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AUTHOR Minter, Mary; And Others
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ABSTRACT

As a result of the increasing insistence that schools should concentrate on teaching basic skills, states and school districts have moved to establish minimum competencies for high school graduation, to be assessed by tests that demonstrate that students have achieved a certain level of mastery of basic skills. The Austin, Texas, Independent School District's board of trustees passed in 1975 the first version of the minimum competency testing requirement for Austin public school students. It stated that students not demonstrating an eighth grade competence (as measured by standard achievement tests) in reading and math cannot graduate from Austin high schools. The problems encountered in implementing the board's mandate, such as test selection, test security, and test administration, are described in this speech. (Author/DS)

MINIMUM COMPETENCY REQUIREMENTS:

What To Do When Your School Board Sets Them

Paper Presented at the 1978 Southwest Educational Research Association Annual Meeting, Austin, Texas

Mary Minter
James Watkins
Paula Matuszek

Austin Independent School District
6100 Guadalupe, Box 79
Austin, Texas 78752

Minimum Competencies
Basic Skills
Accountability

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The cry has been growing for some time--students graduate from high school and arrive at college or a job without even minimum adequacy in very basic subjects. They can't read instructions. They can't balance their checkbooks. They can't even write a coherent sentence. The meaning of a high school diploma has been diminishing for some time. As early as 1958, a survey carried out by the city of Denver showed that most businessmen considered a high school diploma to indicate attendance in school for 12 years, but not much more.[1] Similar opinions have been expressed in a variety of other forums. In addition, a survey carried out by the University of Texas showed that between 1/5 and 1/3 of adults have difficulty functioning in such basic areas as math computations, health, and consumer economics.[2] The public, faced with these findings, declining SAT scores, and many other similar bits of information, is increasingly demanding to know why today's high school education does not in fact seem to educate.

Some of the answers are clear. Today's schools have too many tasks. They carry the major burden of integrating society. They teach students to like and value themselves and others. They try to provide each student an education which allows him to explore who he is and where he is going. Perhaps, with so many goals competing for instructional time, it's not too surprising that not everyone learns to read.

In response to such competing priorities there has grown up the "back to basics" movement--an insistence that schools should concentrate first of all on teaching some very basic skills like reading. And following in the wake of this movement has grown another--the trend toward minimum high schools graduation competencies, assessed by tests which demonstrate that students have indeed learned these basics.

Standardized testing at the high school level is not new, of course. Achievement tests, aptitude tests and college entry tests have been given in high schools for many years. However, along with the movement toward more "humanized" education of the 1960s and early 1970s came a lessened emphasis on testing. In addition, controversy over the use of aptitude and IQ tests for minority students for tracking and placement purposes grew, and the general issue of test bias began to receive a great deal of attention. Although this controversy was focused primarily on aptitude tests, some negative feelings inevitably spilled over onto standardized tests of all kinds. Thus testing of any kind was, for a time, given relatively low priority.

Many concerns over testing and the use of tests remain. Educators express fears that tests used for graduation requirements will dictate a very narrow curriculum specifically aimed at the test.[3] They feel that a minimum competency will also tend to become a maximum goal, beyond which students won't try to learn and teachers won't try to teach.[4] They are concerned about the "labeling" effect of yet another test, and the consequences of telling substantial numbers of teenagers that they are not competent.[5] They are concerned that the testing will force substantial changes in the entire school system, ranging from the kinds of courses taught to the way progress is reported to parents, and especially concerned that these changes are not foreseen and planned for.[6] They worry that resources for adequate test development and administration will not be made available, leading to the use of restrictive tests developed in isolation from a district's curriculum.[7]

Nonetheless, in spite of these concerns, competency testing is clearly on the way. In 1969 Denver initiated its Proficiency and Review Test program, which still continues. Three years later, in 1972, Oregon became the first state to mandate a minimum competency test for high school graduation.

