EVALUATION

An Analysis of the Relationship Between School-Level AP® Professional Development Activity and Subsequent Student AP Performance[1]

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Introduction

The continuing education of teachers has long been considered a cornerstone to improving our education system.[2] Although the field of professional development (PD) is varied in terms of approach and apparent outcomes, Desimone[3] has identified a set of well-accepted characteristics of PD (content focus, active learning, coherence, duration, and collective participation) that serve as a foundation for these efforts. Although there is some value placed on the direct impact of PD on teachers in the areas of job satisfaction, increased content, and pedagogical knowledge, students should ultimately be the beneficiaries of this training. However, this indirect effect of PD on student outcomes raises significant challenges for measuring any potential impact of the PD program. If PD is to affect student outcomes, its success is contingent upon the acquisition of skills and strategies by the teacher. Once the teachers possess these skills, they must implement them effectively in the classroom. In addition, although it seems plausible to expect a teacher's newly acquired skills to have some indirect impact on students, it is equally important to note the complexity of the system in which student learning takes place. Educators do not teach and students do not learn in a vacuum; they are part of a complex dynamic of social, financial, and educational factors. In assessing the efficacy of any program, it is important to acknowledge this complexity.

About the Research

The overarching purpose behind this evaluation was to gauge the impact of AP® professional development on AP student outcomes in a state with a significant rate of PD implementation. The evaluation attempted to predict the level of student performance in AP by the number of AP PD events attended by teachers in that school in the prior year, while controlling for some socioeconomic status (SES), teacher, and school effects. The outcomes predicted by the number of PD events attended were defined as the average AP score obtained for that school as well as the percentage of AP Exam takers scoring a 3 or above. A similar analysis was also performed for AP courses comprising the STEM disciplines (Biology, Chemistry, Computer Science, Environmental Science, Calculus AB, Calculus BC, Physics B, Physics C: Electricity and Magnetism, Physics C: Mechanics, and Statistics). The controlling factors (covariates) used in the analyses were average household income (a proxy for SES), the percentage of students taking AP in the school (school effect), and the average number of years teaching AP (teacher effect).

Data and Methodology

The study utilized the AP PD activity of a set of teachers in a Midwestern state for the 12-month period leading up to an academic year. Then the AP data from the following spring AP Exam administration from the students who attended the schools in which these teachers taught were matched to the school-level AP PD event data. The original sample used for analysis consisted of 309 schools with AP Exam data. However, because of some missing data elements, a set of 197 schools was eventually retained for analysis.

Two sets of analyses were undertaken to examine the relationship of AP PD activity and student performance on AP. First, two one-way analyses of variance (ANOVAs) were undertaken to examine whether student AP performance measured by mean AP Exam score and percentage of AP Exams with a score of 3 or above were statistically significantly different across three levels of teacher activity in AP PD. Second, to control for other variables that have been shown to be related to student performance, a regression analysis was used to examine the relationship of AP PD activity on student AP performance when teacher experience, SES levels, and school AP activity were controlled.

Results and Conclusions

ANOVA results indicated that students who attended schools with high levels of AP PD tended to outperform those who attended schools with low or no known AP PD activity. When analyzed for only STEM-related subject areas, the same findings were noted. The regression model that was tested indicated that a school's level of AP PD activity can predict student outcomes above teacher experience and other factors such as household income and level of AP activity (percentage of students taking AP in the school). The influence of experience also seemed to play a significant role, and the effects seemed to increase in the STEM-related exams. However, the level of PD activity was still the most significant contributor (see Table 1). Given the unit of analysis and the inability to directly attribute student test scores to their specific teachers, it is difficult to say for certain that the specific PD events were the cause, or whether the outcomes were unduly influenced by some artifact of a school culture with a robust professional development component. In addition, although the professional development and teacher-experience predictors in the model were significant, there was still a majority of the variance unaccounted for in the model, indicating that there is much more that could help inform our understanding of student performance.

Table 1.

Summary of Regression Parameters Predicting AP Exam Performance for STEM Exams

	Variable	*B*	*SE B*	*β*	*t*	*sig*
$R^2 = .15$						
Step 1	(Constant)	1.54	0.38		4.01	0.00
	Household Income	-0.02	0.02	-0.06	-0.64	0.52
	AP Commitment	0.33	0.26	0.13	1.28	0.21
	Experience	1.26	0.32	0.38	3.93	0.00
$R^2 = .31$						
Step 2	(Constant)	0.74	0.39		1.90	0.06
	Household Income	0.01	0.02	0.05	0.50	0.62
	AP Commitment	-0.01	0.24	0.00	-0.04	0.97
	Experience	1.12	0.29	0.33	3.83	0.00
	AP PD Events	0.67	0.15	0.44	4.58	0.00

1. V. Laitusis, *An Analysis of the Relationship Between School-Level AP® Professional Development Activity and Subsequent Student AP Performance* (College Board Research Report No. 2012-8) (New York: The College Board, 2012). Accessed from http://research.collegeboard.org/rr2012-8.pdf.

2. H. Borko and R. T. Putnam, "Expanding a Teacher's Knowledge Base: A Cognitive Psychological Perspective on Professional Development," in *Professional Development in Education: New Paradigms & Practices*, ed. T. R. Guskey and M. Huberman (New York: Teachers College, Columbia University, 1995), 35–66; L. Darling-Hammond, "Reframing the School Reform Agenda: Developing Capacity for School Transformation," *Phi Delta Kappan* 74, no. 10 (1993): 752–61.

3. L. M. Desimone, "Improving Impact Studies of Teachers' Professional Development: Toward Better Conceptualizations and Measures," *Educational Researcher* 38, no. 3 (2009): 181–99.

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