

Exciting Science: Study on learning ocean science concepts gets underway

Jointly appointed in the Dept. of Marine and Coastal Sciences and the Dept. of Learning and Teaching (in the Graduate School of Education) Tim's current work focuses on understanding the nature of student learning between classroom and out-of-classroom experiences (e.g., "field trips"). K-16 teachers, including university professors, often take students on field trip to "informal" learning contexts such as aquariums, on-board research vessels or to the coast. Yet, the small body of research on such experiences reveals that students often do not connect what they learn in a classroom to what they learn during a field trip. I am working to fill this gap in our collective understanding of learning and to develop pedagogical methodologies that promote what I call "Learning Across Contexts" (LAC).

Learning about fish adaptations prior to a field trip to an aquarium

This work involves the use of mobile device technologies for promoting LAC and for capturing in situ learning during field trips. To conduct this research, Dr. Zimmerman, Frank Natale, a researcher at IMCS, graduate students in education, and undergraduate programmers worked together to design a technology-enhanced marine science curriculum focused on ideas of adaptation and marine habitat destruction. High school students learned about fish adaptation and habitat destruction using the science education learning environment known as WISE (Web-based Inquiry Science Environment). They worked on WISE in the classroom for a couple days preparing for a field trip to the Jenkinson's Aquarium, a partner on this project.

Students are asked to collect their data and to communicate with their classmates via text messaging, all in an effort to get students to think about science while they are visiting the aquarium. Eventually, students will be able to see each others' data during the field trip, allowing them to engage in discussions about data integrity, validity and reliability, as is the practice of scientists.

Once at the aquarium, students were given G1 mobile devices. These Internet-enabled devices allow students to wander the aquarium collecting data on fish anatomical and behavioral adaptations they see amongst different fish species. Data is collected using special data collection tools that include "learning scaffolds" such as Hints, online Field Guides, and Prompts that promote reflection on science concepts learned in the classroom on WISE.

Students at an aquarium using G1 mobile, Internet connected devices to collect data and communicate real-time about data they collect.

The whole time, students' conversations were recorded on tiny, digital recorders. The content of these conversations can reveal a lot about what students are thinking during the field trip and data collection activity. Insights drawn from this often "hidden" form of thinking will allow Dr. Zimmerman and his team to better understand the ways in which students connect what they learn in a classroom to what they learn during a field trip. This work will lead to better teaching approaches and pedagogical methodologies that improve science learning, especially when that learning includes a field trip.

It will take the team awhile to analyze all data (pre-tests, post-tests, interviews, students conversations, and work on WISE) collected during this pilot project but soon a better picture of how we can improve student understanding of science will emerge. Then, work can begin on understanding how students apply their knowledge of science to solving real-world marine science problems.