

Project-Based Learning in AP Courses

AP U.S. Government and Politics

Technical Report *PRELIMINARY*

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Executive Summary

College readiness initiatives have become central to large-scale efforts to boost educational outcomes. Few dispute the need for universal education. But much work remains to be done to enable all students to have access to great courses. Ultimately, high quality, *challenging* courses serve learners two ways. They help students experience school as meaningful in the present, not just for their future, and they expand students' views of what they are capable of as learners—especially when they work collaboratively and make wise use of technology to accelerate their success.

The Knowledge in Action project is asking the research question: Can rigorous project-based learning (PBL) applied to high school AP courses improve student learning?

Specifically, is it possible to get:

- 1 More students to pass the AP Test with a well-designed PBL course?
- 2 Deeper learning than that measured by the AP Test—by designing measures of *knowledge in action* indicative of deep understanding?
- 3 Deeper engagement in the course and in related activities outside of the classroom?

Project Goals

- ✓ *Same or higher scores on the AP Test*
- ✓ *Accomplishment that's more valuable*
 - *Deep conceptual learning*
 - *Capacity for principled, adaptive reasoning*
- ✓ *Engagement that's greater; appeal and success for more students*
- ✓ *A course that's sustainable and scalable by design*

In this technical report, we present initial findings from the research.

Students were 314 high school students from 12 classes in three schools, all in the Bellevue (WA) School District near Seattle, Washington. In each of two studies, outcomes from a PBL AP course were compared to those for a traditionally-taught course.

Study 1 compared results from students in two high-achieving schools matched on prior AP performance and student socioeconomic status. One school (4 classes) served as the PBL AP course condition; the other school (4 classes) served as the traditional AP course condition. Study 2 also involved the latter high-achieving school. However, in Study 2, students' results (4 classes, traditional AP course condition) were compared to those from a moderate-achieving school (4 classes, PBL AP course condition).

Measures addressed student learning and engagement. Specifically, we asked: Will the “AP+” students (those students in the PBL AP course condition) perform as well on the standard AP Test, but higher on an assessment of knowledge in action indicative of deep learning?

Study 1 Findings

- ***The AP+ students from the high-achieving school performed significantly better on both the AP Test and on all 4 dimensions of the Knowledge in Action Test.***
- ***This held true even when we looked solely at students with below-average Pre-SAT scores.***
- ***In addition, the AP+ students rated their engagement higher on 2 out of the 4 dimensions of classroom community.***

Study 2 Findings

- ***The AP+ students from the moderate achieving school—who as a group had lower prior achievement — performed as well on the AP Test and significantly better on all 4 dimensions of the Knowledge in Action Test, controlling for prior achievement.***

Background

Advanced Placement (AP) courses are widely seen as one of the best ways to deliver high quality, rigorous curriculum to more high school students. Among high school graduates of 2006, 24.2% had taken an AP Exam, up from 15.9 percent in 2000 and growing (College Board, 2007). Yet the dominant method of teaching AP courses has changed little in the 50 years since the program began.

A major National Academy of Sciences report in 2002 found that “existing programs for advanced study are frequently inconsistent with the results of research on cognition and learning” (National Research Council, p. 2). In the press for acceleration, Advanced Placement programs frequently resort to “coverage” of tested content as their primary aim, while deep conceptual learning and student engagement fall to the wayside. In contrast, deep conceptual understanding of the content and unifying concepts of a discipline is needed, research has shown, for accelerated *future* learning as well as for innovative and integrative solutions across subject matter specialties (National Research Council, 2000; Darling-Hammond, Bransford, LePage, Hammerness, & Duffy, 2005).

Admirably, AP curricula are developed collaboratively by scholars and teachers working together with the College Board. These courses are not the product of a single teacher working in isolation “behind the classroom door” (Goodlad & Klein, 1970); course syllabi are the product of a kind of democratic deliberation, which opens them up to public inspection both during and after development—public inspection being the cornerstone of both science and democracy (Dewey, 1910). AP has this critically important “public” advantage over many curricular contenders. Its achilles’ heel, however, lies in the gap between a *curriculum* and a *course*. With AP, there is often too much curriculum for the course; hence, a great stuffing of topics into a space temporally too small and pedagogically too meager to manage them meaningfully. Before us lies the possibility of tackling the breadth/depth dilemma so that students achieve robust working knowledge of a subject as a result.

Research Goals

With these issues and opportunities in mind, and through the support of the George Lucas Education Foundation, researchers from the University of Washington in collaboration with teachers and leaders in the Bellevue School District (BSD), Bellevue, WA undertook a research project investigating whether a new AP course, reformulated using principles of *How People Learn* (National Research Council, 2000) and project-based learning (e.g., Darling Hammond et al., 2008) would improve student learning compared to a traditionally-taught AP course.

Rationale for a Project-Based Approach to Advanced Placement Courses

While the dominant approach to AP instruction has changed little in last half century, tremendous strides have been made in understanding how to engage students to achieve advanced learning aims. Good summaries of this research can be found in volumes including *How People Learn* (National Research Council, 2000); *How Students Learn* (National Research Council, 2005); *Powerful Learning* (Darling-Hammond et al., 2008); and *Surpassing Ourselves* (Bereiter & Scardamalia, 1993). The National Academy of Sciences report on AP (see p. 1) pointed to seven principles of human learning as key: principled conceptual knowledge, prior knowledge, metacognition, differences among learners, motivation, learning communities, and situated learning.

The good news, the National Academy of Sciences report on AP concluded: “Although AP programs . . . currently are not well aligned with learning principles, they can be revised with this research in mind. The resulting transformations are likely to make the programs more successful in enhancing deep conceptual learning and make them more accessible to additional students” (p. 9). We agree. Further, we believe that project-based learning is one of the most powerful means available for improving advanced study in this direction. If you want to learn to swim, it greatly helps to get in the water.

In project-based learning, students, working together, learn knowledge and skills through an extended inquiry process structured around complex, authentic challenges and carefully designed products and tasks (Ravitz, 2009). By captivating students’ attention in the moment, PBL prepares students for the future. It targets “the more complex knowledge and skills needed in the 21st century—skills needed for framing problems, seeking and organizing information and resources, and working strategically with others to manage and address dilemmas and create new products” for a better world (Darling-Hammond et al., p. 2).

In project-based learning, well done, students have multiple opportunities to bridge their own prior, informal, and local knowledge with the world’s academic, formal, more broadly vetted knowledge. Through project activities – and the recurring phases of project anticipation, execution, and reflection – students have meaningful opportunities to try out their current levels of understanding and ultimately deepen them.

Currently in AP, however, projects are most often treated as add-ons—valuable activities, but only *after* the “real” reading and remembering has been done. Indeed, it is surprising how few projects take place in high school AP courses today. A 2005 College Board survey of AP biology and AP U.S. history teachers (Paek, Ponte, Sigel, Braun, & Powers, 2005) found that asking students to design and conduct science projects, and participating in various competitions, were the two activities students were *least* frequently asked to do. Less than 1% of teachers reported using these activities more than once or twice

In a 2006 report, “The Silent Epidemic: Perspectives of High School Dropouts” (Bridgeland, DiIlio Jr., and Morison) the top reason U.S. dropouts gave for leaving school was that “classes were not interesting.”

The promise of research on project-based AP lies in its potential to help more students find more meaning in challenging studies, inspiring the kinds of learner identities on which well-being depends.

a week. Similarly, the predominant instructional methods self-reportedly used by the history teachers were lecturing and teacher-led whole-group discussions; the researchers found that “teachers do not make frequent use of presentations by students and independent research/projects by students to assess their students’ progress.” Only 6% and 4% of the history teachers, respectively, reported using these evaluation methods at least once a week.

What well-designed project-based courses do is invert this course organization so that the integrative elements do not get left out. Projects provide the spine for a course, a strong core from which robust content coverage can be supported and learners’ new knowledge can be developed, strengthened, and flexed. The spine provides a “keystone” for continual evaluation of progress. This is different from project-based courses that provide end-of-course capstones that do not necessarily help connections throughout the course.

The research sought answers to the following questions:

Is it possible to get:

1. More students to pass the AP Test with a well-designed PBL course?
2. Deeper learning than that measured by the AP Test by designing measures of *knowledge in action* indicative of deep understanding?
3. Deeper engagement in the course and in related activities outside of the classroom?

The research was conducted in Bellevue School District classrooms during the 2008-2009 school year. The course of focus for the research was AP U.S. Government and Politics.

This Technical Report describes preliminary findings from the research.¹

¹ A Technical Report containing complete results will be available in January 2010.

Research Methodology

Participants

In total, 314 high school students took part in the research, representing 12 classes at three high schools (8 PBL AP classes and 4 traditional AP classes) in Washington State’s Bellevue School District. Table 1 contains the numbers of students, classes and teachers in each school/research group.²

Table 1. Number of Students, Classes, & Teachers By School & Research Condition

		Total Number of Students		Classes	Teachers
Study 1	High achieving school	106	PBL AP course	4	4
	High achieving school	106	Traditional AP course	4	1
Study 2	Moderate achieving school	102	PBL AP course	4	4
		314		12	5

Teacher Characteristics

All five teachers (“AP+” and traditional-course) were certified teachers. Each had a Master’s in Teaching earned from a university teacher education program in the past nine years. Each teacher also had a bachelor’s degree in political science or a related field, and 1-8 years classroom teaching experience. (The traditional-course teacher had the most years teaching experience.)

Each teacher was provided .2 FTE release time (for 1 or 2 semesters) to participate in collaborative course design and reflection on results.

Class Characteristics

For comparability, all classes were year-long AP U.S. Government and Politics. Class sizes were roughly equivalent. The mean number of students per class was 27.8 (range 23-32 students). Within each school, all of the year-long AP U.S. Government and Politics courses were of the same type (i.e., PBL AP or traditional).

² Appendix A contains information on the demographics of the Bellevue School District and each school.

Research Design

We used a non-randomized *interventional study design*.

The research consists of two studies, Study 1 and Study 2. In each study, outcomes from a PBL AP course were compared to those for a traditionally-taught course.

Studies 1 and 2 differed in terms of the achievement levels of the participating students; Study 1 PBL AP students were higher achieving on average than the PBL AP students in study 2.

Study 1 compared the results for students enrolled in 2 high schools that were matched on prior AP performance and student SES. Results for students in 4 traditionally-taught AP classes at a high achieving school were compared with the results for students in 4 PBL AP classes in a comparably high achieving school.³

Study 2 also compared the results for students enrolled in AP classes in 2 high schools. However, the 4 PBL AP classes were at a moderate achieving school, a school that historically has fewer students passing the AP Test as compared to the 4 classes that were in the control high-achieving school. The results for students in 4 traditionally-taught AP classes were compared with the results for students in 4 PBL AP classes.⁴

School & Teacher Selection Process

The district's first choice and recommendation for the intervention school was a high-achieving school that had switched to a year-long AP U.S. Government and Politics course the year before. Of the five district high schools, it is one of the two highest achieving—our control school is the other—and has a track record of strong performance on AP exams. For these reasons, the school seemed well poised to offer a rigorous implementation of PBL AP to discerning students, their school and families.

We were also interested in including a school where we could test the intervention with a less advantaged student population. Given resource constraints and the desire to develop the intervention in small trials at first, we settled on a moderately achieving school. Of the schools in the district with an AP U.S. Government and Politics course, this was the school whose student population was least advantaged compared to our first intervention school, although certainly not disadvantaged by national standards.

As the control school (for the site of the traditional AP classes), we chose a high-achieving school whose student population is demographically most like the high-achieving intervention school we had selected and whose students in previous years performed similarly on the AP U.S. Government and Politics exam.

³ Assignment of students and teachers to classes was non-random. Hierarchical Linear (random coefficient) models were used to compare the results taking into account the students nesting within classrooms, student-level prior achievement, and the treatment condition.

⁴ Ibid.

It, too, has a reputation for academics and strong AP Test performance. No other school in the district was a viable control.

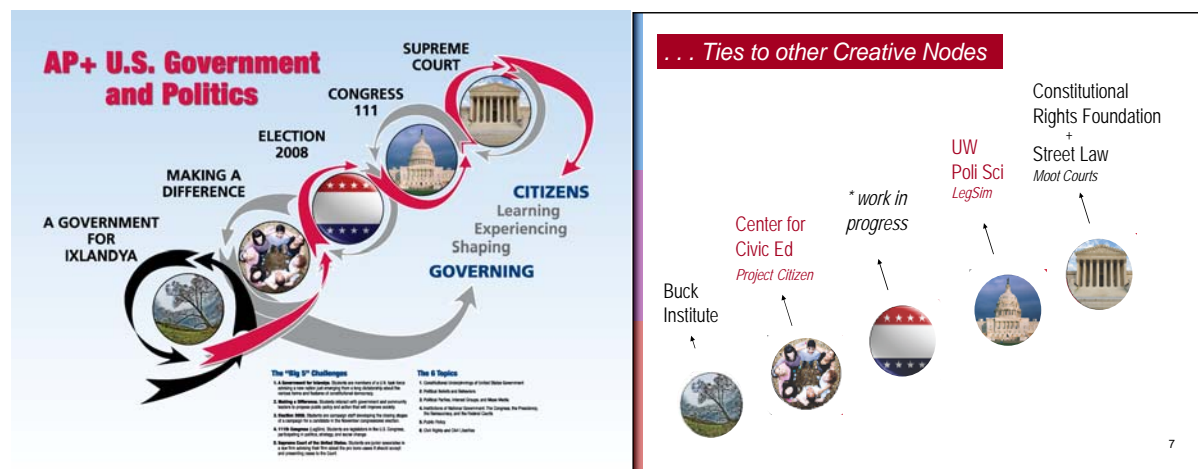
Due to the small number of teachers at each school, we could not control for teacher’s years of experience or "effectiveness"—in either the PBL AP or control sites. Only one of the PBL AP teachers had taught year-long AP U.S. Government and Politics before, and, in fact, one intervention teacher at the high-achieving school and one at the moderately-achieving school were entirely new to AP Gov. Indeed, the groups were roughly comparable, making the transition from one-semester to year-long AP Gov, and all five teachers were reputed to be good teachers, early in their teaching careers.

Once we had identified the desired control school, the BSD partners on our Knowledge in Action project team approached the school’s faculty and administration about offering a year-long version of AP U.S. Government and Politics for comparison with the PBL AP version. The school agreed on the condition that it could retain its one-semester version of the course as well, and one teacher was designated to teach the year-long classes that would serve as our study’s control.

The Project-Based Learning AP Course

In the AP+ U.S. Government and Politics course, students move together through project cycles that address the six AP topics specified by the College Board for the course.

Figure 1. 2008-09 Course



The 5 Project Cycles

- *A Government for Ixlandya*. Students are members of a U.N. task force advising a new nation just emerging from a long dictatorship about the various forms and features of constitutional democracy.
- *Making a Difference*. Students interact with government and community leaders to propose public policy and action that will improve society.
- *Congress 111 (LegSim)*. Students are legislators in the U.S. Congress, participating in politics, strategy, and social change.
- *Election 2008*. Students are party strategists advising candidates in the November congressional election.
- *Supreme Court*. Students are justices of the Supreme Court or attorneys arguing before the Court.

