

Integrating and Evaluating Computational Thinking in an Undergraduate Marine Science Course

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Abstract : Undergraduate students, particularly in the environmental sciences, have difficulty displaying quantitative skills in their laboratory courses. Students spend time sampling in the field, often using new methods, and are expected to make sense of the data they collect. Computational thinking may be used to navigate these new experiences. We developed a curriculum for the marine science department at a small liberal arts college in the Northeastern United States based on previous computational thinking frameworks. This curriculum incorporates marine science data sets with specific objectives and topics selected by the faculty at the College. The curriculum was distributed to all students enrolled in introductory marine science classes as a mandatory module. Two pre-tests and post-tests will be used to quantitatively assess student progress on both content-based and computational principles. Student artifacts are being collected with each lesson to be coded for content-specific and computational-specific items in qualitative assessment. There is an overall gap in marine science education research, especially curricula that focus on computational thinking and associated quantitative assessment. The curricula itself, the assessments, and our results may be modified and applied to other environmental science courses due to the nature of the inquiry-based laboratory components that use quantitative skills to understand nature.

Keywords : marine science, computational thinking, curriculum assessment, quantitative skills

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