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Orange Juice or Orange Drink?

Ensuring that "Advanced Courses" Live Up to Their Labels

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Introduction

The majority of students are now seeking additional education after high school. State policy has encouraged this trend. For example, Texas's Higher Education Coordinating Board has set a goal of enrolling 500,000 additional minority students in Texas public colleges and universities by the year 2015.[2] In addition, a recent report by the American Diploma Project emphasized that college and workplace readiness skills are increasingly similar.[3] The implication of this finding is that even students who do not plan to go to college should leave high school with the skills they would need to attend college should they later choose to do so.

Yet many students are leaving high school ill-prepared for college and, by extension, for better jobs in the workplace. This problem is especially pronounced among low-income and minority students.[4]

One major strategy for increasing students' college and workplace readiness has been to enroll more students in advanced and college-preparatory courses in high school. Interest in expanding student participation in a core academic high school curriculum goes back at least as far as *A Nation at Risk* (1983) that encouraged students to take four years of English and at least three years each of mathematics, science, and social studies.[5] Student completion of more advanced academic courses increased in the 1980s and 1990s.[6]

Recent policy changes have focused even more on increasing student participation in advanced high school courses. For example:

[1]The authors would like to acknowledge the invaluable research assistance of Janey Chaplin in the preparation of this paper.
[2] Texas Higher Education Coordinating Board spreadsheet, *New CTGs targets v 2 9-05.xls*, email attachment provided by Janet Beinke, January 24, 2006.
[3] Achieve, *Ready or Not: Creating a High School Diploma that Counts*, 2004, available at http://www.achieve.org/achieve.nsf/AmericanDiplomaProject?openform.
[4] For example, of 1999-2000 Texas high school graduates entering Texas public colleges and universities, 75.6% of African-American students, 68.5% of Hispanic students and 72.4% of low-income students needed remediation in reading, writing, or mathematics. Email attachment provided by James Dilling, Texas Higher Education Coordinating Board, March 3rd, 2005.
[5] The recommendations from *A Nation at Risk* also clarified that the courses should be at the high school level so that, for example, the mathematics courses would prepare students to "(a) understand geometric and algebraic concepts; (b) understand elementary probability and statistics; (c) apply mathematics in everyday situations; and (d) estimate, approximate, measure, and test the accuracy of their calculations."
[6] For example, the percent of high school graduates completing at least four high school courses in English, three in social studies, three in science, and three in mathematics increased between 1982 and 1994 from 16% to 53% of white students, 12% to 45% of African-American students, and 7% to 41% for Hispanic students. National Center for Education Statistics (1998), Table 13.

- Since the February 2005 National Education Summit on High Schools, eight states -- Arkansas, Oklahoma, Illinois, Indiana, Kentucky, Mississippi, Iowa and Louisiana -- have adopted tougher course requirements for students to get a diploma.[7]

- Texas and Louisiana have made a college-preparatory curriculum the default high school graduation plan for all students, and Indiana is phasing in a similar requirement.[8] In Texas and Indiana, the standard high school curriculum consists of four years of English, three years each of science and social studies, and mathematics through Algebra 2.[9] Louisiana provides a list of high school mathematics courses that can be taken to fulfill the requirement of two math courses beyond Algebra 1.

- Twelve states now have "State Scholars" programs, generally sponsored by business organizations such as the state chamber of commerce, that encourage students to take college-preparatory courses in high school.[10]

- All 50 states as well as the District of Columbia now offer incentives for students to take Advanced Placement, International Baccalaureate, or dual enrollment courses. The College Board reports New York, Maryland, Utah, Florida, California and Massachusetts as leaders in this program.[11]

Research by Adelman (1999) has been influential in encouraging the campaign to enroll students in advanced courses. Adelman's studies used data from the High School and Beyond (HS&B) and National Educational Longitudinal Study (NELS) student cohorts, consisting of students graduating from high school in 1982 and 1992. He found that the strength of a student's high school curriculum, as measured by an "Academic Resources Index," was a stronger predictor of college success and college graduation than was socioeconomic status. Specifically, disadvantaged students in the top quintile on the Index were more likely to graduate from college than were advantaged students who were average on the Index.

