

# THE ROLE OF ADVANCED PLACEMENT AND INTERNATIONAL BACCALAUREATE COURSES IN THE DEVELOPMENT OF STUDENTS IN THE KNOWLEDGE ECONOMY

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## Abstract

High school students who take college level coursework put themselves at a strategic advantage for both getting into college, and in pursuing fulfilling careers. The Advanced Placement (AP) and International Baccalaureate (IB) programs both offer high school students the opportunity to take college-level classes. Locally, Vestal High School offers three advanced diplomas for students who want to go above and beyond their normal course load. In Texas, there is a program specifically designed to help high school students get ahead of their peers in the field of engineering. Above just taking higher level courses, though, students need to be taught advanced reasoning skills at a young age if they are to excel in college.

*Keywords:* Education pipeline, International Baccalaureate, Advanced Placement, TexPrEP, Knowledge Economy, High school, College transition

*Local Keywords:* Vestal High School, Binghamton High School, Binghamton University, Broome Community College

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## I. INTRODUCTION

Over the course of the past quarter-century, the face of the Earth has welcomed a major transformation. It has been in the past 25 years that the cellular telephone, the personal computer, email, and micro processing technologies have gained a major foothold with billions of people. The way that information is imparted and discovered has changed drastically. To author a research paper no longer requires a trip to the library; by simply sitting at a personal computer with an internet connection, one gains access to endless amounts of information. Bulky encyclopedia collections have gone out of style with the advent of websites such as Wikipedia. It would take multitudes of pages to describe all of the changes that have taken place over the past two-and-a-half decades, with regards to the sharing and acquisition of information. Simply stated, information is more accessible to the masses, giving the world population that lives today the potential to be the smartest population to live on this planet. One piece of the puzzle that is making people smarter today than ever before is Advanced Placement (AP) and International Baccalaureate (IB) courses.

Kevin Smith stated that we are shifting from a manufacturing-based economy to a knowledge-based economy. He defines the foundation of the knowledge economy as "the idea that knowledge is in some way more important as a product than it has been hitherto – that we

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are seeing the rise of new forms of activity based on the trading of knowledge products” (Smith 2). This definition has many far-reaching implications. For one, it implies that an individual who has more knowledge and insights in a subject matter is more valuable than an individual who knows less. The more an individual knows, the more desirable that person is to have on payroll, or to have as a co-worker. Employers, therefore, are constantly vying for the smartest possible workers. Lengnick-Hall and Lengnick-Hall use a metaphor describing employees as “free agents” who are constantly competing, in an open market, for the best employment (Lengnick-Hall 74).

The way in which individuals are taught is changing all the time. Elementary school students are being taught material using the internet. A teacher no longer has to be in the same room, or even in the same country, to teach students course material. The fact of the matter is that students in grades K-12 will be competing against one another to become the smartest and gain the most knowledge. Only the best and brightest will be able to have their dream careers in the knowledge economy. It is not in middle school or high school, though, that students gain the majority of their knowledge base; rather, it is in post-high school settings where pupils reap vast amounts of intelligence. This point raises an important question: how do colleges and universities decide which students will have the privilege of studying at their respective institutions?

Colleges and universities only want to admit the best and the brightest learners. Every high school student that strives to attend college after finishing high school must compete with hundreds of thousands of other high school graduates for a limited number of college seats. These students need a way to separate themselves from the rest of their competition. College admissions counselors look at several factors in determining which students should be admitted to come to attend their universities. These determining factors include high school grade point average, SAT/ACT scores, extra-curricular activities, and the quality of AP and IB courses taken. Students who take these courses in high school set themselves apart from those who do not. AP and IB courses, in addition to the enrollment in other advanced courses and curriculums, play a major role in the development of individuals in the knowledge economy.

The Advanced Placement program was first conceived in the 1950s. A partnership was formed between three college prep schools and three prestigious colleges: Harvard, Princeton, and Lawrenceville. By the mid-1950s, a program giving high school students college-level material was being tested at 27 schools. The overall consensus was that the program had lots of potential for mass success; it could achieve its founding goal of helping colleges and high schools work together to enhance the education of students (AP Central). Initially, AP test scores could not be used as a determining factor considered in college admissions. The reason behind this was that scores on the exams took a long time to be graded, and it was primarily juniors and seniors in high school who were taking the courses. It was not until after admission decisions had been made that test results were made official. In the 1980s several very selective colleges and universities, like Princeton and Georgetown, started looking at AP test scores as an admission standard. It was first used because schools had to “make increasingly fine distinctions among growing numbers of applicants” (Geiser 76). This coincides with the quarter-century timeframe of rapid changes in the knowledge economy.