In 1975, Florida and California passed minimum competency test bills, and a number of individual school districts, including Gary, Indiana; Anchorage, Alaska and Austin, Texas were involved in setting up tests for graduation. By May of 1976, there were 7 states with legislation or education board rulings mandating competency testing of some kind, and 6 more with legislation pending. Individual school districts also continued to set such programs. By January of 1977, 17 states had set some kind of minimum competency program.[8, 9]

At that point the movement really escalated. In a September, 1977 publication, ETS listed 20 states as experimenting with or piloting some kind of competency test program, 16 more as planning one, and 11 more as studying the matter. Only three states had no plans for minimum competency testing activities.[10,11]

Many of these minimum competency tests at the state level are designed primarily for assessing student progress throughout school, rather than for graduation requirements. But by December, 1977 there were 18 states which required minimum competency tests for graduation from high school of all students, and 12 more which required minimum competency tests, but did not specify for high school graduation. Of the 18 requiring minimum competency testing for graduation, two are requiring it already, 7 more have set a date by which time it will be required which

is later than June 1978, and 9 are working on a test or otherwise studying the procedure.[12] In addition to the activity at the state level, many local school districts are now involved in some kind of competency testing. For instance, of the seven largest school districts in Texas, only one is not testing, considering testing or studying the idea of testing its seniors before graduation. In addition, discussion is underway regarding a federal bill requiring minimum competency testing nationwide.

Typically, such requirements are in basic academic subjects such as reading, writing, and math, or in applications of these subjects to life skills such as filling out forms, calculating income taxes, etc. Some requirements extend beyond such basic applications into competence in a variety of adult activities. For instance, items included might measure not only ability to balance a budget, but also general knowledge about how to set one up, wise use of credit, and other aspects of financial competence. Most such tests are paper and pencil, and most systems provide for initial administration of the test long before twelfth grade, to allow time for remediation.

Beyond this general summary of minimum competency testing, however, there are a variety of detailed questions which must be faced by any school district about to implement a program such as this. While passing the initial legislation or policy is relatively easy, going from the mandate to actual test scores is another matter entirely. How one district dealt with these questions, and problems that were encountered is discussed below.

When a school district sets minimum competency requirements for graduation, some of the implications are quite clear. For example, it becomes

apparent that arrangements must be made for personnel to administer and monitor the tests and, in some cases, to score test results; administration schedules must be set with adequate informational materials being prepared for those administrators, counselors, and other persons who will be involved in the administration of the tests, as well as students; suitable times and places must be set aside for testing; also, parents, teachers, and students must be informed of the requirements and of when and how the requirements are to be met.

Other implications may be revealed in the wording of the policy statement regarding the proficiency requirements. For example, the statement will probably identify the subject areas to be tested (e.g., math and/or reading, etc.) and the level of proficiency to be demonstrated (e.g., eight grade level). This implies that 8th grade tests in math and reading are intended for the competency testing.

Still other implications may exist but are likely to be more subtle such as: Are new students (transfers) to the district subject to the same requirements even though they have already completed much of their high school work elsewhere? What about students in special education programs? Are they subject to the requirements? How are students to be identified as having passed or failed the proficiency exams? Will all students receive the same diploma or certificate of graduation even though some passed the requirements and others were exempt from having to meet them.

In any case, those charged with the implementation and management of competency testing program as likely to spend many an hour working on expected and unexpected problems that arise.

I will share with you some of the problems experienced by the Austin Independent School District in planning and implementing its competency testing program. The first problem that had to be considered was the policy statement itself. In 1975, the first version of the minimum competency testing requirement was passed by the Austin Independent School District (AISD) Board of Trustees. It stated:

> "Students not demonstrating at least an 8th grade reading level, as measured by the California Achievement Test, will be placed in classes to remedy indicated deficiencies, including courses beyond the 9 quarters of required Language Arts unless the student places on file a letter signed by a parent or guardian acknowledging that the student proposes to graduate without achieving an 8th grade reading level."
>
> "All students will begin their required Mathematics in the fall quarter 9th grade and continue with Mathematics courses each quarter until their Mathematics requirement is met. Students not successfully completing 3 quarters of Algebra or its equivalent will be given a Mathematics test covering the 48 basic competencies as defined by the National Council of Teachers of Mathematics and that for students who fail to achieve a 75% performance score, further courses will be required to remedy the deficiency unless the student places on file a letter signed by parent or guardian acknowledging that the student proposes to graduate without basic skills in Mathematics as specified by the NCTM."[13]

The Director of the Office of Research and Evaluation points out that test management problems were inherent in the working of the Austin

policy statement.[14] Several problems surfaced. First of all, the statement named a specific test, the California Achievement Test (CAT), which had recently been replaced earlier for general testing in the Austin high schools because of its limitation in measuring achievement at the high school level page. Instead, the Sequential Tests of Educational Progress (STEP Tests) had been selected for the districtwide testing program.

