

# Use of Placement Tests in College Classes

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Introduction- Many colleges use some sort of a placement system to determine if incoming students are required to take remedial level courses or place students in a class that focuses the teaching to their level of expertise. While this practice is widespread and continuing throughout America, what is the impact on the students and the courses they are taking? Have we designed the test for the specific purpose in mind, assessed the method, and validated the methods? This paper is designed to look at the literature behind the reasons why placement exams are given, the results, the uses, and suggestions for improvements.

The mainstream media has reported that the basic science skills of American students are declining when compared to students around the world. Based upon the continued decline of scores in these courses, many collegiate institutions and science classes have looked at the reasons behind a high failure rate or a lower than average GPA in a specific course. To place students in classes with instructors whom are more able to teach to a specific ability, most universities rely upon some type of placement "exam." The exam comes in many different packages, but the purpose is to provide a best fit model for the ability of the student and the capability of the instructor in order to maximize learning. The increased use of placement testing can be traced to 17 years worth of declining test scores on standardized tests (Schmitz and delMas, 1991.)

The type and appearance of placement tests take a variety of forms and range from internally generated tests given to every student to algorithms designed to place or validate to SAT score correlations to looking simply at past performance in higher level education (Nordstrom, 1990, Karrp, 1995.) Based upon a 1996 study by Boughan, the highest correlation for students to pass freshman chemistry was a high overall GPA. Overall collegiate GPA as a predictor for success lacks the prerequisite of students that have no previous college experience (Bodenhause, 1998, Davis and Shih, 2007.) Students with the highest GPAs should perform best in these courses.

Many college level science courses have gone to giving locally produced and administered placement exams that allow the courses to place students in classes with a group of peers that have a similar ability to grasp and retain scientific knowledge (Karrp, 1995.) Simultaneously, the better suited or experienced instructors are placed in the sections to teach to the skill levels present. This marriage of skills of both instructor and student should help the student perform at a higher level (Bodenhause, 1998.) The other influencing factor is the students' peers in the same section are a similar level as themselves. If the instructor finds a general weakness, it can be expected that many of the students indicate, to some degree, a weakness in that area. This fact can be attributed to a report that 30% of college freshman take a remedial course their first year of college (Mollison, 2006.) If a random group of students are placed together, the instructor will only be teaching to approximately 80% of the students. The lower and upper 10% will not be in the correct section that will maximize their learning environment or can sometime defy placement tests. A students ability to work hard, be persistent, maturity, etc. can sometimes change the equation (Schmitz and delMas, 1991, Davis and Shih, 2007, Mollison, 2006.)

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Placement exams can never be 100% effective. Most environmental, social, economic, and ethnic sources of variation have been studied to determine a root cause for a lowering of scientific literacy with few conclusions (Davis and Shih, 2007, Sawyer, 1997.)

Love them or hate them, placement tests have become a normal way of life. Students are tested in elementary schools, high school, on ACTs, SATs, MCATs, etc and the results of these tests are used to determine rewards such as scholarships or punishments, such as denial to medical school. Most students have evolved to look at their performances on these tests as “the truth” about their academic merit. Several studies indicate the need to include tests results as pieces of information, but indoctrinate a whole person attitude when determining their academic merit (Sadler and Tai, 2007, Karrp, 1995.)

One influencing factor for looking at the whole person concept is because students who generally take higher level tests such as the Advanced Placement Exam normally take and complete a rigorous AP course designed to prepare them for college courses (Mollison, 2006.) The self selection process that has occurred where a good student selects to perform at their potential has created a situation where a different population of students has been attracted who are motivated and excel academically (Sadler and Tai, 2007.)

Other studies indicate freshman grades may not be the best indicator for true abilities in college. Many students undergo an adjustment period transitioning to college (Mollison, 2006.) Students undergo a wide range of adjustments in social and academic changes going from high school to college. By comparing placement exams and freshman college grades, we may not be taking into account all aspects of the problem (Karrp, 1995, Davis, 2007, Sawyer, 1997.) One study found that student disposition and demographic variables explained performance more than placement tests (Armstrong, 2000.)

Testing practices and open access to the tests have been challenged in California (Karrp, 1995.) Lawsuits have claimed that everyone must be given access and the same relative abilities to pass the exams (Armstrong, 2000.) California has gone as far as to require tests meet a certain criteria to be used for admittance or placement in courses. An attempt to evaluate a pre-existing group of sorted students will show a very low correlation to final grades (Armstrong, 2000.) The main reason is the students are pre-sorted for ability and disposition. The exams and courses must focus on a diverse population of college level students entering (Mollison, 2006.)

For a course that decides to use placement tests designed for a specific function the tests can be written in such a manner to generally predict the students who can achieve this level of expertise in a subject (Karrp, 1995, Schmitz and delMas, 1991, Sadler and Tai, 2007.) A single test cannot be administered that will allow the tester to evaluate every aspect of every student. Most researchers do not question the institutional belief that placement tests are useful and advantageous for the student and college, but they do question the collegiate level system of validating the tests, students, and teachers to ensure the tests are capturing the appropriate data in the context of their students (Schmitz and delMas, 1991.)

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While placement tests may show a lower correlation to final grades, placement exams appear to be able to accurately predict the students who have the potential to excel in a subject. The act of excelling is still a student driven event and relies upon the individual drive and disposition to succeed. Placing the students with other students of similar potential, one can hope the social situation leads to peer leadership and learning.

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1. Davis, Jon D. (2007) Secondary Options and Post-secondary Expectation: Standards-based Mathematics Programs and Student Achievement on College Mathematics Exams. School Science and Mathematics. 107, No 8, pp336-346.

The researchers found that students' performance was mainly based upon previous experience in a mathematics academic discipline. The students who had more years of experience taking classes within the discipline were more likely to achieve later academic success. Another important conclusion was that male students generally outperform female students on academic achievement tests, but females tend to have higher grades in college.

2. Sadler, PM and Tai, RH. (2007) Advanced Placement Exam Scores as a Predictor of Performance in Introductory College Biology, Chemistry, and Physics Courses. Science Educator. Vol 16, No 2.

This article examines the validity of assuming a good score on an AP exam correlates to mastery of skills in science. The authors argue that high performing students will self select to the more difficult classes based upon demographics and determination. The article implies that evidence exists indicating the non-equivalence of AP scores and college courses in biology, chemistry, and physics. The study found that the AP program, which certainly is valuable to some students, may lack evidence to support the claim the courses are equivalent to collegiate level courses.

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4. Mollison, Andrew. (2006) Advanced Placement Turns Fifty. Surviving a Midlife Crisis. Education Next. pp 34-39.

This paper leads the reader through the evolution of the AP exam and how it was initially an elitist, private school exam to today's view as a college level course taught in high school. The exam's largest growth has occurred in demographic access. This paper also examined government involvement in financing exams and paying teachers whose students take AP exams. AP scores indicate academic success, not AP enrollment. The AP program is seen as a college cost saving program and not a way around college.

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5. Hasci, Timothy A. (2004) Document Based Question: What is the Historical Significance of the Advanced Placement Test? The Journal of American History. p 1392 – 1400.

This article gave a summarized history of where and how the AP test originated in 1901 and the evolution of the SAT and ACT tests as derivatives of the AP test. The author also shows how the evolution of standardized tests has impacted the views and preparation of the college students.

6. Armstrong, William B. (2000) The Association Among Student in Courses, Placement Test Scores, Student Background Data, and Instructor Grading Practices. Community College Journal of Research and Practice. 24: 681-695.

This study was designed to test the validity of a California law requiring equal access to placement tests by all students and whether the placement tests were a valid method to predict course grades in English and Mathematics. The study went further to produce a model that explained the variance in test scores and course grades by looking at test scores, student background, and instructor grading variance. Student disposition and demographic variables explained their success. Academic standards are imposed on students by the institution and are not determined by the students' abilities.

7. Boughan, Karl. (1996) Correlates of Chemistry 101 Course Performance. Preliminary Findings. Research Brief RB97-8. Prince George's Community College Office of Institutional Research and Analysis.

This study focused on survey data from one year of incoming college freshman to determine low pass rates for a course required in biology and chemistry. The outcome was that cumulative college GPA was the best predictor of success. The next reason was socio-educational "maturity", reading, and math skills. The final reason was the uncompromising nature of the material was believed to be beyond the students' ability to master.

8. Sawyer, Richard. (1996) Decision Theory Models for Validating Placement Tests. Journal of Educational Measurement. Vol 33, No. 3, pp 271-290.

Approximately 90% of colleges have some form of remedial courses designed for students who are not academically prepared to perform in regular classes. Two proposed reasons are high schools are no longer preparing students for college or more students from disadvantaged backgrounds are attending college. If placement tests are used to determine students' need to take remedial courses, the course placement system must undergo an assessment of the effectiveness and accuracy of the placement test.

9. Karrp, Edward R. (1995) Validating the California Chemistry Diagnostic Test for Local Use. Research Technical Published Glendale Community College.

This paper discusses the validity of an exam given to determine validation and placement in a chemistry course. Additional multiple measures were identified (highest math course and last math grade) to predict student success. A local test was determined to be a good predictor of success in the general

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chemistry course. This paper also saw a difference in male and female test scores and course grade where males scored better but females' grades were higher.

10. Schmitz, CC and delMas, RC. (1991) Determining the Validity of Placement Exams for Developmental College Curricula. Applied Measurement in Education, 4(1), 37-52.

This article questions the validity of placement exams given at the collegiate level based upon a lack of exam assessment to determine if the tests accurately reflect an empirical examination of student aptitude or assess the social norms of what is expected on these tests. The authors go on to state the test should be systematically evaluated and not the scores of the students. The study tested if test scores distinguished between remedial and non-remedial students, placement tests could predict course grades, cut-scores used have a high success ratio, and course success is related to criteria other than test scores. The impact of this study was 84% of college freshman were forced to take remedial classes. To compensate, schools must accurately evaluate their tests.

11. Bodenhausen, Judith. (1988) Paper presented to the American Educational Research Association Annual Meeting. pp 5-9.

Although this is an older study, it was one of the first to design an experiment to examine the data from multiple high schools teaching AP level courses. Multiple subjects were examined. Results indicated that schools with well established AP programs were more likely to score better on exams. Additionally, the teachers that had either more experience or a high GPA themselves were more likely to have students that scored better on the exams.