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CollegeBoard

The Impact of AP® Achievement Institute I on Students' AP Performance

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EVALUATION

Contents

Executive Summary

The AP® Achievement Institute I (APAI I) is a four-day professional development program offered to teachers and administrators by EXCELerator™, a district reform program operated by the College Board. The APAI I program is designed to help teachers develop effective AP instructional strategies for a diverse student body and to help district, school, and curriculum leaders strengthen the district's infrastructure to support AP students and teachers.

Teachers from a large urban school district on the West Coast participated in APAI I in the summer of 2009. The purpose of this project was to determine the impact of APAI I on student achievement on AP English language arts (ELA) and social studies exams. Students' AP Exam scores from the 2009 and 2010 administrations were examined for all participating teachers' students who took the AP English Language and Composition, English Literature and Composition, U.S. History, World History, European History, Comparative Government and Politics, U.S. Government and Politics, and Human Geography Exams.

For students whose teachers participated in APAI I, achievement on AP Exams was compared before and after the APAI I professional development (PD). An analysis of covariance (ANCOVA) was conducted to compare the AP Exam scores of the participating teachers' students, while controlling for student prior achievement levels by year (before and after taking the APAI I PD), by student race/ethnicity, and by any interactions between year and race/ethnicity. Because students included in the file were in different grade levels in high school (some AP Exam takers were sophomores, some juniors, and some seniors), prior achievement on the state assessment was identified simply as assessment scores in the year prior to AP.

There were 12 teachers who received the APAI I professional development and taught one of the specified AP courses in both the 2008-09 and 2009-10 school years. There were slightly more AP students in 2009-10 compared to 2008-09 (574 and 509, respectively); students in 2009-10 also took more AP Exams than in 2008-09 (601 and 523, respectively). Much of this increase was represented by Hispanic students, who took AP Exams in greater numbers. After the APAI I PD, more Hispanic students of lower prior achievement in absolute counts (though the increase was not statistically significant) were enrolled in the AP courses taught by the APAI teachers than before APAI I. Despite this increase, there were no statistically significant differences between the students' AP scores before and after the APAI I PD. In summary, students taking AP Exams in the second year were more diverse, representing lower levels of prior achievement while still managing to maintain consistent AP Exam performance. This suggests that the teachers were, in fact, able to provide rigorous AP instruction to a more diverse set of learners.

Introduction

The continuing education of teachers has long been considered a cornerstone to improving our education system (Borko & Putnam, 1995; Darling-Hammond, 1993). The importance placed on continuing education or professional development can be seen in the numerous incarnations of professional development programs currently in operation and the billions of dollars spent annually by public schools to fund these activities (Guskey & Yoon, 2009; Zhou, 2008). Although there are numerous studies examining the efficacy of professional development programs in the literature, many are focused solely on the perceptions of the participants or employ less rigorous methodologies. In fact, in a recent review of more than 1,300 studies, Yoon, Duncan, Lee, Scarloss, and Shapley (2007) found nine studies that met the minimal standards for rigor set forth by the What Works Clearinghouse. There are several plausible reasons why there is such a dearth of rigorous research on PD programs, including the time needed for real change to occur, costs, and possible lack of technical expertise. The current study attempts to address the desire for more rigorous research on PD through an examination of a pilot program for teachers and administrators called AP Achievement Institute I (APAI I). Instead of focusing on only teacher perceptions or correlational evidence, this study links student performance to their actual teacher's participation in the PD program while controlling for the student's prior achievement.

The APAI I was a four-day professional development program offered to teachers and administrators by EXCELerator, a district reform program operated by the College Board. The program was designed to help teachers develop effective AP learning environments for a diverse student body. The APAI I was composed of two components: instructional and administrative. The instructional component, geared toward AP teachers, ran for four days and addressed topics such as defining rigor, differentiation, and scaffolding. Topics also included data interpretation and application, as well as the introduction of strategies that address reading and writing instruction. The administrative component, geared toward school-based administrators and curriculum leaders, ran during the first two days of the instructional component and included information on operating an AP program in a school as well as the use of data and reporting materials (see Appendix for a summary of key teacher and administrator objectives for the PD).

Teachers from a large urban school district on the West Coast participated in APAI I in the summer of 2009. The purpose of this project was to determine the impact of APAI I on student achievement on AP ELA and social studies exams. AP scores from the subsequent 2009 and 2010 administrations were examined for all participating teachers' students who took the AP English Language and Composition, English Literature and Composition, U.S. History, World History, European History, Comparative Government and Politics, U.S. Government and Politics, or Human Geography Exams.

