

Algebra 1—An Open Course: Pilot Profile and Case Study

New Resources for New Approaches

Algebra 1 – An Open Course is a flexible, comprehensive, learner-centered program that integrates a broad range of pedagogical approaches. It is designed to open the door to mathematical concepts for all students, and to give teachers new tools to address the challenges of math instruction. This case study is one in a series that highlight a number of the new approaches to mathematics education made possible with these resources.

Sierra Vista High School, Whittier, CA Whittier Union High School District

BACKGROUND

Sierra Vista High School is an alternative high school that is part of the Whittier Union High School District in California. Founded in 1978, it offers both continuation and independent study programs. The district is located 10 miles south of Los Angeles, and includes six comprehensive high schools, one adult school, plus Sierra Vista High School. Sierra Vista enrolled 469 students in 2009-10; 84% are Hispanic/Latino, and 62% are identified as socioeconomically disadvantaged. While the school serves grades 9-12, the majority of the students are in grades 11-12, and many are 5th year seniors working to finish their high school degrees. Sierra Vista is a year-round, open-enrollment high school that offers students flexible options for completing their high school degree.

THE PILOT PROJECT – WHY NROC?

Sierra Vista began piloting NROC *Algebra 1—An Open Course* in October 2010 with 20 students in the continuation program. NROC's web-based curriculum was ideal to support the self-paced, blended design of the course.

BLENDED ENVIRONMENT

The algebra class that used the NROC *Algebra 1* curriculum was organized as a blended course that was primarily asynchronous, with face-to-face teacher support available when students were struggling. The students met in a computer lab with an instructor present. A variety of supplemental materials were prepared and integrated into the course's learning management system (LMS) to guide students through the curriculum.



DISTRICT STATISTICS

- **District Enrollment:** 13,670
- **LMS and LOR:** Moodle
- <http://www.wuhd.org/svhs>
- **Contact:** Carrie Bisgard, Math Chair

PILOT DETAILS

- **Number of Students:** 20
- **Teacher(s):** One, no previous online teaching experience
- **Course Type:** Blended course, lab-based, primarily asynchronous. The course is open entry/exit.
- **Terms in Use:** Two pilot terms beginning in October 2010; using in 2011-12 school year

INSTRUCTIONAL APPLICATIONS

- Blended/Hybrid Learning**
- Alternative Education**
- Open Enrollment/Open Exit**
- Computer Lab Setting**
- Asynchronous Content Delivery**

SELF-PACED INSTRUCTION

The nature of the online, hybrid class allowed students to easily enter the course at different times and participate when it best worked in their schedules. While continuation school students often have difficulty attending regular classes because of personal or social reasons, this hybrid class approach seemed to avoid many of these problems and attendance was higher than in the traditional class. Students also responded well to the flexibility and self-paced approach of the curriculum.

The open entry/open exit policy helped keep students from falling behind, one of the primary reasons students drop out. Students worked at their own pace and were able to repeat sections until they mastered the material. The ability to repeat materials was especially beneficial for students who were reluctant or embarrassed to ask questions in class.

The teacher developed a plan that outlined student assignments, and then monitored student performance, corrected assignments, provided feedback and advice, and handled technical issues. Assignments included reading text and writing definitions; listening to presentations and responding to questions; and doing math problems online and on printed worksheets.

“I like that the practice test tells me what I got right and wrong, I don’t have to wait for the teacher to grade it.”

- Sierra Vista Student

FLEXIBLE COURSE DESIGN - ADAPTED TO STATE STANDARDS

The Whittier Union High School District has developed a set of benchmark mathematics tests that correlate to California state standards. The benchmark tests allow an alternative education program to compare its performance data with that of a traditional high school. The content of *Algebra 1 – An Open Course* was slightly reorganized by the teacher to present the material in an order that better reflected the sequence of the district benchmark assessments. This flexibility was convenient, and the teacher found it easy to correlate the courseware to the district benchmarks.

The teacher created additional problem sets and practice tests at the end of each learning unit that reflected items on the district benchmark tests. The students were required to get a passing score on these tests at the end of each section prior to taking the district’s benchmark exams.

EARLY RESULTS

Preliminary results suggest that students in the hybrid class using the NROC *Algebra 1* program are more likely to pass the algebra benchmark tests than students in the traditional course. The Whittier Union School District as a whole (all high schools included) has a 75% passing rate for common assessment benchmarks. By comparison, the hybrid class using the *Algebra 1* courseware had a passing rate of 88%. The first semester of the pilot, about one-half of the traditional classroom students passed the common assessment, while nearly all of the students in the hybrid class passed the same exam (see Figures 1 and 2). In the traditional class, the class must move on, regardless of whether all of the students master the material. In the hybrid class, by contrast, students don’t move on until they are ready. The pace is slower, but the success rates are higher.

Overall, students were very positive about the *Algebra 1* courseware and their hybrid class. The reasons students preferred the hybrid class to traditional math classes included,

- They liked working at their own pace and repeating material they did not understand.
- The courseware is flexible, so they can work on assignments in class, at home, or at the library.
- The multimedia content is more engaging than passively listening to a lecture.
- Students found that learning math was easier than they expected.

