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 an answer is selected. 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 bias is compromised
- Timely feedback is a best practice
- Allowing opportunity for application of feedback is a best practice

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 more time on the assessment than those who used one attempt

H1e Student utilization of the second attempt varied across the term

H1f Time spent on task correlates to the grade earned on the first attempt

H1g Time spent on task correlates to the final grade earned

Methods

- CHEM 139/141
  - Module Quizzes (2 attempts)
  - Pre-Lab Quizzes (3 attempts)
  - October / November 2017
- Feedback
  - Actionable
  - Available once immediately after attempt
- Assessment Programming in LMS
  - No penalty for stopping on first attempt
  - Closed questions from pools
  - Questions one-at-a-time
  - Save and resume option
  - Timed – 1 hour
  - Keep highest score
  - Multiple attempts communicated multiple ways
  - Auto-graded by LMS

Exploring the Data (cont’d)
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

Do students 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
- Fail to reject the null hypothesis
- Do those who used multiple attempts outperform those who did not? (H1b)
  - ANOVA
  - P value = 0.8667
  - Post-hoc Tukey HSD test
- Fail to reject the null hypothesis

Do students spend more time on task when using multiple attempts? (H1c)
- Two sample t-test with a = 0.05
- P value = 0.0001

Does student use of multiple attempts vary during the term? (H1d)
- Regression analysis
- Pearson’s r correlation coefficient = 0.015 and determination = 0.0002
- Week of term is not a good predictor of utilization of multiple attempts
- Pearson’s r correlation coefficient = 0.1866 and determination = 0.0348

Does time on task correlate to the grade earned on the first attempt? (H1e)
- Regression analysis
- Pearson’s r correlation coefficient = -0.106 and determination = 0.0112

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
- 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 a predictor, either)

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