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It has been estimated that an average worker in today's economy participates in 15 hours of informal learning in a week (Livingstone 20). Those that cannot keep up with this fast pace of learning will not be able to compete with those who are putting in the effort to learn. As a college admission counselor, the goal is to only admit those students who will be very successful after college, improving the reputation of the college in return. Therefore, a college admission counselor only wants to admit a student who is motivated, and has a high probability of participating in continued education for the duration of their career, which will intuitively result in a successful career. High school students who sign up to take advanced courses are exemplifying the idea of being highly motivated to learn (Geiser 76). A student who chooses to take, for example, AP Economics, as opposed to traditional Economics, shows a desire to gain more information than their counterpart who chooses the base course. Motivated learners like this are the kind of individual that a college wants to enroll, as it will improve the reputation of the institution.

Without knowing too much about the AP program, it would be hard for one to present a counteracting argument. There seem to be far more pluses than minuses when it comes to giving high school students a head start at college. College admission counselors must ponder the "chicken and the egg" question. Which comes first, students with high potential taking AP courses, or AP courses preparing students for the rigors of college? Put another way, is taking an AP course what gives a high school student the tools to succeed, or does a student who enrolls in an AP course already have the tools for success? This question is almost impossible to answer. The best solution is to look at figures about students who take AP courses with relation to their college success. The college dropout rate for students who took at least one AP course in high school is 10% lower than students who never took an AP course (Santoli 28). Other studies reveal that there are a statistically higher number of students graduating college with honors after having taken AP courses in high school. Additionally, students are more apt to focus on college curriculum closely related to AP classes already taken (College Board).

One argument made against the AP program is that it tends to exclude individuals who are of low socioeconomic status. Affluent families tend to locate in school districts that are viewed as better than surrounding districts. In fact, property values tend to be higher in towns where excellent schools exist, in terms of their ability to prepare students for college (Dounay 14). In return for having more affluent tax payers in a district, schools are more able to hire additional teachers that can teach additional AP courses. After more AP courses are offered, more affluent individuals will gravitate towards that district. Many school districts are experiencing this upward spiral, while others are facing the opposite trend (Klopfenstein 44). Whether students with an innate ability to learn are the ones in the affluent school districts or not, the fact that they are from well-off families indicates that ability is present before taking an AP course (Klopfenstein 46). The implication for students of low socioeconomic status is not good. In the knowledge economy, it becomes increasingly more difficult for them to compete with their peers.

Another possible shortcoming of the Advanced Placement program is that some say teachers do not emphasize problem solving and logic enough. David McCauley argues that AP curriculum sacrifices depth of coverage within a subject, for breadth over many subjects (McCauley 12). He mentions that high school students do not gain the same knowledge as a college student taking a course because college is much more rigorous, requiring considerably

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more studying. McCauley acknowledges that AP most likely is a great indicator of “ability and motivation,” but that a lack of emphasis on critical thinking makes the program less effective than many think (McCauley 12).

The argument that AP does not emphasize problem solving does not hold true across all AP curriculums. Courses such as AP Calculus, AP Physics, and AP Computer Science focus much more on logic and problem solving than most other courses (Rethinam 15). In a study performed by Rethinam, factors for success in mathematics were extrapolated to predict future success across mathematics and other fields of study. It makes sense that a course based on logic would propel a student to success. The basic foundations of problem solving could be applied across other curriculums both in and out of an academic setting. That is why Rethinam wants to see more students taking advanced math courses that emphasize logic.

One very early indicator of whether a student will excel in math and want to take additional math courses is the influence of educators during the middle to high school years (Rethinam 48). Clewell states:

Students who have a strong liking for and/or do well in mathematics frequently point to a teacher as an important influential factor. Similarly, students who express negative attitudes or who drop advanced mathematics courses often attribute their thinking and decisions to bad experiences with teachers (Clewell 47).

Teachers who have a positive view of the students they are teaching will have a higher expectation of those students. In a study performed by Rosenthal and Jacobson in 1968, students were chosen randomly and put into a “gifted” class. Those students performed better on tests than their peers in other classes. It can be inferred that the difference in performance can be attributed to the teacher’s belief that the students were gifted (Rosenthal 18). Rosenthal called this phenomenon a self-fulfilling prophecy. The AP program pairs students who have high degrees of motivation with teachers that are under the assumption that AP students are “gifted.” The potential for the student having a positive experience in the class is very high in such a case. Also, the likelihood of students excelling in such a course goes up dramatically, as compared to being in a class with a less enthusiastic teacher. By using this logic, it becomes clear why the AP program has been around for so long, and continues to expand (AP Central).

