

C2: PER: Student Success

Location: Grand Ballroom B Time: 2–3 p.m. Date: Sunday, January 19, 2025 Moderator: Carolyn Sealfon

C2-02 2:12 PM-2:24 PM | *Contributed Talk (12 Minutes)* | Pre-instruction diagnostic tests can help predict probability of obtaining high or low course grades in introductory physics

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In a study including over 2000 students in 30 distinct introductory physics classes at four universities, we found that administration of certain pre-instruction diagnostic tests allowed reliable prediction of the relative probability of attaining high (top quartile) and low (bottom quartile) course grades for high and low scorers on those tests. The tests used were the Force Concept Inventory, the Lawson Test of Scientific Reasoning, and a mathematics diagnostic test that covered only pre-college mathematics. High (top quartile) scorers on any of the pretests were, on average, about 5 times more likely to get a high course grade than low (bottom quartile) scorers. Low scorers on the pretests were about 4 times more likely to get a low grade than high scorers. This trend was observed to hold in 97% of the 114 cases examined; the probability ratios were 2.0 or greater in 84% of the cases. Although students' performances on the various pretests were positively correlated with each other, the different tests each had independent predictive power and using multiple test results increased the reliability of the relative probability estimates.