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 customized based on which wrong answer was 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 bank is compromised
- Timely feedback is a best practice
- Allowing opportunity for application of feedback is a best practice

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

Do students who need to take advantage of a second attempt do so? (H1a)
- Chi Square with a = 0.05
- Rejected null, accept alternative hypothesis

Do students who take advantage of multiple attempts outperform those who did not? (H1b)
- Quizzes
  - T-test with a = 0.05
  - P value on one tailed test = 0.6094
- Fail to reject the null hypothesis
  - No difference in final scores between 1 and 2 attempts

Do students do better on future attempts after receiving feedback? (H1c)
- Paired sample t-test with a = 0.05
- P value = 0.0001
- Rejected null, accept alternative hypothesis

Do students spend more time on task when using multiple attempts? (H1d)
- Two sample t-test with a = 0.05
- P value = 0.0001
- Rejected null, accept alternative hypothesis

Do students use multiple attempts vary during the term? (H1e)
- Regression analysis
  - Pearson’s r correlation coefficient = 0.015 and coefficient of determination = 0.0002
- Week of term is not a good predictor of utilization of multiple attempts

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
- 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? (H1g)
- 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

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
- Assessments designed with multiple attempts that incorporate feedback 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

Mogen, P. H., & Galen, J. (2002). Multiple attempts on online assessments in an operations management course: An exploration. Journal of Distance Education, 17(1), 247-255. doi:10.1080/08923640701341653