English Language Learners' Online Science Learning: A Case Study

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EXECUTIVE SUMMARY

English Learners may struggle when learning science if their cultural and linguistic needs are unmet. The Collaborative Online Projects for English Language Learners in Science project was created to assist English learners' construction of science knowledge, facilitate academic English acquisition, and improve science learning. The project is a freely available, online project-based, bilingual instructional website designed for English learners of Hispanic origin. The project website contains two units: Let's Help Our Environment and What Your Body Needs. To create these collaborative online projects, two constructivist approaches were combined: The Cognitive-Affective Theory of Learning with Media and Project-Based Learning. These approaches to science education were used as the basis for culturally and linguistically relevant science instruction, which was delivered within a collaborative, online instructional platform. Using a case study design, two teachers demon-

strated implementation of the project with fidelity, and students showed statistically significant gains in science content assessments. The Collaborative Online Projects for English Language Learners in Science project provides educators with a strong model for creating instructional materials that support English learners' science learning by combining culturally-relevant, constructivist, collaborative projects using online, multimedia technology.

ORGANIZATION BACKGROUND

Collaborative Online Projects for English Language Learners in Science is a publically available, digital, Project-Based Learning and teaching platform for delivering bilingual science content to Spanish-speaking English learners. The Collaborative Online Projects for English Language Learners in Science project received funding from the National Science Foundation to design, translate, enhance, and evaluate culturally relevant and linguistically appropriate collaborative online projects in science for secondary level Spanish-speaking English learners. The project website (http://copells.uoregon.edu) houses two classroom-tested and supported collaborative online projects, the *What Your Body Needs* life science unit and the *Let's Help Our Environment* life science unit. Both units target 7th grade U.S. National Science and Engineering Curriculum Standards. Collaborative Online Projects for English Language Learners in Science was made possible through a strong partnership between the Center for Advanced Technology in Education at the University of Oregon, the Instituto Latinoamericano de la Comunicación Educativa in Mexico, and the Biological Sciences Curriculum Study group in the United States. Over the past three years, these organizations have been creating science units and studying their feasibility and usability, addressing both the cultural and linguistic needs of English learners in science education.

The Center for Advanced Technology in Education at the University of Oregon is a research and development group within the University of Oregon's College of Education, working in the area of technology-supported solutions to student challenges in reading, writing, and studying. The center has more than 20 years of research and development experience behind computer-based study strategies to support student learning in the general education curriculum, more than 10 years designing and evaluating online learning environments, and more than 10 years designing, developing, and evaluating supportive resources for learning in electronic environments. Currently funded projects include: The National Center for Supported eText; Mathematics eText Research Center; and Project SOAR: Strategies for Online Academic Reading.