Method

Data

Student-level data from three years (2007-08, 2008-09, and 2009-10) were obtained from the participating school districts. These data included the following files: enrollment and demographics, course transcripts, college exam records, and state assessments. Teacher-level data were also obtained that contained a file on courses and sections taught. Students were linked to specific teacher classrooms through a unique course and section identifier. Finally,

a list of all teachers who participated in the APAI I professional development program in the summer of 2009 was obtained from the districts (n = 23).

In order to better manage the data for analysis, two files were initially developed: a file for students in the 2008-09 school year and a file for students in the 2009-10 school year. To construct the data files for analysis, we first removed all teachers in the district teacher file who were not participants in the APAI I PD. Next, we deleted all teachers who did not teach one of the target AP courses. Next, we matched students to this remaining list of teachers through their course sections. We then pulled in the students' demographic data, AP Exam scores for each administration year, and state assessment scores on ELA from the prior academic year to control for prior achievement.

Once these two files were constructed, they were concatenated to include only those teachers who were found in both files so that differences in their students' AP performance could be examined. Table 1 presents the count of teachers, students, and AP Exams in the final data file. The number of exams exceeds the number of students because some students took more than one AP Exam per year. There were 12 teachers who received the APAI I professional development and taught one of the specified AP courses in both the 2008-09 and 2009-10 school years. There were slightly more AP students in 2009-10 compared to 2008-09 (574 and 509, respectively); students in 2009-10 also took more AP Exams than those in 2008-09 (601 and 523, respectively).

Table 1.

Number of Teachers, Students, and AP Exams in the Data File

	2008-09	2009-10
AP Teachers	12	12
AP Students	509	574
AP Exams	523	601

Analysis

Participating teachers' student achievement on AP was compared before and after the APAI I professional development. Student AP performance (mean AP Exam score) from each cohort was the outcome of interest. An analysis of covariance (ANCOVA) was conducted to compare the participating teachers' students' AP Exam scores while controlling for student prior achievement levels: by year (before and after taking the APAI I PD), by student race/ethnicity, and by any interactions between year and race/ethnicity. Because students included in the file were in different grade levels in high school (some AP Exam takers were sophomores, some juniors, and some seniors), prior achievement on the state assessment was identified simply as assessment scores in the year prior to AP. In other words, if a student's AP Exam took place in his or her senior year, the junior year state assessment was used to control for prior achievement.

Results

Descriptives

Descriptive statistics were calculated to examine students' AP participation and performance and prior achievement levels across years, by race/ethnicity, by gender, and by AP subject. Results from these analyses are presented in Tables 2–7, with the difference between years

depicted as the delta (Δ) in each table. It should be noted that while the differences between years are discussed as being higher or lower, none of the differences were statistically significant at the $p < .05$ level.

Table 2 presents the number of AP Exams taken across racial/ethnic groups and by gender, both before and after the teachers participated in the APAI I PD. The largest increase in AP Exams came from Hispanic students (an increase of 61 students), followed by an increase in exams by Asian American students (13 more exams in 2009-10); the number of AP Exams taken by African American, Native American, and white students stayed about the same. While females took more exams overall than males, they also increased more in the number of exams taken from 2008-09 to 2009-10 (increasing 43 exams compared to 35 exams for males).

Table 2.

Number of AP Exams Taken, by Students' Race/Ethnicity and Gender

	2008-09	2009-10	Δ
Asian American	168	181	13
African American	26	30	4
Hispanic	192	253	61
Native American	2	3	1
White	135	134	-1
Female	326	369	43
Male	197	232	35

Table 3 presents the number of AP Exams taken by year for the subject areas that were the focus of this study. U.S. History was the most commonly taken exam for this group, both before and after the APAI I PD, while English Literature and Composition was the least common exam in both years. The exam with the largest increase after APAI I was U.S. Government and Politics (with an increase of 51 exams after the PD), followed by U.S. History (with an increase of 21 exams after the PD), and English Language and Composition (with an increase of 18 exams after the PD). Both English Literature and Composition and European History showed slight declines in exam taking (-3 and -9 exams, respectively).

Table 3.