The HS&B and NELS student cohorts attended high school in an era when a relatively thin stratum of the best-prepared students took advanced courses. Under those circumstances, students who received credit for advanced courses were relatively likely to have mastered the content implied by the course titles, and there was relatively little impulse to water down the course content to meet the need of poorly-prepared students. In addition, Adelman included an SAT-like college readiness exam as one component in his Index. Thus, Adelman's research does not support the idea that students are well-prepared for college if they enroll in advanced courses but do not learn the course content.

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[7] Kavan Peterson, "Push to Reform High Schools Gaining" www.stateline.org, May 24, 2005.
[8] Indiana's plan goes into effect with the high school graduating class of 2011. Indiana Department of Education, "Core 40 Overview," www.doe.state.in.us/core40/overview.html.
[9] Integrated Mathematics I-III can be used to meet the mathematics requirement in Indiana; together these three courses cover the same requirements as Algebra 1, Geometry, and Algebra 2. Indiana Department of Education.
[10] The states with State Scholars programs are: Arizona, Arkansas, Connecticut, Indiana, Kentucky, Maryland, Mississippi, New Jersey, New Mexico, Oklahoma, Rhode Island, Tennessee, Texas, Washington. See www.centerforstatescholars.org/
[11] The College Board, "Advanced Placement Proves Gateway to Success", January 2005, http://www.collegeboard.com/press/article/0,3183,41022,00.html.

The Problem of Course Credit Inflation

Recently, troubling evidence has accumulated that as student enrollment in advanced courses has expanded, increasing percentages of students who are receiving credit for those courses are not learning the content implied by the course titles. It has proven to be much easier to enroll and give students credit for a course labeled "Algebra 2" than it has been to ensure that those students actually learn algebra.

An analogy may be made to truth-in-labeling laws in business. A company selling an orange-colored beverage under the label "orange juice" can get in legal trouble if the beverage contains little or no actual juice. But there are no consequences for giving credit for Algebra 2 to students who have learned little algebra. In some cases the problem is the lack of a standard definition of the content of an Algebra 2 course, in other cases, districts and states lack measures of whether the defined content has been taught and learned; in still other cases, students receive credit for courses even though available measures indicate that they have not mastered the course content.[12]

The phenomenon of giving increasing percentages of students credit for courses whose content they have not learned may be labeled "course credit inflation" by analogy with the concept of grade inflation. In the case of grade inflation, the knowledge and skill level of the median student receiving an "A" declines over time. In the case of course credit inflation, the level of content mastery by the median students receiving credit for a course with a given title declines over time. If the decline is dramatic, then course completion can lose its ability to predict student success in college. This may help to explain the findings of Geiser and Santilices [2004], who reported that the students' number of advanced course credits on their transcripts did not predict their likelihood of persistence in college, but that scores on AP and SAT II curriculum-based exams did; and of Dougherty, Mellor, and Jian [2006] who found that a high school's percent of students taking and passing AP exams was a much better predictor of college graduation rates than was the percent of students taking AP courses but not passing exams.

The problem of course titles not reflecting course content, let alone what students are learning, has received attention from national organizations. The College Board has announced an initiative to review the content of courses taught under the Advanced Placement label to make sure that they follow the College Board-approved curriculum for those courses.[13] ACT has developed a system to audit the content of high school courses and has written a report with the Education Trust on the content of model advanced high school courses.[14]

Evidence of Course Credit Inflation

[12] The "orange juice or orange drink" metaphor was also borrowed by Dounay (2006) from a July 2005 presentation by Dr. Jean Rutherford of NCEA.
[13] Vaishali Honawar, "To Maintain Rigor, College Board to Audit All AP Courses," *Education Week*, July 27, 2005.
[14] ACT and Education Trust, "On Course for Success: A Close Look at Selected High School Courses That Prepare All Students for College," www.act.org and www.edtrust.org, 2004.

Based on current evidence, the problem of course credit inflation is worst for low-income and minority students. The evidence here is taken from Texas because of the availability of longitudinal student data making it possible to link enrollment, course completion, graduation, and high school and college test records for the same students. We believe that a similar analysis in other states, if the right data were available, would yield similar results.

