The Relationship Between Advanced Placement and Honors Science Courses

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Introduction

Many American high schools provide enriched science courses for their academically talented and motivated students. While some schools offer advanced placement (AP) classes, others offer honors courses, and still others offer both. Advanced placement courses provide curricula that prepare students for the College Entrance Examination Board's national AP examinations, and many colleges and universities award credit and/or advanced standing to students who perform well on these examinations (College Board, 1990a, 1990b, 1990c). By contrast, the curricula of honors classes are generally designed by teachers, departments, or districts, with no national coordination and no standardized examination of competency.

The Advanced Placement Program was introduced in the mid-1950s in an effort to stimulate academic excellence in high schools and improve curricular articulation between high schools and colleges. The lack of coordination between institutions lead to frequent overlapping of curricula, and researchers believed that this contributed to boredom and apathy among high school seniors and college freshmen. Several studies were conducted to investigate ways of stimulating high school academics while avoiding curricular repetition. One study, known as the School and College Study of Admission with Advanced Standing, suggested that high school students be able to earn college credit for college-level work performed in high school. The committee concluded that such an arrangement would provide opportunities for the intellectual development of students while allowing them to continue in school with their peers. To provide a measure of quality control, the committee recommended that standardized examinations be administered, and colleges be encouraged to award credit for sufficiently high scores (Carnog, 1980). The program was well-received, and soon the College Entrance Examination Board was requested to take over full administrative responsibilities while the Educational Testing Service was called upon to develop, administer, and grade the examinations (Douglas, 1959; Englestem & Miles, 1958; Keller, 1958). The Advanced Placement Program has grown steadily since its inception in 1954. By 1990, 42% (8,958) of all high schools in the United States were administering AP examinations, and more than 2,000 colleges were receiving scores from AP students (College Board, 1990d). Although little data is available regarding the historical development of honors programs, they are known to have pre-dated the Advanced Placement Program and have traditionally served students with similar academic profiles.

In a parallel study, data from the Cooperative Institutional Research Study's Freshman Survey (Astin, Green, Korn, Schalit, & Berz, 1988) found that 39% of all first-time, full-time, 1988-89 college freshmen had taken at least one AP class in high school, while 50% had taken at least one honors class. Data from the College Board show that during the past decade, the number of students taking AP examinations increased by 175% to over 330,000 (College Board, 1990d), and research has shown that honors programs also enjoyed strong growth during this period (Herr, 1992).

Despite the magnitude of these programs, only a limited body of data exists regarding the perceived influences of Advanced Placement Program courses (Casserly, 1969; Chamberlain, 1978; Edwin, 1986; Haag, 1981; Ruch, 1968; Willingham & Morris, 1986; Wimmers & Morgan, 1990), and virtually nothing is available about honors programs. In particular, no data are available regarding the similarities and differences of honors and AP classes. Within this informational vacuum, college admissions officers have been faced with making judgements about the relative merits of both programs. A survey of 158 selective institutions showed that 75% have developed specific policies for recognizing and rewarding such advanced work but very few have adopted objective policies that differentiate between AP and honors coursework (Herr, in press). The University of California, for example, uses a weighted grading scale in which advanced placement and honors courses are awarded an extra grade point when applicant grade point averages are calculated (University of California, 1988).

While both honors and advanced placement courses are intended to serve similar students, little is known about their relationship to each other. The goal of this study was to determine the relationships between honors and advanced placement science courses, particularly at those schools in which the Advanced Placement Program was introduced when an active honors program in the same scientific discipline already existed.

The Study

Prior to constructing a formal questionnaire, a pilot study was performed in which interviews were conducted with 19

instructors who were experienced in teaching advanced placement and honors biology courses. These teachers were selected from a representative cross-section of schools throughout Los Angeles County, California. This pilot study determined the basic issues and field tested sample questions to examine their usefulness for the questionnaire that was subsequently constructed. This questionnaire was designed to collect data that would help clarify the relationship between advanced placement and honors programs.