How were the differences to be resolved? Were students to be required to take both tests? If the high school student were to take the 8th grade CAT, how was the score to be interpreted? Other problems resulted from the wording of the statement. There was the ambiguity regarding the exemption letter and remedial classes. At what point could the student choose the letter option and avoid further remedial classes? Also, there was the question of whether students who had met the AISD competency requirement must still meet the TEA mandated course requirements in mathematics and language arts.

After hours and months of deliberation between board and staff members, the requirement was revised in December, 1976. The approved revision read as follows:

> "Students will be required to demonstrate at least an eighth grade competence in reading or place on file a letter signed by parent or guardian acknowledging that the student proposes to graduate without achieving an eighth grade level in reading.
>
> "Students will be required to demonstrate at least an eighth grade competence in mathematics or place on file a letter signed by parent or guardian acknowledging that the student proposes to graduate without achieving an eighth grade level in mathematics."

This revision was accompanied by an administrative procedure statement which set forth the details for how the requirement could be met. The procedure statement read:

The Austin Independent School District graduation requirement of an eigth grade competence in reading and mathematics may be met by any of the following options:

1) Achieving a score on the eighth grade administration of the California Achievement Test which represents national median performance for eighth grade students.
2) Achieving the raw score equivalent to the national median performance by eighth grade students on any annual administration of the Sequential Tests of Educational Progress.
3) Achieving a score on the California Achievement test (level 4), at any re-administration subsequent to high school entry, which represents national median performance for eighth grade students.

Only after the revision had been made could the Department of Secondary Education and the Office of Research and Evaluation attend to the specific details of implementation. Within the Department of Secondary Education numerous decision questions had to be addressed:

1) When could/should students bring letters? Were students to complete the other graduation required coursework in math and language arts and then bring the letter: Could they avoid completing the course requirements?
2) What about transfer students? Should all transfer students be subject to the competency requirements? What about those students who had already earned some of their senior credits at the time of the transfer?

3) What about special education students? Are they to be required to meet the competency requirements? Should special waivers or exemptions be granted to some of the special education students?

Some of these questions were addressed immediately as they were prerequisites to implementation. Other questions and their solutions have been evolving, more or less. All of the issues mentioned, however, preceeded the administrative procedural problems that still had to be addressed by the Office of Research and Evaluation, the office having primary responsibility for administering the competency tests.

The requirement would be effective with the group of students who would be seniors in 1978-79. They were the 10th graders in 1976-77. Those students in 10th grade were now nearing the end of their course requirements in mathematics. Many of them had taken the CAT in 8th grade and/or the STEP in 9th grade prior to the new policy requirements. Then had no idea at the time that they took the tests that graduation depended on the student's passing of the test. Many had not passed the tests. It was decided that these students should be afforded another opportunity to meet the requirements before being placed in remedial classes. Consequently the first administration of the competency tests in the district would be geared to this group of students. Some of the questions/problems which had to be addressed by ORE before this effort took place were:

1) Which students must be tested? How would these students be identified and informed?

2) What additional personnel would be needed to help identify

students needing to be tested? Have such personnel already had their TB tests? Where would funds for hiring and training them come from? Would additional persons need to be hired to help administer and monitor the test session? How much training would be needed? Who would score the test? etc. etc.

3) What form of the test would be used? What additional materials must be purchased? What materials needed to be ordered? What was already on hand?

4) How would the data be recorded, stored and retrieved? How much programming time would be needed? What about the computer program to be used? Who pays for data programming costs?

5) How would results be reported to schools, students, and to parents?

The Office of Research and Evaluation developed a timeline that considered each of these tasks that were implied. Counselors were contacted to assist in identifyng students at 10th grade who had not yet passed the graduation requirements, test answer sheets were ordered; a quadruplicate reporting form for test scores was designed and ordered; test sites were scheduled and set up; additional personnel were hired to administer, monitor and score the test. New personnel were trained and the testing began. The quadruplicate forms that were designed for recording the scores allowed the ORE to have the results hand scored immediately after the testing sessions and to retain a copy of the scores for the records to be checked against the machine scored results that would be done later. It also provided three copies of the hand-scored results to

the schools within a twenty-four hour period--thus allowing sufficient time to inform students of whether they needed to register for Fundamentals of Math Tutorial classes (FOMT) (the remedial classes) prior to the registration period for spring (fall registration). The testers were paid and forms were disseminated to the schools indicating test results. Finally the first round of competency testing had been completed. New problems began to evolve immediately. What about test security for future testing? Since the tests must be given each quarter how was the office to ensure that test items did not become available to students beforehand? A different form of the test must be ordered before the fall testing.

Will the final exam for the FOMT classes be administered by ORE or by the teacher? Since these students must meet the proficiency requirements it was logical that the final exam would be a form of the standardized test (CAT). Would it be the same form? If so, again there are the concerns over test security.

What about data processing of the test result? Can we have all of the programming bugs worked out in time to get the needed information to counselors, registrars, teachers, and principal before beginning to schedule the next round of tests? Have all special students been identified? What about bad (erroneous) student ID numbers?

And then there are the little problems that sometimes seem to mount in geometric progression:

- The notices being mailed at the wrong time.
- Not all of the information being complete on the forms so that the testing session is delayed and lunch is scheduled only 15 minutes after the testing session is scheduled to end.

  An error in the computer program which causes some students not to get credit for passing the test, etc.

All in all, there are various categores of problems. Some of which have rather straightforward solutions. Others are of a more technical nature and may require special consideration. Some of the particular technical problems faced in our district are discussed in more detail.

The first of several technical problems that required resolution was to devise an operational definition of the "8th grade competency" that was specified in the adopted board policy. Actually, three forms of the operational definition were required:

- one definition for use with the level 4 form A of the California Achievement Tests. This test is administered to all 8th grade students in February as part of the regular districtwide testing program. It is the first opportunity allowed for students to demonstrate that they have achieved competency in reading and in math.)
- a second definition for use with form B of this same test. (This test is used as a final examination for high school students who are enrolled in special remedial classes).
- a third definition for use with the Sequential Tests of Educational Progress (STEP). (This test is administered to all high school students in the spring of each year as part of the regular districtwide testing program.)

Two different considerations had to be resolved before the operational definition for level A of the CAT could be established.

- The expression "8th grade" in the policy statement implied the use of a norm reference standard but the policy did not clearly indicate whether this standard should be one of local norms,

national norms, urban district norms, or some other set of norms. In the case of the Austin policy, however, the discussions by the board of trustees prior to adoption of the policy clearly indicated that the national norm referenced standard was intended by the board. This standard was therefore incorporated into the operational definition.

. Since form A of the CAT is administered in February, it would seem reasonable to define the cutoff score as the 50th percentile point for a midyear testing. There was some discussion however of insisting that the "8th grade expectancy" should refer to competency at the end of the 8th grade year rather than at the midpoint of the year. If this alternative were adopted, the cutoff score would have to be the end of year 50th percentile point rather the midyear 50th percentile point. Practical considerations resolved this issue in favor of the use of the midyear 50th percentile point as the cutoff score. Most students who would score an end of year 50th percentile at the end of the 8th grade would be expected to score a midyear 50th percentile in the middle of the 8th grade year. There seemed to be little purpose in denying competency status to these students on the 8th grade administration of the CAT since most of these students would achieve competency anyway next year during the next year's testing session.

The final operational definition of "8th grade competency" for the CAT level 4 form A (the 8th grade test) was thus:

> a score of 50th percentile or higher, based on 8th grade national norms for midyear testing.

The operational definitions for form B of the CAT and for the STEP then had to be defined so as to be equivalent to the above operational

definition. For form B of the CAT, the corresponding operational definition was very straightforward - it is identical to the definition for form A except that the form B norm tables to determine the raw score corresponding to the 8th grade midyear 50th percentile point (even though this test is used for high school students).

The operational definition of "8th grade competency" for the STEP administrations at high school was not so straightforward. No equivalency studies were available to relate the CAT and the STEP and the Austin Evaluation Office did not have the resources to conduct such a study.

Although the Anchor study results were restricted to reading tests and for grades 4-6 only, some extrapolation of these Anchor study results to the Austin needs appeared to be the most reasonable alternative available. This extrapolation was based on the observation that for each of grades 4, 5, and 6, a 50th percentile score on the CAT Reading Test Level 4 was approximately equivalent to a 45th percentile score on the STEP level 3 Reading Test. Assuming that this relationship is also approximately true at the 8th grade and is approximately true for math tests as well as for reading, the following rationale can be used to determine "8th grade competency" for STEP administrations that would be equivalent to that used for the CAT:

- the 8th grade 50th percentile point on the CAT is "equivalent" to the 45th percentile on the STEP, level 3 (based on the extrapolations of the Anchor study, discussed above).
- Using the scale scores that link the different levels of the STEP, it is found that the 45th percentile of STEP level 3 corresponds, on level 2, to a raw score of

  28 for the STEP level 2 Reading Test,
  26 for the STEP level 2 Computation Test, and
  20 for the STEP level 2 Math Concepts Test.

The operational definition of "8th grade competency" for the high school administrations of the STEP are thus the three raw scores listed above.

The logic that was involved in the development of these STEP competency scores was rather tenuous and disquieting. Therefore, the Austin Evaluation Office staff examined some hit-and-miss contingency tables which were created with existing data to ascertain the adequacy of the STEP operational definition. For both reading and math, the consistency of the "pass/no pass" decision between the 8th grade CAT administration and the 9th grade STEP administration is reasonably high. The two tables below display these results.

	9th Grade STEP Reading		
8th Grade CAT Reading		pass	fail
	pass	47%	11%
	fail	5%	37%

	9th Grade STEP Math		
8th Grade CAT Math		pass	fail
	pass	40%	5%
	fail	8%	47%

The second of the technical problems that required resolution was the problem of test security. This problem is still not adequately resolved. A long-range solution to the issue is now under consideration and is discussed in this paper. The essence of the problem is that the same test is administered a number of times each year. Consequently, memory effects may occur, and the possibility also exists for one copy of the test being circulated through the underground to students. Since the publisher of the test provides no rigid control it is also possible that copies of the tes could be obtained by students simply by ordering them from the publisher.

The only adequate method of maintaining physical security seems to involve the creation of a new test for each testing situation. Naturally, each of these different test forms would need to be a measure of the same variable (competency in reading, or in math). Also, the cutoff score on each form would have to be tied back in to the original operational definition of "8th grade competency" as identified on the CAT level 4 form A. The Rasch model[15,16] appears promising as a solution to these problems. The following tenative plan is being explored, using the reading competency as an example:

1. All items on the CAT Reading Test would be Rasch-calibrated on a logit scale.
2. Assuming that all items satisfied the goodness of fit test for the Rasch model, then the estimate of person ability for a raw score that corresponds to the 8th grade midyear 50th percentile point would be defined as the cutoff point on the logit scale. These test items form the initial kernel of an item pool to be created.
3. Additional test items from other sources are calibrated and are linked to the CAT items already in the item pool.
4. Each test form to be used in an administration would be created by drawing items from the pool that were as near as possible to the logit scale estimate of person ability that is the cutoff point.

Regarding point #2 in the above, some discussion has insued as to the proper course of action if one or more of the CAT items do not satisfy the Rasch goodness of fit test. George Ingebo of the Portland Schools suggests that if only a few of the CAT test items fail to meet the goodness of fit criteria, this will have only negligible impact on the final

results.[16]

A final technical problem (actually a class of loosely related problems) involves the validity of the measurement procedure.

- The question of test bias is still an unresolved issue. One of the difficulties in examining this issue is that by most models of test fairness, an external criterion must be identified and measured. Such a task would be difficult enough under objective procedures. However, the reality is that such a selection would also be so intertwined in different political and social factions as to be even more complicated. The other great difficulty here is that there are many different models of test fairness and for the most part they are not internally consistent; that is, a measurement that is fair under one model is seldom fair under another model.
- A final and perhaps more fundamental problem involves the question of whether the board's understanding of what "8th grade competency" means is identical to the operational definition actually used. Consider for example the following experiment that might be performed.

> The cutoff score for the 8th grade CAT Reading administration, in terms of raw score units, is 55 raw score (out of a maximum of 85 test items). Suppose that the board members were asked to examine each of these 85 test items and to reflect on the content knowledge that would be involved in correctly answering each of these items. After this task was completed, the board members would then be asked the following question:
>
> "Do you agree that any student who can correctly answer 55 of these items (65%) has an 8th grade competency?"

A conjecture as to how board members might answer the question would be hazardous and will not be offered in this paper. However,

considering how educational jargon is bandied about without serious effort at communicating the intent of the jargon, it should not be considered out of the realm of possibility that this simple experiment might reveal a serious gap between the understanding of one or more of the board members and those who happily created those wonderfully precise and highly measureable operational definitions.[17]

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