national minimum competency survey was included in the Report submitted to the Ohio General Assembly and the State Board of Education. That summary is included here because it presents data not available elsewhere and because the ultimate decision was to recommend against mandating minimum competency testing. It is instructive to look at the information considered by the committee in arriving at such a recommendation.

1. 26 of the 36 states plus the District of Columbia which are either planning or operating "minimum competency" programs are concentrating primarily on setting minimum performance levels for students to graduate from high school. Six states are contemplating use of these programs to permit students to graduate prior to completion of the 12th grade. Ten states plus D.C. are concerned also about using these programs for purposes of grade-to-grade promotion. Four states are planning or operating early entrance programs.

2. States operating or planning minimum competency activities have been motivated primarily by the State Department of Education or State Board of Education, rather than by state legislative mandate. The "well-known" programs of California and Florida, however, were mandated. There is an indication that State Department initiatives in other states may have been taken in anticipation of legislative action.

3. Overwhelmingly, states with minimum competency programs concentrate on establishing and measuring performance levels in the basic skill areas of reading and mathematics. The grade levels assessed vary considerably from state to state, but most cover multiple grades.

4. Minimum competency levels are set in most states at the state level by the State Education Agency through a consensus of teachers, administrators, board members, and citizens. In states where minimum competencies are also set in each district, a similar process is followed.
5. The most frequent approach to measurement of student performance is that of paper and pencil tests of either standardized or objective performance/criterion reference types. A combination of these test forms, along with course grades and teacher observations, is also frequently used.

6. In most states, the instruments used to measure student performance are developed at the state level, with development by the district next in frequency, and purchase of state and/or district last in frequency.

7. Most states with such programs either offer or require remedial work by students who do not meet minimum competency levels. Further student diagnosis and individually prescribed program structures are also used.

8. Development of such a program can be expected to take from two to five years.

9. As expected, states have shown us that the four major problems in implementing such programs are (1) difficulty of defining competency levels; (2) lack of financial support; (3) lack of measurement instruments; and (4) lack of sufficient time to implement the program. (p. 22)

The symposium mentioned in item two above was held during a two-day period in August 1977. The states represented at the symposium were Arizona, California, Florida, Georgia, Maryland, and Oregon. It can be assumed that the majority of the state representatives gave positive presentations and generally supported minimum competency testing.

In an attempt to obtain input from Ohio citizens and educators, thirteen regional public forums were held by the Assessment and Annual Progress Advisory Committee. These thirteen forums were attended by a total of 1024 persons, 12 percent or 123 of these were parents. There were 231 individuals who made verbal comments, in addition 88 individuals or groups submitted written testimony or position papers. The diverse groups submitting position papers included:
- Buckeye Association of School Administrators
- Columbus Urban League
- Ohio Association of Secondary School Administrators
- Ohio Association of Supervision and Curriculum Development
- Ohio Congress of Parents and Teachers, Inc.
- Ohio Council of Teachers of Mathematics
- Ohio Education Association
- Ohio Educational Library/Media Association
- Ohio Federation of Teachers
- Ohio Music Education Association.

Of the 231 comments 178 or 77.1 percent were by educators, 49 or 21.2 percent by parents, and four or 1.7 percent were by other interested persons. In the advisory committee report, 22 questions or concerns were identified as being "most frequently expressed."

The concerns are listed in the order given in the advisory committee.

1. Will the test results be used unfairly to compare students, teachers, administrators, schools, or school districts?

2. Will the state provide adequate funding?

3. Will local control be further ordered?

4. Will parents and the community be willing to assume their share of the responsibility?

5. Will the test results be used unfairly to evaluate teachers?

6. Will we be able to establish one standard of competency for all students?

7. Will the minimums become the maximums?

8. Will the test be related to curriculum and course content?
9. Will we end up with a state curriculum?
10. Will the total curriculum be narrowed to the basics of reading, writing and arithmetic?
11. Will teachers teach to the test?
12. Will the tests be used to deny diplomas?
13. Will there be different diplomas?
14. Will there be safeguards to protect students against discrimination?
15. Will the testing result in segregation along racial and socioeconomic lines?
16. Will test results be used to "track" students?
17. Will there be adequate provisions (funds, services, materials, trained personnel, differentiated staffing, etc.) for remediation or intervention?
18. Will allowances be made for EMR, L/D and other handicapped students?
19. Will the programs result in lawsuits related to constitutionality, due process, and discrimination?
20. Will the drop out rate increase to avoid stigma of incompetence?
21. Will the mandatory attendance age be changed?
22. Will there be ample time for implementation? (pp. 8-9)

The questions raised by Ohio educators and lay citizens reflect an awareness of the issues and problems that had arisen in other states as well as some items that may not have a basis in existing programs.

It was at one of these 13 forums that the Ohio Council of Teachers of Mathematics issued a position statement addressing some of the issues surrounding minimum competency testing.
We advocate that minimum grade level, course, or graduation requirements not be mandated or implemented before four years of state assessment results 2-12 become available. If such requirements do become mandated at that time, we recommend that they be implemented at an individual district level of decision-making and control. (Ohio Council of Teachers of Mathematics, 1977, p. 1)

A result of careful study, the June 1978 recommendations of the Ohio Assessment and Annual Progress Report Advisory Committee sent to the General Assembly said:

The purpose of an Ohio minimum competency program should be to improve the instruction and achievement of students through the use of tests for diagnosis of learning problems and planned intervention for individual students. (p.14)

The Assembly Advisory Committee believed the concerns of the legislature for improving student minimum competencies in the areas of reading, mathematics, and English composition could best be achieved by a thorough revision and rigid enforcement of the Minimum Standards of Ohio Elementary, Junior High, and High School, particularly as they apply to the areas of primary reading, junior high mathematics, junior high reading and composition, high school mathematics and high school composition. Such an effort would mandate that specific curriculum requirements be established in these areas with minimum skills to be mastered clearly stated.

The committee recommended that adequate state funds be allocated to the State Board of Education for the revision of minimum standards to include a minimum competency program; for providing technical assistance to local districts to implement the competency requirements; and for monitoring and enforcing the minimum standards.
It was recommended that implementation and enforcement of the revised standards in the skill areas, particularly the requirement for intervention programs in the areas of primary reading/composition, and high school mathematics and composition, be contingent upon adequate state categorical allocation to local school districts.

The committee further recommended that guidelines and recommendations for the revision and expansion of the standards by the State Board of Education include provision for:

a) State level minimum competency committees in each skill area to assist in defining the minimum competencies and establishing the minimum skills.

b) A variety of locally determined procedures and alternatives to measure and assess student learning needs.

c) Required locally developed intervention programs and alternatives to meet the needs of students who cannot achieve the standards under traditional methods.

d) Assurances that intervention programs, especially those which include grouping procedures, are based on demonstrated instructional needs and not on punitive, arbitrary, discriminatory criteria.

e) Adequate phase-in time for the implementation, effective date and enforcement of the revised standards.

f) Compliance procedures which may include state approval of local plans for measuring competencies and providing intervention programs for those students who do not meet the standards.

g) No local or state funds should be diverted from the present, basic instructional programs of the schools.

h) The revised standards should not narrow or decrease instructional requirements. (p. 15)
The Committee also suggested that, "if not presently empowered, the State Board of Education seek legislative authority to ensure through a monitoring and reporting process that local school districts be in compliance with the intent of the revised standards to improve the instruction and achievement of students in basic minimum competencies."

The Committee reaffirmed its resolution adopted at the April 20-21, 1978 meeting as follows: "as a result of their review of the 1977 assessment results and the public testimony of citizens, parents, educators and representatives of educational organizations gathered in 13 regional public forums, no mandated minimum competency testing should be implemented as a prerequisite for promotion to grades 5 and 9 and for graduation" and further, the Committee opposed the use of any state mandated test as a final determination for promotion or graduation. (p. 16)

As a result of these recommendations, neither the legislature or the State Board of Education mandated minimum competency testing.

In June 1979, the Standards Revision Advisory Committee was convened. This committee, appointed by State Superintendent Franklin Walter at the direction of the State Board of Education, was charged with making a "...thorough, comprehensive and appropriate revision of Minimum Standards for elementary schools, middle/junior high schools, and secondary schools."

The present draft (12-12-80) of the "new" minimum standards calls for "competency based education in reading, English composition, and mathematics." The provisions call for pupil performance objectives, instruction which may include intervention "until the pupils attain minimum competency levels or until they meet graduation requirements," and regular assessment "until they attain minimum competency."
In addition to the work on the new standards, the State Board of Education identified thirteen priorities for "improving the quality of education and nurturing student development" (Mission for the 80s: A Blueprint for Excellence, 1981, p. 1). For each of the thirteen priorities, the desired state and local activities are specified. These are goal statements and are not mandates by the State Board of Education. The first priority listed was "Improving Pupil Achievement." The State Board described the desired state action: "Provide leadership to school districts in developing and implementing locally-designed programs for students" (p. 1). A lengthy list of specific state responsibilities was included. The document also specified desired local action:

School districts will have competency testing programs for pupils in operation by September 1984 together with appropriate intervention and remediation programs to the extent funds can be made available. (p. 2)

Therefore the state seems to be moving toward some sort of minimum competency requirements.

One of the things that may have contributed to this move was a survey study commissioned by the Elementary and Secondary Division of the Department of Education. Since there were no state mandated minimum competency testing programs, the Ohio Department of Education could not study such programs in a manner similar to those already described in some other states.

The survey conducted by Ned S. Hubbell and Associates was reported in Opinions of Ohio Citizens About Priorities of a General Education of High Quality (1980). The study contained several questions concerning minimum competency testing. Data indicated that 78
percent of those polled favored requiring passage of a test before a student could go from elementary school to junior high school to senior high school. Also, 76 percent favored requiring passage of a test as a criterion for high school graduation. This is slightly above the 68 percent figure that is often quoted as the result when the Gallop Poll asked the same question of a national sample. It may be that Ohio citizens are slightly more favorably disposed toward the idea, or it may be that the idea has become more popular in the few years since Gallop obtained the 68 percent figure.

Another study was conducted by a chapter of Phi Delta Kappa located in Cuyahoga County. This study, involving a literature review and survey, resulted in nine recommendations for districts considering the implementation of minimum competency testing. These include: any district implementing a minimum competency testing program should develop a position paper discussing crucial aspects of the program; minimum competency tests should be developed by districts or groups of contiguous districts; and students not passing should be given developmental assistance (Phi Delta Kappa, 1978, p. 39-40).

Attitudes of Other Groups and Individuals

In 1980 the Ohio Department of Education conducted a study to determine how citizens of Ohio become informed about their schools. Seventy-eight percent of the respondents mentioned newspapers as a way in which they obtain information about schools. Newspapers were mentioned more often than any other way of obtaining information. This would seem to imply that information about
schools in newspapers would be important. Unfortunately the investigation of newspaper treatment of minimum competency testing was not as thorough as in other states, for reasons previously mentioned. The newspaper articles reviewed came primarily from only two newspapers, the Akron-Beacon Journal and the Columbus Dispatch. The Akron-Beacon Journal editorial policy apparently has been to be supportive of minimum competency testing.

"It's the promise not the pitfalls, of minimum competency testing that makes the idea attractive" (Competency tests offer promise for Ohio Schools, Akron-Beacon Journal, November 18, 1977) and "In such cases, competency tests may be the only way for the public to determine average levels of school achievement." ("Three-R tests could help", 1977)

The Beacon Journal ran an article in which individuals representing several viewpoints expressed opinions. The article quotes a number of individuals including:

Assistant Superintendent James E. Ervin
"Tests for graduation would have great limitations."

Barberton Superintendent Milan Pankov
"There's a strong probability that some kids will have difficulty mastering achievement levels set at some arbitrary standard."

Canton Superintendent Henry Kurdziel
"It all depends on what we think youngsters should be doing. I feel they should have vast backgrounds. I could argue for competency in history and others could argue for other things."

President of Akron Education Association, Paul Morehouse Jr.
"I'm opposed to competency testing until a bias-free test is available. It's a potential damaging thing. I think it would be challenged ultimately in courts and found to be a violation of students' rights."
"How do you set minimums that are not too low for some students' abilities and too high for others?"

"This concept of minimum competency is absurd. It's a simplistic notion held by people who don't understand how learning takes place. The approach is negative, rather than positive."

The article also quotes a parent from Stark County as supporting testing for promotion and statewide testing ("Fight over 'competency' is on in Ohio", 1978).

The Beacon-Journal also ran several articles in 1977 which addressed either directly or indirectly some of the issues surrounding minimum competency testing (Why should diplomas be the same? June 8, 1977; Demand Grows for 'minimum competency testing,' November 18, 1977).

On March 24, 1980 an editorial "Basic testing can help" suggested that:

"Minimum competency may not be the ultimate answer, but until a better one is devised to build confidence in schools it's worth a try." ("Basic testing can help", 1980)

This prompted two letters to the editor from state representatives. The first letter, signed by five members of a house subcommittee considering minimum competency testing, praised the article for "calling attention to its importance." They went on to say, "While we may not agree with all you assertions..." The second letter discusses "many erroneous observations" and asserts "Ohio has benefited from not being stampeded into hastily enacting statewide
testing programs" (Boggs, Basic Testing Standards Needed in Ohio Schools, 1980).

The Akron-Beacon Journal provided more of an arena for controversy concerning minimum competency testing than did the other newspaper that was studied by the investigator. The Columbus Dispatch coverage included reports of state department and state legislative activity on minimum competency testing as well as national happenings. In one article candidates for the Columbus Board of Education were asked, "Should Columbus seniors be required to pass a competency test before being eligible to graduate?" While competency testing was given general support in the answers of the six candidates, only one candidate responded with an unqualified yes to the question (Sohovich, "School Board Candidates Back Levy Bid", 1979). While there is no evidence that the Columbus Dispatch had an editorial policy giving overwhelming and unqualified support to minimum competency testing, neither is there an indication of opposition to minimum competency testing.

The above indicates that the context in which the survey was conducted was not one of great controversy. There was interest in minimum competency testing in Ohio and differences of opinion about it. But it was not the political issue or controversial topic that it was in some states.

Case Study

Survey Results

Response rates for the Ohio survey are indicated in Table 76. Demographic data indicating a reasonably even distribution between
respondents in terms of geographic distribution are displayed in Table 77.

TABLE 76
Ohio Response Rate on Survey

<table>
<thead>
<tr>
<th>Sampled Population</th>
<th>Number of Surveys Mailed</th>
<th>Number of Surveys Returned</th>
<th>Percentage of Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>105</td>
<td>69</td>
<td>66%</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>105</td>
<td>76</td>
<td>72%</td>
</tr>
<tr>
<td>Elementary Principals</td>
<td>32</td>
<td>22</td>
<td>69%</td>
</tr>
<tr>
<td>Secondary Principals</td>
<td>77</td>
<td>58</td>
<td>75%</td>
</tr>
</tbody>
</table>

TABLE 77
Ohio Respondent Characteristics

Small Town or Rural        40.0%
Suburban                   31.6%
Urban                      24.0%
Other                      2.7%
Missing                    1.3%

An attempt was made to determine the kind of expertise and experience respondents had in the development, interpretation, and use of test results (see Table 78). The majority of both teachers
I have taken a course concerned specifically with tests and measurements.

I have received instruction in interpreting and using tests given by state or district.

I have not received instruction but documents are available to assist in test score interpretation and utilization.

I have not received instruction in interpreting and using test results, but one member of our staff has and this person serves as a resource person for the rest of our staff.

I have been involved in the development of minimum competency tests at the state or local level.
and principals indicated that they had taken a course concerned specifically with tests and measurements. A majority of the principal respondents indicated they had received instruction from the state or district in the interpretation and use of tests. Few of the respondents indicated personal involvement in the development of minimum competency tests.

The next item on the survey attempted to determine the personal familiarity of the respondents with minimum competency tests used for different purposes (see Table 79). As was previously explained, this item may have caused some confusion because the question was asked in terms of "your school or district." It seemed obvious that some respondents answered in terms of their own schools, others in terms of the situation in the entire district. At any rate, as was expected the majority of each sample indicated that no minimum competency test was given. Few respondents indicated that minimum competency testing was used for either high school graduation or promotion.

The next two items (see Tables 80 and 81) were designed to indicate the types of minimum competency tests that the respondents were familiar with and also to determine the way the standard or cutoff scores were determined. These two items also contained the unfortunate and previously discussed phrase "school or district" and again this limits interpretation of results. Also since a majority of respondents report that a minimum competency test is not given, the specific questions regarding the minimum competency tests given do not assume as much importance. Except for elementary teachers, the plurality of respondents indicated tests were
Passage of a minimum competency test is a requirement for high school graduation.

No minimum competency test is given.

Minimum competency testing is done for diagnostic and remedial purposes.

Passage of a minimum competency test is a requirement for grade-to-grade promotion.