In the Spring of 1989, questionnaires were mailed to advanced placement and honors science teachers throughout the states of California and New York. A total of 847 teachers responded, including 62% of all AP chemistry teachers and 68% of all AP physics and AP biology teachers in the state of California. (It was not feasible to calculate response rates among honors teachers because no agency keeps track of the total number of honors programs.) Of those instructors who returned the teacher questionnaire, 23% reported experience teaching both honors and AP courses to students of similar ability and grade level. Fourteen percent had experience teaching AP and honors to non-comparable students, and 63% had experience teaching only honors or AP. Data from the subset of those who had taught AP and honors to students of similar ability and grade level were analyzed first, and these analyses were checked using data from the other groups. The data obtained from the first group was particularly meaningful in that it provided a control for both instructor, grade-level, and student ability.

In an effort to understand the growth of AP and honors programs, questionnaires were mailed to the principals of all 861 California high schools with graduating classes of 60 students or more. In addition, questionnaires were sent to 452 New York high schools. Three hundred sixty one administrators responded to the questionnaire, representing approximately 51% of those schools with AP biology program and 52% of all schools with AP chemistry or AP physics programs.

Program Origins

Data showed that during the preceding 15 years, schools participating in this survey added an average of approximately one honors section and one AP section every three years. When asked to describe the origins of their honors and AP programs, 25% of the administrators surveyed stated that certain honors classes at their schools were currently being transformed into AP classes, while only about 2% said that AP courses were being transformed into honors courses. Viewing in retrospect, approximately 13% of AP teachers stated that their AP courses began as honors classes, while virtually no honors teachers stated that their honors classes had grown out of AP classes. In summary, these data suggest that a significant portion of the growth in the AP Program has come at the expense of honors classes, while virtually none of the growth in the honors program has come at the expense of AP classes.

Relative Placement in Curriculum

Prior to the introduction of the Advanced Placement Program in the mid 1950s, honors courses represented the top of the curricular ladder in most schools that offered advanced science courses. To examine their current placement in the curriculum, administrators were asked for their perspectives of both programs. Nearly 60% of the administrators from those campuses possessing both programs stated that their schools' AP programs represented the highest level in the curricular sequence, while only 3% stated that honors was the highest. The remaining 37% of the administrators said that both AP and honors classes were equivalent alternatives or that it was not possible to make clear distinctions between them.

In 32% of those situations where both programs existed and in which AP was described as the most advanced alternative, honors classes were required as prerequisites for admission to AP classes. In the remaining situations, students were able to select AP or honors or allowed (but not required) to take honors prior to AP.

It is clear that where both programs coexist, the AP Program is generally perceived to be the more advanced alternative. Current data suggest that the AP classes typically replaced honors classes as the capstone classes in the majority of schools which posses both programs.

Historical Interaction

The introduction of AP classes into schools with existing honors programs stimulates a variety of changes. Using data from administrator questionnaires, the following historical perspectives were gathered. Note that this data represents all disciplines and not just the sciences. In approximately 3% of all cases, honors classes assumed the highest level in the curriculum, while AP assumed a lower level. In 37% of the schools, the courses apparently coexisted, attempting to serve the same population of academically oriented students. In 24% of the cases, AP and honors remained options for the same grade level but AP was considered the higher level. In 11% of the cases honors became the first-year prerequisite in a 2-year advanced sequence which culminated in AP. Finally, in approximately 25% of the cases, the AP class simply replaced the honors class so that it was the only advanced course. Perhaps the most important observation was that the majority of administrators believed that the AP program generally took precedence over existing honors programs as the highest expression of the curriculum. This cross-disciplinary data supports findings obtained from science teachers.

Populations Targeted and Served

Both AP and honors classes are intended to serve the special needs of advanced students. Originally, the College Board targeted the AP Program for the top 5% of high school juniors and seniors (Hochman, 1970). Since there was never a national organization governing honors classes, no such targets were ever specified for honors classes. On the administrator questionnaire, principals were asked to define the population for which honors and AP classes were targeted at their schools. In order to perform a paired *t*-test of their responses, 230 schools which offered both AP and honors programs were selected for this analysis (see Table 1). Among these schools, AP was targeted for the top 11% while the honors program was aimed at the top 16%. Realizing that selective private schools could skew the results, the data were reanalyzed using just public schools, and it was found that AP was intended for the top 10% while the honors program was designed for the top 14%.