- 60% of Texas low-income students, 65% of African-American students, and 57% of Hispanics who received course credit for Geometry and Algebra 2 failed a state exit exam covering Geometry and Algebra 1. The corresponding percentages for non-low-income and white students were 36% and 32%, respectively.[15]

- In a study by the Texas Education Agency, 58% of Texas low-income students, 67% of African-American students, and 57% of Hispanics who received course credit for Algebra 1 in 1999 failed the corresponding end-of-course exam. The percentages for non-low-income and white students were 39% and 35%.[16]

- An analysis by the Texas Higher Education Coordinating Board found that 63% of low-income, 61% of African-American students, and 59% of Hispanic students who graduated under the state's new Recommended High School (college preparatory) Graduation Plan in 2000 needed remediation in one or more subjects when they enrolled in Texas public higher education institutions. For non-low-income and white students, the percentages were 33% and 27%.[17]

- Of the low-income students in the 2002 Texas high school graduating cohort taking academic Advanced Placement courses, fewer than one in seven passed any academic AP exams. The corresponding percentage of low-income AP *exam-takers* who pass is less than one in four. For African-American students, the corresponding percentages were one in nine and less than one in four, and for Hispanics, one in seven and less than one in four. Just over one-third of white and one-third of non-low-income AP course-takers passed AP exams, and the percentage for both groups was around 57% for AP exam-takers (research analyses at NCEA).

Solutions

The likely predominant explanation for the poor performance of students receiving credit for advanced courses is their lack of academic readiness for those courses. One of the most important predictors of students' ability to learn new course content is their possession of prior relevant knowledge.[18] Teachers often find it difficult to teach Algebra 2 content to students who need help with Algebra 1 or even prealgebra. "(W)e have to teach them at a lower level to get

[15] The analysis, using longitudinal student-level data acquired from the Texas Education Agency, covered students taking the 11th grade TAKS exam in 2003 who had received credit for Geometry and Algebra 2.
[16] Texas Education Agency, "A Study of the Correlation between Course Performance in Algebra I and Algebra I End-of-Course Test Performance," www.tea.state.tx.us/student.assessment/resources/studies/correlation.pdf
[17] Email communication from James Dilling, Texas Higher Education Coordinating Board, March 3rd, 2005. An earlier analysis by Lopez (2000) using data on 1997 high school graduates found that about half of students receiving "Advanced" or "Advanced with Honors" diplomas needed remediation in one or more subjects when they entered Texas public higher education institutions.
[18] See, e.g., Ausubel et al. (1978), Ch. 5, and Strangman and Hall (2004).

them up to speed," said one Texas Algebra 2 teacher who said he had to spend a significant portion of his class reviewing concepts from Algebra 1.[19]

Traditionally, schools addressed the problem of student preparation for advanced courses by restricting enrollment in those courses to the best-prepared students. This approach led to the traditional outcome that few students took advanced courses. Minority student enrollees in advanced courses were especially scarce.[20] This approach is not likely to meet the goal of preparing the majority of low-income and minority students for college. Nor does it encourage students to take on a challenging high school curriculum, or school districts to take on the challenge of preparing students to master that curriculum.

But the more recent approach of enrolling students in courses without making a systematic effort to get them ready, and giving them course credit even if they don't learn the content implied by the course title, is not working well either. An analogy may be drawn to the debate over social promotion. Giving students credit for courses for which they haven't learned the content is like socially promoting a student who is unready for the next grade. But excluding students from advanced courses – like retaining the student in the previous grade without offering appropriate interventions – does not seem to work well either.

As is the case with policies for promoting students, there are no easy solutions. Workable remedies tend to focus on most or all of the following eight elements:

1. Careful alignment of K-12 curriculum to identify course readiness requirements. For example, if the goal is to get students to take and succeed in Algebra 2, the sequence of prior skills must be carefully thought through and introduced to the student at the appropriate time. If the standard curriculum in high school is to be a more advanced curriculum, then the standard curriculum in K-8 must be one that is designed to get students to that level.

