

High School AP Courses vs. their College Counterparts

How well do we prepare students?

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AP Courses Vs. College

It's been awhile since we went to college...

What's it like now? Do we prepare our students well? Is our AP curriculum aligned appropriately with true college curricula?

Meeting all together with Ned Rosen, Bill Keane and Sol Friedberg

We wanted to get a sense of how BC professors felt about incoming freshmen to their math classes - real feedback

AP Calculus

How can we successfully teach a rigorous course to those who don't have certain prerequisites?

...but these prerequisites are to be ignored, according to the AP

The AP discourages using some factors as criteria, yet the fundamentals should not be shortchanged!

In the AP Calculus Teacher's Guide, *Equity and Access* under the heading “Which Students Should be Encouraged to register for AP courses?”

Any student willing and ready to work should be considered for an AP course

Two factors to consider when counseling a student regarding AP enrollment are Student Motivation and Student Preparation.

The AP Board **strongly** discourages the following factors as thresholds as requirements for admissions to an AP course

- o Grade Point Average
- o **Grade in a required prerequisite course**
- o **Recommendation from a teacher**
- o AP teacher's discretion
- o Standardized test scores
- o Course specific entrance exams or essays

How the AP claims to keep itself informed of changes at the college level

No anticipated changes for the future, but the committee is tracking:

Technology: AP may need to decide how to incorporate computers since they are so integrated in college curricula

Changing in Content in Second Semester: Some colleges and universities have moved away from the introduction of series and instead introduce topics of several variable calculus or study differential equations in greater depth. They may need to respond if such a trend continues

Specialized Calculus: Many fields, biology foremost among them, have come to realize that their students need some but not all of the skills taught in a full year of college-level calculus. They also need statistics, linear algebra, and dynamical systems. Two semester courses which package the necessary mathematics from all of these topics are becoming increasingly popular.

AP Development Committee keeps informed of innovations in calculus curricula and pedagogy.

“Its mission is to maintain a curriculum that is equivalent to that taught at most colleges and universities.”

Is this true in actuality?

The MAA and NCTM issued a joint statement in 1986 with in which two strong recommendations were made:

1. In spite of the pressures to take calculus while still in high school, students should never short-change their mathematical preparation in subjects such as algebra, geometry, or trigonometry. **Solid mathematical preparation is far more important than exposure to calculus.**
2. When calculus is taught in high school, it should be a **college-level** course. This means that the goal of the course should be to give students the same breadth of topics as mastery of calculus obtained by students taking such a course in college. It means that the course should be taught with the **expectation that students who perform satisfactorily will be able to place into the succeeding college calculus course.**

Teachers are being asked to admit more students to AP courses

Scores will decrease, but what does this mean?

Do we water down the quality of the course in order to admit more students?

We naturally want to teach to the level of students' understanding

What does a “3” mean to a college?

We Compared..

content

grading breakdown

exams

homework

book problems

Testimonials

There's a lot of Algebra 2, Trig, and Precalc on exam 1 because of the reality of the background of students in this course. It is better to systematically review it than to assume they remember it (Sol Friedberg)

We teach calculus assuming they know nothing, not that the high school is to blame. Students have trouble writing sentences (missing the “=”), they often have poor “mathematical hygiene” (phrase coined by Roger Howe from Yale): how the diagrams are arranged on the page, etc. (Glenn Stevens)

More questions to consider

What would calculus look like if we didn't care about the AP exam?

How did the TI-83 change the course?

Implications? Where do we go from here? Changes? Stay the same? Thumbs up? Thumbs down?

AP Statistics

- When speaking with college professors, we noted often times statistics courses are specific to major (i.e. business, nursing, education, psychology, etc.)
- For the most part, entry level statistics courses in all disciplines cover the same topics as AP Statistics
- Professors do not expect students to come into an entry level Statistics course with much of a background in the subject

Differences between AP and College

- From reviewing syllabi of college statistics courses, the major difference we noted was use of statistical software packages and actual raw data
 - AP Statistics tends to rely upon the graphing calculator and summary statistics or small, clean data sets

How can we better prepare our students for college statistics?

- Our courses are about half seniors/half underclassmen
 - There is room for extension projects after the AP Statistics exam
- Focus on spreadsheet skills
- What do we want students to be able to do?
 - Recode data, create graphical displays, and model mathematics with spreadsheet formulas

Metrowest Health Survey

- “Since 2006, the MWAHS has been administered every other year to monitor trends in health and risk behaviors and identify emerging health issues at the local and regional levels” (mwhealth.org)
- The survey is a census administered to all students (grades 9-12) from 26 high schools in the region.

AP Statistics Project

- Google Spreadsheets Labs
 - Bi-variate data (both quantitative and categorical)
- Hypothesis Testing Project
 - Data re-coding
 - Checking conditions (using graphical displays)

Questions/Comments

Is there anything we missed?

Next steps?

What else?