In a survey, the students were positive about the level of engagement provided by the *Algebra 1* courseware through the Presentations, Worked Examples, Practice Problems, and other pedagogical features in the course.¹

Figure 1: Traditional: teacher-led classroom, with lecture and textbook; class tests at same time.

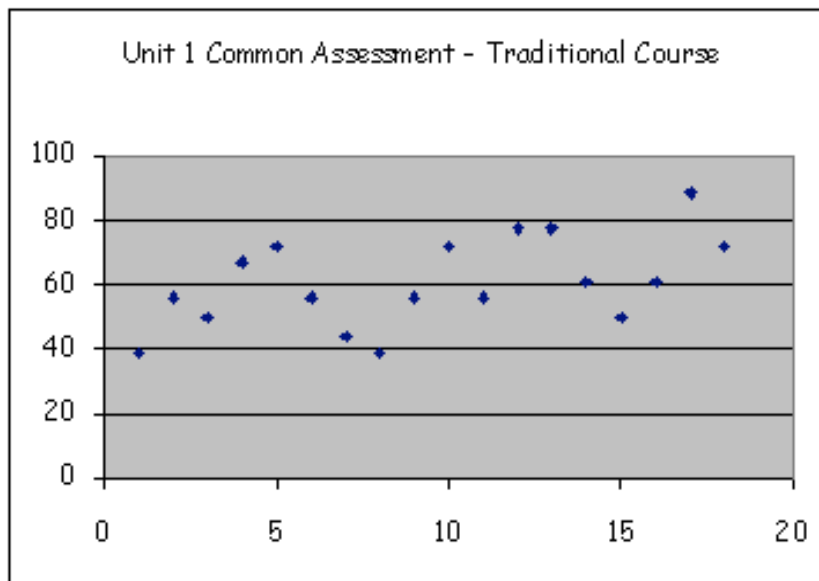
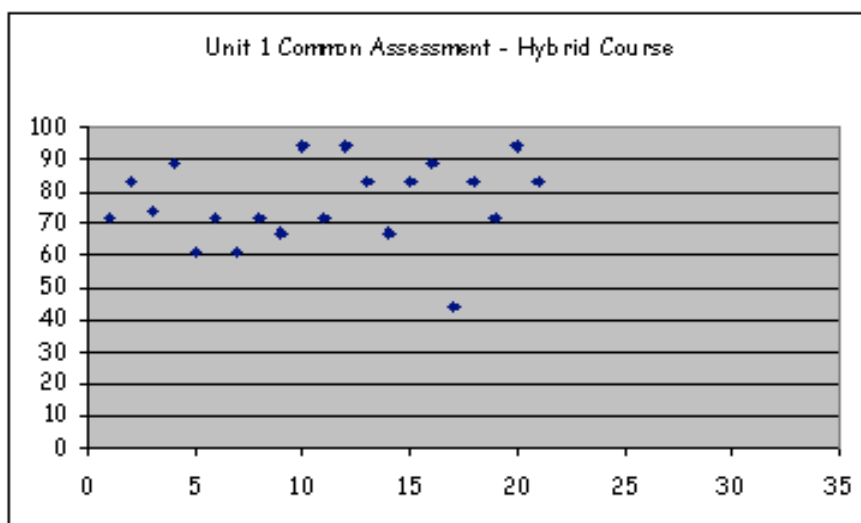


Figure 2: Hybrid: Using NROC, teacher-supported computer lab; self-paced—test when ready.



¹ To view samples of the Presentations, Worked Examples, Practice Problems, and other pedagogical features of *Algebra 1: An Open Course*, please visit <http://www.NROCmath.org>. The Worked Examples in *Algebra 1: An Open Course* were created specifically for this course by Sal Khan of Khan Academy.

WHAT'S NEXT?

Piloting of both semesters of the NROC *Algebra 1* course continued through summer 2011, and the school is expanding access to additional Whittier students for the 2011-12 school year. Some of the issues being considered as the pilot is expanded include:

- Extending the time allowed to complete the semester's work to accommodate students working at a slower pace.
- Timing of standardized tests; while the District benchmark exams can be taken whenever a student completes the course, standardized tests must be planned for and taken at designated times.
- Alignment of semester breaks.

As the program expands, there are plans to add a placement test to jumpstart a path through the courseware. Students appreciate not having to repeat information they already understand. In addition, the program plans to identify new ways of monitoring for persistence, credit recovery, and student learning to more closely track the effectiveness of the program.

ABOUT NROC

The NROC Project is a community-guided, non-profit project focused on new models of digital content development, distribution, and use. NROC is funded by The William and Flora Hewlett Foundation, the Bill & Melinda Gates Foundation, and most importantly by NROC members across the country. We are education leaders from state and system institutions nationwide who believe in open and equal access to education and the power of media to personalize learning. We represent more than 6 million U.S. students from middle school to college. Learn more: <http://TheNROCProject.org>.

For additional information on *Algebra 1 – An Open Course*, please visit [http:// NROCmath.org](http://NROCmath.org), or email membership@theNROCproject.org.