<table>
<thead>
<tr>
<th></th>
<th>Elementary</th>
<th>Secondary</th>
<th>Prinicipal</th>
</tr>
</thead>
<tbody>
<tr>
<td>’in percent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In District of Ohio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Competency</td>
<td>72.7</td>
<td>73.7</td>
<td>74.1</td>
</tr>
<tr>
<td>Test Useage</td>
<td>11.6</td>
<td>14.5</td>
<td>27.3</td>
</tr>
<tr>
<td>Other</td>
<td>3.4</td>
<td>5.2</td>
<td>25.9</td>
</tr>
</tbody>
</table>

**TABLE 79**
<table>
<thead>
<tr>
<th>Secondary Principals</th>
<th>Elementary Principals</th>
<th>Secondary Teachers</th>
<th>Elementary Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.7</td>
<td>1.7</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
<td>22.7</td>
<td>0.0</td>
</tr>
<tr>
<td>0.0</td>
<td>2.6</td>
<td>22.7</td>
<td>22.4</td>
</tr>
<tr>
<td>26.1</td>
<td>2.7</td>
<td>2.9</td>
<td>2.9</td>
</tr>
<tr>
<td>Other</td>
<td>Test prepared by a commercial test specifically as a minimum competency test</td>
<td>Tests prepared by a company to be used on the local level</td>
<td>Tests developed by the State</td>
</tr>
</tbody>
</table>

Tests developed by the State
Tests prepared by a commercial test specifically as a minimum competency test
Test prepared by a company to be used on the local level
Tests prepared by a commercial test (for example, the California Achievement Test)

Other

(11 percent)
Given in other districts
Minimum competency tests
Ohio Educators' Response Regarding
<table>
<thead>
<tr>
<th></th>
<th>Percentages</th>
<th>Percentages</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary</td>
<td>Secondary</td>
<td>Elementary</td>
</tr>
<tr>
<td>Other</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Test Manufacturers</td>
<td>0.7</td>
<td>1.7</td>
<td>4.1</td>
</tr>
<tr>
<td>State Department</td>
<td>7.7</td>
<td>2.7</td>
<td>2.6</td>
</tr>
<tr>
<td>Included parents</td>
<td>4.5</td>
<td>4.5</td>
<td>0.0</td>
</tr>
<tr>
<td>Business people</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Professional people</td>
<td>2.9</td>
<td>11.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Committee of school teachers and administrators</td>
<td>3.4</td>
<td>13.8</td>
<td>3.2</td>
</tr>
<tr>
<td>School Administration</td>
<td>8.3</td>
<td>8.7</td>
<td>3.3</td>
</tr>
</tbody>
</table>

*In percent*

The Establishment of Cutoff Scores
Ohio Educators' Responses Regarding

Table 6.1
developed on the local level. The respondents indicated the most common way of setting cutoff scores was by a committee of teachers and administrators.

Ohio educators were asked to indicate their feeling about minimum competency testing for specified reasons.

Despite the fact that the Hubbell survey indicated a majority of Ohio citizens supported minimum competency testing for high school graduation and promotion, survey results indicated educators did not feel that way. In no case did a majority of any sample support testing for graduation or promotion. In fact there was more moderate support for minimum competency testing for diagnostic purposes than in other states surveyed (see Table 82).

**TABLE 82**

Feelings of Ohio Respondents Toward
Minimum Competency Testing
(in percent)

<table>
<thead>
<tr>
<th>% favoring for H.S. Graduation</th>
<th>% favoring for grade-to-grade promotion</th>
<th>% favoring for diagnosis</th>
<th>% opposed</th>
<th>% undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>33.3</td>
<td>63.8</td>
<td>11.6</td>
<td>14.5</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>46.1</td>
<td>65.8</td>
<td>6.6</td>
<td>14.5</td>
</tr>
<tr>
<td>Elementary Principals</td>
<td>40.9</td>
<td>68.2</td>
<td>9.1</td>
<td>18.2</td>
</tr>
<tr>
<td>Secondary Principals</td>
<td>22.8</td>
<td>68.4</td>
<td>1.8</td>
<td>22.8</td>
</tr>
</tbody>
</table>
Respondents were asked to indicate their impressions of the attitudes of other groups (see Table 83). There was a statistically significant difference in the opinions of respondents concerning all groups considered except Media and Students. In general Ohio respondents seemed most likely to indicate that they did not know the attitudes of the specific groups. These data seemed to indicate that minimum competency testing had not been a major topic of public discussion in Ohio. As was the case with respondents for the other states, teachers and administrators perceived their own groups as being less favorably inclined toward minimum competency testing for high school graduation than they actually were.

Since one reason often cited in the call for minimum competency testing was declining achievement, an attempt was made to determine whether or not teachers felt student achievement had declined (see Table 84). A majority of both elementary and secondary teachers felt that achievement was the same. However, twice as many teachers indicated achievement was lower than the number who indicated achievement was higher.

When the same question was asked in terms of student attitude (see Table 85), again the majority of both elementary and secondary teachers indicated attitude was the same. The split between those feeling attitude was higher and those feeling attitude was lower was about even.
<table>
<thead>
<tr>
<th></th>
<th>Elementary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults</td>
<td>24.4</td>
<td>22.9</td>
</tr>
<tr>
<td>Students</td>
<td>13.1</td>
<td>12.0</td>
</tr>
<tr>
<td>Administration</td>
<td>7.8</td>
<td>5.0</td>
</tr>
<tr>
<td>Local School Board</td>
<td>11.1</td>
<td>15.5</td>
</tr>
<tr>
<td>State Legislators</td>
<td>32.0</td>
<td>27.4</td>
</tr>
<tr>
<td>State Department</td>
<td>41.0</td>
<td>42.9</td>
</tr>
<tr>
<td>Parents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults</td>
<td>24.4</td>
<td>22.9</td>
</tr>
<tr>
<td>Students</td>
<td>13.1</td>
<td>12.0</td>
</tr>
<tr>
<td>Administration</td>
<td>7.8</td>
<td>5.0</td>
</tr>
<tr>
<td>Local School Board</td>
<td>11.1</td>
<td>15.5</td>
</tr>
<tr>
<td>State Legislators</td>
<td>32.0</td>
<td>27.4</td>
</tr>
<tr>
<td>State Department</td>
<td>41.0</td>
<td>42.9</td>
</tr>
<tr>
<td>Parents</td>
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<td></td>
</tr>
<tr>
<td>Adults</td>
<td>24.4</td>
<td>22.9</td>
</tr>
<tr>
<td>Students</td>
<td>13.1</td>
<td>12.0</td>
</tr>
<tr>
<td>Administration</td>
<td>7.8</td>
<td>5.0</td>
</tr>
<tr>
<td>Local School Board</td>
<td>11.1</td>
<td>15.5</td>
</tr>
<tr>
<td>State Legislators</td>
<td>32.0</td>
<td>27.4</td>
</tr>
<tr>
<td>State Department</td>
<td>41.0</td>
<td>42.9</td>
</tr>
</tbody>
</table>

Table 63
Ohio Educators' Perceptions of the Attitudes of Others (in percent)
### TABLE 84

**Ohio Teacher Perceptions of Entering Student Mathematics Achievement**  
(in percent)

<table>
<thead>
<tr>
<th></th>
<th>Higher</th>
<th>Same</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>11.9</td>
<td>61.2</td>
<td>.25.4</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>15.8</td>
<td>51.3</td>
<td>32.9</td>
</tr>
</tbody>
</table>

### TABLE 85

**Ohio Teacher Perceptions of Entering Student Mathematics Attitude**  
(in percent)

<table>
<thead>
<tr>
<th></th>
<th>Higher</th>
<th>Same</th>
<th>Lower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Teachers</td>
<td>22.4</td>
<td>58.2</td>
<td>19.4</td>
</tr>
<tr>
<td>Secondary Teachers</td>
<td>17.1</td>
<td>63.2</td>
<td>19.7</td>
</tr>
</tbody>
</table>

A further attempt to measure teacher attitudes was made on an item concerning pressures felt by teachers (see Table 86). There were no statistically significant differences between responses of elementary teachers and responses of secondary teachers. Clearly minimum competency testing is not perceived by teachers as being a source or pressure. A majority of teachers do report feeling a general pressure to go "back to the basics."
<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teachers in my school do not seem to feel the pressures you have described</td>
<td>34.8</td>
<td>32.9</td>
</tr>
<tr>
<td>The teachers in my school seem to feel a general pressure to go back to the basics</td>
<td>55.1</td>
<td>63.2</td>
</tr>
<tr>
<td>The teachers in my school seem to feel pressure as a direct result of minimum competency test that is given to our students</td>
<td>7.2</td>
<td>3.9</td>
</tr>
<tr>
<td>Teachers in my school seem to feel pressure to have their students perform well on standardized tests, but this pressure is not directly a result of minimum competency testing</td>
<td>46.4</td>
<td>35.5</td>
</tr>
</tbody>
</table>
Respondents were asked to select from among reasons identified in the literature, the single most valid reason for supporting minimum competency testing (see Table 87). A plurality of the two samples indicated "To make sure students are prepared for jobs or post-high school education." A plurality of the principal samples indicated, "To identify remedial students."

Respondents were also asked to select, from among reasons identified in the literature, the single most valid reason for opposing minimum competency testing (see Table 88).

A plurality of all samples indicated, "It will be used to judge schools and teachers." This response was selected by more teachers than principals. There was a statistically significant difference in response on this item.
<table>
<thead>
<tr>
<th>Reason</th>
<th>ET</th>
<th>ST</th>
<th>EF</th>
<th>SP</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>To motivate students</td>
<td>10.4</td>
<td>13.5</td>
<td>4.5</td>
<td>3.6</td>
<td>9.1</td>
</tr>
<tr>
<td>To make sure schools do their jobs</td>
<td>6.0</td>
<td>4.1</td>
<td>9.1</td>
<td>12.5</td>
<td>7.3</td>
</tr>
<tr>
<td>To make sure students are prepared for jobs or post-high school education</td>
<td>38.8</td>
<td>36.5</td>
<td>31.8</td>
<td>16.1</td>
<td>31.5</td>
</tr>
<tr>
<td>To guarantee a focus on the basics in schools</td>
<td>10.4</td>
<td>5.4</td>
<td>0.0</td>
<td>21.4</td>
<td>10.5</td>
</tr>
<tr>
<td>To raise standardized test scores</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>To give meaning to the high school diploma</td>
<td>13.4</td>
<td>14.9</td>
<td>4.5</td>
<td>8.9</td>
<td>11.9</td>
</tr>
<tr>
<td>To identify remedial students</td>
<td>10.4</td>
<td>13.5</td>
<td>36.4</td>
<td>28.6</td>
<td>18.7</td>
</tr>
<tr>
<td>Other</td>
<td>1.5</td>
<td>5.4</td>
<td>0.0</td>
<td>1.8</td>
<td>2.7</td>
</tr>
<tr>
<td>More than one</td>
<td>7.5</td>
<td>5.4</td>
<td>13.6</td>
<td>2.1</td>
<td>7.3</td>
</tr>
<tr>
<td>Reason</td>
<td>ET</td>
<td>ST</td>
<td>EP</td>
<td>SP</td>
<td>Total</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-------</td>
</tr>
<tr>
<td>It will narrow the curriculum</td>
<td>1.6</td>
<td>12.0</td>
<td>13.6</td>
<td>7.1</td>
<td>7.8</td>
</tr>
<tr>
<td>&quot;Minimum competencies&quot; are not identifiable</td>
<td>7.8</td>
<td>12.0</td>
<td>4.5</td>
<td>8.9</td>
<td>9.2</td>
</tr>
<tr>
<td>Test development techniques are not good enough</td>
<td>12.5</td>
<td>12.0</td>
<td>22.7</td>
<td>8.9</td>
<td>12.4</td>
</tr>
<tr>
<td>The potential for racial or cultural discrimination is great</td>
<td>7.8</td>
<td>8.0</td>
<td>4.5</td>
<td>16.1</td>
<td>9.7</td>
</tr>
<tr>
<td>It will increase the high school dropout rate</td>
<td>6.3</td>
<td>1.3</td>
<td>9.1</td>
<td>0.0</td>
<td>3.2</td>
</tr>
<tr>
<td>It will stifle creative teaching</td>
<td>6.3</td>
<td>2.7</td>
<td>4.5</td>
<td>8.9</td>
<td>5.5</td>
</tr>
<tr>
<td>It will be used to judge schools and teachers</td>
<td>50.0</td>
<td>46.7</td>
<td>27.3</td>
<td>23.2</td>
<td>39.6</td>
</tr>
<tr>
<td>Other</td>
<td>3.1</td>
<td>4.0</td>
<td>4.5</td>
<td>16.1</td>
<td>6.9</td>
</tr>
<tr>
<td>More than one</td>
<td>4.7</td>
<td>1.3</td>
<td>9.1</td>
<td>10.7</td>
<td>5.5</td>
</tr>
</tbody>
</table>

*p < .01
It must be emphasized again that it is not possible to measure the impact of minimum competency testing with a survey. It is, however, possible to measure perceptions of the impact. An attempt to measure such perceptions was made on this survey. There were two questions on the survey concerned directly with the impact of minimum competency testing. The first item (see Table 89) asked elementary and secondary teachers to classify sixteen mathematical topics, materials or instructional practices as receiving:

- a) more class time as a direct result of MCT
- b) more class time but not as a direct result of MCT
- c) less class time as a result of MCT
- d) less class time but not as a result of MCT
- e) same amount of class time.

Responses from elementary and secondary samples differed statistically on two items: "Geometry" and "How to Use a Calculator." Neither of these differences seems to be perceived as an impact of minimum competency testing. In no case does a significant percentage of respondents report either more or less class time as a direct result of minimum competency testing.

Fifteen and three tenths percent of the elementary teachers report more class time on "Basic facts" as a direct result of minimum competency testing. That is the largest "as a direct result" statistic. Since Ohio does not have a large number of minimum competency testing programs, it would not be expected that many teachers would indicate minimum competency testing has "caused" a great many changes in class time. Such is the case.
<table>
<thead>
<tr>
<th>Table 89</th>
<th>Ohio Educators' Perception of MCT Impact on Mathematics Topics (in percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>More class time direct result of MCT</td>
</tr>
<tr>
<td>1) Basic Facts</td>
<td>35.3</td>
</tr>
<tr>
<td>2) Story or Word Problems</td>
<td>13.6</td>
</tr>
<tr>
<td>3) How to use a calculator*</td>
<td>0.0</td>
</tr>
<tr>
<td>4) Problems requiring the use of a calculator</td>
<td>0.0</td>
</tr>
<tr>
<td>5) Number bases other than 10</td>
<td>2.5</td>
</tr>
<tr>
<td>6) Sets</td>
<td>3.9</td>
</tr>
<tr>
<td>7) Computation appropriate to course content (i.e. 77+4 for elementary school, (2x+y)(4x-y) for algebra)</td>
<td>5.8</td>
</tr>
<tr>
<td>8) Geometry*</td>
<td>8.7</td>
</tr>
<tr>
<td>9) Enrichment</td>
<td>5.6</td>
</tr>
<tr>
<td>10) Elementary computer topics</td>
<td>0.0</td>
</tr>
<tr>
<td>11) Consumer topics</td>
<td>6.3</td>
</tr>
<tr>
<td>12) Review of material from previous years</td>
<td>12.5</td>
</tr>
<tr>
<td>13) Practice</td>
<td>5.2</td>
</tr>
<tr>
<td>14) Individual Projects</td>
<td>2.6</td>
</tr>
<tr>
<td>15) Diagnosis of individual differences</td>
<td>12.5</td>
</tr>
<tr>
<td>16) Activity Lessons using manipulatives</td>
<td>2.3</td>
</tr>
</tbody>
</table>

(top numbers—elementary, bottom numbers—secondary)

*p < .01
The second item designed to gauge perception of impact was asked of all four samples (see Table 90). Ten things were listed and respondents were asked to classify each thing as:

a) occurring primarily as a result of MCT
b) occurring partially as a result of MCT
c) occurring but not as a result of MCT
d) not occurring
e) I cannot judge.

There were statistically significant differences between samples on six of the ten items. These differences did not, in general, seem to be related to differences in perceptions regarding minimum competency testing. Rather it seems more likely that differences occurred because of the "I cannot judge" response. As an example consider "Fewer field trips." Nobody reported that as occurring either primarily or partially as a result of minimum competency testing. The difference appears to be that many more teachers than principals feel they "cannot judge." As was expected very few respondents indicated that things are occurring either primarily or partially as a result of minimum competency testing.

Ohio survey recipients were asked to indicate whether each of twenty-five mathematical topics or areas was appropriate for inclusion in a minimum competency test that was to be used for high school graduation. As in previous chapters the data is grouped into the basic skills areas identified by NCSM for purposes of this discussion. Using .01 as the criterion level the data indicate a significant difference in the responses of the samples on only two of the items. Those items, among the most strongly supported overall
<table>
<thead>
<tr>
<th>Activity Description</th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower enrollments in elective courses</td>
<td>0.0</td>
<td>1.8</td>
<td>5.3</td>
<td>3.6</td>
<td>89.1</td>
</tr>
<tr>
<td>Fewer field trips</td>
<td>0.0</td>
<td>1.4</td>
<td>3.4</td>
<td>3.7</td>
<td>30.4</td>
</tr>
<tr>
<td>Fewer frequent testing</td>
<td>0.0</td>
<td>0.0</td>
<td>33.9</td>
<td>23.9</td>
<td>32.1</td>
</tr>
<tr>
<td>More remedial classes</td>
<td>0.0</td>
<td>0.0</td>
<td>43.3</td>
<td>26.9</td>
<td>29.9</td>
</tr>
<tr>
<td>More homework</td>
<td>0.0</td>
<td>0.0</td>
<td>44.4</td>
<td>30.0</td>
<td>5.6</td>
</tr>
<tr>
<td>Fewer mini-courses</td>
<td>0.0</td>
<td>0.0</td>
<td>43.4</td>
<td>49.1</td>
<td>5.5</td>
</tr>
<tr>
<td>More drill and memorization</td>
<td>0.0</td>
<td>0.0</td>
<td>33.9</td>
<td>33.9</td>
<td>32.1</td>
</tr>
<tr>
<td>Stricter grading</td>
<td>0.0</td>
<td>0.0</td>
<td>43.4</td>
<td>49.1</td>
<td>5.5</td>
</tr>
<tr>
<td>More students failing courses or grades</td>
<td>0.0</td>
<td>0.0</td>
<td>33.9</td>
<td>33.9</td>
<td>32.1</td>
</tr>
<tr>
<td>More individualized instruction</td>
<td>0.0</td>
<td>0.0</td>
<td>33.9</td>
<td>33.9</td>
<td>32.1</td>
</tr>
</tbody>
</table>

*Significance levels: *p < .01
were: Computing with whole number" and "Computing with fractions" (see Table 91). The disparity between sample responses is primarily a function of the fact that on each item 100 percent of the secondary mathematics teachers supported inclusion of the topics and only 81.8 percent of the elementary principals supported their inclusion. Elementary principals supported two areas more strongly than computation and those areas are "Reading a map" and "Measuring with the standard system." Throughout this section of the survey elementary teachers were generally less supportive of topics than the other samples. However, in no other case is this difference statistically significant. "Computing with fractions" received more support from secondary educators than from elementary educators.