Students who do not have experience taking AP courses, or other advanced math/science classes, often cite a lack of preparedness as a reason for early college setbacks. Sometimes a student will take a while to get their studies up to the standards of the college, as college curriculums are much more difficult than high school. It is easy to conclude that this lack of preparedness stems from a deficiency in exposure to the college experience. There is a separation between the K-12 education system, and the college model of education (Venezia 4). Oftentimes, students graduate high school in good standing, and immediately find themselves behind the curve upon getting to college. Programs need to be implemented to ease the transition from high school to college.

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Tech Prep, like Advanced Placement, is a credit-based transition program between high school and college. It was established in 1990, and has more of an occupational view than the AP program. Tech Prep has a much higher level of coordination between college and high school, giving it the potential to promote an institutional relationship between a high school and a college (Bailey 7). In addition to preparing students for the academic challenges that exist at a university (like AP), Tech Prep does a number of things. It can provide students with a much higher degree of exposure to classes and concepts that might never have otherwise been explored. A program often allows high school students the opportunity to actually go to a university and take a class. So in addition to being exposed to advanced educational material, students have the potential to better prepare for the whole college experience (Bailey 8). Overall, if a college could get more students at a given high school the desire to learn, that college would have a larger applicant pool to choose from. It absolutely makes sense for a college to want as many intelligent applicants as possible and with a partnership such as Tech Prep, the status of a college and a high school could be boosted simultaneously.

Many scholars have proposed the idea of changing the traditional K-12 education system into a K-16 structure. The K-16 model would make the first four years after high school a much easier transition for students. Basically, an undergraduate degree would be more attainable for all. A more seamless transition would exist between grades 12 and 13 (the first year of college). This would mimic the transition between middle school and high school now: it would be effortless (Tafel 5). Huge numbers of middle school students take courses with high school students, and it has worked well. In addition to getting exposure to more advanced material, middle school students get a chance to see what the next level of their education will be like. The AP program and Tech Prep both try to mimic this changeover from high school to college. A major problem that resides within our education system is that not all schools participate highly in the AP program. All school districts, however, have every intention of sending their students from middle school to high school. A K-16 model could force high schools to push students to excel at a higher age, greatly increasing their probability for success in the knowledge economy (Tafel 9). A model like this seems relatively harder to attain than an AP model, which could ultimately cause a K-16 system to never get off the ground.

As colleges become more and more selective, additional criteria will have to be made to filter in the cream-of-the-crop students. As the population of students in high school grows smarter, and their access to better information continues to balloon, better bridges between college campuses and high school corridors will need to be constructed. It will help to ensure that the best of the best make it to the highest level of education. It will be the individuals who are most capable of learning and adapting that will have the best chance for success in the knowledge economy. Many strategic byproducts could be seen from changes in the future of education. One such byproduct will be the partnering of colleges and high schools. This could help to ensure that the student with the most potential, as well as the student who needs the most guidance, could all benefit from one another. The knowledge economy that has taken over our society is gaining momentum. Staying ahead of the curve is essential, and only those who start at a young age will be able to keep up.

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## **II. BEST PRACTICES**

Locally, there are several great high schools that excel in preparing their students for success in college. Binghamton High School and Vestal High School were both ranked in the top 600 in 2007 by *Newsweek*. Binghamton was ranked 502, while Vestal was 516. The ranking system that *Newsweek* uses is based on the ability of the school to prepare its students for college. The main component in determining this criterion is the number of students who take AP and IB courses along with AP and IB exams (*Newsweek*). Vestal goes beyond offering students the chance to take AP and IB courses. The school currently offers three advanced diplomas: the Vestal Honors Diploma, the International Baccalaureate Diploma, and a Scholar Certificate.

Sally Lowenstein, the director of the Vestal Honors Program, is very passionate about challenging students to excel in their academic careers. She wants to be able to prepare students for success after high school. It is her belief, as well as the belief of the Vestal School District, that students who successfully complete advanced degrees at the school will have the best chance of success after graduation.

