If At First You Do Not Succeed: The Student Benefits of Multiple Trials on Summative Assessments

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If At First You Do Not Succeed: The Student Benefits of Multiple Trials on Summative Assessments

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Background
Learning management systems offer flexibility in assessments. In Canvas, questions can be pulled from pools, customizing each quiz. Canvas also allows unique feedback options. Unique feedback can be programmed for students whether they got the question correct or incorrect. Feedback can even be customized based on whether a student answered the question at all. Canvas also allows multiple attempts on assessments, with various options for awarding credit (final attempt, best score, average score, etc.). Combining immediate feedback with multiple attempts is a power – yet underexplored – tool.

Previous research on multiple attempts reveals that multiple attempts alone do not result in stronger performance on assessments as students are not likely to self-diagnose errors.

• Question pools reduce rate bank is compromised
• Timely feedback is a best practice
• Allowing opportunity for application of feedback is a best practice

Hypotheses

H1a. Students who do not earn an A on their initial attempt take advantage of the multiple attempts.

H1b. Students who take advantage of multiple attempts outperform students who do not take advantage of multiple attempts.

H1c. Students’ second attempt on the assessment outperforms their first attempt.

H1d. Students who used multiple attempts spent much longer on the assessment (nearly double on average).

Exploring the Data
Do students who need to take advantage of a second attempt do so? (H1a)
• Chi Square with a = 0.05
• Reject null, accept alternative hypothesis
• Students who used multiple attempts spent much longer on the assessment (nearly double on average)

Do those who used multiple attempts outperform those who did not? (H1b)
• Quizzes
  • T-test with a = 0.05
  • P value on one tailed test = 0.6804
  • No difference in final scores
• Pre-Labs
  • ANOVA
  • P value = 0.8667
  • Post-hoc Tukey HSD test
• Time on task correlate to the grade earned on the first attempt

Do students do better on a future attempt after receiving feedback? (H1c)
• Paired sample t-test with a = 0.05
• P value = 0.0001
• Reject null, accept alternative hypothesis
• Students who took the quiz twice scored significantly higher on the second attempt

Do students spend more on task when using multiple attempts? (H1d)
• Two sample t-test with a = 0.05
• P value = 0.0001
• Reject null, accept alternative hypothesis
• Students who used multiple attempts spent much longer on the assessment (nearly double on average)

Do the total time on task correlate to a better final grade? (H1e)
• Regression analysis
• Pearson’s r correlation coefficient = -0.106 and coefficient of determination = -0.0348

Does time on task correlate to the grade earned on the first attempt? (H1f)
• Regression analysis
• Pearson’s r correlation coefficient = -0.1866 and coefficient of determination = -0.0348

Does the total time on task correlate to a better final grade? (H1g)
• Regression analysis
• Pearson’s r correlation coefficient = -0.106 and coefficient of determination = -0.0348

Time spent on task correlates to the final grade earned
• Model only explains 4% of variation
• Time on task is NOTA predictor of score on first attempt

Pedagogical Implications
✓ Students self-select to take advantage of multiple attempts
✓ Score higher on second attempt
✓ Spend more time on the assignment
✓ Used multiple attempts throughout the term
✓ Assessment design with multiple attempts that incorporate feedforward allows students to demonstrate stronger mastery of content

Multiple attempts are a time investment that is not correlated to better performance (but time on task on the first attempt is not a predictor, either)

References