**TABLE 91**

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computing with whole numbers*</td>
<td>98.5</td>
<td>100.0</td>
<td>81.8</td>
<td>96.4</td>
<td>96.8</td>
</tr>
<tr>
<td>Computing with decimals*</td>
<td>84.8</td>
<td>100.0</td>
<td>81.8</td>
<td>92.9</td>
<td>91.8</td>
</tr>
<tr>
<td>Computing with fractions</td>
<td>80.3</td>
<td>89.3</td>
<td>68.2</td>
<td>87.5</td>
<td>84.0</td>
</tr>
</tbody>
</table>

*p < .01
Data on the items related to problem solving indicate that Ohio educators regard solving "Consumer problems" to be appropriate content for a high school graduation test. "Solving word problems" received moderate support (see Table 92).

**TABLE 92**
Ohio Respondents' Inclusion of Problem Solving and Applying Mathematics to Everyday Situations (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using mathematics to solve consumer problems</td>
<td>83.3</td>
<td>90.7</td>
<td>81.8</td>
<td>85.7</td>
<td>86.3</td>
</tr>
<tr>
<td>Solving word problems</td>
<td>84.8</td>
<td>77.3</td>
<td>68.2</td>
<td>73.2</td>
<td>77.6</td>
</tr>
</tbody>
</table>

There was moderate support for both "Estimating" and "Rounding off numbers" (see Table 93).

**TABLE 93**
Ohio Respondents' Inclusion of Estimation or Approximation (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimating</td>
<td>68.2</td>
<td>73.3</td>
<td>68.2</td>
<td>69.6</td>
<td>70.3</td>
</tr>
<tr>
<td>Rounding off numbers</td>
<td>71.2</td>
<td>74.7</td>
<td>59.1</td>
<td>75.0</td>
<td>72.1</td>
</tr>
</tbody>
</table>
Geometric proof and trigonometry were not supported for inclusion on a high school graduation test. More respondents favored the inclusion of properties of geometric figures but in all samples the majority did not favor including the topic (see Table 94).

**TABLE 94**

Ohio Respondents' Inclusion of Geometry (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing basic properties of geometric figures</td>
<td>45.5</td>
<td>46.7</td>
<td>45.5</td>
<td>35.7</td>
<td>43.4</td>
</tr>
<tr>
<td>Doing simple geometric proof</td>
<td>10.6</td>
<td>10.7</td>
<td>13.6</td>
<td>16.1</td>
<td>12.3</td>
</tr>
<tr>
<td>Solving problems using right triangle trigonometry</td>
<td>4.5</td>
<td>5.3</td>
<td>4.5</td>
<td>5.4</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Ohio educators strongly supported the inclusion of "Measuring with the standard system" as a topic for a high school graduation. "Measuring with the metric system" was another matter. Though a majority of all samples except elementary principals would include it on a test, the weak support is in marked contrast to the support given to the standard system. "Calculating areas and volumes" was more strongly supported by elementary principals than was the
metric system. In general it received weak support for inclusion on a graduation test (see Table 95).

TABLE 95

Ohio Respondents' Inclusion of Measurement (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring with the metric system</td>
<td>62.1</td>
<td>66.7</td>
<td>36.4</td>
<td>55.4</td>
<td>59.4</td>
</tr>
<tr>
<td>Measuring with the standard system</td>
<td>87.9</td>
<td>84.0</td>
<td>90.9</td>
<td>87.5</td>
<td>86.8</td>
</tr>
<tr>
<td>Calculating areas and volumes</td>
<td>47.0</td>
<td>58.7</td>
<td>54.5</td>
<td>51.8</td>
<td>53.0</td>
</tr>
</tbody>
</table>

The same lack of a "futures" orientation that may have been the cause for lack of support given to the metric system might explain the lack of support given the topic "Knowing what computers can and cannot do." In a world rapidly approaching the electronic revolution one can only marvel that educators would give so little support to this topic. "Using a calculator" was better accepted (see Table 96).
Ohio Respondents' Inclusion of Computer Literacy and Other Technology (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing what computers can and cannot do</td>
<td>22.7</td>
<td>24.0</td>
<td>27.3</td>
<td>7.1</td>
<td>19.6</td>
</tr>
<tr>
<td>Using a calculator</td>
<td>48.5</td>
<td>54.7</td>
<td>50.0</td>
<td>44.6</td>
<td>49.8</td>
</tr>
</tbody>
</table>

"Understanding elementary notions of probability" was not supported for inclusion on a high school graduation test. Elementary samples seemed more supportive of the topic than secondary samples, but this difference was not statistically significant (see Table 97).

TABLE 97

Ohio Respondents' Inclusion of Probability (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding elementary notions of probability</td>
<td>27.3</td>
<td>13.3</td>
<td>36.4</td>
<td>17.9</td>
<td>21.0</td>
</tr>
</tbody>
</table>
The specific determination of measures of central tendency as a topic for a high school graduation was not supported. "Making and interpreting graphs" received weak support from the total sample (see Table 98).

**TABLE 98**

Ohio Respondents' Inclusion of Statistical Topics (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making and interpreting graphs</td>
<td>50.0</td>
<td>61.3</td>
<td>63.6</td>
<td>44.6</td>
<td>53.9</td>
</tr>
<tr>
<td>Determining the mean, median, and mode of a group of numbers</td>
<td>24.2</td>
<td>16.0</td>
<td>22.7</td>
<td>25.0</td>
<td>21.5</td>
</tr>
</tbody>
</table>

The square root algorithm received virtually no support. "Reading a map," on the other hand, received moderate to strong support. Elementary samples were more supportive than secondary samples, but not at a statistically significant level (see Table 99).
TABLE 99

Ohio Respondents' Inclusion of Miscellaneous Topics (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determining the square root of a number using the square root algorithm</td>
<td>9.1</td>
<td>2.7</td>
<td>4.5</td>
<td>3.6</td>
<td>5.0</td>
</tr>
<tr>
<td>Reading a map</td>
<td>95.5</td>
<td>80.0</td>
<td>90.9</td>
<td>76.8</td>
<td>84.9</td>
</tr>
</tbody>
</table>

Five of the topics on the survey were Algebra I content. This is sequentially the first course usually thought of as being "high school mathematics content." Four of the five topics received essentially no support. "Solving first-degree equations," which is actually done frequently in elementary schools, was not supported even though many more respondents favored its inclusion than the other algebraic topics (see Table 100).
TABLE 100
Ohio Respondents' Inclusion of Algebraic Topics (in percent)

<table>
<thead>
<tr>
<th></th>
<th>Elementary Teachers</th>
<th>Secondary Teachers</th>
<th>Elementary Principals</th>
<th>Secondary Principals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solving first degree equations</td>
<td>25.8</td>
<td>26.7</td>
<td>18.2</td>
<td>17.9</td>
<td>23.3</td>
</tr>
<tr>
<td>Solving systems of equations with two unknowns</td>
<td>4.5</td>
<td>0.0</td>
<td>4.5</td>
<td>5.4</td>
<td>3.2</td>
</tr>
<tr>
<td>Solving second degree equations</td>
<td>3.0</td>
<td>0.0</td>
<td>4.5</td>
<td>1.8</td>
<td>1.8</td>
</tr>
<tr>
<td>Deriving the quadratic formula</td>
<td>0.0</td>
<td>0.0</td>
<td>4.5</td>
<td>3.6</td>
<td>1.4</td>
</tr>
<tr>
<td>Factoring polynomials in the second degree</td>
<td>1.5</td>
<td>2.7</td>
<td>4.5</td>
<td>3.6</td>
<td>2.7</td>
</tr>
</tbody>
</table>

In general there was little difference in responses across samples indicating general agreement regarding appropriate mathematics content for a high school graduation test. The agreed-upon content is entirely elementary school level and there was a noticeable lack of "future orientation" in the responses.
Summary and Conclusions

Minimum competency testing in Ohio has been neither the political issue nor controversial topic that it has been in some states. State involvement, until now, has been relatively minimal. That condition has potential for change in view of the commitments recently expressed by the State Board of Education and the draft of the state's proposed minimum standards. At the time the survey was conducted, minimum competency testing was not widely occurring in Ohio and therefore was not perceived as impacting on mathematics education. When the study was begun, Ohio's course of action regarding minimum competency testing seemed largely undetermined. Presently it would seem more likely to follow a path similar to that taken by Oregon. Educators and others would do well to study that state's program before proceeding further.
Chapter VII

STATE COMPARISON

The four preceding chapters described the minimum competency testing movement in four different states. One source of information used was the survey results. An additional kind of insight can be gained by comparing the survey results for the four states. All responding educators from each state were considered as a group and differences in the responses of these groups were analyzed. Note that the educational systems in these states differ on several dimensions other than minimum competency testing and therefore minimum competency testing cannot be identified as a causal factor in the differences.

Summary of Individual State Characteristics

This chapter is intended to present a detailed examination of the differences and similarities of responses on the survey by comparing responses by state. In order to place this comparison in the proper context, some of the information from the previous chapters will be reviewed.

The four states studied have responded very differently to the minimum competency testing movement. Two of the states, Florida and Oregon, have minimum competency requirements for high school graduation. In Florida there is a single statewide test used as one criterion for high school graduation. The test, a result of
legislative mandate in 1976, was to have been a graduation criterion for the class of 1979. The implementation of the test was delayed until 1983 as a result of federal court order.

In Oregon, which is not a minimum competency testing state per se, local districts verify competency for high school graduation. Competencies are verified in broad areas specified by the state. Each district in Oregon determines the specific competencies to be verified. The competency based graduation requirement was a part of minimum standards approved by Oregon's State Board of Education. The 1979 graduating class was the first to be affected. There have been no law suits in Oregon. One state department of education official felt this was because the competencies themselves are determined at the local level. The state required that each district provide a mechanism for input from citizens regarding necessary competencies.

Missouri administers a single statewide test in eighth grade. The state department of education had responsibility for the development of the test. Students must take the test every year until they pass or graduate. The test does not affect promotion or graduation. The mandate for the test came from the state board of education. There is some feeling that this was to circumvent legislative action on minimum competency testing.

Ohio is presently the least involved of the four states in minimum competency testing. There is no statewide minimum competency testing program. Some districts in the state have established minimum competency testing programs. The Minimum Standards for Ohio Schools are presently being revised and
may well include mandatory competency-based education in mathematics. Minimum competency testing will probably not be mandated.

The political structure within each state may have affected the response that was made to the issue of minimum competency testing. Table 101 presents some of these characteristics. A number of other differences exist which include: traditions of state versus local controls, strength of teacher organizations, and wealth of populations. Whether the differences in educational program are dictated by the attitudes and beliefs of educators and citizens or formed by the existing conditions is open to conjecture. Yet differences do exist.

Table 102 indicates the percentage of educators from each state agreeing with each statement of attitude toward competency testing. It is important to remember the previously discussed differences between the population samples within each state. But even with this disclaimer in mind, the results are clear. In Florida, the state

<table>
<thead>
<tr>
<th></th>
<th>Head of State Department of Education</th>
<th>State Board of Education</th>
<th>Number of School Districts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida</td>
<td>elected</td>
<td>elected</td>
<td>67</td>
</tr>
<tr>
<td>Oregon</td>
<td>elected</td>
<td>appointed</td>
<td>316</td>
</tr>
<tr>
<td>Missouri</td>
<td>appointed</td>
<td>appointed</td>
<td>556</td>
</tr>
<tr>
<td>Ohio</td>
<td>appointed</td>
<td>elected</td>
<td>615</td>
</tr>
</tbody>
</table>
with the strictest requirements regarding minimum competency testing, respondents were most favorably disposed to minimum competency testing. A larger percentage than in the other states favor minimum competency testing as a criterion for high school graduation and grade-to-grade promotion and as an aid in identifying remedial students, and fewer respondents opposed minimum competency testing for any reason or were undecided. Conversely, in Ohio, the state least involved in minimum competency testing, educators responded least favorably to minimum competency testing.

**TABLE 102**

Educator Attitudes Toward Minimum Competency Testing  
(in percent)

<table>
<thead>
<tr>
<th><em>I favor passage of a minimum competency test as a criterion for high school graduation.</em></th>
<th>FL</th>
<th>OR</th>
<th>MO</th>
<th>OH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>74.3</td>
<td>68.2</td>
<td>46.4</td>
<td>35.7</td>
<td>55.6</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><em>I favor passage of a minimum competency test as a criterion for grade-to-grade promotion.</em></th>
<th>FL</th>
<th>OR</th>
<th>MO</th>
<th>OH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>63.9</td>
<td>36.0</td>
<td>30.4</td>
<td>33.9</td>
<td>40.5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><em>I favor minimum competency testing for the purpose of identifying remedial help.</em></th>
<th>FL</th>
<th>OR</th>
<th>MO</th>
<th>OH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>83.7</td>
<td>66.8</td>
<td>71.9</td>
<td>66.1</td>
<td>71.9</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I oppose minimum competency testing for any reason.</th>
<th>FL</th>
<th>OR</th>
<th>MO</th>
<th>OH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>4.7</td>
<td>3.1</td>
<td>7.1</td>
<td>4.1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><em>I am undecided about minimum competency testing.</em></th>
<th>FL</th>
<th>OR</th>
<th>MO</th>
<th>OH</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5</td>
<td>9.8</td>
<td>14.3</td>
<td>17.0</td>
<td>11.3</td>
<td></td>
</tr>
</tbody>
</table>

*p < .01*
It is not possible to give a definitive answer as to why this is the case. Several possibilities readily come to mind and should be considered. First, once a mandated program is in place, those individuals most intimately concerned with its administration like it. They might like the program because it has educational merit or because once it has become the status quo, it is easier to accept it than not to accept it. Or, it may be that educators who like an idea or program are more likely to work for the adoption of that idea or program. It cannot be determined at this time whether or not Ohio educators would respond more like Florida educators if a state-mandated testing program were to come into existence. Still, the question of whether Floridians like minimum competency testing because they have it, or have minimum competency testing because they like it, is open to debate.

There was some attempt to see whether attitudes of teachers differed from state to state on other dimensions. The teachers were asked to judge the change in mathematics attitude and achievement of students entering their classes this year compared with several years ago. Results are given in Table 103. There was no significant difference between group responses on either the achievement or attitude dimension. The percentages on the attitude question especially are amazingly close. Since Florida officials have made much of the improved student attitudes resulting from their testing program (see Chapter III), one wonders if the Florida survey respondents disagreed with these claims. The largest group of teachers from each state felt that achievement and attitude are about the same as a few years ago. On the attitude question, there is nearly an even split
in each state between those feeling attitude is higher or lower than it was in the past. On the achievement question, more teachers felt that achievement is lower than feel that achievement is higher than it was formerly. The difference is less marked in Florida but not statistically different than the other states.

### TABLE 103

**Teachers' Perceptions of Change in Mathematical Attitude and Achievement**

(in percent)

<table>
<thead>
<tr>
<th>Achievement</th>
<th>Florida</th>
<th>Oregon</th>
<th>Missouri</th>
<th>Ohio</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>higher</td>
<td>about the same</td>
<td>lower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achievement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22.7</td>
<td>47.7</td>
<td>28.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Florida</td>
<td>19.1</td>
<td>54.2</td>
<td>26.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oregon</td>
<td>11.3</td>
<td>55.3</td>
<td>33.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missouri</td>
<td>14.0</td>
<td>55.9</td>
<td>29.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16.6</td>
<td>53.4</td>
<td>29.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Florida</th>
<th>Oregon</th>
<th>Missouri</th>
<th>Ohio</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>higher</td>
<td>about the same</td>
<td>lower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20.8</td>
<td>58.5</td>
<td>20.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Florida</td>
<td>18.0</td>
<td>60.9</td>
<td>21.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oregon</td>
<td>18.8</td>
<td>59.7</td>
<td>21.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missouri</td>
<td>19.6</td>
<td>60.8</td>
<td>19.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ohio</td>
<td>19.3</td>
<td>60.0</td>
<td>20.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Another facet of teacher attitude was explored in the item concerning the pressures felt by teachers (see Table 104). The majority of responding teachers reported feeling general pressure to go "back-to-the-basics." The largest percentage of positive responses to this item came from Florida, the fewest from Oregon. Significant differences were found on two of the four items. Nearly 10 times as many teachers in Florida compared to teachers in Ohio reported pressure as a direct result of minimum competency testing. And when comparing Florida responses to those from Oregon and Missouri, still about two to three times as many teachers reported pressure as a result of minimum competency testing. Florida teachers seemed to feel more pressure than teachers in the other three states studied.

There was no significant difference in responses concerning a general pressure to go back-to-the-basics. A majority of respondents did report such a pressure. There were also no significant differences on the items concerning pressure as a result of standardized tests.

In another type of attitude question, respondents were asked to judge the prevailing attitudes of groups within their state regarding minimum competency testing. Respondents were asked to indicate whether specific groups in their state: support minimum competency testing for graduation, support minimum competency testing for informational purposes only, do not support minimum competency testing, neither support not oppose minimum competency testing, or that the respondent did not know the prevailing feeling of the group. Table 105 summarized responses to this item.