The 6 AP Topics (College Board)

- Constitutional underpinnings
- Political beliefs and behaviors
- Political parties, interest groups and mass media
- Institutions of national government (Congress, Presidency, bureaucracy, Federal Courts)
- Public policy
- Civil rights and civil liberties

The project cycles are united by a driving question (What is the proper role of government in a democracy?). Each project cycle is conceived as a “learning and action cycle” where students alternate between two modes—learning to act and acting to learn. Loosely speaking, “learning to act” here is when students are in traditional AP mode (textbook/test driven) and “acting to learn” is when they are in complex projects with real-world goals. The anticipation of one mode helps motivate and drive the other. As students move through the five project cycles, they loop back on the driving question to reflect on what they gleaned from the prior project cycles that is worth carrying forward into the next. Through this looping, knowledge and activity deepens.

Teachers as Co-Designers. A great strength of our course design is that it puts the teacher in the position of being curriculum maker—always working to integrate two well developed components in the larger educational system: (1) the “gold standard” curriculum of AP or whatever it may change to in the future, and (2) a set of “best of the best” projects, selected from projects developed by other creative nodes in the system. To do this, teachers (and all of us learning to integrate components 1 and 2) need to gain a firm grasp of how to create course activity that loops effectively from one project cycle to the next; teachers (and we) need to get practiced at weaving together AP content and routines with project content and routines so that deep knowledge and engagement can build across the course.

This fits with the view that teachers need to be able to respond to fast changing conditions, including taking advantage of new “best of best” projects and standards as they emerge.

Research Measures

To address our 3 research questions, measures of student learning and engagement were collected at various points during the 2008-2009 school year. In this report, we discuss the results from the following measures: the College Board-administered AP Test, *Knowledge in Action* deep learning assessment, “Politics and Me” engagement survey and “Sense of Classroom Community” survey.⁵

Table 2 lists the measures and the schedule by which they were administered (i.e., at pretest and/or at posttest).

Table 2. Student Learning & Engagement Measures

	Pre-	Post-
AP Test		✓
<i>Knowledge in Action</i> Test <i>our deep learning assessment</i>	✓	✓
Subject Matter Engagement Survey <i>“Politics & Me”</i>	✓	✓
“Sense of Classroom Community” Survey <i>“How My Class Works”</i>	✓	✓

College Board-Administered AP Test

The AP U.S. Government and Politics exam was administered in May, 2009.

***Knowledge in Action* Test™**

The *Knowledge in Action* (deep learning) assessment (see Appendix C and D) uses a simulated real-world problem of politics and government to assess students’ learning in the course. Whereas the AP Test primarily measures students’ ability to identify and describe the structures and functions of government and change in them over time, the *Knowledge in Action* Test assesses how well students can apply that knowledge to a particular scenario where their charge

⁵ Appendix B contains a list of the full set of measures collected in the research—results from the full will be discussed in December’s Technical Report.

is to monitor and influence public policy — specifically, to formulate a plan for well-informed, smart political action on a controversial issue that’s heating up.

This *Knowledge in Action* Test is intended to complement the AP Test as a measure of “deep learning” in the subject – our overarching learning goal for the PBL AP course.

Key features of the *Knowledge in Action* Test include:

- Places students in the role of adviser in a scenario.
- In the scenario, students must create a draft action plan to present to their "client."
- Students are told their client will want to decide for themselves so they need to justify their recommendations.
- The scenario centers on a controversial issue, one the students are not expected to be expert in (facts are provided within the scenario), so it is students’ deep conceptual knowledge that needs to get mobilized, ideally conceptual knowledge that spans several project cycles of the course.
- The topic is one from current news headlines but students are told "While some of the facts and materials of the case are made up, others are real, notably (e.g. news article, statement from government agency)."

Whereas the AP Test is given once, at course end, the *Knowledge in Action* Test was given as a pretest/posttest, once during Week 3 of the Course and again during Week 36/37. The pretest and posttest were on the same controversial issue topic, however, we modified the posttest scenario to represent a different stage in the political process. Students did not receive a grade on the test. However, immediately after the posttest we gave students the opportunity to compare their answer to what they had written on the pretest. We engaged them in a 15-minute whole-class debrief discussion of what they noticed about how their response had changed and we asked them how the assessment might be improved for students like themselves in the future.

The *Knowledge in Action* pretest was a one-day (50-minute class period) paper and pencil assessment. The posttest took two days. Day 1 of the posttest (50-minute class period) consisted of the paper and pencil task. Day 2 (50 minutes of a 90-minute class period) consisted of teamwork (sharing and further developing individuals’ responses from Day 1) culminating in a 5-minute team presentation that each team spoke into an audio recorder (such that the teams were presenting simultaneously). The results presented in this technical report are for the paper-and-pencil portion of the test only—that portion of the test amenable to pre/post analysis at the individual student level.

Scoring Rubric for the *Knowledge in Action* Test. Students’ written responses to the *Knowledge in Action* Test were scored using a rubric developed by the UW research team, in consultation with BSD Curriculum Developer John Brill of the PBL AP Project team. The scoring rubric and sample student responses are contained in Appendix D. Rubric development was based on

consideration of (1) the *Knowledge in Action* task, (2) the team’s own expert knowledge of the subject matter (political science)—both John Wilkerson and Walter Parker of our team are faculty in the UW Political Science Department, (3) the course goals for student learning and performance, and (4) a scan of responses from 20 UW freshmen who took a pilot version of the pretest.

Training Raters to Score the *Knowledge in Action* Test. Responses were scored by graduate students in Political Science after training by a senior research scientist on our team (Susan Mosborg). Eight raters participated in the scoring of the pre-assessment (including 2 recent graduates of the UW Teacher Education Program in Secondary Social Studies). Five raters total scored the post-assessment. They were paid for their time. Two of the scorers participated in both the pre- and post-assessment scoring.

“Politics and Me” engagement survey

The “Politics and Me” survey (see Appendix E) measures students’ civic/political engagement on 4 dimensions: Committed, Capable, Inspired, and Involved in Action. We constructed the survey by combining items from the Carnegie Political Engagement Project survey (Beaumont, 2004) and the California Survey of Civic Education (Kahne & Sporte, 2008). These measures go beyond knowledge about government and politics; they gauge students’ willingness to assume the responsibilities of democratic citizenship. Completed at both pretest and posttest, students took the “Politics and Me” survey online, in class or as homework, as part of their regular course activity.

“Sense of Classroom Community” engagement survey

The “Sense of Classroom Community” survey measures students’ perceptions of their AP Government class as a learning community. We used a Sense of Community (SOC) instrument adapted by Bateman (2002); see also Peterson, Speer, & McMillan (2008). Following the SOC model originated by McMillan and Chavis’ (1986), a group functions as a community when group members, in this case students, feel: (1) belonging or a sense of personal interrelatedness in the group (Membership); (2) attachment or bonding rooted in members’ shared history, place, or experience (Emotional Connection); (3) that one matters or can make a difference in the community, and that the community matters to its members (Influence); and (4) that members’ needs will be met by the community (Needs Fulfillment). The Sense of Classroom Community survey we used (see Appendix F) consisted of 24 statements students rated on a 4-point scale. Completed at both pretest and posttest, students answered the survey online, in class or as homework, as part of their regular course activity.

Research Results

In this section, we present the key results from Study 1 and Study 2, respectively, as they relate to our 3 guiding research questions:

Is it possible to get:

1. More students to pass the AP Test with a well-designed PBL course?
2. Deeper learning than that measured by the AP Test by designing more sensitive measures of deep understanding?
4. Deeper engagement in the course and in related activities outside of the classroom?

A detailed technical analysis of Study 1 and 2 results is contained in Appendix G.

Results of Study 1

Study 1 compared the results for students enrolled in 2 high schools that were matched on prior AP performance and student SES. The results for students in 4 traditionally-taught AP classes were compared with the results for students in 4 problem based learning (PBL) AP classes.⁶

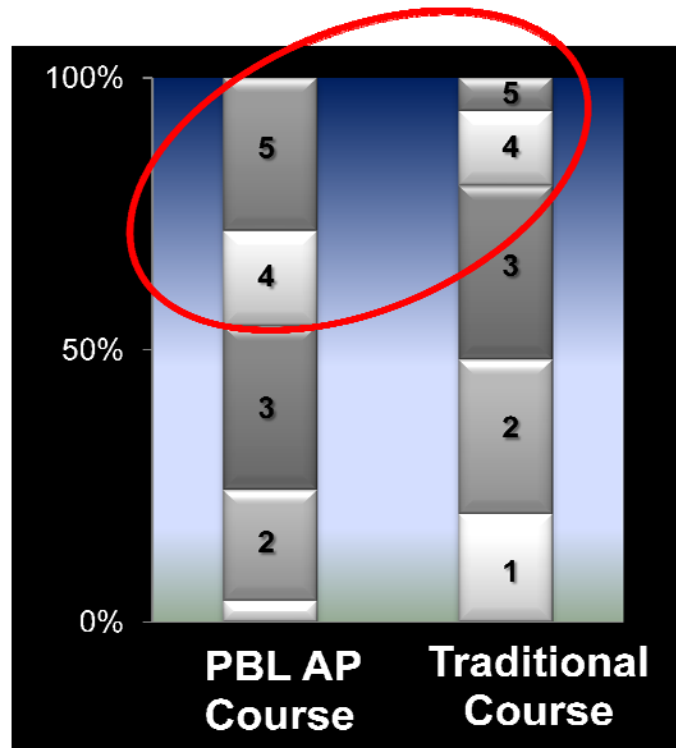
We first looked at the background characteristics of PBL and Traditional course students; there were no significant differences in prior achievement, including their scores on the PSAT, on the Washington Assessment of Student Learning-Reading (WASL-Reading), or on prior AP Tests (i.e., AP U.S. History).

Is It Possible to Get More Students to Pass the AP Test with a Well-Designed PBL Course?

The results indicate that it is possible to get more students to pass the AP Test with a PBL course. Figure 2 shows the percent of PBL and Traditional students earning scores of 1 through 5 on the AP Test (5 is the highest score on the test).

⁶ Hierarchical Linear (random coefficient) models were used to compare the results taking into account the students' nesting within classrooms, student-level prior achievement, and the treatment condition.

Figure 2. Percent of Students Achieving AP Test Scores



In the data analysis, PBL AP students scored significantly higher ($p < .05$) on the AP Test on average than the Traditional students.

Since many colleges assign college credit for AP scores of 3 or more, we conducted an analysis in which we looked at “passing” scores of 3 or more on the AP Test. When analyzed in this way, the results showed that more PBL students (75.7% of PBL) achieved a passing score on the test than Traditional students (51.5% of Traditional).⁷

Is it Possible to Get Deeper Learning than that Measured by the AP Test by Designing Measures of “Knowledge in Action” Indicative of Deep Understanding?

We designed the *Knowledge in Action* Test to measure students’ deeper understanding of course content. The AP Test primarily measures students’ ability to identify and describe the structures and functions of government and change in them over time. The *Knowledge in Action*

⁷ Figure 1 does not adjust for students’ prior achievement; however, when students’ AP Test scores were adjusted using WASL Reading scores and AP U.S. History scores, the PBL students still scored significantly higher than the Traditional students.

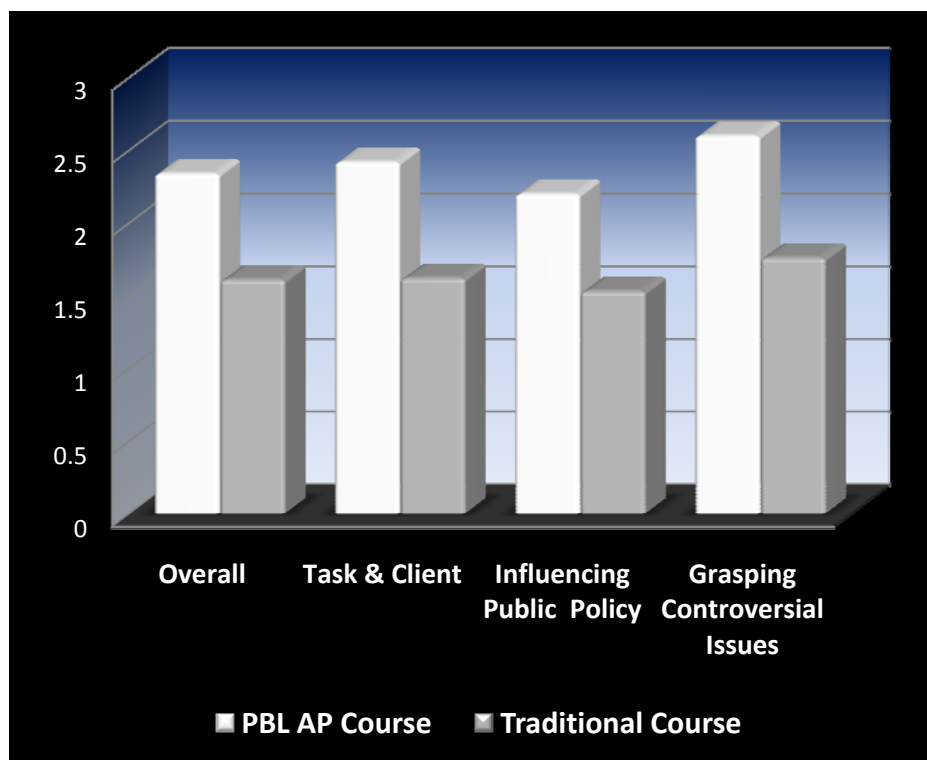
Test looks at how well students can apply what they learned; students are given a real-world problem solve and asked to formulate a plan for well-informed, smart political action on a controversial issue.

Students' written answers to the *Knowledge in Action* Test were scored on 4 dimensions and the quality of the student's answer related to each dimension was assigned a score ranging from 1 to 6 (6 being the highest quality answer). The dimensions were:

1. **Overall Quality**
2. **Task & "Client" (Legislator)** - Directs advice to the Congressman (*appropriate to Congressman X*)
3. **Influencing Public Policy** - Gives a political process account (*using political process concepts & terminology*)
4. **Grasping Controversial Issue(s)** - Analyzes the public policy issue(s) at stake and why they are controversial

Figure 3 shows average scores for PBL and Traditional students on the 4 dimensions of the test.

Figure 3. PBL and Traditional Group's Average Scores on The 4 Dimensions of the *Knowledge in Action* Test



Data analyses indicate that PBL students scored significantly higher on all 4 dimensions of the *Knowledge in Action* Test as compared with students in the Traditional course.⁸ These findings suggest that PBL students more deeply understood the AP content to where they were able to apply it to solve a complex problem.

Is It Possible to Get Deeper Engagement in the Course and in Related Activities Outside of the Classroom?

The final research question relates to students' engagement in AP course and related outside activities. We used 2 measures to address students' engagement: We used the "Sense of Classroom Community" survey to measure students' engagement in course activities, and the "Politics and Me" survey as a measure of students' engagement in civic and political activities outside of class.

Analysis of the "Sense of Classroom Community" survey showed that at the end of the school year PBL students had higher ratings on 2 of the 4 dimensions of classroom community than students in the Traditional course.⁹ PBL students rated themselves as feeling greater membership and having a greater emotional connection to their class. In this way, the results demonstrate that PBL students' engagement with their classmates and teacher was somewhat greater overall than that of students in the Traditional course.

Our analysis of the "Politics and Me" survey did not reveal differences between the PBL and Traditional students on any of the subscales comprising the survey.

We speculate that the failure to achieve differences on this measure is due to the distance between the PBL course, which concentrates on inside-class engagement, and the outside-class focus of the measure. In other words, the focus of the PBL course, like the Traditional course, is on the six topics of the AP Gov syllabus, none of which target increased civic and political participation outside of class.