Table 1

Administrators' Perception of the Target Populations for AP and Honors Classes

	AP	Honors	*t*	*p*	*N*
Target Populations					
All	11%	16%	8.28	.0001	230
Public	10%	14%	6.08	.0001	130
Private	18%	23%	3.50	.0001	21
Percent of Students Who Took at Least One Class					
All	14%	20%	8.08	.0001	216
Public	11%	16%	8.88	.0001	140
Private	30%	36%	1.29	.2080	21

Three generalizations can be made from the data in Table 1. First, administrators believed that the AP Program was targeted for a smaller percentage of the population than honors (means were different at two-tailed probability of .0001). Secondly, administrators believed that the AP program was suited to a larger percentage of the student body than the 5% that the program's founders originally envisioned. Finally, by comparing the top and bottom halves of Table 1, it can be seen that a higher percentage of students took these classes than what the administrators said they were targeted for, somewhat of an anomaly for rigorous academic programs in an era of educational mediocrity.

Grade Level Composition

AP and honors science teachers were asked to give the approximate grade level compositions of their classes (see Table 2). The greatest number of honors biology students were at the ninth (30%) and tenth (45%) grade levels. Traditionally, students take biology in their tenth year, and the fact that 30% of all honors biology students did so in their ninth year was an interesting finding. It is possible that many students took honors biology as ninth-grade students so that they could meet the biology and chemistry prerequisites demanded by AP biology and still meet all of their other graduation requirements. While the ninth-grade honors phenomen cannot be causally linked to AP biology prerequisite requirements, there was ample data from interviews with AP and honors biology teachers to suggest that this was the case.

Table 2

Grade Level Composition of Honors and Advanced Placement Science Courses

	9th	10th	11th	12th
Honors Biology	30	45	9	16
AP Biology	0	8	25	67
Honors Chemistry	1	36	54	9
AP Chemistry	1	2	36	61
Honors Physics	1	3	32	65
AP Physics	0	1	13	86

While 75% of honors biology students were ninth- and tenth-grade students, only 8% of AP Biology students were. By contrast, 67% of AP biology students were at the twelfth-grade level while only 16% of honors biology students were. In general, honors biology was a lower division class while AP was an upper division class. There existed only a 33% overlap between the grade level distributions of honors and AP biology classes.

While the grade level distribution overlap between honors and AP chemistry classes was greater (48%) than for biology classes, it was once again obvious that the honors class was generally oriented towards younger students. High school students typically take chemistry in the eleventh grade but the data suggest that 36% of all honors chemistry students were tenth-grade students. Again, the honors classes appeared to attract younger students than did traditional college preparatory classes.

Of the three sciences, physics showed the greatest similarity in grade level distribution between honors and AP classes. Students typically take physics as seniors but, once again, honors classes appeared to have significantly younger students. Thirty-six percent of all honors physics students took the class prior to their senior year. By comparison, only 14% of all AP students took AP prior to their senior year. A 79% overlap existed between the grade level distributions of AP and honors physics classes.

Competition With Other Classes

After performing the content analysis of the teacher interviews, it became clear that many AP and honors teachers felt that they were in competition with other teachers for the same pool of students. It was frequently mentioned that the caliber of student found in an AP or honors class is in high demand by a number of teachers. To get a perspective on this interclass competition, AP/honors science teachers were asked to specify the class that they believed would be the most popular alternative to theirs in the event that their class was not offered.

In general, teachers believed that students would most likely take an alternative class of the same subject. For example, if honors biology was not offered, 73% thought that the majority of their students would either take AP biology or regular college preparatory biology at the same school. Similar results were found for honors chemistry, honors physics, and AP physics. Thus, it appeared that in these cases, teachers believed that the advanced course was merely an alternative to other forms of the same science.