There were individuals who did not follow directions and marked
### TABLE 104

**Teachers' Perceptions of Classroom Pressures**  
*(in percent)*

<table>
<thead>
<tr>
<th>FL</th>
<th>OR</th>
<th>MO</th>
<th>OH</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.5</td>
<td>44.4</td>
<td>30.8</td>
<td>33.8</td>
<td>32.7</td>
</tr>
</tbody>
</table>

*The teachers in my school do not seem to feel the pressures you have described.*

The teachers in my school seem to feel a general pressure to go back to the basics.

| 63.7 | 49.6 | 59.6 | 59.3 | 58.0 |

*The teachers in my school seem to feel pressure as a direct result of (a) minimum competency test that is given to our students.*

Teachers in my school seem to feel pressure to have their students perform well on standardized tests, but this pressure is not a direct result of minimum competency testing.

| 32.6 | 36.9 | 35.6 | 40.7 | 36.5 |

*p < .01

More than one item – the percents of respondents making this mistake is indicated. Educators in Florida perceived the majority of all populations (except students) as favoring minimum competency testing for high school graduation. Note also that the majority of Ohio educators "don't know" the attitudes of parents, local media, students, local school boards, legislators and the state department of education.
### TABLE 105

**Attitudes of Groups as Perceived by Educators**

*(in percent)*

<table>
<thead>
<tr>
<th></th>
<th>Graduation</th>
<th>Info Only</th>
<th>Not Supportive</th>
<th>Neither Opposes or Supports</th>
<th>Don’t Know</th>
<th>More Than One</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parents</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>51.8</td>
<td>17.8</td>
<td>5.2</td>
<td>5.8</td>
<td>16.8</td>
<td>2.1</td>
</tr>
<tr>
<td>OR</td>
<td>50.0</td>
<td>12.9</td>
<td>2.5</td>
<td>7.4</td>
<td>26.7</td>
<td>0.0</td>
</tr>
<tr>
<td>MO</td>
<td>20.8</td>
<td>28.3</td>
<td>5.7</td>
<td>13.7</td>
<td>31.6</td>
<td>0.0</td>
</tr>
<tr>
<td>OH</td>
<td>10.7</td>
<td>18.5</td>
<td>2.9</td>
<td>12.7</td>
<td>55.1</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Local Media</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>64.1</td>
<td>4.7</td>
<td>5.7</td>
<td>7.3</td>
<td>17.2</td>
<td>0.5</td>
</tr>
<tr>
<td>OR</td>
<td>38.5</td>
<td>3.9</td>
<td>1.0</td>
<td>9.8</td>
<td>46.8</td>
<td>0.0</td>
</tr>
<tr>
<td>MO</td>
<td>30.8</td>
<td>10.4</td>
<td>2.8</td>
<td>14.7</td>
<td>40.8</td>
<td>0.5</td>
</tr>
<tr>
<td>OH</td>
<td>21.0</td>
<td>6.8</td>
<td>0.0</td>
<td>11.2</td>
<td>61.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Students</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>26.5</td>
<td>17.3</td>
<td>21.1</td>
<td>16.2</td>
<td>17.3</td>
<td>1.1</td>
</tr>
<tr>
<td>OR</td>
<td>16.8</td>
<td>9.9</td>
<td>26.7</td>
<td>16.8</td>
<td>28.7</td>
<td>0.5</td>
</tr>
<tr>
<td>MO</td>
<td>7.2</td>
<td>18.4</td>
<td>25.6</td>
<td>20.8</td>
<td>28.0</td>
<td>0.0</td>
</tr>
<tr>
<td>OH</td>
<td>1.0</td>
<td>9.1</td>
<td>20.2</td>
<td>16.7</td>
<td>53.0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Teachers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>61.1</td>
<td>25.3</td>
<td>3.2</td>
<td>1.6</td>
<td>4.7</td>
<td>2.6</td>
</tr>
<tr>
<td>OR</td>
<td>44.3</td>
<td>22.2</td>
<td>14.3</td>
<td>4.9</td>
<td>9.4</td>
<td>3.0</td>
</tr>
<tr>
<td>MO</td>
<td>28.2</td>
<td>43.5</td>
<td>13.9</td>
<td>5.7</td>
<td>8.1</td>
<td>0.5</td>
</tr>
<tr>
<td>OH</td>
<td>15.1</td>
<td>33.7</td>
<td>15.1</td>
<td>11.7</td>
<td>23.9</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Administrators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>69.1</td>
<td>16.0</td>
<td>1.6</td>
<td>1.1</td>
<td>8.5</td>
<td>3.7</td>
</tr>
<tr>
<td>OR</td>
<td>61.8</td>
<td>17.6</td>
<td>4.9</td>
<td>2.9</td>
<td>10.3</td>
<td>2.5</td>
</tr>
<tr>
<td>MO</td>
<td>27.9</td>
<td>44.7</td>
<td>8.2</td>
<td>2.9</td>
<td>15.9</td>
<td>0.5</td>
</tr>
<tr>
<td>OH</td>
<td>19.1</td>
<td>31.9</td>
<td>8.8</td>
<td>8.3</td>
<td>30.9</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Local School Board</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>78.8</td>
<td>9.0</td>
<td>0.5</td>
<td>0.5</td>
<td>8.5</td>
<td>2.6</td>
</tr>
<tr>
<td>OR</td>
<td>67.2</td>
<td>11.3</td>
<td>0.5</td>
<td>2.9</td>
<td>16.2</td>
<td>2.0</td>
</tr>
<tr>
<td>MO</td>
<td>27.9</td>
<td>31.7</td>
<td>4.8</td>
<td>2.9</td>
<td>31.7</td>
<td>1.0</td>
</tr>
<tr>
<td>OH</td>
<td>10.8</td>
<td>21.2</td>
<td>4.4</td>
<td>11.8</td>
<td>51.2</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Legislators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>81.2</td>
<td>3.8</td>
<td>0.5</td>
<td>0.0</td>
<td>12.9</td>
<td>1.6</td>
</tr>
<tr>
<td>OR</td>
<td>48.5</td>
<td>2.6</td>
<td>0.0</td>
<td>2.6</td>
<td>44.4</td>
<td>2.0</td>
</tr>
<tr>
<td>MO</td>
<td>30.4</td>
<td>14.5</td>
<td>1.0</td>
<td>1.0</td>
<td>52.7</td>
<td>0.5</td>
</tr>
<tr>
<td>OH</td>
<td>11.1</td>
<td>5.1</td>
<td>0.5</td>
<td>3.0</td>
<td>80.3</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>State Department of Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FL</td>
<td>89.3</td>
<td>1.6</td>
<td>0.5</td>
<td>0.5</td>
<td>6.4</td>
<td>1.6</td>
</tr>
<tr>
<td>OR</td>
<td>73.1</td>
<td>5.6</td>
<td>0.0</td>
<td>0.5</td>
<td>18.3</td>
<td>2.5</td>
</tr>
<tr>
<td>MO</td>
<td>39.8</td>
<td>28.6</td>
<td>1.5</td>
<td>1.0</td>
<td>29.1</td>
<td>0.0</td>
</tr>
<tr>
<td>OH</td>
<td>18.0</td>
<td>10.0</td>
<td>1.0</td>
<td>4.0</td>
<td>66.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

*p < .01*
The data give a clear indication of the relative controversy caused by minimum competency testing within a state.

When educators were asked to select the single most valid reason for opposing minimum competency tests from among seven reasons commonly found in the literature, the reason chosen by more respondents from each state than any other reason was, "It will be used to judge schools and teachers" (see Table 106). The fact that this response was definitely number one across states was rather surprising because, while it is mentioned with some regularity in the literature, it does not enjoy nearly the prominence given some of the other reasons.

Also, while Florida teachers reported feeling pressure because of minimum competency testing, the majority of respondents from other states did not report feeling this pressure. The results may imply that educators did not feel any of the other alternatives was appropriate or it may reflect a sort of backlash against the accountability movement.

Survey respondents also exhibited remarkable unanimity when asked the most valid reason for favoring minimum competency testing. "To be sure students are prepared for jobs or post-high school education" was the most popular response by a substantial margin (see Table 107). The somewhat similar reason, "To give meaning to the high school diploma," ranked second in Florida and Oregon and third in Missouri and Ohio.
<table>
<thead>
<tr>
<th>Reason</th>
<th>FL</th>
<th>OR</th>
<th>MO</th>
<th>OH</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>It will narrow the curriculum</td>
<td>18.1</td>
<td>13.1</td>
<td>11.0</td>
<td>7.8</td>
<td>12.4</td>
</tr>
<tr>
<td>&quot;Minimum Competencies&quot; are not identifiable</td>
<td>7.3</td>
<td>15.0</td>
<td>10.1</td>
<td>9.2</td>
<td>10.4</td>
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<tr>
<td>Test development techniques are not good enough</td>
<td>8.3</td>
<td>15.5</td>
<td>12.8</td>
<td>12.4</td>
<td>12.4</td>
</tr>
<tr>
<td>The potential for racial or cultural discrimination is great</td>
<td>8.3</td>
<td>4.9</td>
<td>5.0</td>
<td>9.7</td>
<td>7.0</td>
</tr>
<tr>
<td>It will increase the high school dropout rate</td>
<td>1.6</td>
<td>3.9</td>
<td>4.6</td>
<td>3.2</td>
<td>3.4</td>
</tr>
<tr>
<td>It will stifle creative teaching</td>
<td>6.2</td>
<td>5.8</td>
<td>3.2</td>
<td>5.5</td>
<td>5.2</td>
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<tr>
<td>It will be used to judge schools and teachers</td>
<td>38.9</td>
<td>26.7</td>
<td>45.4</td>
<td>39.6</td>
<td>37.8</td>
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<tr>
<td>Other</td>
<td>7.3</td>
<td>12.6</td>
<td>3.2</td>
<td>6.9</td>
<td>7.4</td>
</tr>
<tr>
<td>More than one item checked</td>
<td>4.1</td>
<td>2.4</td>
<td>4.6</td>
<td>5.5</td>
<td>4.2</td>
</tr>
</tbody>
</table>
TABLE 107

Reasons for Supporting Minimum Competency Testing* (in percent)

<table>
<thead>
<tr>
<th>Reason</th>
<th>FL</th>
<th>OR</th>
<th>MO</th>
<th>OH</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>To motivate students</td>
<td>7.9</td>
<td>6.6</td>
<td>5.5</td>
<td>9.1</td>
<td>7.3</td>
</tr>
<tr>
<td>To make sure schools do their job</td>
<td>8.9</td>
<td>5.7</td>
<td>3.7</td>
<td>7.3</td>
<td>6.4</td>
</tr>
<tr>
<td>To be sure students are prepared for jobs or post-high school education</td>
<td>35.6</td>
<td>27.8</td>
<td>44.7</td>
<td>31.5</td>
<td>34.9</td>
</tr>
<tr>
<td>To guarantee a focus on the basics in school</td>
<td>7.9</td>
<td>13.7</td>
<td>6.0</td>
<td>10.5</td>
<td>9.5</td>
</tr>
<tr>
<td>To raise standardized test scores</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.1</td>
</tr>
<tr>
<td>To give meaning to the high school diploma</td>
<td>13.4</td>
<td>17.5</td>
<td>12.4</td>
<td>11.9</td>
<td>13.8</td>
</tr>
<tr>
<td>To identify remedial students</td>
<td>10.4</td>
<td>9.0</td>
<td>15.2</td>
<td>18.7</td>
<td>13.4</td>
</tr>
<tr>
<td>Other</td>
<td>4.5</td>
<td>8.5</td>
<td>1.4</td>
<td>2.7</td>
<td>4.2</td>
</tr>
<tr>
<td>More than one</td>
<td>10.2</td>
<td>11.3</td>
<td>11.1</td>
<td>7.3</td>
<td>10.1</td>
</tr>
</tbody>
</table>

*P < .01
Perceived Impact

All respondents, both teachers and principals, were asked to judge whether particular things were happening in their schools or districts. The survey asked whether these things were: occurring primarily as a result of minimum competency testing, occurring partially as a result of minimum competency testing, occurring but not as a result of minimum competency testing, not occurring, or "I can't judge." Statistical differences between responses of respondents from different states were found on nine of the ten survey items. (see Table 108).

Perhaps the most striking results were on the two items "more remedial classes" and "more frequent testing." On the former item, 74.9 percent of the Florida respondents indicated it was occurring primarily as a result of minimum competency testing. This compares with only 18.6 percent in Oregon, 17.3 percent in Missouri and 6.1 percent in Ohio. While it cannot be certain that minimum competency testing in Florida is causing more remedial classes, it is clear that educators in Florida perceived that minimum competency testing is the cause of more remedial classes.

Several comments must be made regarding these statistics. At first glance, one might decide that Florida is doing much more remedial education than the other states. Yet upon closer examination, this may not be the case. If "reasons" are not considered, then 93.3 percent of the Florida respondents reported more remedial classes, compared with 73.8 percent for Oregon, 80.2 percent for Missouri, and 57.4 percent for Ohio. While the differences are still there, it is evident that the majority of respondents in all four states feel that there are more remedial classes in mathematics than was the case in the past.
The second item which the majority of responding Florida educators believed occurred primarily because of minimum competency testing is more frequent testing. Again it is useful to consider how many respondents from other states believe there is more frequent testing for any reason. Only "fewer field trips" received relatively the same responses across states. Few respondents from any of the states reported minimum competency testing is either primarily or partially responsible for fewer field trips. More respondents seemed to feel that either fewer field trips are not taking place or if fewer trips are occurring minimum competency testing is not the reason (a few respondents indicated in notes written in the margin that the small number of field trips resulted from a tight financial situation).

While the other items exhibited differences at a statistically significant level, the educational significance of some of the differences is open to question. For example, 17 percent of the Florida respondents indicated lower enrollments in elective courses primarily or partially as a result of minimum competency testing and Oregon, Missouri, and Ohio respondents indicated the same thing at the 8.3 percent, 6.4 percent, and 2.3 percent levels, respectively. These differences should be considered in light of the fact that a large majority of respondents from all states indicated that either lower enrollments in elective courses were not occurring or they could not judge whether lower enrollments were occurring.

As might be expected, respondents from Florida seem relatively more likely to feel things were occurring primarily or partially as a result of minimum competency testing. Ohio respondents, on the other
hand, indicated these two categories least often. There seems to be a clear indication that while Florida educators felt that minimum competency testing had caused several educational changes, Ohio educators indicated no such belief. In general, the Oregon and Missouri respondents fall somewhere between the Florida and Ohio respondents. Again, there can be no doubt that Florida educators perceived minimum competency testing as having far-reaching effects.

In a further attempt to determine the educators' perceptions of minimum competency testing, teachers were asked to indicate for 16 topics whether they: spend more class time on the topic because of minimum competency, spend more class time on the topic but not because of minimum competency testing, spend less class time on the topic because of minimum competency testing, spend less class time on the topic but not because of minimum competency testing, or spend the same amount of class time. Of the 16 topics or activities listed, there were statistically significant differences between states on 13 (see Table 109).

It is evident that the teachers in Florida felt that minimum competency testing is causing a change in class time spent on various activities and topics. They reported more class time spent on the following activities:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic facts</td>
<td>74.8%</td>
</tr>
<tr>
<td>Diagnosis of individual difficulties</td>
<td>75.6%</td>
</tr>
<tr>
<td>Story or word problems</td>
<td>70.0%</td>
</tr>
<tr>
<td>Review of materials from previous years</td>
<td>62.2%</td>
</tr>
<tr>
<td>Practice</td>
<td>52.0%</td>
</tr>
<tr>
<td>Consumer topics</td>
<td>46.8%</td>
</tr>
<tr>
<td>Computation appropriate to course content</td>
<td>43.5%</td>
</tr>
<tr>
<td></td>
<td>More Class Time because of NCT</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td><strong>Basic Facts</strong></td>
<td></td>
</tr>
<tr>
<td>1. Florida</td>
<td>74.8</td>
</tr>
<tr>
<td>2. Oregon</td>
<td>33.1</td>
</tr>
<tr>
<td>3. Missouri</td>
<td>35.3</td>
</tr>
<tr>
<td>4. Ohio</td>
<td>11.2</td>
</tr>
<tr>
<td><strong>Story or Word Problems</strong></td>
<td></td>
</tr>
<tr>
<td>1. Florida</td>
<td>70.0</td>
</tr>
<tr>
<td>2. Oregon</td>
<td>12.0</td>
</tr>
<tr>
<td>3. Missouri</td>
<td>34.6</td>
</tr>
<tr>
<td>4. Ohio</td>
<td>7.1</td>
</tr>
<tr>
<td><strong>How to use a Calculator</strong></td>
<td></td>
</tr>
<tr>
<td>1. Florida</td>
<td>3.8</td>
</tr>
<tr>
<td>2. Oregon</td>
<td>6.5</td>
</tr>
<tr>
<td>3. Missouri</td>
<td>1.1</td>
</tr>
<tr>
<td>4. Ohio</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>Problems requiring the use of a Calculator</strong></td>
<td></td>
</tr>
<tr>
<td>1. Florida</td>
<td>4.1</td>
</tr>
<tr>
<td>2. Oregon</td>
<td>6.7</td>
</tr>
<tr>
<td>3. Missouri</td>
<td>1.2</td>
</tr>
<tr>
<td>4. Ohio</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>Number Bases other than Ten</strong></td>
<td></td>
</tr>
<tr>
<td>1. Florida</td>
<td>1.0</td>
</tr>
<tr>
<td>2. Oregon</td>
<td>2.0</td>
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<td>3. Missouri</td>
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<td>4. Ohio</td>
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<tr>
<td><strong>Sets</strong></td>
<td></td>
</tr>
<tr>
<td>1. Florida</td>
<td>5.9</td>
</tr>
<tr>
<td>2. Oregon</td>
<td>1.7</td>
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<td>3. Missouri</td>
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<td>4. Ohio</td>
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<tr>
<td><strong>Computation appropriate to Course Content</strong></td>
<td></td>
</tr>
<tr>
<td>1. Florida</td>
<td>43.5</td>
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<td>2. Oregon</td>
<td>23.1</td>
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<tr>
<td><strong>Geometry</strong></td>
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<td>1. Florida</td>
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<td>2. Oregon</td>
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<td>3. Missouri</td>
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<td>4. Ohio</td>
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</tbody>
</table>

(continued)
<table>
<thead>
<tr>
<th>Activity</th>
<th>Individual Difficulties</th>
<th>Individual Projects</th>
<th>Practice</th>
<th>Review of Materials from Previous Year</th>
<th>Consumer Topics</th>
<th>Enrichment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida</td>
<td>Oregon</td>
<td>Missouri</td>
<td>Ohio</td>
<td>Florida</td>
<td>Oregon</td>
<td>Missouri</td>
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<td>28.0</td>
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<td>33.7</td>
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</tr>
</tbody>
</table>

- More class time because of HCT
- More class time not because of HCT
- Less class time because of HCT
- Less class time not because of HCT
If Florida teachers are actually spending more time on these topics, it would be reasonable to assume that they are spending less time on some other topics. Whatever those topics might be, they were not included on the survey. Certainly Florida teachers did not report spending less time because of minimum competency testing in large numbers. Even when the category "spending less class time but not because of minimum competency testing" is included, the results are not as overwhelming as when looking at the "spending more time" categories. The Florida teachers seemed to feel that minimum competency testing had affected the amount of class time spent on various topics and activities.