⁸ In these analyses, scores were adjusted for prior achievement using WASL-Reading scores and pretest scores on the *Knowledge in Action* Test.

⁹ In these analyses, students' pretest ratings on the survey were used to adjust their posttest ratings.

Results of Study 2

Study 2 also compared the results for students enrolled in AP classes in 2 high schools. However, this set of 4 PBL AP classes were in a school that historically had fewer students passing the AP Test as compared to the 4 classes that were in the control high school. The results for students in 4 traditionally-taught AP classes were compared with the results for students in 4 PBL classes.¹⁰

We first looked at the entering characteristics of students in the PBL and Traditional courses. As expected based on the 2 schools' historical data, the entering PBL students were significantly lower on prior achievement than the entering Traditional-course students on the P-SAT, the WASL-Reading and on GPA.

Is It Possible to Get More Students to Pass the AP Test with a Well-Designed PBL Course?

In our analysis, we adjusted students' AP scores using their prior WASL-Reading scores and their GPAs in order to statistically control for pre-existing achievement differences between the PBL and Traditional students in Study 2.

The analysis of the adjusted scores showed that the PBL students' scores on the AP Test were not significantly different from the scores of students in the Traditional course.

Setting aside prior achievement, a lower proportion of the AP+ students (39%) scored 3 or better on the AP Test than the Traditional-course students (52%).

However, two points should be noted: First, more students in the PBL school passed the AP Test in the year that the research was conducted (2008-2009) than in previous years when the course was not project-based.

Second, only 61% of the students in the traditionally-taught AP condition took the AP Test. The remainder took a district-administered (practice) AP Test. Based on their performance on the *Knowledge in Action* Test and the district-administered (practice) AP Test, the 39% who did not take the "official" AP Test in the traditionally-taught classrooms were lower in achievement than those who did take the AP Test. Had these lower achieving students opted to take the AP Test, their performance might well have lowered the overall performance of students in the Traditional course to a point where the PBL students would have out-performed them.

Overall, while the results did not show that PBL students out-performed the Traditional students on the AP Test, the PBL students did perform equally well (when their scores were adjusted) and

¹⁰ Hierarchical Linear (random coefficient) models were used to compare the results taking into account the students' nesting within classrooms, student-level prior achievement, and the treatment condition.

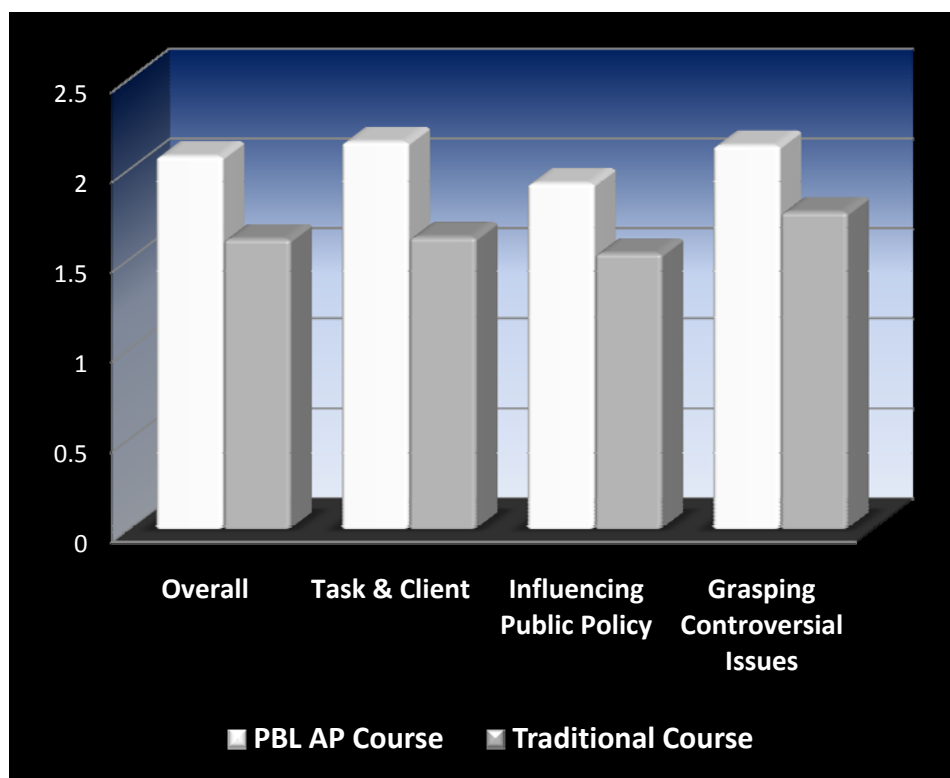
performed better than students from the same school in previous years. Furthermore, as we will next discuss, there was value added for PBL students on the measure of deep learning.

Is it Possible to Get Deeper Learning than that Measured by the AP Test by Designing Measures of “Knowledge in Action” Indicative of Deep Understanding?

As discussed previously, we designed the *Knowledge in Action* Test to measure students’ deeper understanding of course content. In Study 2, students written answers to the *Knowledge in Action* Test were scored on 4 dimensions (Overall Quality, Task & Client, Influencing Public Policy and Grasping Controversial Issues) and the quality of the student’s answer related to each dimension was assigned a score ranging from 1 to 4 (4 being the highest quality answer).

Figure 4 shows average scores for PBL and Traditional students on the 4 dimensions of the test.

Figure 4. PBL and Traditional Group’s Average Scores on the 4 Dimensions of the *Knowledge in Action* Test



Data analyses indicate that PBL students scored significantly higher on all 4 dimensions of the *Knowledge in Action* Test as compared with students in the Traditional course. These findings suggest that PBL students more deeply understood the AP content to where they were able to apply it to solve a complex problem.¹¹

Is It Possible to Get Deeper Engagement in the Course and in Related Activities Outside of the Classroom?

The final research question relates to students' engagement in AP course and related outside activities. Analysis of the "Sense of Classroom Community" and "Politics and Me" Surveys did not reveal any significant differences in favor of the PBL students; Traditional students rated themselves significantly higher on the Involved in Action subscale of the "Politics and Me" Survey.

We are revising both the "Sense of Classroom Community" and "Politics and Me" survey instruments to make them more relevant to changes in engagement we might reasonably expect to see in the course. High inter-item correlations suggested places to streamline the questionnaires. We decided to use the recently validated Brief Sense of Community Survey (Peterson, Speer, & McMillan, 2008) for its suitability, to which we have added one item to address learning from distributed expertise. We eliminated from the "Politics and Me" survey items that seemed to us least relevant to the course. This will also enable us to reanalyze this year's "Politics and Me" survey results with the now fewer, more targeted items for each scale.

Concluding Thoughts

Our research experiment found that an AP course reformulated using principles of how people learn and project-based learning yielded performances on the AP Test that were as good or better than a traditionally-taught AP course, while also yielding demonstrably better performance on a *knowledge in action* (deep learning) assessment. We found we could improve student learning and engagement by using projects to drive delivery of the 6 AP topics specified by the College Board for the course—projects as keystone rather than capstone. The initial findings suggest the merit of helping teachers work, with intention, to integrate two well developed components in the larger educational system: (1) the "gold standard" curriculum of AP or whatever "gold standard" may arise, and (2) a set of "best of the best" projects, selected from projects developed by other creative nodes in the system.

The research and course design are proceeding iteratively. We are repeating portions of the study with the PBL AP students and teachers in Bellevue School District this (2009-10) school

¹¹ In these analyses, scores were adjusted using WASL-Reading scores and pretest scores on the *Knowledge in Action* Test.

year. Directions for future research include replicating the study in other courses/subjects, and in schools with less advantaged student populations, as well as developing and testing a professional development (instructional leadership) model to facilitate uptake of the curriculum by other teachers, schools, and districts.

Ultimately, we want to be able to show not only *what* works, but how to get what works to work—providing a powerful school program component for college readiness, and contributing to learning theory.

Acknowledgements

Our deep appreciation and thanks to the students and teachers who contributed to this research, and to everyone in the Bellevue Schools community who made it possible—school administrators, the Bellevue Schools Foundation, families, and community members. We continue to be inspired by their spirit of innovation, and their dedication to successful ambitious learning for all. We are indebted to the College Board for their assistance. We would especially like to thank the George Lucas Educational Foundation for their generous support and leadership. The researchers are solely responsible for the findings and conclusions in this report and any errors herein.

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Appendix A: Schools' Demographics and Prior AP Test Scores

Bellevue (Washington) School District. (Demographics are K-12, district wide. AP scores are from the 3 of the 5 high schools in the district that have an AP Gov course.)																																					
Student Population (BSD #s)														AP US Gov Examination (College Board #s)																							
Year	Total count (as of Oct 1)	% F/R lunch	How many first languages?	Other first language %	ESL %	Spec Ed %**	% Asian	% Black	% Hisp	% Other	% White	% of Stu Pop AP US Gov test	Total count taking AP US Gov test	Mean Score	SD	% scoring 3 or higher	1	2	3	4	5	% 1s	% 2s	% 3s	% 4s	% 5s	Asian	Black	Hisp	Other	White	% Asian	% Black	% Hisp	% Other	% White	
2008-2009	16868	17.7%	72	30.2%	9.3%	8.7%	27.0%	2.6%	7.8%	9.3%	53.1%	1.9%	309	2.77	1.34	52.1%	62	86	73	37	51	20.1%	27.8%	23.6%	12.0%	16.5%	114	4	14	15	162	36.9%	1.3%	4.5%	4.9%	52.4%	
2007-2008	16435	17.1%	74	29.9%	9.2%	8.5%	25.6%	2.5%	7.8%	8.7%	55.0%	2.0%	332	2.92	1.13	61.7%	35	92	101	74	30	10.5%	27.7%	30.4%	22.3%	9.0%	106	6	8	17	195	31.9%	1.8%	2.4%	5.1%	58.7%	
2006-2007	16380	19.0%	71	28.8%	8.2%	8.3%	24.4%	2.6%	8.1%	8.4%	56.1%																										
** Special education codes: 4C and 4H. Does NOT include 4T (therapy only) services																																					
High Achieving School - intervention site (PBL-AP course)																																					
Student Population (BSD #s)														AP US Gov Examination (College Board #s)																							
Year	Total count (as of Oct 1)	% F/R lunch	How many first languages?	Other first language %	ESL %	Spec Ed %**	% Asian	% Black	% Hisp	% Other	% White	% of Stu Pop AP US Gov test	Total count taking AP US Gov test	Mean Score	SD	% scoring 3 or higher	Number of students by score					% 1s	% 2s	% 3s	% 4s	% 5s	Asian	Black	Hisp	Other	White	% Asian	% Black	% Hisp	% Other	% White	
2008-2009	1313	9%	36	23%	4%	8%	26%	2%	3%	6%	64%	7.9%	104	3.45	1.20	76.0%	4	21	32	18	29	3.8%	20.2%	30.8%	17.3%	27.9%											
2007-2008	1342	9%	34	23%	5%	8%	25%	2%	3%	5%	65%	3.7%	50	3.56	1.37	66.0%	5	10	8	11	14	10.0%	20.0%	16.0%	22.0%	28.0%	19	1	0	2	28	38.0%	2.0%	0.0%	4.0%	56.0%	
2006-2007	1430	11%	37	22%	4%	7%	24%	2%	3%	5%	68%	8.1%	116	3.19	1.14	68.1%	6	31	31	31	17	5.2%	26.7%	26.7%	26.7%	14.7%	36	3	5	8	63	31.0%	2.6%	4.3%	6.9%	54.3%	
High Achieving School - control site (Traditional AP course)																																					
Student Population (BSD #s)														AP US Gov Examination (College Board #s)																							
Year	Total count (as of Oct 1)	% F/R lunch	How many first languages?	Other first language %	ESL %	Spec Ed %**	% Asian	% Black	% Hisp	% Other	% White	% of Stu Pop AP US Gov test	Total count taking AP US Gov test	Mean Score	SD	% scoring 3 or higher	Number of students by score					% 1s	% 2s	% 3s	% 4s	% 5s	Asian	Black	Hisp	Other	White	% Asian	% Black	% Hisp	% Other	% White	
2008-2009	1640	9%	36	25%	0%	7%	36%	1%	3%	8%	53%	9.6%	158	3.16	1.23	69.0%	17	32	44	39	26	10.8%	20.3%	27.8%	24.7%	16.5%											
2007-2008	1609	7%	37	25%	0%	7%	36%	1%	3%	7%	53%	7.5%	121	2.96	1.12	50.4%	15	33	36	16	9	12.4%	27.3%	29.8%	13.2%	7.4%	68	0	1	4	48	56.2%	0.0%	0.8%	3.3%	39.7%	
2006-2007	1570	9%	33	24%	0%	7%	35%	1%	3%	6%	55%	7.1%	112	2.95	1.09	66.1%	12	26	38	28	8	10.7%	23.2%	33.9%	25.0%	7.1%	46	9	3	7	47	41.1%	8.0%	2.7%	6.3%	42.0%	
Moderate Achieving School - intervention site (PBL-AP course)																																					
Student Population (BSD #s)														AP US Gov Examination (College Board #s)																							
Year	Total count (as of Oct 1)	% F/R lunch	How many first languages?	Other first language %	ESL %	Spec Ed %**	% Asian	% Black	% Hisp	% Other	% White	% of Stu Pop AP US Gov test	Total count taking AP US Gov test	Mean Score	SD	% scoring 3 or higher	Number of students by score					% 1s	% 2s	% 3s	% 4s	% 5s	Asian	Black	Hisp	Other	White	% Asian	% Black	% Hisp	% Other	% White	
2008-2009	984	30%	38	35%	9%	16%	20%	4%	14%	6%	56%	10.3%	101	2.39	1.19	38.6%	26	36	21	10	8	25.7%	35.6%	20.8%	9.9%	7.9%											
2007-2008	1030	27%	39	33%	9%	13%	19%	4%	14%	5%	57%	6.4%	66	1.92	1.06	27.3%	30	18	14	1	3	45.5%	27.3%	21.2%	1.5%	4.5%	10	2	7	3	44	15.2%	3.0%	10.6%	4.5%	66.7%	
2006-2007	1205	30%	42	32%	10%	13%	19%	4%	15%	6%	55%	5.6%	68	2.21	0.99	32.4%	17	29	15	5	2	25.0%	42.6%	22.1%	7.4%	2.9%	8	2	3	8	47	11.8%	2.9%	4.4%	11.8%	69.1%	

Appendix B: Research Measures & Other Data Collected

Student Learning & Engagement Measures

	Pre-	During Course	Post-
AP Test			✓
Knowledge in Action Test <i>our deep learning assessment</i>	✓		✓
Subject Matter Engagement Survey <i>"Politics & Me"</i>	✓		✓
"Sense of Classroom Community" Survey <i>"How My Class Works"</i>	✓		✓
Experience Sampling <i>student questionnaire</i>		✓ approximately weekly 17-20 times / class	
Student Course Evaluation <i>includes questions about AP Test interest / motivation</i>			✓
Student Project Cycle / Unit Evaluation		✓ 5 times / class	
Course Master Question <i>student writing sample</i>		✓ various, 1-5 times per class	



Indicates measures that are the focus of this Technical Report.