2. Identification of which students are missing which prerequisite skills. The practice of teachers keeping close tabs on each student's course-relevant skills and sharing that information as needed with the student's other teachers is a practice common in higher performing schools at all levels.[21]

3. Extensive use of data and intervention in kindergarten through eighth grade. Most of the interventions needs to happen early so that as many students as possible enter high school with the prerequisite skills they will need to succeed in advanced courses. For students who enter high school with major deficiencies in prerequisite skills, acquiring those skills in a relatively short time and moving up to succeed in multiple advanced courses is a Herculean task.[22]

[19] Sean Cavanaugh, "Several States Making College-Prep Courses the Default Curriculum," *Education Week*, April 20, 2005, p.13.
[20] See the 1982 percentages of students taking college-preparatory high school courses in Footnote 5 above.
[21] The findings on higher performing schools are based on investigations in more than 450 schools using the Best Practice Framework developed at the National Center for Educational Accountability. Much of the work with districts was funded by the Broad Foundation in connection with the Broad Prize for Urban Education.
[22] For example, famed AP calculus teacher Jaime Escalante expected students to enroll in summer school and required students to commit to long hours of before and after school and on Saturdays. That was just for one advanced course, not a full load of such courses. See the account in Mathews (1988).

4. Intervention with high school students to build the prerequisite skills prior to their enrollment in advanced courses. Some high schools strongly encourage students with missing prerequisite skills to enroll in summer programs that the school and district create especially for assisting students with those skills. For example, a student who completed Algebra 1 without achieving full mastery of Algebra 1 skills would be encouraged to enroll in a summer "bridge" program to fill in the missing skills prior to enrolling in Algebra 2. Having the student simply retake Algebra 1 – like having the student repeat a grade – might waste time repeating those skills the student already knows, whereas the purpose is to focus on what the student does not know.[23]

5. Interventions to affect students' motivation to enroll in and succeed in advanced courses. High-performing schools and districts are more likely to use programs and strategies that help create a "culture of achievement" among their students. These include awarding letters for academic achievement, promotion of academic achievement through students' extracurricular activities, and adoption of programs that promote higher student aspirations.[24]

6. Interventions with students while they are taking the course. Higher performing schools and districts are more likely to use interim exams given during the course to identify students who are having difficulty and to assess with what skills and concepts those students need help. These districts are more likely to organize teachers into problem-solving teams and to have made sure that those teacher teams have the information and resources they need to address students' problems. Rather than simply pushing struggling students out of the courses, they are more likely to develop strategies to help those students.

7. Development of teachers' capacity to carry out these interventions. Working with students who need more carefully designed instruction and extra help in order to master advanced material is a skill that many teachers do not develop – even teachers who are highly knowledgeable about the subject matter they are teaching. Higher performing schools and districts are more likely to assist teachers in developing those skills.

8. Use of end-of-course exams to monitor whether students in each course have learned the course content. Higher performing schools and districts are more likely to use these exams to monitor whether the system is working effectively to help students of all socioeconomic backgrounds learn the content in their advanced courses. Without these exams, schools and districts may not know if their students have consumed "orange juice" or "orange drink." Broad Prize winners Garden Grove and Long Beach use interim and end-of-course exams to monitor whether students are learning the content of advanced courses, and each district has developed additional end-of-course exams in courses that are not tested by the state. [25]

[23] If it turns out the student knows almost no algebra, then the student may need to take a course that uses a different teaching approach than the regular course at which he or she just failed.
[24] The AVID (Advancement Via Individual Determination) program was cited by Long Beach Superintendent Chris Steinhauser and Garden Grove superintendent Laura Schwalm, whose districts won the Broad Prize for Urban Education in 2003 and 2004, respectively.
[25] For example, Garden Grove has developed end-of-course exams in 10 courses not tested by the state, and Long Beach has developed similar exams in 43 courses from Grade 8.

Conclusion

The pressure to improve high school students' academic results has led many schools and districts to take the first step of enrolling more students in advanced courses. Business and state policy leaders have encouraged this practice. However, the hard part of the bargain is to ensure that students actually learn the advanced content implied by the course labels. Lack of student academic preparation and teacher capacity has led many schools and districts to take the easy path – substituting "orange drink" for "orange juice" so that students can pass the course and graduate. This practice appears to be most prevalent with low-income and minority students.