By contrast, in Ohio never more than 12.3 percent of the teachers report more class time being spent on a topic because of minimum competency testing. It was often the case that a plurality of Ohio teachers indicated the same amount of class time was being spent. When one of the other alternatives was more popular than this one, it was always "not because of minimum competency tests" (basic facts, how to use a calculator, problems requiring the use of a calculator, number bases other than 10, sets, enrichment, and consumer topics). It is apparent that for the topics considered, Ohio teacher respondents did not feel minimum competency testing has affected class time spent on the topic.

Despite the fact that Oregon is considered a minimum competency state, Oregon teachers did not seem to feel that minimum competency testing had had an impact on education to the same extent that Florida teachers felt it had. This may be a result of the fact that local districts retained control of the specific competencies to be
required. This might imply that the competencies were established to fit the existing curriculum and therefore test content did not have as great an effect on course or class content. This is, of course, only conjecture.

Missouri teacher responses were amazingly similar to Oregon responses. An exception is found on the topic "Story or word problems." Since the mathematics section of Missouri's BEST is nearly all word problems, this is not surprising.

Table 109 indicates that Florida teachers definitely feel minimum competency testing has resulted in their changing the amount of class time spent on given topics and activities. Ohio teachers definitely feel minimum competency testing has not changed the amount of class time spent on given topics and activities. Oregon and Missouri teachers fall between these two extremes. There is some indication that they feel minimum competency testing has affected the amount of time spent on some, but not on all, areas.

Two other observations should be made. First, it may again be the case that because two things are happening concurrently, one is seen as "causing" the other. The majority of all samples reported spending more time on basic facts, but only in Florida, where there is a highly publicized, single statewide test, do teachers feel that this is because of minimum competency testing. Clearly the trend in all four states is toward spending more time on basic facts. The teachers perceive the reasons for this trend differently, but it may be that in all cases the same conditions and forces precipitating the call for minimum competency testing are also causing an emphasis to be placed on basic facts.
The Second observation is that this item provides an excellent validity check on the survey. Professional opinion is that emphasis on calculators and computers is increasing and the emphasis on topics such as sets and number bases other than ten is decreasing, but these conditions are not the result of minimum competency testing. Survey results verify this prevailing professional opinion.

Respondents were asked to assume that a minimum competency test for high school graduation was to be given and asked which of 25 topics indicated should be on such a test. The results may be disappointing to mathematics educators who have advocated a broad definition for basic skills. Results are given in Table 110. Answers were different at a statistically significant level on only seven of the 25 items. Again, statistical significance does not necessarily imply educational significance. On item 25, for example, only 0.9 percent of Oregon respondents compared with 10.3 percent of Missouri respondents felt that "Determining the square root of a number using the square root algorithm" should be on a high school graduation test. Yet, the vast majority of people from both states would not include that skill.

Similarly, analysis indicated a difference in response for item 17 - "Reading a map." The largest discrepancy between two states' on this item was the 94.9 percent by Florida respondents and the 78.2 percent by Oregon respondents. In both cases, a large majority of respondents favored including the topic, and the statistically significant difference may not be educationally significant.
<table>
<thead>
<tr>
<th>Table 110</th>
<th>Educator Responses Regarding the Inclusion of Mathematical Topics on a High School Graduation Test (in percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Computing with whole numbers</td>
</tr>
<tr>
<td>2.</td>
<td>Computing with decimals</td>
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<tr>
<td>3.</td>
<td>Computing with fractions</td>
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<tr>
<td>4.</td>
<td>Rounding off numbers</td>
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<tr>
<td>5.</td>
<td>Making and interpreting graphs</td>
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<tr>
<td>6.</td>
<td>Measuring with the metric system</td>
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<tr>
<td>7.</td>
<td>Measuring with the standard system</td>
</tr>
<tr>
<td>8.</td>
<td>Understanding elementary notions of probability</td>
</tr>
<tr>
<td>9.</td>
<td>Knowing what computers can and cannot do</td>
</tr>
<tr>
<td>10.</td>
<td>Knowing basic properties of geometric figures</td>
</tr>
<tr>
<td>11.</td>
<td>Estimating</td>
</tr>
<tr>
<td>12.</td>
<td>Solving word problems</td>
</tr>
<tr>
<td>13.</td>
<td>Using a calculator</td>
</tr>
<tr>
<td>14.</td>
<td>Solving problems using right triangle trigonometry</td>
</tr>
<tr>
<td>15.</td>
<td>Calculating areas and volumes</td>
</tr>
<tr>
<td>16.</td>
<td>Doing simple geometric proof</td>
</tr>
<tr>
<td>17.</td>
<td>Reading a map</td>
</tr>
<tr>
<td>18.</td>
<td>Deriving the quadratic formula</td>
</tr>
<tr>
<td>19.</td>
<td>Factoring polynomials in the second degree</td>
</tr>
<tr>
<td>20.</td>
<td>Determining the mean, median and mode of a group of numbers</td>
</tr>
<tr>
<td>21.</td>
<td>Solving first-degree equations</td>
</tr>
<tr>
<td>22.</td>
<td>Using mathematics to solve consumer problems</td>
</tr>
<tr>
<td>23.</td>
<td>Solving systems of equations with two unknowns</td>
</tr>
<tr>
<td>24.</td>
<td>Solving second-degree equations</td>
</tr>
<tr>
<td>25.</td>
<td>Determining the square root of a number using the square root algorithm</td>
</tr>
</tbody>
</table>
The differences on these items is neither as interesting or as important as the similarities. Six of the items received strong support (more than 85 percent) across the four state samples:

1) Computing with whole numbers 98.1%
2) Computing with decimals 95.2%
3) Using mathematics to solve consumer problems 87.6%
4) Computing with fractions 86.9%
5) Measuring with the standard system 86.7%
6) Reading a map 86.2%

The only statistically significant difference on these six was on the previously discussed "Reading a map." So there is fairly universal agreement among respondents concerning some of the mathematics that should be on a minimum competency test for high school graduation.

Likewise, there is some agreement concerning what definitely should not be on the test (less than 15 percent support):

1) Deriving the quadratic formula 2.2%
2) Factoring polynomials in the second degree 2.5%
3) Solving second degree equations 3.0%
4) Solving problems using right triangle trigonometry 4.4%
5) Determining the square root of a number using the square root algorithm 5.6%
6) Solving systems of equations with two unknowns 6.8%
7) Doing a simple geometric proof 12.2%

The only statistically significant difference in response on these seven items occurred on the previously discussed "Determining the square root of a number using the square root algorithm."

Consideration of these first groupings of items suggests that what respondents agree should be on a minimum competency test for graduation is largely content from elementary school mathematics, and what they agree should not be on the test is largely content from secondary school mathematics (principally traditional Algebra I content). This conjecture bears further study. Consider three more groupings: Those items supported by 60 percent to 80 percent (some support); those items supported by 40 percent to 60 percent (controversial); and those items supported by 15 percent to 40 percent (some opposition).

Some Support:
1. Rounding off numbers 79.9%
2. Solving word problems 79.2%
3. Estimating 76.6%
4. Measuring with the metric system 68.8%
5. Making and interpreting graphs 62.2%
6. Calculating areas and volumes 59.3%
Controversial:
1. Knowing basic properties 49.2% of geometric figures
2. Using a calculator 47.4%

Some Opposition:
1. Knowing what computers can 21.8% and cannot do
2. Solving first-degree 22.8% equations
3. Determining the mean, median 25.3% and mode of a group of numbers
4. Understanding elementary 26.4% notions of probability

It is instructional at this point to recall some of the state-defined contents of some of the minimum competency tests. (Bear in mind that these are not all required for high school graduation).

Basic Essential Skills Test (BEST) Mathematics Objectives (Missouri)
To be assessed by a paper-and-pencil test:
1. Add and subtract whole numbers in sample problems involving real-life situations.
2. Multiply and divide whole numbers in sample problems involving real-life situations.
3. Add and subtract common decimal fractions in sample problems involving real-life situations.
4. Multiply and divide common and decimal fractions in sample problems involving real-life situations.

5. Solve sample problems involving business and consumer situations.

6. Solve problems involving measures of length, area, and volume.

7. Solve problems involving measures of time and temperature.

8. Interpret information from charts, graphs, tables, maps, and scale drawings.

9. Solve sample problems by applying the concept of ratio and proportion.

10. Interpret simple probability and statistical statements relating to common situations such as weather reports and opinion polls.

11. Determine the average for given numerical data.

12. Identify horizontal, vertical, parallel, and intersecting lines.

13. Identify simple plane and solid geometric figures.

To be assessed locally:

14. Use standard measuring devices to measure length, area, volume, weight, time, and temperature in common English and metric units.

15. Estimate results and judge the reasonableness of answers to computational problems.

State Student Assessment Test, Part I - Mathematics (Florida)

(11th grade assessment)

Number Concepts:

1. Round numbers with no more than three decimal places.

2. Round a mixed number to the nearest whole number.

3. Put three numbers in order (through millions).
4. Identify an improper fraction equal to a mixed number.
5. Identify a mixed number equal to an improper fraction.
6. Identify decimals and percents equal to common fractions.

Computation:
7. Multiply two 3-digit numbers.
8. Divide a 5-digit number by a 2-digit number.

Fractions:
9. Add two mixed numbers.
10. Subtract a whole number and a mixed number.
11. Subtract two mixed numbers.
12. Multiply a whole number and a mixed number.

Decimals:
13. Multiply two decimal numbers.
15. Multiply a whole number and a whole number percent.
16. Multiply a decimal number and a percent.
29. Solve word problems involving averages.
30. Solve word problems involving proper fractions.

State Student Assessment Test - Part II
(FUNCTIONAL LITERACY TEST) Mathematics Skills (FloridA)
Determine the solution to real word problems involving:
- Comparison shopping
- Simple Interest
- Discounts
• 1 or 2 whole number operations
• Decimals and fractions
• Percents
• Length, width, heigth, capacity, and weight using metric or customary units
• Area of a rectangular region using metric or customary units
• Elapsed time between two events
• Equivalent amounts of money
• Line graphs, circle graphs, and tables

Survival Competencies in the area of Personal Development (Oregon) includes:

Compute using the basic processes

and

Understand basic scientific and technological processes.

Local school boards were asked to adopt locally defined minimum survival competencies that would ensure graduating students were able to do the above.

The five topics receiving the most support across the four states were: (1) computing with whole numbers, (2) computing with decimals, (3) computing with fractions, (4) using mathematics to solve consumer problems, and (5) measuring with the standard system. All are mentioned explicitly in the Missouri and Florida lists (where consumer objectives are called discounts, simple interest, and comparison shopping). The first three of the topics are implied in Oregon’s survival competencies. Those topics for which there was "some support" received different levels of support by respondents from different states.
"Rounding off numbers" received greatest support from Florida respondents, least support from Ohio respondents, with Oregon and Missouri respondents in the middle. It is perhaps not surprising that Florida respondents ranked this as highly as they did, since it appears as an objective on the State Student Assessment Test - Part I.

"Solving word problems", a feature of both the Florida and Missouri tests, was most strongly supported by Florida and Missouri respondents, followed by Ohio and Oregon respondents. Exactly why Oregon respondents were as relatively unsupportive of this topic is open to question. Nearly the same pattern of support exists for "estimating" (except more Oregon respondents support it than do Ohio respondents).

"Measuring with the metric system" was an interesting item in several respects. It is a stated objective in both Missouri and Florida yet received the most support from Oregon respondents. Also it received much less support than "Measuring with the standard system" in all states - 15 percent to 20 percent less in Florida, Oregon, and Missouri and about 30 percent less in Ohio.

"Making and interpreting graphs" followed the most typical pattern. It received the most support in Florida and the least in Ohio, with Oregon and Missouri falling in the middle. Graphs and charts are explicitly mentioned in both the Missouri and Florida objectives; however, the word "making" used in the survey may be the reason support was not stronger in these two states.

"Calculating areas and volumes" deviated from the pattern of support slightly, receiving the most support in Missouri, followed by
Florida, Oregon, and Ohio. Unlike the five items discussed immediately preceding this one, the difference in responses was not statistically significant. The "controversial" label was used to indicate a fairly even split between responding educators. It is interesting that only two items fall in this range and that these two items are of such different types. The other item was "Using a calculator"; surely this as a graduation competency is controversial. Since calculators are still not universally accepted as an educational tool, it is not surprising that educators are not in agreement regarding requiring skills using a calculator for high school graduation. This is despite the fact the calculator usage in the population is widespread.

The responses on the four items labeled "Some opposition" did not differ significantly between states. Note that while "Finding an average" is an objective in both Florida and Missouri, support is not great in those states.

Summary of the Four State Comparison

In summary, three things are indicated by the patterns of responses. First, most of the content approved for inclusion on a minimum competency test for high school graduation is generally considered elementary or middle school level. Most topics at the high school level were not considered appropriate for inclusion. Second, the appeals by individual mathematics educators and by mathematics organizations for an expanded view of basic skills in mathematics do not seem to have worked. "Computation" is by far the most accepted by respondents, while things like "Knowing what computers can and cannot do" and "Understanding elementary notions of probability"
receive little support. Likewise, measurement with the standard system is favored much more highly than measurement with the metric system. Third, as one might expect Florida is most favorably inclined toward including various topics and Ohio is least favorably inclined. There is some indication that Florida and Missouri respondents are supportive of items that are found in their state objectives. There are, however, exceptions to this.

The four states studied are different educationally. It might be expected then that these states would respond differently to minimum competency testing and that has been the case. The survey data indicate differences among the states on various issues related to minimum competency testing. The data seem to indicate that under certain conditions minimum competency testing does change what goes on in mathematics classrooms. This could, of course, be "good" or "bad" depending on the specific change. Data from the survey indicate that there may be some curricular narrowing because of minimum competency testing.
Chapter VIII

CONCLUSIONS AND RECOMMENDATIONS

The conclusions are grouped under the four broad categories identified in the problem statement: goals, definitions and mandates, implementation and impact.

Conclusions Regarding the Goals of Minimum Competency Testing

The goals, or expected outcomes, of minimum competency testing are far-reaching. The literature review and survey revealed that proponents felt that minimum competency testing would assure that students would be prepared for vocations or further education, that minimum competency testing would restore meaning to the high school diploma. There is an implied yearning to go back to the good old days in many of the statements of minimum competency advocates. The unstated goal often seems to be that minimum competency testing will make things the way they used to be.

One relevant survey question sought to ascertain the feelings of respondents regarding the most valid reason for supporting minimum competency testing. A plurality of respondents from each state indicated that reason is "To be sure students are prepared for jobs or post-high school education." This finding is consistent with the prevailing feeling that perhaps schools are not now preparing students for post high-school living.
Opponents of minimum competency testing, nearly all of whom are educators, make dire predictions about the outcomes of minimum competency testing. They see the curriculum being narrowed and the lives of students who do not pass the test as being ruined. Minimum competency testing is also opposed by the leaders of certain special interest groups such as the NAACP, NEA, or some groups interested in handicapped students. These groups feel tests may be unfair or use of the results may be inappropriate. Most statements of opposition to minimum competency testing oppose it on the basis that the testing is unsound from a philosophical (minimum competencies are not identifiable) or psychometric (test development techniques are not good enough) standpoint. However, the survey suggests that educators at the school level are most afraid that the results will be used to make judgements or evaluations. A plurality of survey respondents feel that the most valid reason for opposing minimum competency testing is that "It will be used to judge schools and teachers." The opponents of minimum competency testing discount all claims made by proponents and further suggest that the testing will have an adverse effect on curriculum and teachers and students. Considering some of the newspaper articles in Florida and Missouri, this fear is not surprising. Yet, that educators see this as the most valid reason for opposing minimum competency testing is discouraging. Many of the other choices had to do with impact on students or curriculum and it seems that educators should be more worried about these items.
Conclusions Regarding the Definitions and Mandates of Minimum Competency Testing

While Brickell talks about "school skills" and "life skills" and makes a reasonable distinction between the two, in practice most minimum competency tests do not make the distinction.

While literature from Florida, Oregon, and Missouri speaks of "applications", it appears that this is handled by using rather standard textbook "story" or "word" problems. In most places the mathematical content of minimum competency tests reflects elementary content and the "narrow" view warned against by the National Council of Teachers of Mathematics in its Agenda For Action (1980). The wording in many mandates often specifies "computation" or even "arithmetic." Most prominent mathematics educators feel that this limited view of necessary mathematical skills is not sufficient, either to pursue further mathematics or to "get by" in daily life.