By contrast, only 36% of AP biology teachers and 26% of AP chemistry teachers believed that the majority of their students would enroll in another course of the same subject if their AP class was not offered. This suggested that these two courses compete with other classes outside of their own disciplines. When examining the responses of AP biology teachers, it was found that 33% said that the majority of their students would probably have enrolled in a physics class if AP biology had not been offered but only 11% of AP physics teachers thought that the majority of their students would have enrolled in a biology class had the AP class not been offered. While students generally take college preparatory biology as sophomores, they don't take physics until their senior year. Most students take biology as sophomores and must decide between a second year of biology (AP biology) or a first year of physics when planning the curriculum of their senior year. If their high school offers an extra grade point for AP classes or if the colleges to which they are applying have policies which favor AP classes, then it is likely that competitive students will opt for AP biology rather than physics. This may be an unfortunate interaction because it is well-known that American schools are plagued by a chronic under-enrollment in physics classes (Pallrand & Lindenfield, 1985). It would be advisable, therefore, for school administrators to consider making physics (any level) a prerequisite or co-requisite to AP biology or offer AP biology only as a first-year class, simply so that it does not detract from enrollments in physics.

Part of the growth of AP classes has come at the expense of honors classes. Twenty-two percent of the AP science teachers reported that an honors class of the same subject would be the most likely recipient of the greatest number of students in the event that their AP class was not offered. By contrast, only 9% of honors teachers said that an AP class of the same subject would be the class most likely to receive the most students in the event that the honors class was not offered. Thus, it would appear as though AP detracts more from enrollment in honors classes of the same subject than honors classes detract from enrollment in AP classes. It is important that this study be repeated using data obtained from students to either confirm or refute these findings.

Schools Without AP or Honors Programs

Many schools do not offer either AP or honors classes. Table 3 shows the reasons administrators gave for why these programs don't exist. The most important factor was school size. Knowing that the majority of selective universities and colleges give special consideration to AP and honors coursework when reviewing admission and scholarship applications, it seems clear that students attending high schools too small to offer such advanced programs may be at a disadvantage in these competitive processes.

Table 3

Reasons Given by Administrators for Why Their School May Not Offer Honors or AP Classes

Reason for No Program	Honors (%)	AP (%)
School is too small	36	46
Too few able students	26	33
Too few interested students	18	23
Disagree with philosophy	18	7
Insufficient funds	7	15
No adequately prepared teachers	7	10
No willing teachers	5	8
Unfamiliar with program	7	3

Schools With Mixed Programs

Many small and medium size schools can not afford to offer advanced classes due to low enrollments. To meet the needs of advanced students, such schools often fuse honors and AP sections with each other and/or with traditional college preparatory sections. In such situations, teachers attempt to meet the needs of these students through special study groups or independent assignments. Students registered in such honors or college preparatory classes may elect to take advanced placement examinations but their high school transcripts will not reflect this. To further complicate matters, it has been shown that approximately one-third of students enrolled in advanced placement science courses never take the national exam (Herr, 1992). Since numerous colleges offer extra grade points for honors and/or advanced placement coursework

when examining the transcripts of potential students, such confusion in nomenclature may lead to confusion in transcript evaluation. Further research is needed to study the relationship between these mixed classes and their honors and AP counterparts.

Summary

Honors programs in American high schools are in a state of flux. In the absence of an AP program, honors courses represent the apex of the curricular ladder. AP courses, however, provide students with the opportunity to earn college credit and are therefore probably perceived as even more advanced or prestigious by students and teachers.

Once AP classes are established, honors classes typically undergo a period of redefinition. While they may co-exist as equivalent alternatives to their AP counterparts, it is more likely that they are eliminated or assume subservient roles. It is particularly common that honors courses become first year courses while AP classes become the second year capstone courses. One of the most significant findings is that AP classes typically serve older students than do honors classes.

Administrators believe that AP classes are slightly more selective in that they are designed for approximately the top 11% of the student body while they believe honors classes serve the top 16%. It is particularly surprising that a larger percentage of students are enrolled in AP Program classes than the top 5% that the program was originally designed for. The program is obviously larger than its founders envisioned, indicating that it has been particularly popular among college bound students.

Honors and AP classes frequently compete with each other and college preparatory science classes for the top students. In this competition, teachers believe that AP detracts from enrollment in comparable honors classes more than honors detracts from AP. While most competition is intradisciplinary, it appears as though many students apparently take AP biology as a second year course in place of a first year physics course, a finding that should raise concern among science educators.

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