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Changing students' approach to learning physics in undergraduate gateway courses

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This study investigated if and how a combined set of specially developed activities; reflective writing, critique-writing activities, & reflective write-pair-share combined with the collaborative conceptual-conflict group exercises can help students change their approach to learning physics and their actual learning. The study was conducted over a three year period and supported by SSHRC. Each of these activities was previously successfully tested as a stand-alone activity. We also developed new rubrics for evaluation of the impact of the activities. Data were collected at two different institutions. At each institution the same instructor taught students in two sections. At the first, a comprehensive university, classes were relatively large sections in a typical calculus-based course in mechanics. At the second, a community college, there were relatively small classes of a typical algebra-based introductory course in mechanics, electricity, and magnetism. The two institutions used different textbooks and had different formats. Measured outcome variables included student interviews and writing products. Students identified key concepts, related concepts to their own prior understanding of the same and other concepts, and used a paradigm- rather than template-based approach to solving new problems. These differences were more clearly apparent than in stand-alone studies of the learning activities

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