CONSIDER FOR TALK

8th Annual SEA-PHAGES Symposium Abstract

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Is a CURE a CURE? Comparing Student Educational and Motivational Outcomes in SEA-PHAGES and Alternative CUREs

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The 2011 Vision and Change Report and other efforts to transform higher education have focused attention on the engagement of students in high-impact practices such as undergraduate research due to their measured benefits for student engagement and retention. Of current interest are Course-Based Undergraduate Research Experiences (CUREs) since they can be integrated into courses from the introductory to the capstone level, and their benefits for students related to academic performance and self-reported scientific literacy and motivation. There have been many CUREs developed over the past decade, with SEA-PHAGES being one of the largest in terms of implementation sites and students engaged each year. The goal of this collaborative project was to compare head-to-head student educational outcomes and student motivation arising from participation in different CUREs at three different institutions, and compare their outcomes to a traditional “cookbook” style of undergraduate laboratory. The CUREs were implemented in introductory majors Biology courses at the University of Northern Colorado, the University of Texas-El Paso, and Washington State University. Using both the SMQ (Science Motivation Questionnaire) and CLASS (Colorado Learning Attitudes about Science Survey) instruments, students in participating in a Copepod CURE or SEA-PHAGES displayed significantly higher motivation levels at the end of their experience than students in traditional laboratories. Even though there were deceases in student motivation at the end of the semester for all students, these decreases were significantly smaller for students in a CURE than a traditional laboratory. However, significant differences were observed when Scientific Literacy was measured using three validated instruments: TOSLS (Test of Scientific Literacy Skills), BEDCI (Biological Experimental Design Concept Inventory), and EDAT (Experimental Design and Testing). Students in the WSU SEA-PHAGES laboratory did not show any measurable gains in scientific literacy on any of the three instruments, whereas the Copepod CURE students did show measurable and reproducible positive gains. The similarities and differences between these CUREs have been explored to determine probable origins for these divergent student outcomes.