There does not appear to be a difference in the mandates enacted by state legislatures and those decreed by state boards or state departments of education. One trend is noteworthy: it appears that often state boards or state departments of education have reacted to the minimum competency testing issue in order to forestall legislative action. This is, of course, not always the case.

Survey data indicate respondents do not seem to have a broad definition of basic skills. The topics that received most support for inclusion on a graduation test were computation and consumer problems. Future oriented skills such as "knowing what computers can and cannot do" received only minimal, as did all content that is generally thought of as belonging in the secondary curriculum.
Conclusions Regarding the Implementation of Minimum Competency Testing

The actual and anticipated effect on class enrollment, dropouts, and "early out" options varies from one situation to another. Only California has been allowing "early out" on the basis of a test score long enough to see trends. The trends there seem to support the observation that, after an initial flurry where many students signed up to take the test and few passed, now few students even sign up to take the test. There has not been a dramatic effect in terms of large numbers of students leaving high school early. The effect on dropout rate is still largely undetermined. There is some evidence that the rate has increased in Florida, but state department of education officials deny this and data are largely unavailable. The effect on class enrollment was not discussed with specific data in the literature. The survey data indicates that 17 percent of Florida respondents feel lower enrollments in elective classes have resulted primarily or partially as a result of minimum competency tests. This compares with 7.3 percent, 6.4 percent, and 2.3 percent in Oregon, Missouri, and Ohio.

What happens to students who fail varies from situation to situation. Florida requires remediation. In Missouri no specific mandate exists, probably because passing the BEST is not a criterion for high school graduation. It is a mistake to think that if a student fails a test some intervention action will be taken with that student. In a statement by the Ohio board of education, intervention is called for if "funds are available."

The time at which minimum competencies are measured varies. There are those who feel early measurement is vital if remediation
is to be provided. These individuals often advocate measurement in eighth or ninth grade. However, it is often pointed out that, given what educators know about "forgetting", this is not very reasonable. Just because a student possesses certain skills or competencies as an eighth or ninth grader, this does not guarantee that the same student possesses those skills four or five years later at graduation time. No clear pattern exists on this issue, though the trend seems to be to start testing early.

The setting of the cutoff scores or standards is theoretically one of the most difficult issues involved in minimum competency testing. Some psychometricians state plainly that there is no "acceptable" way to set such a standard. Others feel that there are ways to set such standards and describe complicated methods involving much time, talent, and work. In practice, standard setting has not greatly bothered minimum competency testers. A few places, like New Jersey, have set standards using a "scientific method." Most places have been like Arizona and set a "grade level", or like Florida and used a "commonly accepted percent", or like Los Angeles and failed only the number of students they could afford to remediate. There are several states or districts whose competency tests were mentioned frequently in literature concerning minimum competency testing. These programs were often described in some detail, yet the method of setting the standard was rarely discussed.

Eliminating racial and cultural bias is a concern partly because of the threat of litigation. Some tests are submitted to committees representing the affected racial and cultural minorities. In one instance, a test item calling for the calculation of the volume of a
swimming pool was eliminated because it was felt to discriminate against the poor who usually do not have swimming pools. Whether these committees reviews effectively remove bias is open to question, but other methods are not widely used.

Conclusions Regarding the Impact of Minimum Competency Testing

The single most important fact about the impact of minimum competency testing is that research evidence concerning the impact is almost nonexistent.

Advocates point to falling standardized test scores as a reason for needing minimum competency tests. Yet there is no evidence that schools where minimum competency tests are given have different standardized test scores than schools where minimum competency tests are not given. There are no data which suggest that students who pass a minimum competency test are more prepared to get a job than students who have not passed a minimum competency test. Similarly, there is little evidence that the curriculum has been greatly narrowed or teaching methods drastically changed. In short, the impact of minimum competency testing is largely undetermined and perhaps largely undeterminable at this time. Available data suggest that very few students have failed to graduate from high school solely because of minimum competency testing.

The survey data from this study suggest that educators perceive that minimum competency testing has had an impact in several areas. Whether the changes have actually occurred or only seem to, the educators to have occurred, is debatable. Still, it can be concluded that a majority of educators in Florida, where a single statewide
minimum competency test is given, think that several things have happened partially or primarily because of minimum competency testing. These include: more frequent testing, more remedial classes, more drill and memorization, stricter grading, more students failing grades or courses, and more individualized study. Similarly, a majority of Florida teacher respondents report more class time is spent on the following topics as a direct result of minimum competency testing: basic facts, story or word problems, review of materials from previous years, practice, and diagnosis of individual difficulties. Most of the above is rather unsettling to many mathematics educators. National Assessment clearly indicates that students can compute; what they cannot do involves the higher level cognitive skills. And the learning of these skills may not be enhanced by "more drill and memorization" or more class time spent on "basic facts" or "review of materials from previous years" or even more "practice." While educators in Florida feel that minimum competency testing has had an impact on mathematics education in that state, Ohio educators seem to feel the opposite. They identify no impact of competency testing in their state. This was expected because of the time the study was conducted only two districts had minimum competency testing for high school graduation.

The results in Missouri and Oregon are mixed. That is, no clear pattern exists. For example, 37.6 percent of Missouri educators report that there is more frequent testing primarily or partially as a result of minimum competency testing, but 16.2 percent report that while it is occurring it is not because of minimum competency testing and 26.9 percent believe it is not occurring.
It is easy to formulate conjectures regarding these mixed results. In Oregon, competency verification is done by local school districts. In conversations with Oregon Department of Education officials it was indicated that implementation of the competency graduation requirement varied greatly from district to district. This could account for the variance of responses from the Oregon sample. In Missouri, a single test is used, but it is given in eighth grade and it is not a criterion for graduation so it might be conjectured that responses varied according to grade level or course taught.

In summary, the survey data indicate educators in Florida think that minimum competency testing has had an impact on mathematics education. Educators in Ohio feel minimum competency testing has not had an impact on mathematics education. Results indicate there is no clear consensus concerning the impact among educators in Oregon and Missouri.

Other Conclusions

Not surprisingly, teachers and principals within a state did not necessarily give similar responses. Likewise, individuals primarily concerned with elementary education did not always agree with individuals who were primarily concerned with secondary education. Despite this, there were discernable patterns from each state.

The existing educational political structure played an important but easily overlooked role in the development of a particular state's "stance" on minimum competency testing. Florida, the only one of the case study states which considers itself high in state control of
education, has the most complete competency program. This program is characterized by statewide testing at several grade levels, manuals issued by the state department that, among other things, suggest teaching strategies, and finally the state test which partially determines graduation from local district high schools. The political set-up in Florida allows the state department of education to do things that would be totally unacceptable in states with more local control.

Minimum competency testing is an educational and sociological phenomenon. Some of the more important conclusions of this study are not directly drawn from the survey, or the interviews with state department of education officials, or even from the literature - rather, the whole is greater than the sum of the parts. The minimum competency testing movement has been called consumerism by some authors. Kelley (1977) examines the phenomenon in detail and takes the position that having a credential becomes meaningless if everyone has one, but not having one is devastating. Other authors suggest minimum competency testing is intentionally or unintentionally a movement that will promote racial segregation and keep "lower classes" in their place.

It is the conclusion of this investigator that minimum competency testing is all of these things to some degree and none of these things totally. There are several things that make the minimum competency testing movement hard to understand. First of all, like politics, the movement makes for strange bedfellows. While the NEA officially opposes the movement, many of its members support it.
Second the movement is many things to many people. There seems to be a sentiment among the lay public that this will make educators do their job. The movement may be popular because it is part of the educational manifestation of the larger sociological and political movement that rejects some "humanistic" ideas and reembraces the work ethic, fiscal conservatism, and a return to traditional values.

Educational movements have often been called cyclic. Mathematics educators are fond of using the sine curve as a model for educational fads or movements. This line of thought would imply that an attitude akin to "This too shall pass" might be the most reasonable and least traumatic for a concerned educator. Yet the administrative and legislative mandates that will not be easily repealed combined with the lack of research evidence to support minimum competency testing make it imperative that educators do not take a complacent attitude. Rather, they must seek to find the true effects of minimum competency testing. Toward this end, the following recommendations are made.

Recommendations

1. Institute longitudinal studies on several aspects of mathematical achievement with minimum competency testing as a variable.

2. Institute longitudinal studies on life successes of groups identified as minimally competent compared with those groups unable to pass a competency test.

3. Identify and classify intervention and remediation programs.

4. Identify the necessary mathematical competencies for effective, efficient living.
5. Continue research on technical aspects of test design and standard setting.

6. Delay implementation of minimum competency testing in those states which have not yet implemented minimum competency test programs, until more data are available.

7. Avoid using the data to deny diplomas in those states where minimum competency testing has been implemented, until further research is done.
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APPENDIX A

LISTS OF MATHEMATICAL SKILLS
Computation with whole numbers, decimals, fractions, and per cent comes first but there is something more that you ought to know. How much mathematics is a "must" for every citizen? It's time to get that straightened out. Here is a Check List of 29 questions. If you can say "yes" to nearly all of them you can feel pretty secure when it comes to dealing with the problems of everyday affairs.

The Check List

1. Computation. Can you add, subtract, multiply, and divide effectively with whole numbers, common fractions, and decimals?
2. Percent. Can you use percents understandingly and accurately?
3. Ratio. Do you have a clear understanding of ratio?
4. Estimating. Before you perform a computation, do you estimate the result for the purpose of checking your work?
5. Rounding numbers. Do you know the meaning of significant figures? Can you round numbers properly?
6. Tables. Can you find correct values in tables; e.g., interest and income tax?
7. Graphs. Can you read ordinary graphs: bar, line and circle graphs; the graph of a formula?
8. Statistics. Do you know the main guides that one should follow in collecting and interpreting data; can you use averages (mean, median, mode); can you draw and interpret a graph?
9. The nature of a measurement. Do you know the meaning of a measurement, of a standard unit, or the largest permissible error, of tolerance, and of the statement that "a measurement is an approximation"?
10. Use of measuring devices. Can you use certain measuring devices, such as an ordinary ruler, other rulers (graduated to thirty seconds, to tenths of an inch, and to millimeters), protractor, graph paper, tape, caliper micrometer, and thermometer?
11. Square root. Can you find the square root of a number by table, or by division?
12. Angles. Can you estimate, read, and construct an angle?
13. Geometric concepts. Do you have an understanding of point, line, angle, parallel lines, perpendicular lines, triangle (right, scalene, isosceles and equilateral), parallelogram (including square and rectangle), trapezoid, circle, regular polygon, prism, cylinder, cone, and sphere?
14. The Pythagorean relation. Can you use the Pythagorean relationship in a right triangle?
15. Constructions. Can you with ruler and compasses construct a circle, a square, and a rectangle, transfer a line segment and an angle, bisect a line segment and an angle, construct a triangle, divide a line segment into men than two equal parts, draw a tangent to a circle, and draw a geometric figure to scale?
10. Drawings. Can you read and interpret reasonably well, maps, floor plans, mechanical drawings, and blueprints? Can you find the distance between two points on a map?
17. Vectors. Do you understand the meaning of vector, and can you find the resultant of two forces?
18. Metric system. Do you know how to use the most important metric units (meter, centimeter, millimeter, kilometer, gram, kilogram)?
19. Conversion. In measuring length, area, volume, weight, temperature, angle, and speed, can you shift from one commonly used standard unit to another widely used standard unit; e.g., do you know the relation between yard and foot, inch and centimeter, etc?
20. Algebraic symbolism. Can you use letters to represent numbers; i.e., do you understand the symbolism of algebra—do you know the meaning of exponent and coefficient?
21. Formulas. Do you know the meaning of a formula—can you, for example, write an arithmetic rule as a formula, and can you substitute given values in order to find the value for a required unknown?
22. Signed numbers. Do you understand signed numbers and can you use them?
23. Using the axioms. Do you understand what you are doing when you use the axioms to change the form of a formula or when you find the value of an unknown in a simple equation?
24. Practical formulas. Do you know from memory certain widely used formulas relating to areas, volumes, and interest, and to distance, rate, and time?
25. Similar triangles and proportion. Do you understand the meaning of similar triangles, and do you know how to use the fact that in similar triangles the ratios of corresponding sides are equal? Can you manage a proportion?
26. Trigonometry. Do you know the meaning of tangent, sine, cosine? Can you develop their meanings by means of scale drawings?
27. First steps in business arithmetic. Are you mathematically conditioned for satisfactory adjustment to a first job in business; e.g., have you a start in understanding the keeping of a simple account, making change, and the arithmetic that illustrates the most common problems of communications and everyday affairs?
28. Stretching the dollar. Do you have a basis for dealing intelligently with the main problems of the consumer; e.g., the cost of borrowing money, insurance to secure adequate protection against the numerous hazards of life, the wise management of money, and buying

(Commission on Post-War Plans, 1947)
1. The main uses of numbers
   (without calculation)
   1.1 Counting
   1.2 Measuring
   1.3 Coordinate systems
   1.4 Ordering
   1.5 Indexing
   1.6 Identification numbers, codes
   1.7 Fractions

2. Efficient and informed use of
   computation algorithms
   2.1 Intelligent use of mechanical aids to calculation

3. Relations such as equal, equivalent,
   less or greater, congruent, similar,
   parallel, perpendicular, subset, etc.
   3.1 Existence of many equivalence classes
   3.2 Flexible selection and use of appropriate elements from
       equivalence classes (e.g., for fractions, equations, etc.)

4. Fundamental measure concepts
   4.1 "Measure functions" as a unifying concept
   4.2 Practical problems: role of "unit"; instrumentation;
       closeness of approximation
   4.3 Pervasive role of measures in applications
   4.4 Derived measures via formulas and other mathematical
       models

5. Confident, ready, and informed use of
   estimates and approximations
   5.1 "Number sense"
   5.2 Rapid and accurate calculation with one and two digit
       numbers
   5.3 Appropriate calculation via positive and negative powers
       of ten
   5.4 Order of magnitude
   5.5 Guess and verify procedures; recursive processes
   5.6 "Measure sense"
   5.7 Use of appropriate ratios
   5.8 Rules of Thumb; rough conversions (e.g., "a pint is a
       pound"); standard modules
   5.9 Awareness of reasonable cost or amount in a variety of
       situations

6. Links between "the world of mathematics" and "the world of reality"
   6.1 Via building and using "mathematical models"
   6.2 Via emulative "embryos" of mathematical ideas

7. Uses of variables
   7.1 In formulas
   7.2 In equations
   7.3 In functions
   7.4 For stating axioms and properties
   7.5 As parameters

8. Correspondences, mappings, functions, transformations
   8.1 Inputs, outputs, appropriateness of those for a given
       situation
   8.2 Composition ("If this happens, and then that, what is
       combined result?")
   8.3 Use of representational and coordinate graphs

9. Basic logic
   9.1 "Starting points": agreements (axioms) and primitive
       (undefined) words
   9.2 Consequences of altering axioms (rules)
   9.3 Arbitrariness of definitions; need for precise definition
   9.4 Quantifiers (all, some, there exists, etc.)
   9.5 Putting together a logical argument

10. "Chance," fundamental probability
    ideas, descriptive statistics
    10.1 Prediction of mass behavior vs. unpredictability of single
        events
    10.2 Representative sampling from populations
    10.3 Description via arithmetic average, median, standard
        deviation

11. Geometric relations in plane and
    "space"
    11.1 Visual sensitivity
    11.2 Standard geometry properties and their applications
    11.3 Projections from three to two dimensions

12. Interpretation of informational
    graphs
    12.1 Appropriate scales, labels, etc.
    12.2 Alertness to misleading messages

13. Computer uses
    13.1 Capabilities and limitations
    13.2 "Flow chart" organization of problems for communication
        with computer

Fig. 2. A short and tentative list of what is "really" wanted as a minimum residue for everyman from
the school mathematical experience

(Committee on Basic Mathematical Competencies and Skills, 1972)
<table>
<thead>
<tr>
<th>TEN BASIC SKILL AREAS</th>
</tr>
</thead>
</table>

**Problem Solving**

Learning to solve problems is the principal reason for studying mathematics. Problem solving is the process of applying previously acquired knowledge to new and unfamiliar situations. Solving word problems in texts is one form of problem solving, but students also should be faced with non-textbook problems. Problem-solving strategies involve posing questions, analyzing situations, translating results, illustrating results, drawing diagrams, and using trial and error. In solving problems, students need to be able to apply the rules of logic necessary to arrive at valid conclusions. They must be able to determine which facts are relevant. They should be unafraid of arriving at tentative conclusions and they must be willing to subject these conclusions to scrutiny.

**Applying Mathematics to Everyday Situations**

The use of mathematics is interrelated with all computation activities. Students should be encouraged to take everyday situations, translate them into mathematical expressions, solve the mathematics, and interpret the results in light of the initial situation.

**Alertness to the Reasonableness of Results**

Due to arithmetic errors or other mistakes, results of mathematical work are sometimes wrong. Students should learn to inspect all results and to check for reasonableness in terms of the original problem. With the increase in the use of calculating devices in society, this skill is essential.

**Estimation and Approximation**

Students should be able to carry out rapid approximate calculations by first rounding off numbers. They should acquire some simple techniques for estimating quantity, length, distance, weight, etc. It is also necessary to decide when a particular result is precise enough for the purpose at hand.

**Appropriate Computational Skills**

Students should gain facility with addition, subtraction, multiplication, and division with whole numbers and decimals. Today it must be recognized that long, complicated computations will usually be done with a calculator. Knowledge of single-digit number facts is essential and mental arithmetic is a valuable skill. Moreover, there are everyday situations which demand recognition of, and simple computation with, common fractions.

Because consumers continually deal with many situations that involve percentage, the ability to recognize and use percents should be developed and maintained.

