

Abstract Submitted
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Examining student multi-step reasoning ability¹ FRANCES DEROOK, ZACK POPE, ANDREW BOUDREAUX, Western Washington University — Experienced instructors recognize that students often struggle with multi-step reasoning. At Western Washington University, we have been investigating the nature of these difficulties in the calculus-based introductory course. The research grew out of a study on student understanding of fluid dynamics. While many students were proficient in applying isolated principles such as the Bernoulli effect and pressure-depth relationship, the majority had difficulty integrating these concepts to reach a correct response. Many had difficulty combining factors that acted either as enhancing or competing effects on fluid pressure. We developed curriculum to address student difficulties and observed improvements in student ability to apply reasoning to subsequent fluids problems. We also wished to know whether students could transfer multi-step reasoning to new contexts. In particular, we examined student ability to resolve two competing factors, vector magnitude and direction, in electrostatics. In this poster we describe specific difficulties with multi-step reasoning and present results from the transfer experiment.

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