Number of AP Exams Taken, by AP Subject

	2008-09	2009-10	Δ
English Language and Composition	137	155	18
English Literature and Composition	27	24	-3
European History	64	55	-9
U.S. Government and Politics	131	182	51
U.S. History	164	185	21
Total	523	601	78

Table 4 presents students' scale scores on the ELA portion of their state assessment in the year prior to taking an AP course with their APAI I teacher. On average, ELA prior achievement was lower for students in AP courses taught after the APAI I PD (-4.16 points lower).

The study did not examine individual course taking prior to the AP course, but the state assessment scores suggest that this cohort of students may have been less well prepared than others to succeed in a rigorous AP course. While African American AP students in the 2009-10 school year had higher prior achievement than African American AP students in the 2008-09 school year, all other subgroups had lower prior achievement, including the Hispanic subgroup, which showed the largest increase in participation in AP after the APAI I PD. Although these results highlight a salient trend in terms of preparation, the differences were not statistically significant.

Table 4.

Mean Prior ELA Achievement on the State Assessment

	2008-09	2009-10	Δ
Asian American	375.24	371.66	-3.58
African American	374.65	388.67	14.01
Hispanic	383.77	377.74	-6.03
White	408.59	407.16	-1.44
Female	385.25	380.73	-4.51
Male	390.11	386.38	-3.73
Average	387.08	382.92	-4.16

Table 5 presents students' AP performance by racial/ethnic subgroups and by gender. As expected given their prior achievement on the California Standards Tests (CSTs), African American students had higher AP Exam scores in the 2009-10 school year compared to the 2008-09 school year. All other groups showed slightly lower AP scores; the average AP score in 2009-10 was -0.11 points lower than in 2008-10, although none of these differences were significant.

Table 5.

Mean AP Exam Score

	2008-09	2009-10	Δ
Asian American	1.99	1.96	-0.03
African American	2.19	2.50	0.31
Hispanic	2.13	1.96	-0.17
White	2.89	2.81	-0.08
Female	2.17	2.04	-0.13
Male	2.46	2.39	-0.07
Average	2.28	2.18	-0.11

Tables 6 and 7 present students' mean prior achievement scores and mean AP scores for students before and after the APAI I PD by AP subject area. Students taking AP courses in European History, English Language and Composition, and English Literature and Composition in 2009-10 had lower prior ELA achievement than students in 2008-09 (-19.71, -4.35, and -9.45 points lower, respectively), while students taking AP courses in U.S. Government and Politics and U.S. History in 2009-10 had slightly higher prior ELA achievement than students in 2008-09 (3.21 and 2.95 points higher, respectively). All differences in scale scores were not significant, with the exception of the scores for European

History. Without controlling for prior achievement levels, mean AP scores were lower after the APAI I PD on all exams except U.S. History (see Table 7), with the largest decline in European History (-0.65 points). All differences in mean AP scores were not significant, with the exception of European History.

Table 6.

Mean Scale Scores

	2008-09	2009-10	Δ
English Language and Composition	385.59	381.25	-4.35
English Literature and Composition	414.41	404.96	-9.45
European History	428.75	409.04	-19.71
U.S. Government and Politics	365.07	368.28	3.21
U.S. History	385.14	388.09	2.95

Table 7.

Mean AP Scores

	2008-09	2009-10	Δ
English Language and Composition	1.98	1.89	-0.09
English Literature and Composition	2.52	2.25	-0.27
European History	3.14	2.49	-0.65
U.S. Government and Politics	2.37	2.15	-0.22
U.S. History	2.10	2.34	0.24

Statistical Model

An analysis of covariance (ANCOVA) was conducted on the APAI I sample to determine whether AP mean scores differed between the "before" and "after" APAI I groups, while controlling for prior achievement on the state ELA assessment. Table 8 presents the results of the ANCOVA after controlling for prior achievement. It indicates that the main effect for year (pre- versus post-APAI I) was not significant, while the main effect for race/ethnicity was statistically significant.

Table 8.

ANCOVA Results

Source	DF	Type III SS	Mean Square	*F* Value	Pr > *F*
State Scale Score	1	506.53	506.53	577.68	<.0001
Year	1	0.58	0.58	0.66	0.42
Race/Ethnicity	4	30.19	7.55	8.61	<.0001
Year by Race/Ethnicity	4	1.49	0.37	0.42	0.79

A closer examination of the main effect for race/ethnicity utilizing the Scheffe post hoc procedure indicated that Asian American students scored significantly lower than African American and white students on their AP Exams, and that Hispanic students scored

significantly lower than African American students. No other differences were significant. The year by race/ethnicity interaction effect was not significant.

