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Study: AP Science Courses Are Poor Substitutes for College Work

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Scores on Advanced Placement (AP) science exams do not translate into success in introductory level college science courses, according to a study by researchers at Harvard and the University of Virginia.

Harvard's Wright senior lecturer on celestial navigation, Philip M. Sadler, the primary researcher of the study, said the recent survey polled college students in biology, physics, and chemistry courses to test the correlation between AP scores and first-semester college grades.

The study, which found no significant correlation between AP scores and grades, adds to the ongoing debate among educators over the weight placed on AP exam scores.

Many educators question whether a score of three or above on an AP test should allow a student to bypass introductory level courses, as is the policy at many colleges.

At Harvard, by contrast, "AP Biology does not substitute for any concentration requirement in biology"—including the requirement that concentrators must take an introductory course, according to the undergraduate student handbook. Freshmen who scored 4 or 5 on the AP exam in chemistry can enroll in a sophomore level Chemistry Department course, according to the undergraduate course catalogue.

But in the Physics Department, a score of 5 on the mechanics section of the AP Physics C exam is needed to place into sophomore-level Physics 16, according to the course catalogue.

Gordon McKay Professor of Applied Physics Eric Mazur, who served on the development committee for AP Physics from 1995-2000, said that the correlation between AP science exam scores and performance in college is weak.

"In my class, I have had students with absolutely no physics background do better than people who make a 5 on the AP exam," Mazur, who co-teaches the Physics Department's introductory-level year-long sequence, said.

Mazur said that AP exams "do a disservice to higher education."

"They are geared as a model that rewards 'plug and chuck' and memorization," Mazur said. "You look at a problem and say what equation should be used without understanding."

And Higgins Professor of Biology Daniel L. Hartl, who co-teaches the spring semester course in the year-long introductory Life Sciences sequence, wrote in an e-mail, "From what my students know, and don't know, I can only infer that most AP biology courses do not have the depth or rigor to justify testing out of a college course."

The study's authors, Sadler and University of Virginia Assistant Professor of Science Education Robert H. Tai, presented their findings on Feb. 17 at the annual meeting of the American Association for the Advancement of Science in St. Louis.

According to Sadler, the recent findings—which are not yet published—are a portion of a larger ongoing study.

The study—which included 500 students who had taken AP exams—found that their grades were not significantly different from those of students who had not taken the advanced courses previously, Sadler said.

Students who bypass the introductory level courses with AP scores eventually perform worse in higher level courses, Sadler said, citing additional findings of the study.

The College Board, which administers the AP exams, has disputed the study's findings.

The executive director of College Board, Trevor Packer, said the study's sample size was too small to be meaningful, adding that other studies conducted with larger sample sizes yielded results contradicting Sadler and Tai's findings.

Packer also said that Harvard—which issued a press release trumpeting Sadler's findings—unnecessarily created a controversy based on an unpublished report.

"It's a deliberate attempt to mislead people to think that the claims are accurate." Packer said. He said that the Harvard officials who issued the press release "should be ashamed."

In response to Packer's claims, Sadler and Tai said that sample size is not the only important factor in assessing a study's validity, and that College Board's own studies are flawed because their sample is not randomly selected.

"A highly controlled study with a random sample is much more illuminating than a study with a larger sample size and selected samples," Sadler said.

Sadler said that the College Board does not conduct studies on students' grades in introductory courses even though the board has the capability to do so.

Also, according to Sadler, the College Board studies do not take into account variables such as parental education level and student family income, which he said were factored into his study.

Sadler said he feels that the AP exam should not qualify students to skip introductory level college courses. AP classes are good preparation for first-year courses, but should not be used as a substitute, he added.

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