**Geometry**

Students should learn the geometric concepts they will need to function effectively in the 3-dimensional world. They should have knowledge of concepts such as point, line, plane, parallel, and perpendicular. They should know basic properties of simple geometric figures, particularly those properties which relate to measurement and problem-solving skills. They also must be able to recognize similarities and differences among objects.

**Measurement**

As a minimum skill, students should be able to measure distance, weight, time, capacity, and temperature. Measurement of angles and calculations of simple areas and volumes are also essential. Students should be able to perform measurement in both metric and customary systems using the appropriate tools.

**Reading, Interpreting, and Constructing Tables, Charts, and Graphs**

Students should know how to read and draw conclusions from simple tables, maps, charts, and graphs. They should be able to translate information into more manageable or meaningful terms by setting up simple tables, charts, and graphs.

**Using Mathematics to Predict**

Students should learn how elementary notions of probability are used to determine the likelihood of future events. They should learn to identify situations where immediate past experience does not affect the likelihood of future events. They should become familiar with how mathematics is used to help make predictions such as election forecasts.

**Computer Literacy**

It is important for all citizens to understand what computers can and cannot do. Students should be aware of the many uses of computers in society, such as their use in teaching/learning, financial transactions, and information storage and retrieval. The "mystique" surrounding computers is disturbing and can put persons with no understanding of computers at a disadvantage. The increasing use of computers by government, industry, and business demand an awareness of computer uses and limitations.

(National Council of Supervisors of Mathematics, 1977)
Skills and Competencies

Individuals often find the need to use mathematics in everyday life and in many jobs. The following outline of content gives some indication, under each heading, of what minimum "doing" skills are needed by the enlightened citizen.

1. Numbers and numerals
   a) Express a rational number using decimal notation
   b) List the first ten multiples of 2 through 12
   c) Use the whole numbers in problem solving
   d) Recognize the digit in place value, and the number represented through billions
   e) Describe a given positive rational number using decimal, percent, or fractional notation
   f) Convert to Roman numerals from decimal numerals and conversely (e.g., date translation)
   g) Represent very large and very small numbers using scientific notation

2. Operations and properties
   a) Write equivalent fractions for given fractions, such as 1/2, 2/3, and 3/5
   b) Use the standard algorithms for the operations of arithmetic of positive rational numbers
   c) Recognize and use properties of operations (grouping, order, etc.) and properties of certain numbers with respect to operations (a + 0 = a, a · 0 = 0, etc.)
   d) Solve addition, subtraction, multiplication, and division problems involving fractions
   e) Solve problems involving percent
   f) Perform arithmetic operations with measures
   g) Estimate results
   h) Judge the reasonableness of answers to computational problems

3. Mathematical sentences
   a) Construct a mathematical sentence from a given verbal problem
   b) Solve simple linear equations such as
      \[ a + 3 = 12; \quad 16 - n = 4; \quad a/3 = 7; \quad \text{and} \quad 4a - 2 = 18 \]
   c) Translate mathematical sentences into verbal problems

4. Geometry
   a) Recognize horizontal lines, vertical lines, parallel lines, perpendicular lines, and intersecting lines
   b) Classify simple planar figures by recognizing their properties
   c) Compute perimeters of polygons
   d) Compute the area of rectangles, triangles, and circles
   e) Be familiar with the concepts of similarity and congruence of triangles

5. Measurement
   a) Apply measures of length, area, volume (dry or liquid), weight, time, money, and temperature
   b) Use units of length, area, mass, and volume in making measurements
   c) Use standard measuring devices to measure length, area, volume, time, and temperature
   d) Round off measurements to the nearest given unit of the measuring device (ruler, protractor, thermometer, etc.) used
   e) Read maps and estimate distances between locations

6. Relations and functions
   a) Interpret information from a graphical representation of a function
   b) Apply the concepts of ratio and proportion to construct scale drawings and to determine percent and other relations
   c) Write simple sentences showing the relations \(<, \leq, \geq, >, \text{ and } \neq\) for two given numbers

7. Probability and statistics
   a) Determine mean, median, and mode for given numerical data
   b) Analyze and solve simple probability problems such as tossing coins or drawing one red marble from a bag containing one red and four white marbles
   c) Estimate answers to computational problems
   d) Recognize the techniques used in making predictions and estimates from samples

8. Graphing
   a) Determine measures of real objects from scale drawings
   b) Construct scale drawings of simple objects
   c) Construct graphs indicating relationships of two variables from given sets of data
   d) Interpret information from graphs and tables

9. Mathematical reasoning
   a) Produce counterexamples to test the validity of statements
   b) Detect and describe flaws and fallacies in advertising and propaganda where statistical data and inferences are employed
   c) Gather and present data to support an inference or argument

10. Business and consumer mathematics
    a) Maintain personal bank records
    b) Plan a budget including record keeping of personal expenses
    c) Apply simple interest formulas to installment buying
    d) Estimate the real cost of an item
    e) Compute taxes and investment returns
    f) Use the necessary mathematical skills to appraise insurance and retirement benefits

(Bell, 1974)
APPENDIX B

REPRESENTATIVE SAMPLE SURVEY COVER LETTERS
Dear Elementary Principal,

I am writing to ask your help in obtaining answers to questions of great importance to all of us in education. As you know, minimum competency testing is a rapidly growing educational phenomenon. More and more states and local districts are setting minimum standards for grade-to-grade promotion or high school graduation or in some cases simply testing without any promotion or graduation requirement. Whether or not promotion or graduation are involved minimum competency testing involves defining needed competencies and setting minimum standards.

I am doing dissertation research on the minimum competency testing movement in mathematics. I very much want the opinions of elementary teachers about this important subject. This letter is one of one hundred sent to randomly selected Ohio elementary principals with the request that you pass on the enclosed survey and letter to one of your teachers. I would hope that is is not too great an imposition on either you or the teacher. I would like the survey form to go to a teacher in grades 1 thru 6 who teaches mathematics, not necessarily a mathematics specialist, and who you feel would take the time necessary to thoughtfully complete the survey.

Thank you for your time and trouble.

Sincerely,

Margaret Kasten

Margaret Kasten
February, 1980

Dear Florida Principal:

I am writing to ask your help in obtaining answers to questions of great importance to all of us in education. As you know, minimum competency testing is a rapidly growing educational phenomenon, for grade-to-grade promotion or high school graduation or in some cases, simply testing without any promotion or graduation requirement. Whether or not promotion or graduation are involved minimum competency testing involves defining needed competencies and setting minimum standards.

I am doing dissertation research on the minimum competency testing movement in mathematics. Since I feel administrators are in a key position to observe and effect change in schools, I very much want your opinions and ideas on this important educational subject. You are receiving one of 100 surveys sent to Florida principals. Florida is considered a pioneer in minimum competency testing and I feel sure that you have had a unique opportunity to observe and think about minimum competency testing. I hope you can spare the time to complete the survey. I intend to produce a document useful to states and districts engaged in decision making about minimum competency testing. If the document is to have any meaning it is vital that I have input from administrators such as yourself.

Thank you for your time and trouble. Any comments you wish to make would be appreciated.

Sincerely,

Margaret Kasten
Dear Ohio Teacher of Mathematics:

I am writing to ask your help in obtaining answers to questions of great importance to all of us in education. As you know, minimum competency testing is a rapidly growing educational phenomenon. More and more states and local districts are setting minimum standards for grade-to-grade promotion or high school graduation or in some cases, simply testing without any promotion or graduation requirement. Whether or not promotion or graduation are involved minimum competency testing involves defining needed competencies and setting minimum standards.

I am doing dissertation research on the minimum competency testing movement in mathematics. While Ohio does not presently have a legislated minimum competency testing program, there are bills in the legislature that would establish such a program. Ohio educators, some of whom are already working with minimum competency testing on the local level, may be increasingly involved in implementing minimum competency testing in the future. This gives Ohio teachers a unique perspective on this important issue. For this reason and because I believe the classroom teacher is the single most important component in instruction, I very much want your opinions and ideas on this important educational subject. You are receiving one of 200 surveys sent to Ohio teachers and I hope that you can spare the time to complete the survey. I intend to produce a document useful to states and districts engaged in decision making about minimum competency testing. If the document is to have any meaning it is vital that I have input from classroom teachers such as yourself.

Thank you for your time and trouble. Any comments you wish to make would be appreciated.

Sincerely,

Margaret Kasten
Dear Secondary Mathematics Teacher:

Some time ago I wrote asking your help. I explained that I was doing dissertation research on minimum competency testing in mathematics and I requested that you complete a survey. To date, approximately 50 percent of the Missouri secondary teacher forms have been returned.

I realize this is a very busy time of year for teachers. But all too often those members of the educational community — classroom teachers — who have the most to do with actual instruction have the least say in policy decisions related to that instruction. Minimum competency testing is a rapidly growing educational phenomenon, for grade-to-grade promotion or high school graduation or, as in the case of Missouri’s Basic Essential Skills Test (BEST), simply testing without any promotion or graduation requirement. Whether or not promotion or graduation are involved minimum competency testing involves defining needed competencies and setting minimum standards. Minimum competency testing has great potential for changing mathematics teaching. I intend to produce a document useful to states and districts engaged in decision making about minimum competency testing. If the document is to have any meaning, it is vital that I have input from secondary mathematics teachers.

I am enclosing another survey and self-addressed stamped envelope. Please take the time to thoughtfully complete the survey.

Thank you for your time and trouble.

Sincerely,

Margaret-Kasten

Enclosure
APPENDIX C

REPRESENTATIVE SAMPLE SURVEY INSTRUMENTS
FLORIDA TEACHER OF MATHEMATICS SURVEY

1. Class taught most often or grade level of primary responsibility

2. Number of years as a classroom teacher

3. I would characterize the school in which I work as being: (check one)
   1. small town or rural
   2. suburban
   3. urban
   4. other

4. Please consider your own experiences and check all statements that apply.
   1. I have taken a course concerned specifically with tests and measurement.
   2. I have received instruction in interpreting and using tests given by
      state or district.
   3. I have not received instruction but documents are available to assist in
      test score interpretation and utilization.
   4. I have been involved in the development of minimum competency tests at
      the state or local level.
   5. I have not received instruction in interpreting and using test results,
      but one member of our staff has and this person serves as a resource
      for the rest of the staff.

5. Their performance in class indicates that the mathematics achievement of students
   entering my class this year as compared with the mathematics achievement of
   students entering my class several years ago was (check one)
   1. higher
   2. about the same
   3. lower

6. The attitude toward mathematics of students entering my class this year as compared
   with the attitude toward mathematics of students entering my class several years
   ago was (check one)
   1. more positive
   2. about the same
   3. more negative

7. Which of the following describe the status of minimum competency testing in
   mathematics in your school or district? (Check all that apply)
   1. No minimum competency test is given.
   2. Passage of a minimum competency test is a requirement for high school
      graduation.
   3. Passage of a minimum competency test is a requirement for grade-to-grade
      promotion.
   4. Minimum competency testing is done for diagnostic and remedial purposes.
   5. Other

8. If minimum competency tests are given in your school or district, check all of the
   following that apply.
   1. Student Assessment Test (formerly Functional Literacy Test)
   2. Other tests developed by the state.
   3. Test developed on the local level
   4. Test prepared by a commercial test company to be used specifically as a minimum
      competency test
   5. Test prepared by a commercial test company that is a general achievement test (for
      example, the California Achievement Test)
   6. Other

9. If your state, district, or school uses a minimum competency test, was the cutoff
   mark of passage of the test determined by: (check all that apply)
   1. school administrators
   2. a committee of school teachers and administrators
   3. a committee that included parents or business people as well as professional
      educators
   4. the state department or state board of education
   5. test manufacturers
   6. Other
10. Please classify each of the 16 topics or activities listed below as a, b, c, d, or e. If none of them are relevant to the grade level or school in which you teach:

a. More class time is spent on this now than was spent a few years ago, as a direct result of minimum competency testing.
b. More class time is spent on this now than was spent a few years ago, but not as a direct result of minimum competency testing.
c. Less class time is spent on this now than was spent a few years ago, as a direct result of minimum competency testing.
d. Less class time is spent on this now than was spent a few years ago, but not as a direct result of minimum competency testing.
e. The same amount of class time is spent on this now as a few years ago.

1. Basic facts
2. Story or word problems
3. How to use a calculator
4. Problems requiring the use of a calculator
5. Number bases other than ten
6. Sets
7. Computation appropriate to course content (i.e., \(77 + 44\) for elementary school, \((2x + y)(4x - y)\) for algebra)
8. Geometry
9. Enrichment
10. Elementary computer topics
11. Consumer topics
12. Review of material from previous years
13. Practice
14. Individual projects
15. Diagnosis of individual difficulties
16. Activity lessons using manipulatives

11. Please consider the mathematics program in your own school or district and label each of the ten practices that follow as a, b, c, d, or e.

a. Occurring in my school or district primarily as a result of the pressures of minimum competency testing.
b. Occurring in my school or district partially as a result of the pressures of minimum competency testing.
c. Occurring in my school or district but not as a result of minimum competency testing.
d. Not occurring in my school or district.
e. I cannot judge whether this is occurring in my school or district.

1. lower enrollments in elective courses
2. fewer field trips
3. more frequent testing
4. more remedial classes
5. more homework
6. few mini-courses
7. more drill and memorization
8. stricter grading
9. more students failing courses or grades
10. more individualized instruction

12. Classroom teachers have often felt pressured to change either the content of the courses they teach or the methods by which they teach. Which of the following statements reflect your feelings about the pressures felt by teachers? (check all that apply)

1. The teachers in my school do not seem to feel the pressures you have described.
2. The teachers in my school seem to feel a general pressure to go back to the basics.
3. The teachers in my school seem to feel pressure as a direct result of minimum competency test that is given to our students.
4. Teachers in my school seem to feel pressure to have their students perform well on standardized tests, but this pressure is not directly a result of minimum competency testing.

13. Please check all statements that reflect your feelings about minimum competency testing.

1. I favor passage of a minimum competency test as a criterion for high school graduation.
2. I favor passage of a minimum competency test as a criterion for grade-to-grade promotion.
3. I favor minimum competency testing for the purpose of identifying students who need remedial help.
4. I oppose minimum competency testing for any reason.
5. I am undecided about minimum competency testing.

14. Some of the reasons given by its advocates for supporting minimum competency testing are listed below. While you may agree with all or with none of these reasons, please check the one reason that you consider the most valid.

1. to motivate students
2. to make sure schools do their job
3. to be sure students are prepared for jobs or post high school education
4. to guarantee a focus on the basics in schools
5. to raise standardized test scores
6. to give meaning to the high school diploma
7. to identify remedial students
8. other _______________________________

15. Some of the reasons given by its opponents for opposing minimum competency testing are listed below. While you may agree with all or with none of these reasons, please check the one reason that you consider the most valid.

1. it will narrow the curriculum
2. "minimum competencies" are not identifiable
3. test development techniques are not good enough
4. the potential for racial or cultural discrimination is great
5. it will increase the high school dropout rate
6. it will stifle creative teaching
7. it will be used to judge schools and teachers
8. other _______________________________

16. Assuming a school district is going to give a minimum competency test in mathematics, which of the following do you consider minimum for high school graduation? (check all that apply)

1. Computing with whole numbers
2. Computing with decimals
3. Computing with fractions
4. Rounding off numbers
5. Making and interpreting graphs
6. Measuring with the metric system
7. Measuring with the standard system
8. Understanding elementary notions of probability
9. Knowing what computers can and cannot do
10. Knowing basic properties of geometric figures
11. Estimating
12. Solving word problems
13. Using a calculator
14. Solving problems using right triangle trigonometry
15. Calculating areas and volumes
16. Doing simple geometric proof
17. Reading a map
18. Deriving the quadratic formula
19. Factoring polynomials in the second degree
20. Determining the mean, median, and mode of a group of numbers
21. Solving first-degree equations
22. Using mathematics to solve consumer problems
23. Solving systems of equations with two unknowns
24. Solving second-degree equations
25. Determining the square root of a number using the square root algorithm

17. Please give your impressions of the prevailing attitude of the groups from your community or state that are listed below. Label each group a, b, c, d, or e.

a. Supportive of passage of a minimum competency test as a criterion for high school graduation.
b. Supportive of minimum competency testing if it is used for informational purposes (i.e., identification of remedial students, program evaluation) only.
c. Not supportive of minimum competency testing.
d. This group neither supports nor opposes minimum competency testing.
e. I don’t know the attitudes of this group.

1. Parents in your school district
2. Local media (newspapers, radio, etc.)
18. In answering the following questions please consider the mathematics course you teach most often or the grade level of primary responsibility.

A. If possible, list three mathematical topics that have been deleted from your curriculum in the last few years.
   1. 
   2. 
   3. 

B. If possible, list three mathematical topics that have been added to your curriculum in the last few years.
   1. 
   2. 
   3. 

C. If possible, list three mathematical topics that receive more emphasis in your curriculum now than they did a few years ago.
   1. 
   2. 
   3. 

D. If possible, list three mathematical topics that receive less emphasis in your curriculum now than they did a few years ago.
   1. 
   2. 
   3. 

19. Do you see any connection between the changes you described in question 17 and minimum competency testing? If so, what?

20. If you would be willing to be interviewed regarding your views on minimum competency testing, please give your name and phone number.

