Moving a program elsewhere requires a careful re-tuning of the components and materials, such that all stakeholders in the new environment see it as easier to follow the model to success than to continue with unsuccessful, but familiar, strategies.

Katherine Stevenson, Professor of Mathematics, Director of Developmental Mathematics, California State University, Northridge

California State University, Northridge’s Hybrid Lab course model targets high failure rate, multi-section, gateway courses in which prerequisite knowledge is a key to success. The Hybrid Lab course model components incorporate interventions and practices that have proven successful at CSUN and other campuses in supporting students, particularly those from underrepresented minority and disadvantaged economic groups. The CSUN team is using its initial and follow-on grants from NGLC to scale the Hybrid Lab course model to other subjects and to other CSU and California Community Colleges (CCC) institutions.

**DESIGN DETAILS**

The Hybrid Lab course model creates a “flow of learning” that pairs a parent course with a one-unit supplemental hybrid course. Together, the two courses offer carefully articulated components: face-to-face lecture, facilitated group work in a supplemental contact hour with a tutor or teaching assistant, independent online homework, and student activities for assessment and remediation.

Course instruction is divided among faculty, who teach the parent course, and graduate teaching assistants and/or undergraduate tutors, who manage the supplemental contact hour and remediation. A course coordinator manages the day-to-day coordination of materials to move students actively and successfully through the course.

The learning flow gradually moves the student from active listener to independent learner. In the framework, students:

- arrive having prerequisites for each new concept at their fingertips—using an online self-paced remedial program;
- practice this new concept in class—using partially completed common lecture notes;
- practice in facilitated group work during lab hours—using the lab book;
- practice independently—using homework with instant feedback; and
- return to class ready to expand on that concept, learn a new concept, or be tested.¹

**PROJECT ACTIVITIES**

To facilitate campus scaling, the project team fostered relationships with administration, faculty, and departments at partner institutions in the CSU and CCC systems. In each

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instance, tenured faculty members have been involved in the adoption, modifying and adapting the model to suit local needs. The project leads found that successful implementation was achieved by building consensus around ideas and evidence, not by mandating external solutions. The project team and partner institutions used a multipronged strategy to support adoption:

1. A web-based training video embedded in a Moodle training site that provides a clear initial idea of the model.
2. A database that collects institutional research, exam results, homework data, and remediation data to be used by all adopting institutions.
3. Analysis tools that compare the effects of the model components across the consortium.

Combined with data demonstrating the academic effectiveness of the Hybrid Lab course model, this infrastructure led to broad support from senior administrators as well as formal endorsement by partner institutions’ undergraduate curricula committee and mathematics department chairs. Indeed, all of CSUN’s lower-division math courses, from college algebra through the calculus sequence, as well as several courses at CSULB, Humboldt State University, and Los Angeles Pierce College adopted the Hybrid Lab course model.

Hybrid Lab course model’s academic effectiveness has catalyzed the creation of the broader, system-wide CSU Consortium to scale it to 18 CSU and 4 CCC campuses over the next five years. NGLC, the CSU Chancellor’s Office, the CSU Council of Math Chairs, and the CCC System provide financial and logistical support to achieve this goal. For example, in the project’s first phase, NGLC’s initial $249,981 grant financed the Hybrid Lab course model’s expansion beyond CSUN to three other campuses. In Phase II, NGLC’s $2.3 million follow-on grant is financing expansion to nine CSU and four CCC campuses between January 1, 2013, and December 31, 2014.

In the first six months of NGLC’s follow-on funding, the CSU Consortium focused mainly on campus recruitment and building the Hybrid Model Resources Repository of class materials, training tools, and an assessment database. The group continues to strengthen the program through promoting more courses, classroom facilities, and instructor training; improved assessment, data collection, and analysis; and salaried grant/project managers and staff. These actions not only help new campuses launch the Hybrid Lab course model but also help mature projects keep on task with materials development, model implementation, and data collection.

RESULTS TO DATE

• The Hybrid Lab model, when implemented at four institutions during the initial funding period, led to significant positive effects for students, the equivalent of raising the average score on a 100-point exam from 50 to about 73; this finding is from an external evaluation conducted by SRI International.

• In CSUN’s Business Math course, 70% of students earned a C or higher after the Hybrid Lab course model was implemented. Before the model’s introduction, two-thirds of students had to repeat the course.

• In Math 115 (College Algebra) at CSULB, using the model decreased the number of repeaters and increased the number of students receiving As and Bs.

• The Hybrid Lab course model is cost-effective; dramatic reduction in the number of students repeating the class produced a net savings of $5,000 per semester at CSUN. These savings and the reduced need for remediation courses further encourage Hybrid Lab course model scaling efforts, contributing to the program’s sustainability.

PARTICIPANT IMPRESSIONS

Faculty: Hybrid Lab course model faculty members build scalable, replicable course and lab materials collaboratively as a whole package that is available for all users. “With the instruction talent focused on the development of shared rather than separate courseware, we benefit from scale on both expertise and cost: the class size is able to increase to over 60
from 40. The open resources developed are now available to instructors, organizations, and self-learners without a cost,” stated Hongde Hu, chairman of the Department of Mathematics and Statistics, CSU Monterey Bay. In turn, the Hybrid Lab’s materials and organized structure help the instructors systematically focus the students’ attention on the course goals. “The Hybrid Model workflow guarantees that we address the content with a variety of activities,” explained Florence Newberger, a professor in the Department of Mathematics and Statistics at CSU Long Beach. “We choose what content we wish to assess, and then systematically include activities that engage students with this content in the online homework, laboratory manual, lecture notes, and exams.”

**Students:** The Hybrid Lab course model structure eases students’ math anxieties. One student explained, “This class created a comfortable environment to practice and get help with our work. The labs helped with understanding, due to the ease of ability to ask questions.” And the math labs enable students to actively work on problems, facilitating comprehension and learning. “We completed the labs and then checked our answers when the lab solutions were posted,” stated another student. “It allowed me to learn from my mistakes and know the proper way to do the math problems.”

**NEXT STEPS**
The CSU Consortium continues to promote a system-wide approach to the Hybrid Lab course model. For example, it took initial steps to transfer project control from individual campuses to the CSU Math Council, the CSU System, and the CCC offices. Such actions bolster broader developmental math program redesign and foster greater economies from system-wide scaling efforts, providing the opportunity to transform gateway course success rates across both systems.

**FOR MORE INFORMATION**
Considering a Hybrid Model: CSUN Workshop Convenes Faculty from Across the CSU System, NGLC Blog post by Nancy Millichap, August 12, 2013.
Hybrid Model Resources Repository, CSUN ScholarWorks site Hybrid Labs for Entry Level Math, Merlot II site.

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http://nextgenlearning.org/grantee/california-state-university-northridge