Building a Better Assignment: Creating Scaffolded Student Assessments Using Two-Stage Exams in Large and Small-Enrollment Geology Courses

MICHELLE HASKIN

TEACHING ASSISTANT PROFESSOR

MHASKIN@UNC.EDU

UNC | COLLEGE OF ARTS AND SCIENCES
Earth, Marine and Environmental Sciences

Two-Stage Exams

a.k.a. collaborative exams, tiered exams, individual and group exams

- Shift high-stakes assessments to a learning tool
- Integrate into a course-wide learning framework where students receive frequent feedback on their competencies with progressively more challenging assessments
- Encourage growth mindset
- Increase long-term concept retention
- Benefit low-achieving students
- Are preferred by ~70% of students over traditional exams, largely due to cited learning gains and grade improvements

Identified Needs in GEOL101 Courses

- Increase comprehension of course concepts
- Support under-performing students
- Promote engagement and connectedness
- Practice "power skills"
    - Communication
    - Relationship building
    - Self awareness
- Decrease stress and anxiety surrounding high-stakes assessments
- Prompt personal reflection on strengths and areas of improvement
- Integrate more challenging higher-order thinking questions

Execution

Stage 1: Individual Exam

Closed-book exam completed individually

- Objective questions with single, definitive answers (multiple-choice, true/false), short answer/essay, calculations
- Submit the individual exam priot to stage 2

Stage 2: Group Exam

Students retake the same exam in a small group (~4 members) with the goal to discuss all questions and come to consensus on the best answers.

- Open-book or closed-book
- Composed of only objective questions with single, definitive answers (multiple-choice, true/false)
- Completed in the same class period (TTh, 75-min.) or during the subsequent class (MWF, 50-min.)
- Option to opt out or complete it open book as an individual

Adaptability

In-person or synchronous online instruction (Zoom breakout rooms)

Fixed and moveable seating

Small to large-enrollment courses

50-min and 75-minute classes

Quizzes and exams, assessments with a variety of question styles

Professor pre-assigned, static groups or student-formed ad hoc, fluid groups

Student Feedback From surveys from GEOL101 classes, Fall20-Sp23

"[Group exams] helped me to understand the material a lot better because students sometime know how to explain things in a manner other students can understand them but they also help me do better in the class."

"I loved the set-up of the individual and group exam. It took off some of the pressure and allowed me to learn from my mistakes by having the discuss why I had chosen the answers I did. This was one of my favorite parts of the course. I think it benefitted everyone."

"The fact that you could retake them with your group was very helpful in terms of learning. A lot of times after an exam, students will forget everything they learned and won't care to try and figure out the ones they got wrong. The group exam aided in keeping students engaged and really figuring out the ones they were stuck on."

"A big motivator for reviewing is avoiding misleading the group. I vividly remember a moment when, after the group adopted my line of reasoning for a particular answer, we ended up getting the question wrong. I'll likely never forget the concept now."

Resources

Bloom, D. (2009). Collaborative test taking: Benefits for learning and retention. *College Teaching*, *57*(4), 216-220.

Gilley, B. & B. Clarkston (2014). Collaborative Testing: Evidence of Learning in a Controlled In-Class Study of Undergraduate Students, *Journal of College Science Teaching*, 43(3), pp. 83-91.

Knerim, K., Turner, H., & Davis, R. K. (2015). Two-stage exams improve student learning in an introductory geology course: Logistics, attendance, and grades. *Journal of Geoscience Education,* 63(2), 157-164.

Macpherson, G. L., Lee, Y., & Steeples, D. (2011). Group-examination improves learning for low-achieving students. *Journal of Geoscience Education, 59*(1), 41-45.

Rieger, G. & C. Heiner (2014). Examinations That Support Collaborative Learning: The Students' Perspective, *Journal of College Science Teaching*, 43(4), pp. 41-47.