21. Comments:
1. Type of administrative position held ________________

2. Number of years as a principal ________ 3. Number of years as a teacher ________

4. I would characterize the school in which I work as being: (check one)
   ______ a. small town or rural _______ c. urban
   ______ b. suburban _______ d. other ________________

5. Please consider the mathematics program in your own school or district and label each of the ten practices that follow as a, b, c, d, or e.
   a. Occurring in my school or district primarily as a result of the pressures of minimum competency testing.
   b. Occurring in my school or district partially as a result of the pressures of minimum competency testing.
   c. Occurring in my school or district, but not as a result of minimum competency testing.
   d. Not occurring in my school or district.
   e. I cannot judge whether this is occurring in my school or district.
      ______ 1. lower enrollments in elective courses _______ 6. fewer mini-courses
      ______ 2. fewer field trips _______ 7. more drill and memorization
      ______ 3. more frequent testing _______ 8. stricter grading
      ______ 4. more remedial classes _______ 9. more students failing courses
      ______ 5. more homework _______ 10. more individualized instruction

6. Which of the following describe the status of minimum competency testing in mathematics in your school or district? (check all that apply)
   ______ 1. No minimum competency test is given.
   ______ 2. Passage of a minimum competency test is a requirement for high school graduation.
   ______ 3. Passage of a minimum competency test is a requirement for grade-to-grade promotion.
   ______ 4. Minimum competency testing is done for diagnostic and remedial purposes.
   ______ 5. Other ________________

7. If minimum competency tests are given in your school or district, check all of the following that apply.
   ______ 1. Test developed on the state level _______ 4. Test prepared by a commercial test company that is a general achievement test (for example, the California Achievement Test)
   ______ 2. Test developed on the local level _______ 5. Other ________________
   ______ 3. Test prepared by a commercial test company to be used specifically as a minimum competency test

8. If your state, district, or school uses a minimum competency test, was the cutoff point of passage of the test determined by: (check all that apply)
   ______ 1. school administrators
   ______ 2. a committee of school teachers and administrators
   ______ 3. a committee that included parents or business people as well as professional educators
   ______ 4. the state department or state board of education
   ______ 5. test manufacturers
   ______ 6. other ________________
9. Please check all statements that reflect your feelings about minimum competency testing.

   _1. I favor passage of a minimum competency test as a criterion for high school graduation._
   _2. I favor passage of a minimum competency test as a criterion for grade-to-grade promotion._
   _3. I favor minimum competency testing for the purpose of identifying students who need remedial help._
   _4. I oppose minimum competency testing for any reason._
   _5. I am undecided about minimum competency testing._

10. Some of the reasons given by its advocates for supporting minimum competency testing are listed below. While you may agree with all or with none of these reasons, please check the one reason that you consider the most valid.

   _1. to motivate students
   _2. to make sure schools do their job
   _3. to be sure students are prepared for jobs or post high school education
   _4. to guarantee a focus on the basics in schools
   _5. to raise standardized test scores
   _6. to give meaning to the high school diploma
   _7. to identify remedial students
   _8. other_______________________________.

11. Some of the reasons given by its opponents for opposing minimum competency testing are listed below. While you may agree with all or with none of these reasons, please check the one reason that you consider the most valid.

   _1. it will narrow the curriculum
   _2. "minimum competencies" are not identifiable
   _3. test development techniques are not good enough
   _4. the potential for racial or cultural discrimination is great
   _5. it will increase the high school dropout rate
   _6. it will stifle creative teaching
   _7. it will be used to judge schools and teachers
   _8. other_______________________________.

12. Please consider your own experiences and check all statements that apply.

   _1. I have taken a course concerned specifically with tests and measurements._
   _2. I have received instruction in interpreting and using tests given by state or district._
   _3. I have not received instruction but documents are available to assist in test score interpretation and utilization._
   _4. I have been involved in the development of minimum competency tests at the state or local level._
   _5. I have not received instruction in interpreting and using test results, but one member of our staff has and this person serves as a resource for the rest of the staff._

13. Assuming a school district is going to give a minimum competency test in mathematics, which of the following do you consider minimum for high school graduation? (check all that apply)

   _1. Computing with whole numbers
   _2. Computing with decimals
   _3. Computing with fractions
   _4. Rounding off numbers
   _5. Making and interpreting graphs
6. Measuring with the metric system
7. Measuring with the standard system
8. Understanding elementary notions of probability
9. Knowing what computers can and cannot do
10. Knowing basic properties of geometric figures
11. Estimating
12. Solving word problems
13. Using a calculator
14. Solving problems using right triangle trigonometry
15. Calculating areas and volumes
16. Doing simple geometric proof
17. Reading a map
18. Deriving the quadratic formula
19. Factoring polynomials in the second degree
20. Determining the mean, median, and mode of a group of numbers
21. Solving first-degree equations
22. Using mathematics to solve consumer problems
23. Solving systems of equations with two unknowns
24. Solving second-degree equations
25. Determining the square root of a number using the square root algorithm

Please give your impressions of the prevailing attitude of the groups from your community or state that are listed below. Label each group a, b, c, d, or e.

a. Supportive of passage of a minimum competency test as a criterion for high school graduation.

b. Supportive of minimum competency testing if it is used for informational purposes (i.e., identification of remedial students, program evaluation) only.

c. Not supportive of minimum competency testing.

d. This group neither supports nor opposes minimum competency testing.

e. I don't know the attitudes of this group.

1. Parents in your school district
2. Local Media (newspapers, radio, etc.)
3. Students in your school district
4. Teachers in your school district
5. Administrators in your school district
6. Your local school board
7. State Legislator
8. State Department of Education

15. Comments:
MISSOURI TEACHER OF MATHEMATICS SURVEY

1. Class taught most often or grade level of primary responsibility ______________________

2. Number of years as a classroom teacher __________________

3. I would characterize the school in which I work as being: (check one)
   - 1. small town or rural
   - 2. suburban
   - 3. urban
   - 4. other

4. Please consider your own experiences and check all statements that apply.
   - 1. I have taken a course concerned specifically with tests and measurement.
   - 2. I have received instruction in interpreting and using tests given by state or district.
   - 3. I have not received instruction but documents are available to assist in test score interpretation and utilization.
   - 4. I have been involved in the development of minimum competency tests at the state or local level.
   - 5. I have not received instruction in interpreting and using test results, but one member of our staff has and this person serves as a resource for the rest of the staff.

5. Their performance in class indicates that the mathematics achievement of students entering my class this year as compared with the mathematics achievement of students entering my class several years ago was (check one)
   - 1. higher
   - 2. about the same
   - 3. lower

6. The attitude toward mathematics of students entering my class this year as compared with the attitude toward mathematics of students entering my class several years ago was (check one)
   - 1. more positive
   - 2. about the same
   - 3. more negative

7. Which of the following describe the status of minimum competency testing in mathematics in your school or district? (Check all that apply)
   - 1. No minimum competency test is given.
   - 2. Passage of a minimum competency test is a requirement for high school graduation.
   - 3. Passage of a minimum competency test is a requirement for grade-to-grade promotion.
   - 4. Minimum competency testing is done for diagnostic and remedial purposes.
   - 5. Other __________________________

8. If minimum competency tests are given in your school or district, check all of the following that apply.
   - 1. Basic Essential Skills Test (BEST)
   - 2. Other tests developed by the state
   - 3. Test developed on the local level
   - 4. Test prepared by a commercial test company to be used specifically as a minimum competency test
   - 5. Test prepared by a commercial test company that is a general achievement test (for example, the California Achievement Test)
   - 6. Other __________________________

9. If your state, district, or school uses a minimum competency test, was the cutoff mark of passage of the test determined by: (check all that apply)
   - 1. school administrators
   - 2. a committee of school teachers and administrators
   - 3. a committee that included parents or business people as well as professional educators
   - 4. the state department or state board of education
   - 5. test manufacturers
   - 6. Other __________________________
10. Please classify each of the 16 topics or activities listed below as a, b, c, d, or e. Omit those not relevant to the grade level or school in which you teach.

a. More class time is spent on this now than was spent a few years ago, as a direct result of minimum competency testing.

b. More class time is spent on this now than was spent a few years ago, but not as a direct result of minimum competency testing.

c. Less class time is spent on this now than was spent a few years ago, as a direct result of minimum competency testing.

d. Less class time is spent on this now than was spent a few years ago, but not as a direct result of minimum competency testing.

e. The same amount of class time is spent on this now as a few years ago.

1. Basic facts
2. Story or word problems
3. How to use a calculator
4. Problems requiring the use of a calculator
5. Number bases other than ten
6. Sets
7. Computation appropriate to course content (i.e., \(77 + 44\) for elementary school, \((2x + y)(4x - y)\) for algebra)
8. Geometry
9. Enrichment
10. Elementary computer topics
11. Consumer topics
12. Review of material from previous years
13. Practice
14. Individual projects
15. Diagnosis of individual difficulties
16. Activity lessons using manipulatives

11. Please consider the mathematics program in your own school or district and label each of the ten practices that follow as a, b, c, d, or e.

a. Occurring in my school or district primarily as a result of the pressures of minimum competency testing.

b. Occurring in my school or district partially as a result of the pressures of minimum competency testing.

c. Occurring in my school or district but not as a result of minimum competency testing.

d. Not occurring in my school or district.

e. I cannot judge whether this is occurring in my school or district.

1. Lower enrollments in elective courses
2. Fewer field trips
3. More frequent testing
4. More remedial classes
5. More homework
6. Few mini-courses
7. More drill and memorization
8. Stricter grading
9. More students failing courses or grades
10. More individualized instruction

12. Classroom teachers have often felt pressured to change either the content of the courses they teach or the methods by which they teach. Which of the following statements reflect your feelings about the pressures felt by teachers? (check all that apply)

1. The teachers in my school do not seem to feel the pressures you have described.
2. The teachers in my school seem to feel a general pressure to go back to the basics.
3. The teachers in my school seem to feel pressure as a direct result of minimum competency test that is given to our students.
4. Teachers in my school seem to feel pressure to have their students perform well on standardized tests, but this pressure is not directly a result of minimum competency testing.

13. Please check all statements that reflect your feelings about minimum competency testing.

1. I favor passage of a minimum competency test as a criterion for high school graduation.
2. I favor passage of a minimum competency test as a criterion for grade-to-grade promotion.
3. I favor minimum competency testing for the purpose of identifying students who need remedial help.
4. I oppose minimum competency testing for any reason.
5. I am undecided about minimum competency testing.

14. Some of the reasons given by its advocates for supporting minimum competency testing are listed below. While you may agree with all or with none of these reasons, please check the one reason that you consider the most valid.

1. To motivate students
2. To make sure schools do their job
3. To be sure students are prepared for jobs or post high school education
4. to guarantee a focus on the basics in schools
5. to raise standardized test scores
6. to give meaning to the high school diploma
7. to identify remedial students
8. other

15. Some of the reasons given by its opponents for opposing minimum competency testing are listed below. While you may agree with all or with none of these reasons, please check the one reason that you consider the most valid.
1. It will narrow the curriculum
2. "Minimum competencies" are not identifiable
3. Test development techniques are not good enough
4. The potential for racial or cultural discrimination is great
5. It will increase the high school dropout rate
6. It will stifle creative teaching
7. It will be used to judge schools and teachers
8. Other

16. Assuming a school district is going to give a minimum competency test in mathematics, which of the following do you consider minimum for high school graduation? (Check all that apply)
1. Computing with whole numbers
2. Computing with decimals
3. Computing with fractions
4. Rounding off numbers
5. Making and interpreting graphs
6. Measuring with the metric system
7. Measuring with the standard system
8. Understanding elementary notions of probability
9. Knowing what computers can and cannot do
10. Knowing basic properties of geometric figures
11. Estimating
12. Solving word problems
13. Using a calculator
14. Solving problems using right triangle trigonometry
15. Calculating areas and volumes
16. Doing simple geometric proof
17. Reading a map
18. Deriving the quadratic formula
19. Factoring polynomials in the second degree
20. Determining the mean, median, and mode of a group of numbers
21. Solving first-degree equations
22. Using mathematics to solve consumer problems
23. Solving systems of equations with two unknowns
24. Solving second-degree equations
25. Determining the square root of a number using the square root algorithm

17. Please give your impressions of the prevailing attitude of the groups from your community or state that are listed below. Label each group a, b, c, d, or e.

a. Supportive of passage of a minimum competency test as a criterion for high school graduation.

b. Supportive of minimum competency testing if it is used for informational purposes (i.e., identification of remedial students, program evaluation) only.

c. Not supportive of minimum competency testing.

d. This group neither supports nor opposes minimum competency testing.

e. I don't know the attitudes of this group.

1. Parents in your school district
2. Local media (newspapers, radio, etc.)
3. Students in your school district
4. Teachers in your school district
5. Administrators in your school district
6. Your local School Board
7. State Legislator
8. State Department of Education

18. In answering the following questions please consider the mathematics course you teach most often or the grade level of primary responsibility.

A. If possible, list three mathematical topics that have been deleted from your curriculum in the last few years.
   1.
   2.
   3.

B. If possible, list three mathematical topics that have been added to your curriculum in the last few years.
   1.
   2.
   3.

C. If possible, list three mathematical topics that receive more emphasis in your curriculum now than they did a few years ago.
   1.
   2.
   3.

D. If possible, list three mathematical topics that receive less emphasis in your curriculum now than they did a few years ago.
   1.
   2.
   3.

19. Do you see any connection between the changes you described in question 17 and minimum competency testing? If so, what?

20. If you would be willing to be interviewed regarding your views on minimum competency testing, please give your name and phone number.

21. Comments:
1. Type of administrative position held ________________________

2. Number of years as a principal _____  3. Number of years as a teacher __________

4. I would characterize the school in which I work as being: (check one)
   ____ a. small town or rural   ____ c. urban
   ____ b. suburban             ____ d. other ______________

5. Please consider the mathematics program in your own school or district and label each of the ten practices that follow as a, b, c, d, or e.
   a. Occurring in my school or district primarily as a result of the pressures of minimum competency testing.
   b. Occurring in my school or district partially as a result of the pressures of minimum competency testing.
   c. Occurring in my school or district but not as a result of minimum competency testing.
   d. Not occurring in my school or district.
   e. I cannot judge whether this is occurring in my school or district.

   1. lower enrollments in elective courses
   2. fewer field trips
   3. more frequent testing
   4. more remedial classes
   5. more homework
   6. fewer mini-courses
   7. more drill and memorization
   8. stricter grading
   9. more students failing courses or grades
   10. more individualized instruction

6. Which of the following describe the status of minimum competency testing in mathematics in your school or district? (check all that apply)
   1. No minimum competency test is given.
   2. Passage of a minimum competency test is a requirement for high school graduation.
   3. Passage of a minimum competency test is a requirement for grade-to-grade promotion.
   4. Minimum competency testing is done for diagnostic and remedial purposes.
   5. Other __________________________

7. If minimum competency tests are given in your school or district, check all of the following that apply.
   1. Test developed on the state level
   2. Test developed on the local level
   3. Test prepared by a commercial test company to be used specifically as a minimum competency test
   4. Test prepared by a commercial test company that is a general achievement test (for example, the California Achievement Test)
   5. Other __________________________

8. If your state, district, or school uses a minimum competency test, was the cutoff mark of passage of the test determined by: (check all that apply)
   1. school administrators
   2. a committee of school teachers and administrators
   3. a committee that included parents or business people as well as professional educators
   4. the state department or state board of education
   5. test manufacturers
   6. other __________________________
9. Please check all statements that reflect your feelings about minimum competency testing.

   ___ 1. I favor passage of a minimum competency test as a criterion for high school graduation.
   ___ 2. I favor passage of a minimum competency test as a criterion for grade-to-grade promotion.
   ___ 3. I favor minimum competency testing for the purpose of identifying students who need remedial help.
   ___ 4. I oppose minimum competency testing for any reason.
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10. Some of the reasons given by its advocates for supporting minimum competency testing are listed below. While you may agree with all or with none of these reasons, please check the one reason that you consider the most valid.

   ___ 1. to motivate students
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   ___ 3. to be sure students are prepared for jobs or post high school education
   ___ 4. to guarantee a focus on the basics in schools
   ___ 5. to raise standardized test scores
   ___ 6. to give meaning to the high school diploma
   ___ 7. to identify remedial students
   ___ 8. other

11. Some of the reasons given by its opponents for opposing minimum competency testing are listed below. While you may agree with all or with none of these reasons, please check the one reason that you consider the most valid.

   ___ 1. it will narrow the curriculum
   ___ 2. "minimum competencies" are not identifiable
   ___ 3. test development techniques are not good enough
   ___ 4. the potential for racial or cultural discrimination is great
   ___ 5. it will increase the high school dropout rate
   ___ 6. it will stifle creative teaching
   ___ 7. it will be used to judge schools and teachers
   ___ 8. other

12. Please consider your own experiences and check all statements that apply.

   ___ 1. I have taken a course concerned specifically with tests and measurements.
   ___ 2. I have received instruction in interpreting and using tests given by state or district.
   ___ 3. I have not received instruction but documents are available to assist in test score interpretation and utilization.
   ___ 4. I have been involved in the development of minimum competency tests at the state or local level.
   ___ 5. I have not received instruction in interpreting and using test results, but one member of our staff has and this person serves as a resource for the rest of the staff.

13. Assuming a school district is going to give a minimum competency test in mathematics, which of the following do you consider minimum for high school graduation? (check all that apply)

   ___ 1. Computing with whole numbers
   ___ 2. Computing with decimals
   ___ 3. Computing with fractions
   ___ 4. Rounding off numbers
   ___ 5. Making and interpreting graphs
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7. Measuring with the standard system
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11. Estimating
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14. Solving problems using right triangle trigonometry
15. Calculating areas and volumes
16. Doing simple geometric proof
17. Reading a map
18. Deriving the quadratic formula
19. Factoring polynomials in the second degree
20. Determining the mean, median, and mode of a group of numbers
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14. Please give your impressions of the prevailing attitude of the groups from your community or state that are listed below. Label each group a, b, c, d, or e.

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b. Supportive of minimum competency testing if it is used for informational purposes (i.e., identification of remedial students, program evaluation) only.
c. Not supportive of minimum competency testing.
d. This group neither supports nor opposes minimum competency testing.
e. I don't know the attitudes of this group.

1. Parents in your school district
2. Local Media (newspapers, radio, etc.)
3. Students in your school district
4. Teachers in your school district
5. Administrators in your school district
6. Your local school board
7. State Legislator
8. State Department of Education

15. Comments: