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State Exam Scores in Course Grade Calculation: Review of Current Practice and Some Proposed Guidelines

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Abstract

The number of states that offer end-of-course (EOC) exams in a wide variety of content areas continues to grow. Many states use these exams as graduation requirements and some require the inclusion of student EOC exam scores in the calculation of final course grades. This practice has some advantages, including ensuring that student grades reflect state standards. Still, there are many considerations when taking a score from a standardized measure and incorporating it into a classroom grading system. This paper reviews current practice around this issue in several states and highlights the challenges faced by a state, district, or school wishing to combine EOC exam scores and course grades. Guidelines for policymakers are included and educational implications are discussed.

Introduction

As more and more states offer end-of-course (EOC) exams in multiple content areas (Domaleski, 2011), the temptation grows for policymakers to utilize the results of these tests for more than a single purpose. Measurement of Adequate Yearly Progress (AYP) and student remediation needs require the collection of student-level achievement data in order for schools to meet federal and state obligations. Models of assessing teacher effectiveness with student achievement results as a component are possibly the most highly debated educational issue in the past decade. Yet, there is a movement stirring in the field declaring that students are over-tested and that classroom time must be reclaimed for instructional activities (e.g., Wolfgang, 2013). It is easy to see how including student performance on state end-of-course exams in course grade calculations provides a handy way to eliminate the need for a final exam and test students one less time during the academic year.

Despite the convenience, and a few other superficial benefits of this approach, there are many issues to be addressed when a decision is made to use end-of-course exam scores as a major part of final course grades. Multiple states have shouldered the task of tackling these issues in order to "double-dip" the collection of data about student achievement that state-level end-of-course exams provide. A review of several states' current practices is described in the next section.

Review of Current Practice

Domaleski (2011) suggested that "incorporating the EOC test score into course performance…may increase student motivation for performance" (p. 4). He went on to list ten states that reported encouraging the use end-of-course exams in the calculation of student course grades. As grading practices vary widely between school districts – and even between teachers

within a school – including a standardized measure can help ensure that student achievement is in line with state learning standards. Put another way, the inclusion of state EOC exam scores in course grades strengthens the assumption that students who earn course credit, regardless of school or teacher, meet state expectations for the content area. Such a concern is typically the driving force behind policies that mandate or strongly suggest including student exam scores in the determination of final course grades.

Studies that have examined the relationship between course grades given by teachers and EOC exam scores report cases where the two measures are not equitable when used for decision making (e.g., Brennan, Kim, Wenz-Gross, & Siperstein, 2002; Ross & Gray, 2008). A key component of the practice of using EOC scores to ensure that course grades reflect state standards is the assumption that classroom grades are less rigorous or equal in rigor to the EOC exam. Studies such as those above questions this assumption and present very real possibility that high teacher expectations or even task differences could result in the inclusion of exam scores weakening the overall interpretation of the course grades.

One of the major considerations for the inclusion of exam scores in course grades is the weight to be given to the test when final grades are calculated. Domaleski (2011) explained that this can vary based on how much influence the state, or other stakeholders, would like the test to have. Florida mandates that the EOC exams count for 30% of a student's course grade while Texas and Georgia set this weight at 15%. Although many states simply average the resulting exam score with the course grade, at least twenty-six states use a passing score on one or more EOC exams as a gatekeeper for graduation (Center on Educational Policy, 2008). However, eighteen or more of these states offer alternative pathways in which exam requirements are replaced. Substitutable achievements include additional coursework, local assessments, or

satisfactory completion of advanced coursework such as that offered by International Baccalaureate programs. Thus, while the EOC score has the opportunity to contribute to course grades, there are many additional variables in play.

An additional issue of major consequence is the methodology employed to include exam scores in course grades. Few states report student achievement on a 0-100 scale as would be comparable to the grades assigned by a classroom teacher. State-level EOC exam reporting scales vary widely across the country, but are typically developed using item-response theory (e.g., Kolen & Brennan, 2004). These scales are rarely, if ever, linear in nature. Thus, attempts to mathematically transform scale scores to a 0-100 range will not be methodologically sound. New York is one state that scales exams on this range and the practice often leads to confusion as many educators do not realize that the results are reported as scale scores rather than percentage correct (New York State Education Department (NYSED), 2005). Ignoring the scale in favor of percent-correct scores eschews the measurement of the underlying construct that the scale was developed to report. While several states report normative information such as percentile ranks that do use this range, this raises questions of fairness as grades are calculated at a school level and percentile ranks incorporate all examinees in that state.

Currently, the most common practice for including EOC exam results in course grades is to develop a secondary scale using a more familiar range. This is typically done using 0-100, but could include any range useful to the consumers (e.g., 0-4.0). The state of Georgia employs such a method and refers to the resulting concordance as a *grade conversion scale* (Georgia Department of Education, 2012). Table 1 shows the Georgia grade conversion scale for ten EOC exams administered by the state. Not only are scale score ranges converted from 200-600 to 0-

100, but the corresponding performance levels are shown to provide additional information about student performance.

Table 1

Georgia Grade Conversion Scale

	Performance Level 1: Does Not Meet Expectations		Performance Level 2: Meets Expectations		Performance Level 3: Exceeds Expectations	
	Scale Score	Grade Conversion	Scale Score	Grade Conversion	Scale Score	Grade Conversion
Grade 9 Lit	200-399	0-69	400-449	70-89	450-600	90-100
America Lit	200-399	0-69	400-449	70-89	450-600	90-100
Biology	200-399	0-69	400-449	70-89	450-600	90-100
Physical Science	200-399	0-69	400-449	70-89	450-600	90-100
US History	200-399	0-69	400-449	70-89	450-600	90-100
Economics	200-399	0-69	400-449	70-89	450-600	90-100
Mathematics I	200-399	0-69	400-449	70-89	450-600	90-100
Mathematics II	200-399	0-69	400-449	70-89	450-600	90-100
GPS Algebra	200-399	0-69	400-449	70-89	450-600	90-100
GPS Geometry	200-399	0-69	400-449	70-89	450-600	90-100

A grade conversion scale can be created using a transformation or by convening a panel of educators to consider student performance, scale score ranges, and performance level classification and use their professional judgment. This process is analogous to that of setting performance standards for educational assessments and is bolstered by the evidence-based manner at which a recommendation is reached (McLarty, Way, Porter, Beimers, & Miles, 2013). Figure 2 illustrates a more course-grain outcome of such a procedure. In this example, panelists identified the cut points on the EOC exam that they believed represented student achievement on and A-F letter-grade scale. Although this does not provide a numeric value for teachers to record in a gradebook, it does establish guidelines that could be adapted to local policies on grading.

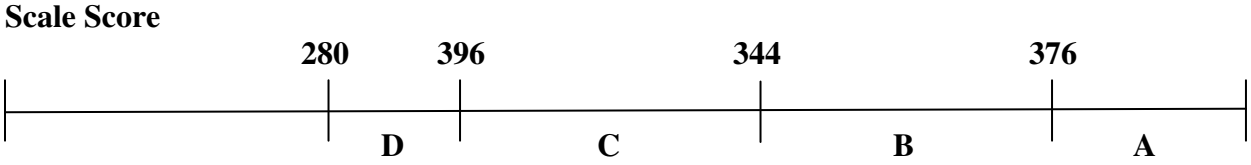

Figure 1. Example grade conversion chart where panelists have set cut scores for conversion into letter grades.

Kentucky has developed a grade conversion scale using A-F as the outcome (see table 2). The guidance to policymakers included "recommending a letter grade for EOC inclusion rather than a percentage because of the great variety of grading scales used in Kentucky districts and schools. To convert a letter grade into a percentage for inclusion in a teacher's grade book, local decisions must be made" (Kentucky Department of Education, 2012). Collier County Public Schools (2013) in Florida have adopted a similar approach and use the direct conversion of proficiency levels to letter grades.

Table 2

Kentucky Grade Conversion Scale

STATE-REQUIRED END-OF-COURSE EXAMS RECOMMENDED LINK TO CLASSROOM LETTER GRADES FOR 2012-13 *(Based on Multiple-Choice Sections)*						
Subject	**A**	**B**	**C**	**D**	**F**	CPE-linked College Readiness Benchmark
English II	175-160	159-154	153-152	151-141	140-125	154
Algebra II	175-151	150-148	147-143	142-138	137-125	148
Biology	175-157	156-154	153-146	145-140	139-125	154
U.S. History	175-151	150-147	146-144	143-139	138-125	147

There are other options for manipulating a scale score into a number or letter that is conducive for inclusion in course grade calculation. Such options include a mathematical division of the scale score range or a comparison of course grade distribution with that of the

exam results. Each of these methods has drawbacks. A mathematical division could be achieved by dividing the range of scale scores by the number of proficiency levels, letter grades, or any other categorical measure that is useful to stakeholders. The major methodological issue encountered with this approach is that scaling is not taken into account and the resulting distribution of grades may not represent student achievement in the manner intended by the use of scale scores.

Florida has left the methodology for incorporating EOC exam scores in final course grades to local discretion (Florida Department of Education, 2012). However, guidance offered to school district officials before the first administration of exams subject to required inclusion in course grades proposed several strategies (Florida Department of Education, 2011). One possible method which differs from the grade conversion approaches described previously was a normative procedure using course grade distributions. This approach allows for fluctuations between test administrations and could be employed at the classroom, school, district, or state level depending on the desired norm group.

Table 3 shows an example of the distribution of student course grades in a classroom with ten students. These grades do not include EOC exam scores. Table 4 illustrates how the distribution of course grades could be used to transform the EOC score into a letter grade. Based on the distribution of student course grades before the EOC exam is administered, the top 3 performing students on the exam would receive an 'A' averaged into their final course grades, the next 5 students would receive a 'B,' and so on. A similar approach could be undertaken with numeric grades. It is simply a matter of establishing the course grade distribution and establishing cut points on the EOC scale to match this distribution.

Table 3

Example Distribution of Students' Course Grades (n = 10)

Course Grade Before EOC Exam	Frequency
A	3
B	5
C	1
D	1
F	0

Table 4

Example of Normative EOC Exam Score Conversion

Student	**Course Grade Before EOC**	**EOC Scale Score**	**EOC Score Rank**	**EOC Conversion for Inclusion in Final Course Grade**
1	C	309	9	C
2	B	350	7	B
3	D	297	10	D
4	A	402	1	A
5	B	370	4	B
6	A	368	5	B
7	A	380	3	A
8	B	352	6	B
9	C	330	8	B
10	B	393	2	A

Finally, the option of reporting the percentage of raw score points earned by each student out of the total raw score points available on the exam always exists and is familiar to educators as it is likely the approach they use to calculate classroom grades on quizzes and other daily activities. It is important to realize that this option ignores the effect of the scale score conversion and that the calculated percentage typically would not represent the interpretation of student achievement in the same manner as measured by the exam developers (Tan & Michel, 2011). Figure 2 below shows how this simple calculation could be performed. Depending on the effects of scaling, the intended student scale score may be similar or completely different from the performance typically associated with a percentage score of 72. Additionally, the Standards for

Educational and Psychological Testing (AERA, APA, & NCME, 1999) warn that normative interpretations are appropriate only when the test specifications indicate this intention.

Raw Score Points Available on Exam = 67
Raw Score points earned by student = 48

$\frac{\text{48 raw score points}}{\text{67 raw score points}} = 0.7164$, or a percentage score of 72

Figure 2. Calculation of percent correct score using available points on an exam and the number of points earned by a student.

The variety of practices in the field today illustrates the complexity of the issues surrounding EOC exam scores and course grades. There is little continuity in inclusion policies, weighting, or methodology for grade calculation. Any policymaker at any level of educational administration is faced with a challenge when considering the extent to which EOC scores can inform classroom grading practices. This is especially true when the exams already serve multiple purposes at the state level. The following section proposes some guidelines to policymakers as they are faced with decisions such as: 1) should EOC scores be included in course grades?; 2) how much weight should be placed on EOC scores?; and 3) how should EOC scale scores be converted for inclusion in final course grades?

Proposed Guidelines

The following guidelines are intended to facilitate discussion surrounding the inclusion of EOC scores in final course grade calculations. These recommendations drawing on reviews and research from scholars such a Domaleski (2011), state and federal policies, and the author's own experience as a teacher and as a member of a state office for educational assessment. The guidelines are by no means comprehensive, but should serve as discussion starters for those policymakers at the school, district, or state level who want to review their current practice.

Although some decisions may be out of the control of administrators, current practices in the field suggest that there is likely one or more major decisions left to local discretion. For example, a principal whose state mandates the weighting of EOC scores in course grades might still need to select a methodology for final grade calculation at the local level. Although the final decision may rest with one or more policymakers, the importance of soliciting input from stakeholders such as teachers, students, and parents cannot be overstated. The guidelines below all assume educators and other parties with unique insight into the practice of assigning course grades will be involved with the conversation and ultimate decision-making process.

Guidelines

1. Decide whether to include exam scores in course grades.
    - Examine the alignment between classroom instruction and state standards.
    - Look at the other roles the EOC exam already must play and determine if it is appropriate for this purpose.
    - Consider the consequences of including (or not including) the exam in course grades.
    - Determine if inclusion should be mandatory or suggested (i.e., at the discretion of the school board, principal, department head, teacher, etc).

2. Determine the weight the exam will be given.
    - As reported by Domaleski (2011): "to the degree that the [policymaker] intends to influence course performance through EOC test scores, the weight should be increased and the flexibility to apply the weight should be removed" (p. 5).
    - Consider the consequences of a larger versus a smaller weight.

3. Select a methodology for including exam performance in course grades.
    - Balance user-friendly and understandable with appropriate and accurate.
    - Consider how easily teachers will be able to include the exam score in their grades (e.g., will they need a lookup table or a mathematical formula?).

4. Put the decisions into practice.
    - Communicate the decisions - including the process undertaken and the rationale for each - with teachers, students, parents, and any other appropriate groups.
    - Develop user-friendly materials that explain the inclusion methodology chosen and aid in the calculation of course grades.
    - Seek feedback on the effectiveness of the inclusion of exam scores in course grades.

- Begin an ongoing research agenda to study the relationship between EOC exam scores and course grades.

Educational Implications

The review of current practices and suggested guidelines highlight the sensitivity of including an external, standardized measure in the calculation of student course grades– a practice typically undertaken solely by a classroom teacher. Like any policy issue there are pros and cons to be weighed and the final decision must ultimately provide the greatest educational benefit. If an EOC exam truly represents what students are expected to know and be able to do according to content area standards, it may be appropriate to allow student achievement as reported by course grades to include this external measure. However, course grades and EOC exams scores have been shown by a few studies as divergent when applied to educational decisions (e.g., Brennan, et al., 2002). This brings to light the possibility that including EOC scores could incorrectly represent student achievement when viewed through the lens fo course grades.

The implications for policymakers include the need to carefully consider the consequences of this practice as well as the importance of transparency and educator involvement with such decisions. Additional research on the relationship of student motivation and EOC exam weight in course grades would be most beneficial in furthering this discussion. Furthermore, validation studies into the utility of EOC exams for this purpose seem crucial if this practice is to continue. Given the increase in EOC exams nationwide, this continuation seems likely. It remains the duty of policymakers and researchers to ensure that grading practices are as fair, reliable, and valid as possible by using any available tools while being cognizant of the constraints of these tools for the measurement of student achievement.

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