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 question is answered, skipped, or not attempted. 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) Student utilization of the second attempt varied time on the assessment than those who used one attempt.
H1b) Students' second attempt on the assessment multiple attempts
H1c) Students who used multiple attempts take advantage of the multiple attempts.
H1d) Time spent on task correlates to the grade earned.
H1e) Student utilization of the second attempt varied the term?
H1f) Time spent on task correlates to the grade earned (H1e)

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, alternative hypothesis
- A tend to try again on quiz.
- A tend to try 2nd attempt on prelab
- A tend to try 3rd attempt on prelab

Do those who used multiple attempts outperform those who did not? (H1b)
- Quizzes
  - Test with a = 0.05
  - P value on one tailed test = 0.6904
  - Fail to reject the null hypothesis
- No difference in final scores between 1 and 2 attempts

Do students spend more time on task when using multiple attempts? (H1c)
- Two sample t-test with a = 0.05
- P value = 0.0001
- Reject null, alternative hypothesis
- Students who used multiple attempts spent much longer on the assessment (nearly double on average)

Does student use of multiple attempts vary during the term? (H1d)
- Regression analysis
- Pearson's r correlation coefficient = 0.015 and coefficient of determination = 0.0002
- Week of term is not a predictor of utilization of multiple attempts

Does time on task correlate to the grade earned on the first attempt? (H1e)
- Regression analysis
- Pearson's r correlation coefficient = -0.1866 and coefficient of determination = 0.0348
- Time on task is NOT a predictor of score on first attempt
  - Model only explains 4% of variation

Does the total time on task correlate to a better final grade? (H1f)
- Regression analysis
- Pearson's r correlation coefficient = -0.106 and coefficient of determination = 0.0112
- Time on task is NOT a predictor of score on multiple attempts
  - Model only explains 2% of variation

Pedagogical Implications

- Students self-select to take advantage of multiple attempts
- Score higher on 2nd attempt
- Spend more time on the assignment
- Used multiple attempts throughout the term
- Assessments 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