Student & Teacher Interviews, Classroom Observations, and Group Debriefs

	Pre-	During Course	Post-
Student interviews <i>a subsample of 23 students</i> <i>(21 from re-designed course, 2 from control course)</i> <i>3 interviews / student</i>	✓	✓	✓
Teacher Interviews <i>all teachers, 2 interviews / teacher</i>	✓		✓
Classroom Observations		✓ Approximately weekly, in conjunction with experience sampling	
50-min Course Debrief (PBL AP Steering Team members asking the class questions) <i>all re-designed course classes</i> <i>and 2 of the 4 control classes</i>	✓		✓
15-min Knowledge in Action Test Debrief (Researchers asking the class questions) <i>all classes</i>			✓
Teacher Team Course Debriefs <i>3 total (videorecorded)</i>		✓	✓

Student Background Measures

all individual-student level data, for entire sample of students

	Pre-	During Course	Post-
From school district:			
Pre-SAT Score	✓		
AP Exam Scores (if any) to date	✓		
Washington Assessment of Student Learning (WASL) Scores: Reading, Writing, Math (middle school and high school)	✓		
GPA	✓		
F/R Lunch	✓		
Race/Ethnicity	✓		
Gender	✓		
Country Student Born In	✓		
English Language Learner (designated)	✓		
Special Ed / IEP	✓		
From student self-report : <i>... on "Politics & Me" survey</i>			
Mother's Education	✓		
Family Income	✓		
US Citizen	✓		
Parents Born in the US or in Another Country	✓		
Post-Secondary Education - Intended	✓		
<i>... on Course Evaluation</i>			
Career / Field of Study - Intended			✓

Other Data

The 2008-09 school year data includes about 40 hours of classroom video shot by the Bellevue School District video staff over the course of the year, primarily in two focal teachers' classes (one re-designed course condition, one control condition), as well as several hours of "flip cam" video snippets shot on occasion by the researchers during classroom observations. In addition we have a handful of short video vignettes, produced by students in the classes who were given flip cams in exchange for serving as "course documentarians" in the study. The video data are intended to help us contextualize the study findings and document salient aspects of the course experience for the future (e.g., for use in tools that could help others uptake the curriculum), rather than for close video analysis by the researchers.

Appendix C: *Knowledge in Action* Test

Dear AP+ Project students,

In this task, we are interested in learning from you how students at the *start* of their AP Gov course solve a real-world problem of politics and government, compared to how you'll be able to solve a similar problem at the end of the course. We can't crawl inside your head, of course (lucky you!). So we hope you will tell us as much of what you're thinking as possible. In this task, more is more. Please try to solve the problem to the very best of your ability. Don't worry about things like spelling. We're more interested in your ideas and how you think about things. Please do describe your ideas as fully as possible. At the end of the course, you'll have a chance to look back at how you've changed as a result of your experience in the course. This task will help us show you how you've changed – and help us make courses like this better for students who follow in your footsteps. Thank you and have fun!

BODY CHIPS FOR ALL: SECURE ID?

Background

Many people in the U.S. have vivid memories of 9/11 and want to feel confident the government is doing all it can to prevent a terrorist attack from happening again. This extends to keeping better track of people coming into the country. Congressman Sanchez put it this way:

I represent a district in California. It's based on a lot of tourism. We have Disneyland, we have Los Angeles Airport not too far from us, the port is the third largest entry port of cargo coming in. We have a border to the south of us, about an hour and a half drive from where we are. And if there is a threat to our country, California would be one of the first places that we would look at and some of the other border states. So this is a very important issue to us about how people get in to our country.

I think we need to do everything we can to secure borders, but we've also got to understand that there's a lot of commerce that happens through the port, through the airport and across our land borders, and there's a lot of movement of goods and people. And it's critical for our economy, for our prosperity that we sort of get a handle on how we're moving things and how we're checking things come in.

The Department of Homeland Security has taken several steps to try to get a handle on how people and things coming into the country are checked. For example, radiation detectors at ports now monitor cargo containers arriving by ship, on the lookout for even small quantities of material that could be used to make a nuclear bomb. As for people, travel visas to the U.S. have become harder to get and applicants are screened more thoroughly. Fewer students from abroad receive special visas to study in the U.S. Even U.S. citizens are checked differently since 9/11. For instance, U.S. citizens traveling to Canada and Mexico must now show their U.S. passport instead of just a driver's license to gain re-entry to the U.S. Another big change has been improved airport screening.

Finding still better ways to keep track of people and things coming into the country continues to be a priority of the Department of Homeland Security.

New Bill Introduced in Congress Would Require “Secure IDs”

Today the Secretary of Homeland Security announced he is proposing a new law, known as Secure ID, as part of the War on Terror. Members of Congress have officially introduced the bill in both the U.S. House and Senate, and several members have signed on as the bill’s sponsors.

The proposed new law requires that all U.S. citizens at birth have implanted somewhere on their body (e.g., arm, foot) a radio frequency identification chip that can be read by a special scanner. The chip is said to be a more secure and trustworthy form of identification that will improve the way people coming into the country are checked. In addition, all visitors to the U.S. (“foreign nationals”) must also have the chip implanted prior to their arrival in the U.S. (or at the time of their arrival).

The chip is no bigger than a pinhead. The insertion procedure is painless and has no known side effects for people of any age. (This was confirmed through rigorous medical trials.)

How does RFID technology work?

The RFID chip stores no information other than a number. The number is several digits long. To read the chip, an RFID scanner is clicked (think of a handheld scanner at a clothing store checkout stand). The RFID scanner is programmed to pick up the number on the chip, so long as the chip is in its vicinity, no greater than 20-30 feet away.

The RFID scanner transmits the number to a computer. With that number, the computer can then look up personal information about the person in a database, such as name, address, date of birth, and any previous criminal record. It can also check to see whether that person is on any terrorist watch list.

This is the same kind of information currently accessible by government officials—for example, when a customs agent enters a passport number into a computer at a border crossing, or when a police officer enters a driver’s license into a computer in a squad car. However, the RFID chip is thought to be harder to fake. Unlike a driver’s license or passport, the chip cannot be stolen or forged. Also, the computer database can include additional biometric data (person’s digital photo, or fingerprint, or iris scan of the eye) that can be called up at the time of the check. This, proponents argue, makes it a more trustworthy and secure form of identification. Others worry that the Secure ID law, like any policy, could have unintended consequences.

In theory, any RFID scanner, not just the “Secure ID” system scanners, could read the chip. However, the number on a chip itself is meaningless. To make sense of the number, one needs to use the “Secure ID” scanner, which is linked to the “Secure ID” database. Only certain government officials (customs agents, police officers, and others specifically authorized by law as “first responders”) will have access to a “Secure ID”

scanner. These officials will only be able to access a limited amount of information from the database at any one time: just enough information about the person whose chip they are scanning to perform their specific job.

As a further protection, if the chip is removed from the body, it is no longer readable by any scanner. However, being without a chip is a violation of the law. The cost of the chip, including insertion, is estimated to be about one dollar per person.

What now?

Regardless of their views, most people agree it makes sense to think hard about the possibilities and evaluate the proposal on: 1) fairness, 2) wise use of public funds and resources, and 3) who's got (or should have) the proper authority for it.

As a staff member to Rep. X from Washington State, Rep. X is looking to you for advice.

Rep. X wants you to help him figure out the best course of political action in response to the RFID bill. He has not yet signed on as a sponsor of the RFID body chip bill, and he wants to make sure he makes a well-informed decision about whether or not to do so.

Rep. X is a moderately conservative congressman from a moderately liberal district—U.S. Congressional District #N. Becoming known as a leader who “does his homework” but is not afraid to think outside the box is very important to Congressman X. So is getting re-elected to Congress.

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UW team researches a future filled with RFID chips

By Kristi Heim

Seattle Times business reporter

Some University of Washington students, faculty and staff are being tracked as they move about the computer-science building, with details of where they've been, and with whom, stored in a database.

Professor Gaetano Borriello checks a computer to find graduate student Evan Welbourne's last location: on the fourth floor, outside room 452 at 10:38 a.m. Wednesday. He opens another screen to reveal the building's floor plan, and a blinking green dot representing Welbourne shows him walking down the hall.

If it seems a bit like Big Brother, that's the intention. The project is meant to explore both positive and negative aspects of a world saturated with technology that can monitor people and objects remotely.

"What we want to understand," Borriello said, "is what makes it useful, what makes it threatening and how to balance the two."

The technology, radio frequency identification, or RFID, is rapidly moving into the real world through a wide variety of applications: Washington state driver's licenses, U.S. passports, clothing, payment cards, car keys and more.

The objects all have a tiny tag with a unique number that can be read from a distance. Many experts predict that the radio tags, as an enhanced replacement for bar codes, will soon become ubiquitous.

Leaders of the UW's RFID Ecosystem project wanted to understand the implications of that shift before it happens. They're conducting one of the largest experiments using wireless tags in a social setting.

"Our objective is to create a future world where RFID is



TOM REESE / THE SEATTLE TIMES

A U.S. quarter (George Washington's profile peeks out on the left side) shows the scale of the square RFID chip that is surrounded by a thin silver antenna. The tag is one of several types that researchers at the University of Washington are using to track the movements of volunteers and objects to study utility and privacy issues.



TOM REESE / THE SEATTLE TIMES

Professor Gaetano Borriello, left, and Evan Welbourne, a graduate student, are tracking the movements of each other using RFID tags like the one Welbourne wears on his belt, at right. Antennas placed in the hallways at the UW computer-science building collect data as volunteers and objects pass by.

RFID in the real world

U.S. passport: Holds RFID chip with information and digital photo.

Washington state Enhanced Driver's License: RFID chip complies with U.S. Department of Homeland Security requirements for border crossing.

ORCA (One Regional Card for All): System linking bus, ferry and other transit in the Puget Sound area.

Contactless payment systems: Used to pay for gas or other items by holding card near a terminal.

Clothing: Retailers use tags to prevent theft, plan to target advertising.

everywhere and figure out problems we'll run into before we get there," said Borriello, a computer science and engineering professor.

Supply chains: Wal-Mart, 7-Eleven and others use RFID tags to track merchandise.

Medicine: Used to ID blood samples, plan to track prescription drugs, prevent counterfeiting.

RFID has been used primarily to track goods in supply chains, and the RFID Ecosystem works as a kind of human warehouse.

For more than a year, a dozen researchers have carried around RFID tags equipped with tiny computer chips that store an identification number unique to each tag. Researchers installed about 200 antennas throughout the computer-science building that pick up any tag near them every second.

The researchers hope to expand the project, funded by the National Science Foundation, to include participation by about 50 volunteers — people who regularly use the building. Volunteers will have the option of removing their data at any point.

The system can show when people leave the office, when they return, how often they take breaks, where they go and who's meeting with whom, Borriello said.

The technology seems less intrusive than a camera, but it's much more precise.

It's a lot easier to fool a camera with a blurred image or disguise. But the latest RFID tags contain a 96-bit code meant to uniquely identify an object or person.

Yet if people don't see the tags, it's easy to forget they are giving out information whenever they come within range of a reader.

"One of the most surprising things is how invisible these tags can be," said Welbourne, who stashed the paper-thin tags in his jacket and bag nine months ago and doesn't always remember he's carrying them. "It's a risk for people. I built part of the system, and I'm caught off-guard."

Lessons learned

UW researchers are gaining some valuable lessons on how to make the technology useful while protecting privacy. Radio tags add a new dimension to social networking. The key is allowing subjects to control who sees what information about them.

They created an application called RFIDDER that lets people use data from radio tags to inform their social network where they are and what they're doing. The feature can be used on the Web and on a mobile phone, with a connection to the social-networking service Twitter.

Borriello can let Welbourne, the project's lead graduate student, see where he is all day, or he can modify settings so Welbourne can only see where he is within 15 minutes of their scheduled meeting. The system is transparent, so each can tell if the other has checked his whereabouts.

The lab's Personal Digital Diary application detects and logs a person's activities each day and uploads them to a Google calendar. Users can search the calendar to jog their memories about when they last saw someone or how, where and with whom they spent their time.

Potential pitfalls

Yet the UW researchers also recognize many potential privacy pitfalls.

Some systems, including new U.S. passports and driver's licenses, have been designed to divulge more information than necessary, opening the door to security and privacy problems, Borriello said.

Experts from the UW RFID team went to Olympia to testify on privacy issues related to the state's Enhanced Driver's License.

"There's no reason to have remotely readable technology in a driver's license," Borriello said. He recommends a system that requires contact with the surface of a reader, so the license-holder knows when information on his license is being read.

However, the U.S. Department of Homeland Security required states to use an RFID chip that is readable from a distance to be compatible with its REAL ID initiative.

Washington state went along so it could offer an optional Enhanced Driver's License as an alternative to a passport for residents crossing the Canadian border.

Gov. Christine Gregoire signed a bill last week that attempts to mitigate security and privacy concerns by making it a felony for unauthorized users to read or possess information on another person's identification document without that person's knowledge or consent.

Piecing a profile

Without the right safeguards, data from radio tags can be pieced together to offer a detailed profile of a person's habits without his or her knowledge.

"People don't understand the implications of information they're giving out," Borriello said. "They can be linked together to paint a picture, one you didn't think you were painting."

If someone carrying the new RFID-chipped driver's license visits a store that has an RFID reader and then uses a credit card, the store can start to form an association between the ID number and the credit-card number.

That information can be used to send targeted advertising messages to the customer, a scenario depicted in the film "Minority Report." A man is recognized as he walks by a store and given a personalized sales pitch.

RFID readers placed around shopping malls and airports could help government agencies collect information about visitors' travel patterns, shopping habits and relationships.

"People might think maybe it's a good thing. Maybe it will make me safer," Borriello said. But he added, "You can see this inching forward until we're tracking people wherever they go."

That might sound far-fetched, but it's going on in other parts of the world. Last year, the number of police requests for information from London's RFID-based transit card rose from four per month to 100, Borriello said. Police use the data in criminal cases.

In southern China, the government is installing RFID readers throughout the city of Shenzhen to track movements of citizens, and U.S. companies are helping deploy the technology, The New York Times has reported. Chips in national ID cards contain not just a number, but a person's work history, education, religion, ethnicity, police record and reproductive history.

"You could argue for any of this stuff in the name of security," Borriello said. "It's important to understand what the technology can do and we, collectively, have to decide what we're going to use it for."

The lessons from the UW RFID project point to the need for consent and transparency, informing people what data are being collected and giving them a way to review, correct or delete it.

The technology alone can't be made to do the right thing without a good system of laws and policies around it.

Protection lacking

So far, there are few such legal protections in the U.S., Welbourne and Borriello say.

While RFID is relatively new, one technology with a potential to track people is well-established: cellphones.

"Most of us trust that information is not being tracked by anyone, but in fact it is," Borriello said.

Large U.S. telecommunications companies are in the middle of a bitter dispute over their role assisting in government wiretapping, and whether they can be sued or be given legal immunity.

Right now RFID is following a typical technology cycle, moving from obscurity into popular usage. The UW researchers are trying to stay ahead of that cycle.

"As soon as it becomes widely used, then it's more attractive and people start attacking it," showing its vulnerabilities, Borriello said. The trouble is "by that time, it's hard to change."

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Before you begin, take a moment to write down your initial thoughts about the following questions. (Please remember, the fuller you can tell us your ideas, the better. Continue on additional sheets if needed.)

