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Flippin' Fluid Mechanics – Comparison of Blended Classroom vs. Traditional Lecture D.R. WEBSTER, R.S. KADEL, W.C. NEWSTETTER, Georgia Tech — We conducted a study of student performance in and perceptions of a blended classroom delivery of a junior-level fluid mechanics course. In the blended pedagogy, students watch short on-line videos before class, participate in interactive in-class problem solving (in dyads), and complete individualized on-line quizzes weekly. Comparisons are made among four sections of the blended classroom delivery in the period of 2013-2017 to eleven sections delivered in a traditional lecture-style format by the same instructor in 2002-2012. The results reveal dramatic improvement in student engagement, perceptions, and achievement in the blended pedagogy. For instance, the withdrawal/fail/barely-passing (WFD) rate is significantly lower for the blended classroom (8.6% vs. 16.3%; $p < 0.05$). The average course total (i.e., aggregate of exam and assignment scores) is significantly greater in the blended classes ($p < 0.001$) with a medium size effect (Cohen's $d = 0.42$). Further, we regressed students' course total on a dummy variable for the blended classroom, as well as with controls for gender, students' major, and prior achievement as measured by incoming GPA. The regression model (for all students) explains a strong amount of variation in final course grade with an R-squared of 0.563, and the blended class variable is significant ($p < 0.001$) with a coefficient of 4.437 (100-point scale). Regarding student perceptions, surveys reveal significantly greater enthusiasm, stimulation, self-perception of how-much-learned, perception of the value of the course activities, and the overall effectiveness of the course and instructor in the blended classroom.

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