



## Knowledge in Action

A collaboration with John Bransford, Walter Parker, Susan Nolen, and Nancy Vye from the University of Washington

The 2014-15 school year marked the eighth year of the Knowledge in Action project, which has used design-based implementation research (DBIR) to improve the effectiveness of Advanced Placement (AP) U.S. Government and Politics, AP Environmental Science, and, most recently, AP Physics courses. This was done in preparation for handing over the work to the George Lucas Educational Foundation for implementation scale-up. The University of Washington team has been engaged in a partnership with the George Lucas Education Foundation and four school districts (one suburban public, two urban public, and one urban charter) in designing, implementing, and conducting research on a project-based approach to AP courses with the goal of matching or exceeding the pass rates of students' scores on the AP tests while encouraging deeper learning, engagement, and identity development for a diverse array of students.

The project began in 2007 in a suburban school district in Washington State. By 2014, the courses had been implemented in urban schools in Washington, California, and Iowa. Founded on the concept of "anchored collaboration," the project has involved teachers working with a multidisciplinary research group in a collaborative, problem-solving team environment. This collaborative model has focused the research on particular curricular and teaching approaches that show promise for meeting project goals and objectives, with financial and policy support from school leadership.

An overarching goal of the DBIR has been to create courses that are effective in helping students learn complex subject matter deeply enough to transfer that knowledge to novel situations while engaging them in authentic intellectual work with important ideas. Our data support the notion that deep learning in a given subject matter can be enhanced over time in project-based learning courses through quasi-repetitive "looping" cycles of immersion in comprehensive, well-designed projects.

One of the project objectives was to develop tests that better measure deep learning and flexible transfer. Accordingly, for each course, the Knowledge in Action team used DBIR methods to design, implement, and revise a Complex Scenario Test that requires students to address a novel, complex problem using the knowledge and skills they learned in their AP course.

Throughout the project, DBIR was employed for research and development of educational interventions that would be inherently usable, scalable, and sustainable. This use of DBIR was motivated by an interest in educational interventions that survive the translation from research to practice and mechanisms for studying interventions that focus on adaptation rather than alignment and fidelity.

While the approach has been refined over the years of the project, there are important consistencies, including these core design principles:

- Projects as the spine of the course (the main dish not dessert)
- Quasi-repetitive activity cycles (looping)
- Engagement first to create a “need to know”
- Teachers as codesigners and collaborators
- An eye toward scalability

During the course of this research, the curricula and teacher professional development have been refined and now contain comprehensive course materials, teacher guides, sample discussion topics, and so on for the AP U.S. Government and AP Environmental Science courses. The careful selection and use of texts to augment teachers and project activities as sources of information (information students need to participate in the projects and pass the AP test) has emerged as an important implementation consideration, especially in schools without a current strong AP culture. The lessons learned by the Knowledge in Action team in the improvement of these two courses have been helpful in the development of the new AP Physics curriculum and materials.