Project Accelerate - Bringing AP® Physics to Underserved Populations
Closing the Access Gap to Physical Science Careers & Academic Programs

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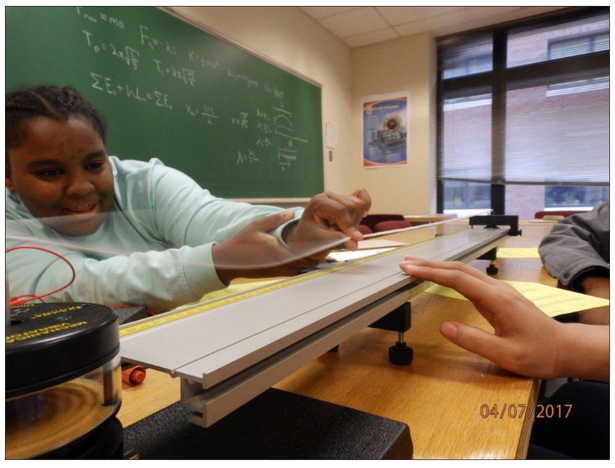
1. The Problem

Access to AP® Physics: Underserved high school students, especially among low income students, in many urban, rural, and small suburban communities don't have access to Advanced Placement Physics. Lacking this opportunity, these students are hard pressed to compete with peers who enter STEM programs in college from schools offering AP® Physics.

II. The Need

Diversity of the STEM Workforce: There is a critical need to develop STEM competencies among youth from demographic groups underrepresented in the STEM workforce. African-American/Black and Hispanic/Latino youth each comprise only 7% of STEM graduates and 6-7% of the STEM workforce.

Evidence exists that students who score 3 or higher on AP® exams have greater success in college than students who did not take an AP® course. The most recent reports indicate schools with predominately low-income students lag in offering AP® courses by a 2 to 1 margin.



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III. Project Accelerate (PA) – A Scalable Solution

A Partnership between University and Individual High Schools: Project Accelerate brings an accredited College Board AP® Physics 1 program to schools that do not offer this opportunity. The program blends together the supportive infrastructure of the student's home school with a highly engaging private edX online instructional tool.

HS Partner: The partner school does the vetting of potential students and each participating student is assigned by their school a time during the day to work on the online instructional tool. A staff member from the HS is selected to serve as the HS Liaison (HSL) to facilitate communications between the partner school and the university. The HSL does not provide formal content instruction.

Online Instructional Tool: The instructional tool is short on "video professor" and long on engaging instruction providing multiple student controlled simulations and direct measurement video laboratory experiences in each module. Along with the instructional scaffolding there are 26 graded virtual explorations, 28 graded homework assignments, 26 graded quizzes and 8 AP® style timed and proctored tests.

University Liaisons: Project Accelerate senior staff hire University Liaisons (UL). Each UL manages up to 6 partner high schools. The UL provides the HSL with regular progress updates, midterm reports and end of term grades to be entered into the student's home school permanent record. The UL monitors the online discussion form and responds to individual student queries.

Hands-on Laboratory Support: Students within commuting distance of the university campus engage in once-a-week 2.5-hour small group hands-on laboratory sessions led by undergraduate physics major Teaching Assistants. "Distant" partner schools have several options supported by Project Accelerate to provide students with an equivalent hands-on laboratory experience.

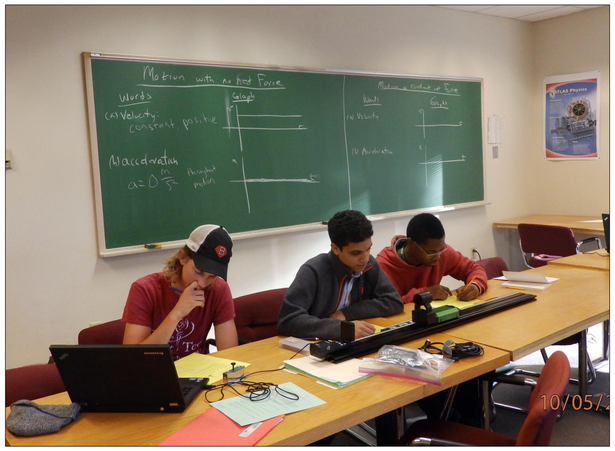
General Group Description	Specific Group Description	No. of Students	% Score 1 & 2	% Score 3, 4 & 5
AP® Physics 1 Students Not Enrolled in Project Accelerate	Nation (white)	83,702	54	46
	Nation (black and Hispanic)	39,402	84	16
	Massachusetts PS (non BPS)	3398	57	43
	Boston PS (non PA)	151	92	8
AP® Physics 1 Students Completing Project Accelerate	Massachusetts PS (non BPS)	7	29	71
	Boston PS	14	86	14

Table 1: Outcomes - Massachusetts' data obtained from mass.gov 2016 Department of Elementary and Secondary School website. National data from College Board, 2016.

IV. Research Questions

Effectiveness of the Program: We explore student outcomes including AP® exam performance, pre/posttest content measure (FMCE), course completion, course performance, science interest survey responses and longitudinal college course selection and performance.

Scalability: We explore implementation structures and strategies to allow for scalability to a national model with fidelity to program design.



V. Pilot Study Year 1

AP® Scores: All participants are required to take the AP® test. During our pilot study, the data, although small in number, indicates that **students engaged in Project Accelerate are as well prepared as, or better prepared than, peer groups in traditional AP® Physics 1 classrooms.**

Interest in STEM: Fifty-two percent of all participants indicated in our post-course survey that they were "more likely" to pursue a STEM program in college as a result of participating in Project Accelerate. The remaining 48% of students indicated "no impact" on their decision. Eight of our 14 BPS completers applied to summer STEM programs. Of these 8, seventy-five percent indicated that PA was "important" in their decision to apply to a summer STEM program.

Demographics & Retention: We had 6 partner schools with a total of 24 participants. The demographics were 67% black and Hispanic and 75% on free and/or reduced lunch programs with a retention rate of 88%.

VI. Growing the Program

Increased Numbers: Our first NSF cohort has 16 partner high schools: 6 BPS, 4 other MA, 5 WV and 1 NY school with a total of 58 participants. Demographics and STEM interest results are very similar to our pilot study. AP® test scores are not yet available.