1. Who might have an interest in this proposed legislation – and why?
2. What are some examples of the social, economic, legal, or political concerns they might have?
3. Do these concerns involve various levels of government (local, state, federal, or international)? Various branches of government (executive, legislative, or judicial)?

Your Task:

Create a plan for a one-day meeting with Congressman X to brief him on the RFID bill and the political issues at stake. Recommend to Congressman X who should be invited, and what specific issues and questions should be explored. Convince the Congressman that the meeting agenda you've planned will help him to understand the range of possible solutions before deciding whether to support, oppose, or amend the RFID bill.

Please write your response in a memo to Congressman X. Be sure to describe your plan in detail so he can understand it and will be convinced.

Feel free to use the extra sheets of paper to jot ideas first.

GO TO NEXT PAGE

Please write your response here.

Study ID _____

MEMO

To: Congressman X
From: Staff Analyst
Re: Body Chips for All: Secure ID?

Dear AP students,

This task uses a simulated real-world problem of politics and government to assess your learning in the course. The AP test looked primarily at your ability to identify and describe the structures and functions of government and change in them over time. In this task by contrast, we are interested how well you can apply that knowledge to a particular scenario where your charge is to monitor and influence public policy — specifically, to formulate a plan for well-informed, smart political action on a controversial issue that’s heating up.

The scenario places you in the role of an adviser to one of the key-most players in U.S. politics — a Congressperson. (You’re a staff member to a Representative from Washington State.) In this role, your advice matters; it has the power to shape not only public policy but individuals’ political futures and prospects.

While some of the facts and materials in the scenario are made up, others are real — notably the Real ID Act of 2005, the newspaper article included as reference, and the quote by Secretary Napolitano. For the purpose of the assessment, treat all of the facts you read in the scenario as real. Where you feel information is lacking, use the knowledge you do have — both from the scenario and from your own knowledge of politics and government — to note what, ideally, you would like to know more about, and to make well-grounded assumptions and inferences that will help you solve the challenge.

Try to solve the challenge to the very best of your ability. Don’t worry about things like spelling. We’re more interested in your ideas and how you think about things. Please try to explain them as fully as possible. Thank you and have fun!

RFID “Enhanced Driver’s Licences”: Road to “Big Brother” Surveillance, or Secure ID?

You are a staff analyst to Congressman X, who narrowly won re-election to the U.S. House of Representatives in November. Last fall, Congressman X asked you to advise him on a bill known as “Secure ID.” Introduced as part of the “War on Terror,” the bill would have required that all U.S. citizens at birth have implanted somewhere on their body a radio frequency identification (RFID) chip that could be read by a special scanner. Proponents argued it would be a more secure and trustworthy form of identification, harder to fake than traditional drivers’ licenses and other state ID cards which the 9/11 hijackers had been able to obtain, and therefore an important tool for preventing similar acts of terror.

Specifically, Congressman X asked you to brief him on the bill and the political issues at stake; he asked you to create a plan for a one-day meeting that would help him understand the range of possible actions, before deciding whether to support, oppose or amend the Secure ID bill. At

the time, the Secure ID bill had just been introduced in both houses of Congress at the request of the Secretary of the Department of Homeland Security (DHS).

As it happened, the Secure ID bill languished in committee in both chambers of Congress and never became law. However, just today the RFID issue re-emerged in a new form, and just a few hours ago, Congressman X emailed you saying he wants to take decisive political action in response. As you've learned from various sources:

New "Enhanced Driver's License" rule issued today by DHS

This morning, the new Secretary of Homeland Security Janet Napolitano issued a rule that changes how provisions of the Real ID Act of 2005 will be implemented.

Background. The Real ID Act of 2005 does not require implantation of body chips on persons. But, like the failed "Secure ID" bill, it is intended to keep better track of people coming into the country; it does so by seeking greater uniformity in what it takes to obtain a driver's license from state to state. It sets federal standards for state-issued driver's licenses which will be required in the future to board airplanes. As described on the DHS website (accessed May 10, 2009):

REAL ID is a nationwide effort to improve the integrity and security of state-issued driver's licenses and identification cards, which in turn will help fight terrorism and reduce fraud.

The 9/11 Commission recommended that the U.S. improve its system for issuing identification documents, urging the federal government to set standards for the issuance of sources of identification. The REAL ID Act of 2005 was Congress' response to this key recommendation.

REAL ID-compliant licenses and ID cards must meet minimum standards which include

- information and security features that must be incorporated into each card
- applicant's proof of identity and lawful status
- verification of the applicant's source documents
- security standards for issuance of licenses and identification cards

Why We Need REAL ID

Raising the standards of state-issued identification is an important step toward enhancing national security. Because a driver's license serves so many purposes (access to federal buildings, nuclear power plants, boarding aircraft, etc.), terrorists actively seek fraudulent state-issued identification. The REAL ID rules will make it more difficult for them, while making it easier for law enforcement to detect falsified documents.

The Real ID law has proved controversial. Several states including Washington have enacted laws blocking compliance, reacting to cost, technical, and privacy concerns.

The new rule. Today's new rule makes it easier for states to comply with the Real ID law by making it optional for a state to use RFID Enhanced Driver's Licenses to meet all requirements of Real ID, rather than the separate list of benchmark requirements DHS initially specified for compliance with the Real ID law. "Enhanced driver's licenses give confidence that the person holding the card is the person who is supposed to be holding the card, and it's less elaborate than Real ID," Secretary Napolitano told *The Washington Times* (Feb. 20, 2009).

Congressman X's position

In his email to you this morning, Congressman X made it clear that he vehemently opposes the new RFID "Enhanced Driver's License" rule issued by DHS, on the grounds that it infringes on constitutional rights to liberty and privacy. His rationale?: Even if the only data on an RFID "Enhanced Drivers license" is a single number, and safeguards are in place so that only very limited information is conveyed from any database to federal agents whenever an RFID-enabled license is checked, there is no way to ensure that in the future various databases will not be linked together by governments or corporations. In fact, the trend is toward greater linkages and integration across various databases. It is only a matter of time before the "enhanced driver's license" number becomes traceable by people who, lawfully or unlawfully, want to access highly personal information about citizens, tracking and profiling their movement, political association, buying, and voting patterns. RFID is commonly linked to biometric data such as digital photos, fingerprints, or iris scans. Clever people will be able to compile the information in ways that are personally identifying. As Congressman X writes in his email to you:

"Big problem – and an incredibly short-sighted solution to border control. Effectively creates a 'national ID' card, something Congress deliberately tried to avoid when we passed Real ID back in '05, even though the 911 Commission had recommended it. Brings in national ID cards through the back door and we need to stop it. See attached Seattle Times article."

While national security was a major issue in the 2008 presidential election, President Obama has not spoken out publicly for or against using RFID technology for identification purposes, and, as a Senator, Obama was absent from the Real ID vote in '05.

What now?

In short, DHS has issued a new rule under the broad authority Congress provided to protect the nation's security, and Congressman X knows what he wants: States should not be required to issue licenses that include RFID tags. Now Congressman X needs your analysis and advice. He wants you to lay out his options for political action and recommend the most promising strategy.

As he put it, “Think big first: What are the possible options for me and others across the nation opposed to the new rule? After you analyze the options, develop for me a concrete political strategy for my consideration.”

Congressman X wants more than a vague strategy; he wants details so he can act on the plan without delay. “Tell me the plan,” he said, “and also particulars. For example: Whose support needs to be cultivated? How can I win this support? What do I need to do first, next, etc. to maximize prospects for success? What makes this the best option?”

Congressman X is a moderately conservative Representative from a moderately liberal district in Washington State—U.S. Congressional District #N. Becoming known as a leader who “does his homework” but is not afraid to think outside the box is very important to Congressman X. So is getting re-elected to Congress. He wants to make a difference on this issue, though he’s not wedded to a legislative solution.

POSTTEST DAY

Before you begin, take a moment to write down your initial thoughts about the following questions. (The fuller you can tell us your ideas, the better. Continue on additional sheets if needed.)

1. Who might have an interest in this new rule – and why?
2. What are some examples of the social, economic, legal, or political concerns they might have?
3. How can the different branches of government have influence over this power (i.e., the new rule just issued)?

Please write your response here.

MEMO

To: Congressman X
From: Staff Analyst
Re: New DHS rule: Real ID / RFID

POSTTEST DAY 1

Your Task:

Describe to Congressman X his options for political action, broadly speaking, and recommend to Congressman X a course of political action. Recommend where in the political process Congressman X should focus his energies, where he should turn for political support (and how), who the key players are, and what to find out from them. Convince the Congressman that you have explored the options as fully as possible under the circumstances, and recommend to him what else you'd want to know to guide further development of the plan.

Please write your response in a memo to Congressman X (on the next page). Be sure to describe your plan in detail so he can understand it and will be convinced.

Feel free to use the space below (and extra sheets of paper) to jot ideas first.

GO TO NEXT PAGE

MEMO

To: Staff Analyst
From: Congressman X
Re: New DHS rule: Real ID / RFID

I'm travelling and in meetings all day today so won't have time to talk – but I want to move forward on this ASAP. I received recommendations, including yours, back from all of the analysts on staff. Lots of good ideas to build on.

Please attend a 1-hour meeting first thing today (my administrative assistant will contact you shortly with the exact time and place). Review the ideas you've all put forward. Then, as a team, hammer out a single, well-crafted plan for my review. I'll need something as fine-tuned as possible.

Although I can't be there in person or by phone, I'd still like an oral briefing. At the end of your meeting, as a team, create for me a 5-minute (max) audio recording presenting and explaining the plan.

My administrative assistant will upload the recording afterward so I can listen to it. The assistant will record the whole meeting, but I'll only be listening to your final 5-min briefing. (Feel free to rehearse as many times as you wish before then.) The assistant will cue you when it's time for the official recording of the briefing (the last 5-minutes of the meeting).

I look forward to hearing your plan,

Best,

Appendix D: *Knowledge in Action* Test Scoring Rubric and Sample Student Answers

	1	2	3	4	5	6
1 Task & "Client" (Legislator) Directs advice to the Congressman <i>(appropriate to Congressman X)</i>	Does not give advice to the Congressman.	Advice is unrealistic & out of step with the political process.	Advice is somewhat realistic but is not geared to the legislator and lacks details.	Advice is somewhat tailored to the legislator, but lacks details or includes some erroneous inferences.	Advice is realistic, tailored to the legislator, and includes some pertinent details and/or sound inferences.	Advice is geared to the legislator, anticipating his or her concerns and/or advising legislator on what should be some of his or her concerns, given what is stated in the problem about this particular legislator and where he or she sits in the political landscape (i.e., type of district, party affiliation, personal aims): Advice is forward thinking, tailored to the legislator, and based on several sound inferences.
	NO ADVICE	PROBLEMATIC ADVICE	OK BUT GENERIC ADVICE	OK TAILORED ADVICE	GOOD TAILORED ADVICE	INSIGHTFUL TAILORED ADVICE
2 Influencing Public Policy Gives a political process account (using political process concepts & terminology).	Discusses pros and cons of the rule generally or gives an argument for or against the rule, or gives a list of issues that should be considered and discussed -- without specifying what actions or discussions should take place, with whom, at what stage, or to what end.	Plan conveys a political process account that is unrealistic and out of step with the legislative process and the broader policy making process. Uses erroneous facts and/or makes unsound inferences when specifying what actions or discussions should take place, with whom, at what stage, or to what end.	Plan conveys a political process account that is somewhat realistic, but it uses only generic concepts and terminology to describe actions such as meeting, discussion, negotiation, agreement, adoption, implementation, and enforcement of policy.	Plan conveys a political process account that is somewhat realistic, and it uses specific concepts and terminology to describe actions such as meeting, discussion, negotiation, agreement, adoption, implementation, and/or enforcement of policy. But the political process account lacks details or includes some erroneous inferences.	Plan conveys a political process account that is somewhat realistic, and it uses specific concepts and terminology to describe actions such as meeting, discussion, negotiation, agreement, adoption, implementation, and/or enforcement of policy. The political process account includes some pertinent details and/or sound inferences relevant to power sharing arrangements in U.S. federalism historically, satisfying various constituencies, or criteria for good public policy. The specific concepts and terminology used are generally used to good effect.	Plan conveys a political process logic: what actions should be taken (or discussed, advocated, hammered out) by whom, when, using what political tools and institutions, and with what consequence for satisfying various constituencies and criteria for good public policy. Takes into account power sharing arrangements in U.S. federalism historically (e.g., distribution of formal and informal powers across the various branches, institutions, and levels of government, and conflicting and common interests among them). Demonstrates understanding and appreciation of how in the U.S. political system public policy is crafted, gains momentum, is enacted, and is upheld as legitimate. Discusses specific political agents (roles, institutions, constituencies) and/or public policy tools/levers.
	NO POLITICAL STRATEGY	PROBLEMATIC POLITICAL STRATEGY	GENERIC POLITICAL STRATEGY	OK POLITICAL STRATEGY	GOOD POLITICAL STRATEGY	INSIGHTFUL POLITICAL STRATEGY
3 Grasping Controversial Issue(s) Analyzes the public policy issue(s) at stake and why they are controversial	Does not name or frame any controversial issue(s).	The controversial issue(s) named and framed are off base & out of step with what is stated in the problem and the facts of the U.S. political scene.	The controversial issue(s) named and framed are somewhat realistic, but described only in very general terms. The situation is not analyzed in terms of types of issues raised (e.g., constitutional, legal, political), or the generic categories used (e.g., economic, social, political) are used to weak effect. Describes issue(s) in terms of why people generally would or wouldn't like the rule issued, or generally what would be good and bad about it (or why it would be good or bad).	The controversial issue(s) named and framed are somewhat realistic, and the situation is analyzed in terms of types of issues raised (e.g., constitutional, legal, political). But the analysis lacks depth, details or includes some erroneous inferences.	The controversial issue(s) named and framed are somewhat realistic, and the situation is analyzed in terms of types of issues raised (e.g., constitutional, legal, political). The analysis includes some depth, pertinent details and sound inferences.	Conveys strong grasp of the controversial issue(s) at stake. Relates the current controversy/issues to fundamental political precepts and/or perennial issues/tradeoffs (e.g., security vs. liberty). Contextualizes it as a constitutional issue or otherwise describes the history of the issue (or the history of the discourse about the issue). Discusses subordinate issues. The situation is analyzed in terms of types of issues raised (e.g., constitutional, legal, political) to good effect.
	NO CONTROVERSIAL ISSUE FRAMED	PROBLEMATIC ISSUE FRAMING	GENERIC ISSUE FRAMING & ANALYSIS	OK ISSUE FRAMING & ANALYSIS	GOOD ISSUE FRAMING & ANALYSIS	INSIGHTFUL ISSUE FRAMING & ANALYSIS

4 Overall
 Performance holistically; high rating also given for outstanding "peak" performance on single dimension(s)

1

2

3

4

5

6

Knowledge in Action Posttest: Sample Scoring

Task and Client

Score 1

Who might have an interest in this new rule – and why?

The government especially homeland security because they are responsible for protecting the privacy and safety of citizens and to prevent ID fraud, they will help protect citizens not only from terrorism but also from getting their identities stolen.

What are some examples of the social, economic, legal, or political concerns they might have?

How to get citizens to agree to participate, would it be a violation to first amendment rights? How secure are the personal information on the RFIDs? Over time, will it be easy for ID thieves to steal your identity as easily as it is now? How much will this cost to implement into our social system?

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

The executive branch will use it to its full potential to try and stop the threat of terrorism. The legislative will use the new rule to customize bills to fit with the people's preferences.

Memo

Dear Congressman X,
Having the option of possessing Enhanced ID cards is better than implementing RFID chips. This is because it is more convenient to have enhanced licenses which are less likely to invade privacy. By giving citizens the option to comply with the Real ID rule [it] also doesn't infringe on their first amendment rights. By voting for Real IDs its new rules, there will be a better chance of progressing towards the age of better security that we are currently seeking.

Score 3

Who might have an interest in this new rule – and why?

People who are mostly concerned with issues of national security are going to be most interested in this new rule. It adds another layer of protection that people are looking to add so that attacks like 9/11 are going to be less likely.

What are some examples of the social, economic, legal, or political concerns they might have?

Social - some may be concerned with citizens' feeling that their privacy is being exploited and that information they don't wish to come out will. Economic - the economic possibility of reinstalling a system for driver's licenses is astounding and may cost too much to do it. Legal/Political - may be illegal and unconstitutional to have information showed like this.

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

Judicial - can rule on how constitutional it is
Legislative - can pass/amend the bill into law
Executive - able to write bill into law a veto

Memo

The issue at hand is a controversial one and as such, it is important that you tread lightly when approaching this issue. While I know you oppose this new rule, we must also be aware of the upcoming election. Because the difference in party is evident in our district through not dominant, we have to convey your beliefs so that many will be convinced.

One of the biggest things that you can hit when addressing this issue is the issue of privacy. As a mostly democratic state and more importantly, a moderately democratic district, it would be wise to say that the new rule for driver's licenses invades too much privacy in individual lives and as such, that is why you're opposing it. By addressing the issue in this manner, you're saying to your constituents that their rights are most important to you and as a result, require your attention and protection.

The best place we can influence this issue is at the beginning. What you need to do is find other Washington representatives who have similar beliefs about this issue. Figure out a way to send a message to congress about this issue. A whole state's opposition to this rule is greater than one congressman's.

Score 5

Who might have an interest in this new rule – and why?

The individual states might have an interest in the new rule, since it is easier to comply with and would not cause quite as much of an uproar as Real ID. It also would hold the interest of citizens, who might have had privacy concerns over the RFID chips being used in the licenses. The DHS might be concerned because they might see the noncompliance with RFID as a weak point in national security.

What are some examples of the social, economic, legal, or political concerns they might have?

Socially, citizens might be concerned that the government is tracking them too closely, and that it might have adverse effects on their lives. Economically, states should be worried about the cost of the technology. They also should be concerned about potential lawsuits for invading the privacy of citizens. Politicians should be wary of the issue, as it might cause a backlash that would hurt them in the next election.

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

The legislative branch is responsible for oversight and making sure that it is being upheld as written and for its original purpose. The executive branch is responsible for enforcing the law, specifically under the DHS. The judicial branch is responsible for judging the constitutionality of the act if any potential litigation arises.

Memo

Given your vehement opposition to the new rule regarding the Enhanced Drivers Licenses, there are a few options for you to take to rally support against the measure. First of all, you should drum up support among various interest groups, including the ACLU and other organizations devoted to protecting the privacy of citizens. Urge them to pressure other congressmen to redirect the new rule or revise it. Short of a change in the law, there are other key measures that can be taken. In Washington State, you should urge the state legislators to pass legislation to oppose the Enhanced Drivers License. Rally up support for state's rights advocates and make it known that such a law is an absolute invasion of privacy, with too much potential for government interference in our lives. Also, you could file an injunction in the courts to try to block the measure from being enforced and by testing the constitutionality of it in the judicial system.

Influencing Public Policy

Score 1

Who might have an interest in this new rule – and why?

Anybody who is an adamant supporter of the "right to privacy" or anybody who feels like sacrificing liberty for safety. Those are the people on either side of the issue who care the most.

What are some examples of the social, economic, legal, or political concerns they might have?

Public safety, cost, national security, ID fraud, privacy, civil liberties.

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

Congress and the President can both make it a law, and the supreme court can justify it or refute it.

Memo

Congressman:

Here is what you need to do. Go back to your district, find the political activism groups in your area. Ask them what they think about the RFID and how it should be used, because they obviously genuinely care about the political process more than the lobbyists trying to sway you. When you gather their opinions, do what you were elected to do and represent them.

I say focus all of your energy on this, you should already be doing this though, it's how democracy works. They are your big players, and the people who will re-elect you when/if you come up with a viable solution that tries to represent all of their opinions without your personal bias (or, similarly, the bias of politics).

If you have a good enough plan, it will go through to congress.
Great success.

Score 3

Who might have an interest in this new rule – and why?

People who frequently travel across the border from Canada to the US.

- Could make it easier, faster.

Republicans (?) because it seems like an expansion of government and infringement on their privacy.

Conspiracy theorists- because it's obvious it's a conspiracy.

What are some examples of the social, economic, legal, or political concerns they might have?

Social - Possible to track people—parents tracking kids, because they are guardians?

- targeted advertising

Legal - Could be used to locate people at the time of a crime-bad in terms of privacy but good in terms of prosecuting people.

Economy - Manufacturers of RFID chips.

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

If someone brings a suit, Supreme Court could call on right to privacy and strike it down, but that would take a long time to happen.

Legislative - there are probably committees or organizations for oversight and they can call hearing and look at this.

- also funding

Executive can tell the Secretary that he approves or disapproves this

Memo

Focus on legislative - push for greater protection on info from RFID. Republican party should oppose it - aim for unity.

Congressional oversight - if there are hearings, can pull in compelling witnesses..

Score 5

Who might have an interest in this new rule – and why?

Police/border patrol - prevent illegals/watch criminals.

Advertisers - reach customers.

Parents - track children to keep out of trouble.

Travelers - make travel faster or harder if illegal.

State dept. licensing - costs \$ to implement.

Citizens - potential tracking by govt / illegal or corrupt misuse of information

What are some examples of the social, economic, legal, or political concerns they might have?

Protect the border / prevent terrorism.

Misuse of govt/ overstepping bounds → police state

More spending, increased consumerism.

Increased ease of social networking.

Tourism down from harder travel?.

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

Congress can amend it/ pass new law.

President can help implement it - pass on jurisdiction to specific bureaucracies, offer to give grants to states to follow it, etc.

S.C. can void or change the law if someone sues if they think it is used illegally..

Memo

Well, your first option is to try and block the rule on Constitutional grounds. This process will involve backing an interest group that backs someone suing the DHS. The individual suing will have to have their case taken to the Supreme Court, whose Justices can ultimately decide whether the rule can be upheld or not. This is a tricky process, and not your best option as it is a lengthy and risky way to change laws.

Another choice is to go through the State legislature and try to block the federal demands by limiting the rules of the DHS. You will need to gain the support of the Governor and State Legislatures. You can perhaps modify the requirements of the rule by only implementing readers near the border or something.

Lastly, you can fight the bill through Congress. You will need to buddy up to all your allies in the house (moderates + conservatives) and try and get the support of a committee concerned with such issues. Yah, do this.

Grasping Controversial Issue(s)

Score 1

Who might have an interest in this new rule – and why?

The public because they might one day be trackable at all times by a computer chip.

People who wrote these chips because they could get a lot more money.

Illegal immigrants because it would be harder for them to live in the USA without being caught.

What are some examples of the social, economic, legal, or political concerns they might have?

Social - People will be divided on the ethics behind this.

Economic - Computer chip company would make a large profit.

Legal -

Political -

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

The congress must pass the law and the president will then sign or veto it.

Memo

Congressman X,

Due to the highly debate ethics behind this controversial legislation, I strongly recommend that you do not support this.

Supporting this controversial bill could ruin your entire career. If I were you, I would align yourself with some powerful members of congress who also plan to vote against the bill. From there, you should stand strong and not flip flop regardless of what your congressional peers do. Only vote for this legislation if the people in your district support it. Otherwise, the ethics behind this bill make it far too politically potent to support.

Best of luck,

Score 3

Who might have an interest in this new rule – and why?

People concerned about privacy and security. This is because the ability to track movements of a person. This can be an intrusion on privacy. This also can serve as a security issue as they can use this against fraud and other such criminal activities.

What are some examples of the social, economic, legal, or political concerns they might have?

Social: tracks habits, whereabouts.

Economic: using habits to personalize advertising.

Legal: Constitutionality, cases on fraud, Political: the controversy over the RFID, money, security.

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

Congress has to enact the law and fund it. The executive can muster support and mobilize it. The bureaucracy will issue it, and the judicial will decide its constitutionality.

Memo

Dear Congressman X,

The RFID seems to be a retooled version of the secure ID. Political support should be gathered from the people, young and old. Targeting potential venues and how it may harm and give information to the government and corporations. Explain exactly the extent of the technology and what it does. Emphasize its ability to sense at a distance. Key players are those in the development, National Security groups, Corporations, and constituents. Information that may be helpful to further my plan and better inform yourself on is:

1. Information on the technologies abilities and vulnerabilities.
 2. Legal and fraud issues.
 3. Sensibility and usage of the technology in government and the economy.
- this is an intrusion into privacy and makes government a bigger part of lives. Conservatives alike would likely oppose the bill, it would be best to help collaborate and earn political support.
- Sincerely Staff Analyst

Score 5

Who might have an interest in this new rule – and why?

Groups concerned about liberty, privacy.

Congressional reps. of districts with borders or major ports.

Customs services, groups around immigration, naturalization and customs.

What are some examples of the social, economic, legal, or political concerns they might have?

Social: erodes culture of relative privacy and personal distinctiveness, makes information unnecessarily available to more people than required. Also, could connect people, + people, + government, on another dimension.

Legal: has potential to be ultimate downfall of privacy, information can be used in undesirable ways by both the [unsavory] everyman and by unscrupulous professionals. albeit could make many legal and governmental dealings faster.

Economic: could enhance commercial activity through open channels of communication, connect producers to products to people.

Political: concerns over implications for privacy that runs counter to political culture. Will constituents support?

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

Executive departments and bureaucracy are responsible for implementing and devising general procedures for new rule and can influence congress as to weather and to what extent they would want to consent to exercising this power. Congress is susceptible to influences from interest groups, committee representatives themselves. Representatives may oppose the measure from a personal standpoint, and those sensitive to demands of constituents may fail to garner their support for the bill and oppose it. They may also seek to introduce checks on the new rule's capacity in the form of new bills or make amendments so that it becomes more pleasing for other branches (see below).

Supreme Court: decisions can deem the act unconstitutional if challenged in court likely, for such a contentious issue.

Memo

The way I see it, emphasis on your constitutional basis for opposition to the bill is likely your best bet in terms of placating your constituents, serving them, and preventing what you yourself consider a dangerous act of Congress. As a moderate conservative in a moderately liberal district, you surely comprehend the ongoing combat and concessions of the American people over the role and size of the government, but ideals presented by the Constitution are enshrined in the minds of the people, who would also not take kindly to the potential disappearance of privacy and liberty privileges that they daily enjoy.

Or oppose the bill, and if you cannot, place extensive amendments on it that would act as safeguards against the massive reprehensible implications it would have on our civil liberties, emphasizing your constitutional grounds all the while.

Should you choose to follow this strict adherence to Constitutional standards, support should be easy to amass among much of the American population, your constituents included. Countless interest groups partake in active scrutiny of government actions precisely to these decisions they believe to be an effort on the government's part to reclaim Americans' privacy (or just unwittingly wrest that limited amount of power they share with the people over the people, in less extreme cases), and their support could be invaluable to your cause. I am also secure in the belief that you are not the only congressperson to adopt this view on the bill, and, like support from the people, may be galvanized across the demographic board to your message. Committees on these matters understand well the implications of the technology; agencies are likewise knowledgeable and responsive, and lobbyists know how to spread the word. You will be at no loss for support on your position, thus I encourage you to pursue it.

Overall

Score 1

Who might have an interest in this new rule – and why?

Everyone, because it will affect everyone. Or government and president that is.

What are some examples of the social, economic, legal, or political concerns they might have?

Information able to be looked into, info grows, to tracking and all info until chip has total control

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

By deciding if it is passed or not or amended.

Memo

I would tell him he basically has three options, he can support it, oppose it, or choose to amend it. I could then suggest that he strongly oppose it because the vast majority of Americans will choose to oppose it as well and if he wishes to be reelected then he should too. Americans like freedom, majority will not go along with this. There has been far too many bad moves about this. If he wants to get re-elected, then to oppose it.

Score 3

Who might have an interest in this new rule – and why?

Authorities that are able to more easily gain this information- like police or border security- would be very interested because it changes their day to day work significantly in terms of efficiency and improving authenticity. Moreover, government agencies that can gain new data on people's travel patterns, habits, etc would also be really interested because it offers more possibilities and ways for them to better target various groups.

What are some examples of the social, economic, legal, or political concerns they might have?

Legal - People who are being required to have this ID may have concerns over their privacy and who is able to access their info... and how it'll be used.

Political - Politicians will be concerned when it comes time to taking a position on this and seeing it implemented while thinking about constituent support for future elections.

Economic - Government agencies etc. will be concerned in terms of how this will impact what people choose to do or not do... in terms of traveling, etc. And thus the economy and what they buy/sell.

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

The legislative branch will have to agree on the fine print details of this new rule, and pass it. The executive branch will have to go over the proposal and choose to sign off or veto it. If this is passed, the Judicial branch also can have a say on whether this conflicts with the constitution (eg. Bill of Rights) through their power of judicial review.

Through states, congress would also have to determine how to ensure that this is implemented everywhere.

Memo

Congressman X,
After thorough research on the full details and background of this issue, I've come up with a few possible paths of action you have the option of pursuing. As someone who is opposed to this new rule, you can garner support by beginning with your constituents and moving but through not only ad campaigns, but also conferences with people representing different sectors that would be negatively impacted and by inviting key people (in addition to voters) to attend. This would help to create a more vocal venue for the widespread dissent against RFID and perhaps even influence other congressmen when it comes to passing or not passing this. Furthermore, I believe the key players include researchers who are currently seeing the effects of the technology as well as key leaders in congress-who are in charge of how this legislation is discussed. In my opinion, I would focus my energies not so much on ad campaigns, as in talking with interest groups, lawyers, and your constituents to create a solid support base from which you can voice your opinion more strongly.

Finally, would like more information in terms of whether we can find other examples of how similar legislation has gone wrong /less than ideal.

I hope you will take my advice and thoughts into consideration when finalizing your plan of action.

Regards,

Score 5.5

Who might have an interest in this new rule – and why?

Many watchdog civil rights groups, such as the ACLU and NOW/NARAL would be very concerned over the infringement of privacy rights. This also incorporates a lot of security and national defense issues, which concerns both federal and state border security.

What are some examples of the social, economic, legal, or political concerns they might have?

Economic: short term increased costs in the form of RFID [tag], Long term job loss for customs and border patrol

Social: violation of privacy, risk of stolen identity

Legal: Are arrests made from RFID evidence considered under the exclusionary principle?

Jurisdiction: should this be monitored at a Federal level.

How can the different branches of government have influence over this power (i.e., the new rule just issued)?

Executive: Department of Homeland security-border patrol, INS-immigration and naturalization could take advantage of this to keep track of illegals.

Legislative: congress could rule that RFID's be carried around 24/7

Judicial: exclusionary principle/using RFID's to debunk alibis.

State: interference with traditionally state role in patrolling borders.

Memo

Three things are key to defeating this bill-support from interest groups, media attention, and bipartisanship.

For the first, I would recommend reaching out to groups such as the ACLU first. Watchdog civil rights groups are constantly paranoid of such measures, which are inherent, albeit passive, violations of the right to privacy. Moreover, in order to maintain the reputation of "doing your homework", I would recommend talking to policy experts from groups such as the freedom foundation, the Cato Institute, or, within our state, The Evergreen foundation. These groups are libertarian, and tend to place a strong emphasis on the civil liberties neglected by the law.

The most important arena to focus on right now is the grassroots approach, directly to the people. The public tends to be considerably less awed by the magic words "Homeland Security". In order to approach your constituency directly, you must get media attention of this subject. In order to do this, I suggest doing press conferences and interviews-many hosts, such as Sean Hannity and Jon Stewart, have a wide viewership and awareness is key to starting action.

Another resource is the bureaucracy itself. Within the government, there are many iron triangles, and if you can convince them to work in concert, it can go a long way towards getting a congressional committee to take action. For example, this issue has longterm repercussions for both the Department of Justice and the INS, since the creation of a national ID system have longterm repercussions. One of these concerns would be the use of RFID tracking data in courts-this could also catch the attention of the American Bar Association.

If this law is already passed, many groups, such as states seeking to regain jurisdiction over border control. As well as civil rights groups, could choose to present this to the supreme court on the grounds of a) not pertaining to commerce and therefore out of congressional/legislative jurisdiction, and b) a violation of due process and the right to privacy.

Another good angle is that of cyber-terrorism. Through this, you might sway Republican representatives who are national security oriented. In addition to those who oppose this bill on the grounds of state's rights and civil liberties.

Finally, an alternative plan would help clarify your position on this and add moderation to your approach.

Appendix E: “Politics & Me” Engagement Survey Subscales & Instrument

Subscale	Variable (Survey Item)	Survey Section
Committed	SELF religious	Intro
	SELF Smart	Intro
	SELF intl issues	Intro
	SELF Fair	Intro
	SELF stand up for right	Intro
	SELF solving comty problems	Intro
	SELF Creative	Intro
	SELF Pol involved	Intro
	SELF Compassionate	Intro
	SELF Honest	Intro
	SELF gov decisions and policies	Intro
	SELF Unconventional	Intro
	SELF justice and human rights	Intro
	SELF Responsible	Intro
	SELF Outgoing	Intro
	PERSP ACT natl, state, and loc issues	Your Perspectives on Political Action
	PERSP ACT comty orgs and local gov	Your Perspectives on Political Action
	PERSP ACT my comty.	Your Perspectives on Political Action
	PERSP ACT natl issues	Your Perspectives on Political Action
	PERSP ACT care me and family	Your Perspectives on Political Action
	PERSP ACT learn backgds exps diff	Your Perspectives on Political Action
	PERSP ACT hear others' ideas	Your Perspectives on Political Action
PERSP ACT work w backgds exps diff	Your Perspectives on Political Action	
REASON I connected to others	Your Civic & Political Participation & Goals	

Subscale	Variable (Survey Item)	Survey Section
Capable	PERSP ACT each good at	Your Perspectives on Political Action
	PERSP ACT each intesd in	Your Perspectives on Political Action
	KNOW Current natl or internatl issues	How You Understand Your Knowledge and Skills of Government & Politics
	KNOW Current loc or state issues	How You Understand Your Knowledge and Skills of Government & Politics
	KNOW Pol leaders	How You Understand Your Knowledge and Skills of Government & Politics
	KNOW Current econ issues	How You Understand Your Knowledge and Skills of Government & Politics
	KNOW Orgs	How You Understand Your Knowledge and Skills of Government & Politics
	KNOW Theories	How You Understand Your Knowledge and Skills of Government & Politics
	KNOW institutions	How You Understand Your Knowledge and Skills of Government & Politics
	GEN SKILL Explain my ideas	How You Understand Your Knowledge and Skills of Government & Politics
	GEN SKILL compromise	How You Understand Your Knowledge and Skills of Government & Politics
	GEN SKILL diverse grps	How You Understand Your Knowledge and Skills of Government & Politics
	GEN SKILL Deal w conflict	How You Understand Your Knowledge and Skills of Government & Politics
	GEN SKILL statement at meeting	How You Understand Your Knowledge and Skills of Government & Politics
	GEN SKILL Talk social barriers	How You Understand Your Knowledge and Skills of Government & Politics
	GEN SKILL grp leadership	How You Understand Your Knowledge and Skills of Government & Politics
	POL SKILL Know to contact	How You Understand Your Knowledge and Skills of Government & Politics
	POL SKILL Weigh pros cons	How You Understand Your Knowledge and Skills of Government & Politics
	POL SKILL research issue	How You Understand Your Knowledge and Skills of Government & Politics
	POL SKILL Org people	How You Understand Your Knowledge and Skills of Government & Politics
	POL SKILL Org meeting	How You Understand Your Knowledge and Skills of Government & Politics
	POL SKILL plan	How You Understand Your Knowledge and Skills of Government & Politics
	POL SKILL Write	How You Understand Your Knowledge and Skills of Government & Politics
POL SKILL Recognize interests	How You Understand Your Knowledge and Skills of Government & Politics	

Subscale	Variable (Survey Item)	Survey Section
Inspired	EFFECTIVE contact influential pple	Your Perspectives on Political Action
	EFFECTIVE interest grps	Your Perspectives on Political Action
	EFFECTIVE protests	Your Perspectives on Political Action
	EFFECTIVE media	Your Perspectives on Political Action
	EFFECTIVE Giv money	Your Perspectives on Political Action
	EFFECTIVE Becming informed	Your Perspectives on Political Action
	PERSP SELF undstd poli issues natl	Your Perspectives on Political Action
	PERSP SELF I role	Your Perspectives on Political Action
	PERSP SELF something to say	Your Perspectives on Political Action
	PERSP SELF better informed	Your Perspectives on Political Action
	PERSP SELF qualified	Your Perspectives on Political Action
	HARD potholes	Your Perspectives on Political Action
	HARD campus probs	Your Perspectives on Political Action
	HARD sen ctr addition	Your Perspectives on Political Action
	HARD charity event org	Your Perspectives on Political Action
	HARD start prog	Your Perspectives on Political Action
	HARD campus policy	Your Perspectives on Political Action
	HARD state law or budget	Your Perspectives on Political Action
	HARD clean-up prog org	Your Perspectives on Political Action
	HARD Influence loc election	Your Perspectives on Political Action
	FOLLOW POL how often	Your Interests
	DAYS newspaper	Your Interests
	DAYS magazine	Your Interests
	DAYS TV news	Your Interests
	DAYS Internet news	Your Interests
	DAYS Discuss	Your Interests
	DAYS e-mail share	Your Interests
	DAYS Use e-mail org issue	Your Interests
	DAYS documentary	Your Interests
	DAYS Use blogs or social netwrkg sites	Your Interests
	REASON care	Your Civic & Political Participation & Goals
	REASON learning	Your Civic & Political Participation & Goals
	REASON feel good	Your Civic & Political Participation & Goals
	REASON influence	Your Civic & Political Participation & Goals
	REASON upset	Your Civic & Political Participation & Goals
	REASON mpact my life	Your Civic & Political Participation & Goals
	REASON ed or career goals	Your Civic & Political Participation & Goals
	REASON excited	Your Civic & Political Participation & Goals
	REASON inspired by someone	Your Civic & Political Participation & Goals
	REASON people who share my ideals	Your Civic & Political Participation & Goals

Subscale	Variable (Survey Item)	Survey Section
Involved In Action	TIMES Discuss w friends	Your Civic & Political Participation & Goals
	TIMES Work w grp comty	Your Civic & Political Participation & Goals
	TIMES Contact pub official	Your Civic & Political Participation & Goals
	TIMES Contact newspaper or mag	Your Civic & Political Participation & Goals
	TIMES Call radio TV talk show	Your Civic & Political Participation & Goals
	TIMES Attend speech	Your Civic & Political Participation & Goals
	TIMES protest march	Your Civic & Political Participation & Goals
	TIMES petition	Your Civic & Political Participation & Goals
	TIMES campaign	Your Civic & Political Participation & Goals
	TIMES boycott	Your Civic & Political Participation & Goals
	TIMES Buy endorse	Your Civic & Political Participation & Goals
	TIMES wear button	Your Civic & Political Participation & Goals
	TIMES Give money	Your Civic & Political Participation & Goals
	TIMES canvas	Your Civic & Political Participation & Goals
	TIMES Donate to charity	Your Civic & Political Participation & Goals
	TIMES school or comty grp	Your Civic & Political Participation & Goals
	TIMES art event	Your Civic & Political Participation & Goals
	FUTURE Vote natl election	Your Expectations About Future Involvement
	FUTURE Vote loc election	Your Expectations About Future Involvement
	FUTURE Discuss w friends	Your Expectations About Future Involvement
	FUTURE Work w grp comty	Your Expectations About Future Involvement
	FUTURE Contact pub official	Your Expectations About Future Involvement
	FUTURE Contact newspaper or mag	Your Expectations About Future Involvement
	FUTURE Call radio TV talk show	Your Expectations About Future Involvement
	FUTURE Attend speech	Your Expectations About Future Involvement
	FUTURE protest march	Your Expectations About Future Involvement
	FUTURE petition	Your Expectations About Future Involvement
	FUTURE campaign	Your Expectations About Future Involvement
	FUTURE boycott	Your Expectations About Future Involvement
	FUTURE Buy endorse	Your Expectations About Future Involvement
	FUTURE wear button	Your Expectations About Future Involvement
	FUTURE Give money	Your Expectations About Future Involvement
	FUTURE canvas	Your Expectations About Future Involvement
	FUTURE Donate to charity	Your Expectations About Future Involvement
FUTURE school or comty grp	Your Expectations About Future Involvement	
FUTURE art event	Your Expectations About Future Involvement	

Appendix F: “Sense of Classroom Community” Survey Subscales

Subscale	Survey Item
Membership	11. I know most of the students in my class very well
	12. I feel I belong in this class
	13. I feel comfortable in my class
	10. I would rather be in another class (-)
	3. Students in my class accept me for who I am
	14. Very few students in my class know me well (-)
Emotional Connection	5. I hope I have the same kinds of classmates in the future.
	4. I like my class.
	7. I feel I am a valued part of the class.
	23. Most of the time students in my class get along with each other
	19. Students in my class generally do not get along with each other (-)
	18. It is very important to me to be in this class rather than in another class
Influence	6. Everyone is a valued part of the class.
	22. What I think and say is important to the rest of the class
	9. We make a lot of decisions about what to learn
	17. If there is a problem in my class, students have a say and it gets solved
	16. I have no influence over what my class is like (-)
	15. I care about what students in my class think of me
Needs Fulfillment	24. This class is a good class for me to be in
	2. Students in my class share the same values
	1. In my “AP Gov” class we help each other learn.
	8. In my class everyone is an expert in something
	21. I can depend on students in my class for help if I need to
	20. My classmates and I want the same things from the class

4-point Likert scale: 1=Never, 4=All the time.

Appendix G: Technical Report on Analyses

Research Measures Administered to Students

College Board-Administered AP Test score

The AP U.S. Government and Politics test score was obtained from the school district files. In addition to analyzing the test score on the 1-5 scale, the score was dichotomized into category 0: scores 1 and 2 and category 1: scores 3, 4, 5 since many colleges assign college credit for AP scores of 3 or higher.

District-Administered AP exam

The district administered a practice AP Exam to students who were not taking the College Board AP Test. This test was then scored by an expert on the scoring system for the AP American Government test.

Project-Administered *Knowledge in Action* Test

The project administered an assessment to all students who had consented to participate in the project. The description of task, the rater training procedures, and the rubrics used to score the written response are described in Appendix C and D. Scores were obtained for the following dimensions: Task & Client, Influencing Public Policy, Grasping Controversial Issues, and Overall rating. The percent agreement of 2 independent raters on these dimensions were Task & Client (88%), Influencing Public Policy (84%), Grasping Controversial Issues (81%), and Overall rating (93%). When the 2 raters did not agree within 1 point, the rubric was applied by an independent third rater and the mean rating was assigned to the paper. Only 7 papers required a 4th rater.

Classroom Community Perception Scales (“Sense of Classroom Community” Survey)

Student responded at the beginning (pretest) and end (posttest) of the school year to a self report questionnaire that produced scores on Membership (6 items, pretest $\alpha = .69$; posttest $\alpha = .68$), Emotional Connection (6 items, pretest $\alpha = .74$; posttest $\alpha = .73$), Influence (6 items, pretest $\alpha = .65$; posttest $\alpha = .59$), and Needs Fulfillment (6 items, pretest $\alpha = .76$; posttest $\alpha = .71$).

Political Involvement Scales (“Politics and Me” Survey)

Students responded at the beginning (pretest) and end (posttest) of the school year to a self-report questionnaire about their current and future involvement in political issues. Scores measure Committed (23 items, pretest $\alpha = .88$; posttest $\alpha = .92$), Capable (24 items, pretest $\alpha = .94$; posttest $\alpha = .94$), Inspired (52 items, pretest $\alpha = .93$; posttest $\alpha = .93$), and Involved in Action (36 items, pretest $\alpha = .94$; posttest $\alpha = .95$).

Student Background Measures

PSAT Test scores

PSAT test scores for mathematics, verbal, writing and total were obtained from the school district files. The Total PSAT score was used in the analyses. For some analyses, students with Total PSAT scores below the sample mean (mean=165.14) were selected.

Prior AP Test Scores

Prior AP Test scores were obtained from the district files. For each individual, the mean of prior AP scores, the number of prior AP Tests taken, and the score on the AP U.S. History test were calculated.

Cumulative Grade Point Average

The cumulative grade point average (GPA) for each student was obtained from district records.

Demographic Information

The student’s gender, ELL qualification, Special Education qualification, and ethnicity were obtained from district records.

WASL (Washington Assessment of Student Learning) Scores

The student’s scores on the WASL tests were obtained from district records. The maximum score earned on the reading, mathematics, writing, and science WASL scores were calculated.

Study 1 Analyses

Study 1 compared the results for students enrolled in 2 high schools that were matched on prior AP performance and student SES. The results for students in 4 traditionally-taught AP classes were compared with the results for students in 4 problem based learning (PBL) AP classes. Hierarchical Linear (random coefficient) models were used to compare the results taking into account the students nesting within classrooms, student-level prior achievement, and the treatment condition.

The models took the following form:

Level 1 Model $\text{Posttest Outcome} = \beta_0 + \beta_1 (\text{student's pretest or prior achievement}) + r$
Level 2 Model (student nested within classroom; treatment fixed effects) $\beta_0 = \gamma_{00} + \gamma_{01} (\text{Traditional vs PBL}) + \mu_0$ $\beta_1 = \gamma_{10}$

Students Taking the AP Test

Percent of students who took the College Board AP Test

	PBL AP Classes (N=169)	Traditional AP Classes (N=107)
Did not take test	2.8%	38.3%
Took test	97.2%	61.7%

Scores on district "AP Test" of students in traditional AP classes who did not take the College Board AP Test

	Traditional AP Classes (N=31)
1	87.1%
2	12.9%
3	0.0%
4	0.0%
5	0.0%

Interpretation: Based on results in Tables 1 and 2, a smaller proportion of students in the traditional AP classes took the AP Test. All students who did not take the College Board AP Test scored 1 and 2 (out of the 5 point AP scale) on the district "AP" test, indicating that those who took the AP Test were, as a group, less prepared or motivated to perform well on the test.

Percent of students earning AP scores in the 2 groups of classes

AP Test score	PBL AP Classes (N=103)	Traditional AP Classes (N=66)
1	3.9%	19.7%
2	20.4%	28.8%
3	30.1%	31.8%
4	17.5%	13.6%
5	28.2%	6.1%

Percent of students earning AP score of 3 or greater in the 2 groups of classes

AP Test score	PBL AP Classes (N=103)	Traditional AP Classes (N=66)
Below 3	24.3%	48.5%
3 or greater	75.7%	51.5%

Interpretation: While these tables do not adjust for prior achievement, they indicate that more students in the PBL classes earned AP Test scores above 3 and that the distribution of scores in the PBL classes is shifted toward higher scores than the distribution of scores in the traditional AP classes even though a broader range of students took the AP Test in the PBL classes.

Hierarchical Linear Modeling of AP Test Scores

The models described above that take the students nesting into classes were fit to the AP scores with the following results:

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.91	0.267	3.40	6	.017
WASL read	0.01	0.003	2.82	94	.006
US Hist AP	0.95	0.074	8.68	94	.001

Interpretation: These results indicate that the PBL adjusted condition mean was significantly greater by 0.91 points than the traditional AP mean after adjusting for the student's prior WASL reading score and the student's prior score on the US History AP exam. Only students who took the AP US History exam can be included in this analysis.

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.70	0.226	3.09	6	.023
WASL read	0.01	0.003	4.08	150	.001
All AP mean	0.76	0.077	9.77	150	.001

Interpretation: These results indicate that the PBL condition mean was significantly greater by .70 points than the traditional AP mean after adjusting for the students prior WASL reading score and their prior score on all AP exams they had taken. All students who had previously taken at least 1 AP exam were included.

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
Mean of trad	2.58	0.072	35.64	6	.001
condition	0.88	0.107	8.16	6	.001

Interpretation: These results indicate that the PBL condition estimated mean was significantly greater (3.46) than the traditional AP mean (2.58). All students who took the AP exam in the 2 schools in Study 1 are included in this analysis.

Hierarchical Linear Modeling of Fail/Pass AP Test Scores

The models described above that take the students nesting into classes were fit to the categorized AP scores (Fail/Pass) with the following results. In these analyses the log odds of passing is modeled as a function of condition and prior AP mean score.

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	1.34	0.494	2.72	6	.035
WASL read	0.02	0.010	2.10	150	.037
All AP mean	1.81	0.299	6.08	150	.001

Interpretation: These results indicate that students in the PBL condition were significantly more likely to pass the AP Test (3 or higher) than students in the traditional AP classes after adjusting for the student's prior WASL reading score and their mean prior score on all AP exams they had taken. All students who had previously taken at least 1 AP exam were included.

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	1.08	0.363	2.98	6	.026
WASL read	0.04	0.010	4.00	165	.001

Interpretation: To test the robustness of the above finding, these results indicate that students in the PBL condition were significantly more likely to pass the AP Test (3 or higher) than students in the traditional AP classes after adjusting for the student's prior WASL reading score. All students who had previously taken the WASL were included.

Means and Standard Deviations on Scores on the *Knowledge in Action* Test

Measure	PBL Classes (N=95)		Traditional Classes (N=91)	
	Mean	Stand Dev	Mean	Stand Dev
Overall	2.34	0.91	1.61	0.75
Task & Client	2.42	0.97	1.62	0.76
Influencing Public Policy	2.20	0.82	1.53	0.70
Grasping Controversial Issues	2.60	0.83	1.76	0.77

Hierarchical Linear Modeling of *Knowledge in Action* Test Scores

Overall Score

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.48	0.145	3.30	6	.019
WASL read	0.01	0.003	2.32	160	.022
pretest	0.41	0.083	4.94	160	.001

Interpretation: These results indicate that students in the PBL condition had significantly higher mean overall scores on the challenge test than students in the traditional AP classes after adjusting for the student’s prior WASL reading score and their pretest score on a challenge test. All students who had a WASL reading score and took the challenge pretest were included in the analysis.

Task/client Score

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.56	0.150	3.73	6	.013
WASL read	0.01	0.003	2.40	160	.018
pretest	0.31	0.075	4.19	160	.001

Interpretation: These results indicate that students in the PBL condition had significantly higher mean task/client scores on the challenge test than students in the traditional AP classes after adjusting for the student’s prior WASL reading score and their task/client pretest score on a challenge test. All students who had a WASL reading score and took the challenge test were included in the analysis.

Influencing Public Policy Score

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.53	0.118	4.74	6	.004
WASL read	0.01	0.002	2.48	160	.014
pretest	0.23	0.067	3.48	160	.001

Interpretation: These results indicate that students in the PBL condition had significantly higher mean Influencing Public Policy scores on the challenge test than students in the traditional AP classes after adjusting for the student’s prior WASL reading score and their inform public policy pretest score on a challenge test. All students who had a WASL reading score and took the challenge test were included in the analysis.

Grasping Controversial Issues Score

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.74	0.125	5.92	6	.001
WASL read	0.01	0.003	2.77	160	.007
pretest	0.16	0.081	1.95	160	.053

Interpretation: These results indicate that students in the PBL condition had significantly higher mean Grasping Controversial Issues scores on the challenge test than students in the traditional AP classes after adjusting for the student’s prior WASL reading score and their Controversial Issues pretest score on a challenge test. All students who had a WASL reading score and took the challenge test were included in the analysis.

Means and Standard Deviations on Posttest Scores of “Sense of Classroom Community” and “Politics and Me”

Measure	PBL Classes (n=87)		Traditional Classes(n=73)	
	Mean	Stand Dev	Mean	Stand Dev
Membership	2.97	0.49	2.71	0.53
Emotion Connection	3.05	0.53	2.78	0.49
Influence	2.64	0.45	2.58	0.46
Needs Fulfillment	2.71	0.50	2.64	0.56
Committed	4.18	0.59	3.93	0.77
Capable	4.00	0.60	3.53	0.84
Inspired	3.62	0.56	3.56	0.71
Involved in Action	2.85	0.87	3.27	0.77

Sense of Classroom Community

Membership

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.34	0.088	3.88	4	.029
pretest	0.47	0.092	5.14	106	.001

Interpretation: These results indicate that students in the PBL condition had significantly higher mean Membership ratings than students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Emotional Connection

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.43	0.082	5.33	4	.002
pretest	0.53	0.091	5.82	106	.001

Interpretation: These results indicate that students in the PBL condition had significantly higher mean Emotional Connection ratings than students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Influence

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.09	0.080	1.90	4	.128
pretest	0.25	0.098	2.54	106	.013

Interpretation: These results indicate that students in the PBL condition were not significantly different on their mean Influence ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Needs Fulfillment

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.14	0.161	0.84	4	.345
pretest	0.33	0.052	6.32	106	.001

Interpretation: These results indicate that students in the PBL condition were not significantly different on their mean Needs Fulfillment ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Politics and Me

Committed

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.08	0.092	0.86	6	.421
pretest	0.71	0.080	8.88	148	.001

Interpretation: These results indicate that students in the PBL condition were not significantly different on their mean Committed ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Capable

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.17	0.109	1.55	6	.086
pretest	0.66	0.049	13.68	145	.001

Interpretation: These results indicate that students in the PBL condition were not significantly different on their mean Capable ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Inspired

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	-0.03	0.162	-0.20	6	.085
pretest	0.71	0.050	14.03	146	.001

Interpretation: These results indicate that students in the PBL condition were not significantly different on their mean Inspired ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Involved in Action

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	-0.45	0.142	-3.16	6	.022
pretest	0.63	0.115	5.48	144	.001

Interpretation: These results indicate that students in the PBL condition had significantly lower mean Involved in Action ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Study 2 Analyses

Study 2 also compared the results for students enrolled in AP classes in 2 high schools. However, the 4 Problem-Based Learning (PBL) AP classes were in a school that historically had fewer students passing the AP Test as compared to the 4 classes that were in the comparison high school. The results for students in 4 traditionally-taught AP classes were compared with the results for students in 4 PBL AP classes. Hierarchical Linear (random coefficient) models were used to compare the results taking into account the students nesting within classrooms, student-level prior achievement, and the treatment condition.

The models took the following form:

Level 1 Model $\text{Posttest Outcome} = \beta_0 + \beta_1 (\text{student's pretest or prior achievement}) + r$
Level 2 Model (student nested within classroom; treatment fixed effects) $\beta_0 = \gamma_{00} + \gamma_{01} (\text{PBL vs traditional}) + \mu_0$ $\beta_1 = \gamma_{10}$

Hierarchical Linear Modeling of AP Test Scores

Because many students in the PBL AP classes had not taken AP previously the models described above that take the students nesting into classes were fit to the outcomes with prior GPA and WASL reading scores as controls for prior achievement giving the following results:

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	-0.15	0.184	-0.82	6	.445
WASL read	0.02	0.003	5.90	156	.001
GPA	0.87	0.189	4.63	156	.001

Interpretation: These results indicate that the PBL condition mean was not significantly different than the traditional AP mean after adjusting for the student's prior WASL reading score and GPA. Only students who took the AP Test and had scores on the WASL reading test can be included in this analysis. Note that only 61% of the students in the traditionally-taught AP condition took the AP Test and based on the performance on the challenge test and the district AP Test, those who did not take the AP Test in the traditionally-taught classrooms were lower in achievement than those who did take the AP Test.

Hierarchical Linear Modeling of Fail/Pass AP Test Scores

The models described above that take the students nesting into classes were fit to the categorized AP scores (Fail/Pass) with the following results. In these analyses the log odds of passing is modeled as a function of condition and prior WASL reading score, and prior GPA.

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	-0.73	0.399	-1.83	6	.116
WASL read	2.36	0.635	3.71	156	.001
GPA	1.81	0.299	6.08	155	.002

Interpretation: These results indicate that students in the PBL condition were not significantly different in their likelihood of passing the APP test (3 or higher) than students in the traditional AP classes who took the AP Test after adjusting for the student's prior WASL reading score and GPA.

Means and Standard Deviations on Scores on Posttest *Knowledge in Action* Test

Measure	PBL Classes (N=78)		Traditional Classes (N=91)	
	Mean	Stand Dev	Mean	Stand Dev
Overall	2.07	0.83	1.61	0.75
Task & Client	2.15	0.84	1.62	0.76
Influencing Public Policy	1.92	0.82	1.53	0.70
Grasping Controversial Issues	2.13	0.77	1.76	0.77

Hierarchical Linear Modeling of Posttest *Knowledge in Action* Test Scores

Overall Score

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.37	0.148	2.51	6	.046
WASL read	0.01	0.002	2.91	131	.005
pretest	0.40	0.078	5.18	131	.001

Interpretation: These results indicate that students in the PBL condition had significantly higher mean overall scores on the challenge test than students in the traditional AP classes after adjusting for the student’s prior WASL reading score and their pretest score on a challenge test. All students who had a WASL reading score and took the challenge test were included in the analysis.

Task & Client Score

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.44	0.148	3.00	6	.025
WASL read	0.01	0.003	3.05	131	.003
pretest	0.29	0.072	4.08	131	.000

Interpretation: These results indicate that students in the PBL condition had significantly higher mean task/client scores on the challenge test than students in the traditional AP classes after adjusting for the student’s prior WASL reading score and their task/client pretest score on a challenge test. All students who had a WASL reading score and took the challenge test were included in the analysis.

Influencing Public Policy Score

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.43	0.123	3.50	6	.016
WASL read	0.01	0.003	3.74	131	.001
pretest	0.17	0.101	1.72	131	.088

Interpretation: These results indicate that students in the PBL condition had significantly higher mean Influencing public policy scores on the challenge test than students in the traditional AP classes after adjusting for the student’s prior WASL reading score and their inform public policy pretest score on a challenge test. All students who had a WASL reading score and took the challenge test were included in the analysis.

Grasping Controversial Issues Score

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.39	0.122	3.17	6	.022
WASL read	0.01	0.003	5.16	131	.001
pretest	0.03	0.084	0.30	131	.762

Interpretation: These results indicate that students in the PBL condition had significantly higher mean Grasping Controversial Issues scores on the challenge test than students in the traditional AP classes after adjusting for the student’s prior WASL reading score and their Controversial Issues pretest score on a challenge test. All students who had a WASL reading score and took the challenge test were included in the analysis.

Means and Standard Deviations on Posttest Scores of “Sense of Classroom Community” and “Politics and Me”

Measure	PBL Classes (n=74)		Traditional Classes(n=73)	
	Mean	Stand Dev	Mean	Stand Dev
Membership	2.64	0.49	2.72	0.53
Emotional Connection	2.65	0.52	2.78	0.49
Influence	2.35	0.52	2.58	0.46
Needs Fulfillment	2.49	0.55	2.64	0.56
	(n=82)		(n=67)	
Committed	3.92	0.73	3.93	0.77
Capable	3.61	0.78	3.53	0.84
Inspired	3.32	0.65	3.56	0.71
Involved in Action	2.75	0.90	3.27	0.77

Sense of Classroom Community

Membership

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.14	0.133	1.06	5	.337
pretest	0.50	0.088	5.70	112	.001
WASL read	0.00	.0002	1.28	112	.204

Interpretation: These results indicate that students in the PBL condition had no significant difference in their mean Membership ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Emotional Connection

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.14	0.122	1.13	5	.312
pretest	-0.43	0.086	-0.13	112	.899
WASL read	0.00	.0002	1.28	112	.204

Interpretation: These results indicate that students in the PBL condition had no significant difference in their mean Emotional Connection ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Influence

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	-0.05	0.133	-0.38	5	.717
pretest	0.37	0.099	3.67	112	.001
WASL read	0.00	.0002	-1.63	112	.106

Interpretation: These results indicate that students in the PBL condition had no significant difference in their mean Influence ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Needs Fulfillment

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	0.02	0.200	0.14	5	.893
pretest	0.30	0.100	3.11	112	.003
WASL read	-0.00	0.002	-0.86	112	.391

Interpretation: These results indicate that students in the PBL condition were not significantly different on their mean Needs Fulfillment ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Politics and Me

Committed

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	-0.16	0.143	-1.09	6	.318
pretest	0.71	0.085	8.32	132	.001
WASL read	0.00	0.002	1.87	132	.064

Interpretation: These results indicate that students in the PBL condition were not significantly different on their mean Committed ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Capable

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	-0.15	0.136	-1.08	6	.322
pretest	0.75	0.075	9.50	131	.001
WASL read	0.00	0.002	0.89	131	.472

Interpretation: These results indicate that students in the PBL condition were not significantly different on their mean Capable ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Inspired

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	-0.25	0.160	-1.58	6	.164
pretest	0.72	0.075	9.50	131	.001
WASL read	-0.00	0.002	-0.38	131	.703

Interpretation: These results indicate that students in the PBL condition were not significantly different on their mean Inspired ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.

Involved in Action

Fixed Effect	Coefficient	Stand error	T ratio	df	p value
condition	-0.44	0.161	-2.76	6	.033
pretest	0.51	0.107	4.75	130	.001
WASL read	-0.00	0.003	-1.22	130	.224

Interpretation: These results indicate that students in the PBL condition had significantly lower mean Involved in Action ratings as compared to students in the traditional AP classes after adjusting for the student's pretest score. All students who had a pretest score were included in the analysis.