The most rigorous diploma is the Vestal Honors Diploma. For a student to receive this degree, he or she must take and pass six AP or IB courses and exams, complete and independent project and oral presentation, and participate in 150 hours of extracurricular activities. These activities include volunteering, club participation, and sports. Additionally, students must take a capstone course called Theory of Knowledge, in which advanced logic skills are taught (Lowenstein). The International Baccalaureate Diploma is similar to the Vestal Honors Diploma, but students must take and pass six IB courses (AP courses do not count), and must complete a 4,000 word research paper based on original research. Both of these diplomas are excellent ways of preparing students for the rigors of college.

Another thing that Vestal High School does that is a great way to promote learning at a college level is that it gives students the opportunity to take classes at Binghamton University and at Broome Community College. Lowenstein says that she is thrilled to see her students taking classes at higher institutions. One obstacle that stands in the way of further growing this program is transportation. It is hard for many high school students to get to other campuses to take classes, as many do not have cars. Additionally, it is not cost effective for Vestal to have buses go to Binghamton University or Broome Community College as there would not be more than a handful of students on a bus at one time. Many students, though, do get special parking privileges at Vestal High School so they can get to and from the other institutions in a timely manner.

The reason that Vestal High School is being used as a best practice, in addition to their outstanding rate of students taking AP and IB courses, is the potential for students to be able to take classes on college campuses before finishing high school. Not only is it a great learning opportunity, but it is also a great way for Binghamton University and Broome Community College to promote their campuses. Many of the best students end up leaving this area upon finishing high school, which is the initial source of the brain-drain in the greater Binghamton community. A main problem stems from the fact that the best high school students do not realize how good of an institution Binghamton University really is. If they were to actually go

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on the campus and take a class, they could see that it is possible to get a top-notch education without venturing far from home.

The second “best practice” that this paper will focus on is a program called the University of Austin Pre-freshmen Engineering Program, or AusPrEP. AusPrEP is part of the TexPrEP program, which is a summer program for middle and high school age students interested in the field of engineering. It was started in 1979 at the University of Texas at San Antonio by Dr. Manuel Berriozabal (AusPrEP). The program lasts for several weeks during the summer, and offers participants a wide variety of coursework. Some of the courses that are taken by students are logic in mathematical applications, introduction to engineering, effective written communication, and introduction to computer sciences.

TexPrEP is a partnership of over 200 public and private agencies, over 25 community and state colleges, and numerous high schools and middle schools. Over 18,000 students have completed at least one summer in the TexPrEP program. Officials maintain that the main objectives of the program are to increase the high school graduation rates, college entrance rates, and college graduation rates in the fields of science and engineering (AusPrEP). By teaching advanced math and reasoning classes, students are equipped with the tools that they will need for success in engineering and in many other fields of study.

This program fits as a best practice because it partners colleges with high schools. High school students are hooked in to the idea of higher education at a young age. They get to interact with college professors and students to get a better feel for what college is really like. Such a partnership is beneficial to all involved: the students, the high schools, and the colleges. Students get a more rigorous education; high schools see higher graduation rates; colleges see smarter students trying to attend their institutions.

### **III. RECOMMENDATIONS**

The first thing I am recommending is that an easier, more convenient way for local high school students to take classes at Binghamton University and Broome Community College be implemented. If Binghamton University, for example, were to invite high school students to take a class during a time that would minimize transportation time, more high school students would have the chance to get into the college classroom. This might be as simple as saying that all classes on Monday and Wednesday afternoon, for example, are open to high school students. This would make transportation and logistics much simpler.

My next recommendation is for local high schools to start special diplomas offering recognition for students who take classes at BU and at BCC. This would only make high school students want to take college classes more. Special recognition is always a great motivating factor in getting individuals to go above and beyond. That is the exact reason why so many Vestal students take classes to receive advanced diplomas. This recommendation would be hard to implement without my first recommendation taking shape, though.

Another thing that would help the partnership between the local colleges and the local high schools is to offer after-hours tutoring from BU and BCC students for high school students who are taking AP and IB exams. High school students would be more able to get to a college campus after school hours, and it would be more convenient for college volunteers to take time

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after most classes are over in the evening. High school students would get a chance to really see what college life is like, without the structure of the classroom. At the same time the high school students would be receiving a direct benefit academically and socially.

Lastly, Binghamton University and Broome Community College need to continue to grow their partnerships with local high schools. There are plenty of summer programs offered that get local high school students to go to the campuses of these institutions. High quality programs need to be maintained so that high school students perceive value from visiting BU and BCC. Hopefully this will entice these students to continue their education locally after high school.

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