Conclusion

After APAI I, more Hispanic students of lower prior achievement (though not statistically significant) were enrolled in the AP courses of the APAI I teachers than before the APAI I PD. Despite this increase, there were no statistically significant differences between the students' AP scores before and after the APAI I PD. This suggests that the APAI I teachers were, in fact, able to provide rigorous AP instruction to a more diverse set of learners.

There are two limitations to the current study that should be noted and considered when interpreting the findings. First, it is unclear whether increased Hispanic AP enrollments were caused by APAI I because no information exists about how students were admitted to AP courses. Second, the findings allow only for limited generalizability because the effects were examined within only one school district. Thus, it is not certain that similar results would be found were APAI I to be implemented in other districts or schools.

References

Borko, H., & Putnam, R. (1995). Expanding a teacher's knowledge base: A cognitive psychological perspective on professional development. In T. Guskey & M. Huberman (Eds.), *Professional development in education: New paradigms and practices* (pp. 35–66). New York: Teachers College Press.

Darling-Hammond, L. (1993). Reframing the school reform agenda: Developing capacity for school transformation. *Phi Delta Kappan*, *74*(10), 753–761.

Guskey, T. R., & Yoon, K.S. (2009). What works in professional development? *Phi Delta Kappan*, *90*(7), 495–500.

Yoon, K. S., Duncan, T., Lee, S. W.-Y., Scarloss, B., & Shapley, K. L. (2007). *Reviewing the evidence on how teacher professional development affects student achievement* (Issues and Answers Report REL 2007 — No. 033). Washington DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Southwest.

Zhou, L. (2008). *Revenues and expenditures for public elementary and secondary education: School year 2005-06 (fiscal year 2006)*. Washington, DC.: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Appendix: APAI I Objectives (Summer 2009)

Teachers

What Does AP Learning Look Like?

- Establish common definitions of rigor, differentiation, and scaffolding
- Determine the differences and connections among rigor, differentiation, and scaffolding
- Demonstrate and practice questioning techniques to increase understanding of texts
- Model scaffolding in a variety of forms

Data Analysis

- Review College Board data and reports that can be used to inform AP learning
- Explain strengths, deficiencies, and gaps with own curriculum, based on College Board data
- Identify skills and topics from data reports that are needed to revise and enhance own curriculum
- Assess the qualities of a good reader and a good writer
- Evaluate AP free-response samples
- Develop exercises that scaffold AP learning

Teaching Reading

- Identify successful strategies for teaching students to read AP-level texts
- Develop strategies to teach a heterogeneous AP group to read AP-level texts
- Review own curriculum to determine whether/how current purpose, strategies, and assessments are related
- Connect purpose, strategies, and assessments of assignments to AP syllabus and unit plans
- Distinguish appropriate reading strategies for the selected text

Teaching Writing

- Identify successful strategies for teaching students to write AP-level assignments
- Construct a writing assignment and develop teaching strategies for the assignment
- Review own curriculum to determine whether/how current purpose, strategies, and assessments are related
- Estimate the proportion of types of writing assignments given in class
- Compare and contrast content of AP Exam with student expectations in AP course

Administrators

What Does AP Learning Look Like?

Curricular and Instructional Leadership

- Analyze AP performance as a function of departmental success as opposed to individual teacher success
- Analyze course sequencing and scheduling practices to support AP student achievement
- Identify gateway AP courses to introduce students to rigorous AP courses
- Analyze classroom observation processes to effectively serve as an instructional leader in the AP classroom
- Determine how to assist teachers in differentiation of instruction in the AP classroom
- Identify gateway academic skills students should possess prior to entering the AP classroom
- Develop a plan of preparation for first-time, nontraditional AP students
- Analyze teacher preparation in order to effectively teach an AP class
- Identify traits and characteristics of quality AP teacher-selection decisions

Data Analysis and Community Leadership

- Identify how to use the AP Course Description, the AP Exam, AP score reports, and the PSAT/NMSQT® as tools to inform instruction
- Define the steps for ordering materials and reports, as well as for completing the AP Course Audit process
- Develop a plan to communicate the AP Program to parents and community members

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