Observation protocol documents college instruction and STEM learning

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A University of Maine professor helped develop an observation protocol that can document college instruction and student learning of science, technology, engineering and mathematics (STEM).

Michelle Smith, assistant professor in UMaine's School of Biology and Ecology and a member of the Maine Center for Research in STEM Education, designed the classroom observation protocol with three researchers from the University of British Columbia.

Over a two-year period, Smith and her colleagues developed, tested and validated the Classroom Observation Protocol for Undergraduate STEM (COPUS) by which observers document instructor and student behaviors in two-minute intervals during the class period.

"Many observation protocols ask observers to rate instructor quality, but the COPUS focuses on how students and instructors are spending the time," says Smith.

The resulting data, which can be put into pie chart form, informs professors of their behaviors and the behaviors of students during class. The information is valuable in light of research that indicates undergraduate college students learn more in courses with active-engagement instruction.

A total of 13 student behaviors are documented, including listening to instructor/taking notes, working in groups, answering a question with the

rest of the class listening, and engaging in whole class discussion.

A total of 12 instructor behaviors are codified, include lecturing, asking a clicker question, listening to and answering student questions with class listening, guiding ongoing student work during active learning task, and one-on-one extended discussion with one or a few individuals.

Educators can use the information to better understand how they utilize classroom time, as well as identify possible professional development needs. Observation data can also be used to supplement faculty tenure/promotion documentation, Smith says.

Several Maine middle and high school teachers helped Smith and her colleagues test and modify the protocol. "The local teachers were enormously helpful," says Smith. "They are very dedicated to partnering with UMaine to enhance the STEM education experience for all students."

More information: Michelle K. Smith, Francis H. M. Jones, Sarah L. Gilbert, and Carl E. Wieman. "The Classroom Observation Protocol for Undergraduate STEM (COPUS): A New Instrument to Characterize University STEM Classroom Practices." *CBE Life Sci Educ* December 2, 2013 12:618-627; DOI: 10.1187/cbe.13-08-0154

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