

Winter January 11, 2019

If at first you do not succeed: Student behavior when provided feedforward within multiple trials for online summative assessments

Emily K. Faulconer, Ph.D., *Embry-Riddle Aeronautical University - Worldwide*

John C. Griffith, Ph.D., *Embry-Riddle Aeronautical University - Worldwide*

Hayden Frank, *Embry-Riddle Aeronautical University - Worldwide*

If At First You Do Not Succeed

Student Benefits of Multiple Trials on Assessments

Emily Faulconer, Ph.D.

John Griffith, Ph.D.

Hayden Frank

Embry-Riddle Aeronautical University



Exemplary assessments guide students in the learning process.

- ✓ Valid
- ✓ Coherent
- ✓ Rigorous
- ✓ Respectful
- ✓ Responsive
- ✓ Engaging



Learning management systems offer flexibility for assessments.

- ✓ Question pools
- ✓ Multiple attempts
- ✓ Scoring options
- ✓ Automatic grading
- ✓ Immediate feedback



What makes feedback high quality?

Website: PollEV.com/emilyfaulcon801

Text: 1835 and your message to 22333

What adjectives describe high quality feedback?

Characteristics of Effective Feedback:

- Timely
- Tangible & Actionable
- Goal-referenced
- Careful/Respectful
- Personal
- Ongoing
- Positives & Growth Areas



Combining immediate feedback with multiple attempts is a powerful yet underexplored tool.



Setting up the LMS for Feedforward:

- ✓ No penalty for stopping on 1st attempt
- ✓ Closed questions from pools
- ✓ Questions one-at-a-time
- ✓ Save and resume option
- ✓ Timed – 1 hour
- ✓ Keep highest score
- ✓ Auto-graded by LMS
- ✓ Feedback immediate, once



Examples of Feedback:

Topic	Question	Feedback
Significant Figures	Which number below contain 3 significant figures?	Zeroes to the left of the nonzero digits are never significant. Zeroes in between nonzero numbers are always significant. Zeroes to the right of nonzero numbers are significant if there is a decimal present.
Dimensional Analysis	Determine the number of atoms across the diameter of a human hair given that the diameter of an atom is 0.1 nm and the diameter of a human hair is 0.1 mm.	This can be solved two ways. If you're comfortable with the prefixes and scientific notation, you can just move the decimal accordingly. You can also write out the conversion factor to get between nm and mm. Be sure to write out your dimensional analysis so that you can ensure your units cancel out.
Subatomic Particles and Atomic Models	How should this diagram be changed to properly represent Lithium - 8?	Which subatomic particles change to form isotopes?

Do students who need to take advantage of multiple attempts do so?

74% tried again (lecture)

86% tend to try a 2nd attempt (lab)

71% tend to try a 3rd attempt (lab)



Do students do better on a future attempts after receiving feedback?

Lecture scores + 8.8

Lab scores 1-2 +6

Lab scores 2-3 +9.6



Do those who used multiple attempts outperform those who did not?

Average final lecture quiz scores

No Retake 75% Vs Retook 72%

Average final lab quiz scores

Scores between 86% and 87% - all groups



Do students spend more time on task when using multiple attempts?

Lecture Quizzes

One attempt: 62 minutes (± 30)

Two attempts: 126 minutes (± 63.5)

Lab Quizzes

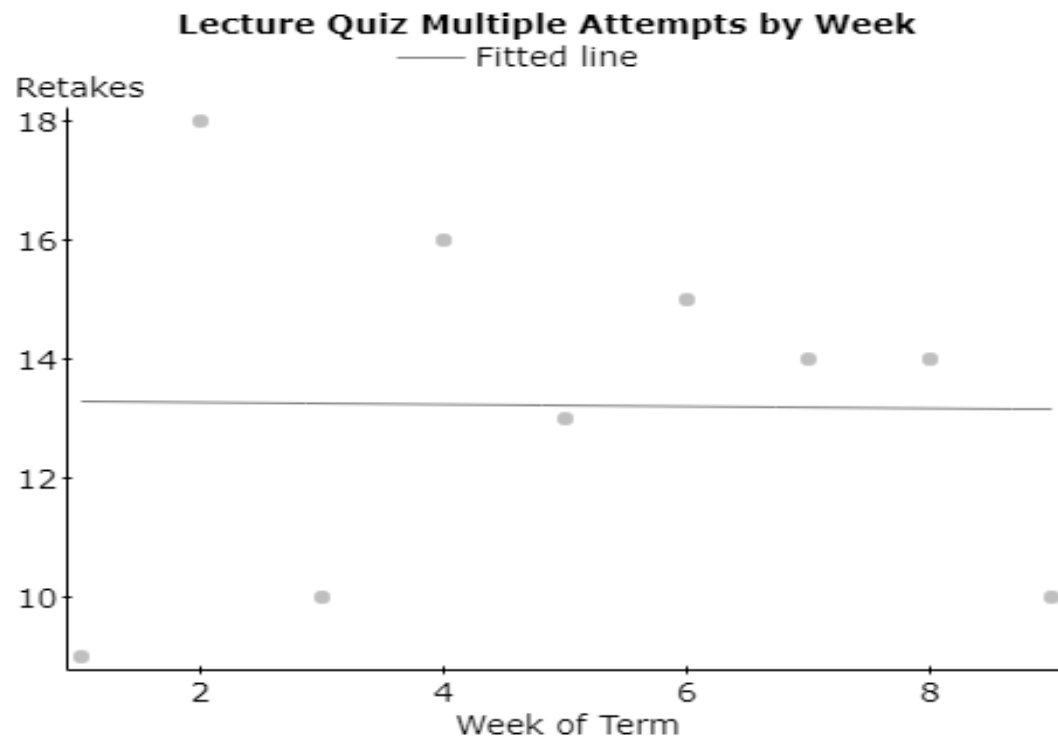
One attempt: 47.5 minutes (± 37)

Two attempts: 78.5 minutes (± 44.5)

Three attempts: 97 minutes (± 73)



Does student use of multiple attempts vary during the term?



Pedagogical Implications

- ✓ Students use multiple attempts
- ✓ Feedforward with multiple attempts improves 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)



Questions?



Emily Faulconer
faulcone@erau.edu

John Griffith
griff2ec@earu.edu