BRIEF HISTORY AND DESCRIPTION OF PROJECT SOL

CIVIL RIGHTS PROJECT AT UCLA

Project SOL 1.0, supported by grants from The James Irvine Foundation, The Carnegie Corporation, and The Bill and Melinda Gates Foundation, developed a comprehensive online college preparatory math and science set of courses, which provided access to rigorous curriculum for Spanish-speaking immigrant students. The program provided nearly 500 course matriculations in college preparatory math and science to students in four high schools in Southern California, and increased the pass rates of the students taking these courses. These courses would not normally have been available to students who were still learning English. Although not a randomized study, we were able to demonstrate higher college preparatory course taking and pass rates among Project SOL students than for similar students in other similar schools, including in courses such as chemistry and physics, which are virtually "off limits" to most English Learners.

Notwithstanding the successes of Project SOL 1.0, we began that project with materials initially developed in Mexico and saw a need to improve the curricula and learning experience, as evidenced by still inadequate passage rates for students. Less than of half of students in Algebra I, Geometry and Biology for Project SOL passed the course with a C or better, which was better than comparison students, but still not good enough. Our goal was and is not only to improve access to critical coursework for English learners, but also to better college readiness for

these students. Our work in Project SOL 1.0 helped us understand how we could improve on the curricula and instruction and simultaneously meet the challenge of new common core standards.

SOL 2.0 AND CK 12

We initiated Project SOL 2.0 in 2013, with the intent to provide the curriculum in open access format, aligned to common core standards (and consistent with Mexican college preparatory curricula, which is aligned with most other Latin American school systems) and in both English and Spanish. We selected CK-12 as a resource and guide for the curriculum. During the development of our prototype, we sought advice from experts in the field of mathematics and open access and were led to CK-12 for its vision and commitment to open access resources. Three elements unique to CK-12 motivated our use of their online resources as a platform on which to build the SOL 2.0 course modules: open access, Spanish resources and their Common Core alignments. First, CK12 offers open source content in math and science to educators. To this end, CK-12 uses a creative common non-commercial share alike and attribution license, which means that any user can take and share the content in any way they like so long as it stays in the same or similar license. Attribution is given to CK-12, and there is no charge for the content. CK-12 also includes a translation tool on their website that allows their material to be translated into Spanish with the click of one button. Additionally, the CK-12 math courses (Algebra 1, Algebra 2 and Geometry) have been aligned to the Common Core mathematical standards for Algebra and Geometry, and have been further aligned in our version. However, there is currently no similar prototype for Next Generation Science Standards, which we intend to build "from the ground up" based on what we have learned from our work on math alignments.

MODULES & INTERACTIVE LESSONS

Much of our work has focused on improving the CK-12 math curricula (and projected science as well) to incorporate more interactive and learner-driven online materials to meet students' needs, wherever they are in relation to content-specific competencies and skills, and to provide teacher guidance for teaching to common core standards. Importantly, the curriculum is also organized into modules. The modules are free-standing (though with indications of pre-requisite knowledge for each module, and links to sites where students can access appropriate preparatory instruction), allowing lessons to be used in whatever sequence the teacher chooses. In this way, the modules also avail themselves to more integrative math courses as well as more traditional delivery of the subject matter. We are also endeavoring to provide teachers with different models for use of online materials, as our earlier work taught us that online accessibility varied greatly among schools and over time.

The content CK-12 provides can be modified and adapted via their online Flexbooks. The Flexbooks provide a free source of content in specific subject areas but can be easily modified online using the CK-12 platform. Given our prior research with bilingual teachers, we know teachers need to be able to modify the resources to better meet the needs of language minority students. Although the Flexbooks provide curriculum in the form of text and images, some audio and video, quizzes and interactivity we found that the curriculum lacked sufficient scaffolds for our target groups. Research maintains that emergent bilinguals and Spanish-dominant students in the US require additional scaffolds during instruction to ensure their success in these courses. Furthermore, from our previous experience with Project SOL 1.0, we found that teachers, in particular, needed more resources for their students in Spanish and English to meet the diverse

learning needs of their students, and build on the assets of these Spanish-dominant students. While CK-12 is used as a baseline, we add online resources and tools for both teachers and students, including concept tasks, interactive assignments, videos and other resources that our team has carefully monitored to ensure they are in line with the already identified Common Core standards.

THE PROCESS OF BUILDING THE COURSES

Our process included an initial collection of resources by our math teacher consultants in the US and Mexico. Then our math teachers reviewed the resources to ensure they were common core aligned and aligned to Mexican standards. The final step included a review by our common core math expert. The subsequent phases of this work will follow the same process. This project has benefited from the participation of exceptionally talented and experienced teacher and curriculum experts in both the U.S. and Mexico. Our teams include several bilingual secondary math teachers with decades of classroom experience, the State of California's Director of Common Core Mathematics Curriculum Development, an internationally renowned expert in online technology located in Utah, and similarly prepared partners in Mexico. We have already identified an equally accomplished group of experts for the science sequence.

(Mexico is also interested in this project because it has great potential for supporting those thousands of students who have found themselves in Mexican schools after having begun their education in the U.S. and in English. Many of these students are U.S. citizens, caught in the broken immigration system.)

TEACHER GUIDANCE AND PROFESSIONAL DEVELOPMENT

We have also dedicated ourselves to developing a teacher guide that any teacher can use--in English, Spanish, or both languages--to help implement the common core aligned curriculum in the classroom, with students at all levels of English and Spanish. Given the range of technical expertise and skills teachers already have, the online course platforms can be utilized in a myriad of ways. Our experience with Project SOL revealed a few ways teachers might benefit from using the courses. We outline these approaches below.

(1) Ideally, students would be able to access the online courses on their own personal computer/device at school or even at home. Under these circumstances, students are able to actively engage in the curriculum at their own pace, and explore the online courses at their own speed and/or direction from their teacher. Teachers will have to ensure they adequately prepare students to sign on and enter the courses, and then check in with students as they continue to work on the website.

(2) If there is a shortage of computers at the school, teachers can also utilize the online course resources by selecting specific resources and/or assignments for students to work on in small groups. In this case, students can work in pairs or triads to view resources or work on specific assignments.

(3) In classrooms where a 1, 2 or 3 to 1 ratio of computers to students is not possible, teachers can use the online courses in their classrooms by projecting them onto a screen. In this case, we suggest that teachers select activities and online videos that students would benefit from viewing and listening on large screen/speakers.

WHERE WE ARE

Working with a team from the University of Guadalajara, we developed prototype modules of Algebra 1, Algebra 2, and Geometry that can be used in any sequence, to accommodate different teaching styles and emphases. We will have completed half of the math modules by the end of summer 2014 and intend to complete the courses by early 2015.

We began piloting the math curriculum in a high school in Los Angeles as well as with high school students in Mexico to see how it works "on the ground" in Spanish, English, and mixed language classrooms. An important element of the proposed work will be to systematically evaluate the "effectiveness" of the curriculum with respect to student access to college preparatory courses, their ability to pass these courses, the usability of the materials by teachers, and the support it offers them in teaching to common core standards. We hope to carefully evaluate the experience of teachers using the materials, both those who are bilingual as well as those who are not, as we have come to understand the enormous challenge for teachers attempting to teach to common core standards with limited-English students, and with limited preparation for this task. We hope to be able to demonstrate that monolingual English-speaking teachers can also use the materials effectively to support their Spanish-dominant, or bilingual students, in accessing common core college preparatory curricula.

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