

QUANTITATIVE ASSESSMENTS: ENCOURAGING SURFACE LEARNING IN INTRODUCTORY PHYSICS?

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Force Concept Inventory (FCI) results are often used to inform the re-structuring of introductory physics courses. The correlation between learning gains on the FCI and results in quantitative assessments have been extensively investigated finding that course re-structuring focused on increased conceptual understanding is commonly accompanied by improvements in quantitative results (Fraser et al., 2014; Freeman et al., 2014).

At the University of New South Wales—a large, research-intensive university—introductory physics students require improvement in quantitative assessments, as opposed to conceptual understanding. In this talk we present a case study of a mild course restructuring with a goal to improve students' exam-readiness: introducing two mandatory mid-term quizzes. These quizzes consisted of four quantitative physics questions, similar in nature to the problems on the final exam. We examine student assessment outcomes for three consecutive introductory physics courses: two prior to the quiz introduction ($n = 1403$) and one post ($n = 557$). No other course changes occurred during this period. We find improvements in students' final exam performance (52% to 61%), but a significant drop in FCI learning gains (25% to 14%). We examine the possible causes for this fall, which may indicate a trend towards a more surface-based learning approach.

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