The need for information going beyond course labels has implications for "State Scholars" and similar programs that focus on encouraging students to sign up for advanced courses. These programs should be evaluated not by course credit alone, but also by evidence that students have mastered course content and do not require remediation when they get to college.[26]

Higher-performing schools and districts are beginning to take the first difficult steps down the path of preparing the majority of students from all backgrounds to learn content that in the past was standard fare only for the best prepared and most advantaged students. Learning from their progress, practices, and success is critical if others are to follow.

[26] Such evaluations are much more feasible in states that have developed longitudinal data systems that follow students from K-12 into college and that provide end-of-course exams for key advanced courses.

Bibliography

Achieve (2004). “Ready or Not: Creating a High School Diploma that Counts,” available at http://www.achieve.org/achieve.nsf/AmericanDiplomaProject?openform.

ACT and Education Trust (2004). “On Course for Success: A Close Look at Selected High School Courses That Prepare Students for College,” www.act.org and www.edtrust.org

Adelman, Clifford (1999). “Answers in the Tool Box,” U.S. Department of Education, Washington, D.C.

Ausubel, David P., Novak, Joseph D. and Hanesian, Helen. (1978). “Educational Psychology,” Second Edition, New York, Holt, Rinehart and Winston, Inc.

Casvanagh, Sean (2005). “Several States Making College-Prep Courses the Default Curriculum,” *Education Week*, p.13, April 20.

Center for State Scholars (2005). www.centerforstatescholars.org

Dilling, James (2005). Email communication with Lynn Mellor, Texas Higher Education Coordinating Board, March 3.

Dougherty, Chrys, Mellor, Lynn and Jian, Shuling (2006). “The Relationship between Advanced Placement and College Graduation.” www.just4kids.org.

Dounay, Jennifer (2006). “Ensuring Rigor in the High School Curriculum: What States Are Doing,” Education Commission of the States, January, available at http://www.ecs.org/clearinghouse/66/67/6667.pdf.

Geiser and Santilices (2004). “The Role of Advanced Placement and Honors Courses in College Admissions,” University of California, Berkley.

Honawar, Vaishali (2005). “To Maintain Rigor, College Board to Audit All AP Courses,” E*ducationWeek*, July 27.

Indiana Department of Education. “Core 40 Overview,” www.doe.state.in.us/core40/overview.html

Lopez, Omar (2000). “The Relationship of the Texas High School Curriculum to College Readiness: An Update -- Implications for Increasing Student College Participation and Success,” unpublished paper, December.

Mathews, Jay (1988). “Escalante: The Best Teacher in America,” Henry Holt & Company Inc., New York.

National Center for Education Statistics (1998). “High School Transcript Study Tabulations” (HSTS), Revised, U.S. Department of Education, September.

Peterson, Kavan (2005). “Push to Reform High Schools Gaining,” www.stateline.org, May 24.

Schwalm, Laura (2005). Superintendent of Garden Grove Unified School District, California. Telephone conversation with Chrys Dougherty, August.

Steinhauser, Chris (2005). Superintendent of Long Beach Unified School District, California. Verbal discussions, August and September. See also www.lbusd.k12.ca.us/research/test_schedules/index.asp

Strangman, Nicole, & Hall, Tracey (2004). "Background Knowledge," Wakefield, MA: National Center on Assessing the General Curriculum. Retrieved September 26, 2005 from http://www.cast.org/publications/ncac/ncac_backknowledge.html.

Texas Education Agency. "A Study of the Correlation between Course Performance in Algebra I and Algebra I End-of-Course Test Performance," www.tea.state.tx.us/student.assessment/respoirces/studies/correlations.pdf

The College Board (2005). "Advanced Placement Proves Gateway to Success," http://www.collegeboard.com/press/article/0,3183,41022,00.html, January 25.

United States Department of Education (1983). "A Nation At Risk," http://www.ed.gov/pubs/NatAtRisk/risk.html. April.