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Michelle Haskin, EMES
mhaskin@unc.edu

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

Students complete a closed-book exam as an individual, then retake it in small groups either closed-book or open book. Allowing students to seek and give immediate feedback converts the exam into a learning experience where corrections are more likely to be internalized such that concept retention is improved. Learning gains are greatest for the lowest performing students. Two-stage exams boost student engagement and allow them to see the benefits of solving problems collaboratively. Most students prefer two-stage exams over traditional exams and report feeling less anxious and stressed.

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 prior 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 the subsequent class (MWF, 50-min.)
- Option to opt out or complete it open book as an individual

Grading Considerations

Explicitly discuss that the exam grade is the total exam grade (the individual exam + the group exam), and the group exam is not a bonus or extra credit.

The individual exam should be weighted more heavily, the literature states 70-90% of the total exam grade. However, if the group exam is weighted too little, students will begin opting out of the group exam if given the opportunity. I have total exam averages between 75-85% by weighing the individual exam at 66%.

Release all exam grades together after the group exam. Releasing the individual exam grade before the group exam can reduce discussion whereby students may tend to accept the answers of the group member with the highest individual exam score.

Show the breakdown of the individual score, group score, and total exam score so students can see where they excelled or where they need to improve. This also prevents a very high group score from masking a lower individual exam score.

No penalties for students with group exam score lower than their individual score. Students earning higher scores on the individual exam percentage wise should have their group exam score be adjusted so it's at parity percentage wise.

Opting out of the Group Exam

Most students will gladly complete the group exam, but there are always students who can't work in groups (processing issues in loud environments) or strongly prefer to work as individuals. These students can take the exam again as an individual but have access to course materials or can opt out of stage two entirely. In this case, their exam score is based only on their individual exam. To preserve the equations in the grade book, I calculate a placeholder score for their group exam that is equivalent to their individual exam percent score.

Group Dynamics and Group Formation

Group functionality is important for two-stage testing. I find better group cohesiveness and buy in with permanent groups. Consider auxiliary supports to help build rapport and establish expectations, such as group introduction posts in an online forum, other in-class group activities (Poll Everywhere questions, assignments, etc.), group contracts, and peer assessments after group work.

In the literature, two-stage testing has been done with student-formed, ad hoc groups assembled in a 5-minute period between the individual and group exams. Once gathered in groups of 4, students raise their hands to get a copy of the group exam. Students without a group go to the front of the room to self-select group members or they're assigned to a group by a TA/LA/professor.

Students with Accommodations

Students who use ARS schedule their individual exam to be completed before the start of the group exam, or they opt out of the group exam and complete their individual exam as usual at ARS. Students taking the group exam bring their individual exam, packaged at ARS, to the classroom.

Tips

Discuss the rationale for two-stage testing and how it will be administered at the beginning of the semester. Consider incorporating this into the syllabus so students can refer to it. Revisit this the week prior to exams.

Provide written instructions displayed to the class during the exam on how students will submit their individual exams, group exams, and how they'll be forming groups if groups have not been pre-assigned. My pre-assigned groups sit according to a seating chart during the individual exam to reduce transition time.

For grading purposes, **individual exams must be kept separate from the group exam**s. If using bubble answer sheets, this can be denoted by having students bubble in different exam versions. Have a procedure to collect and store individual and group exams; be sure any LAs/TAs are aware.

For 50-minute class periods, hold the individual exam and group exam on subsequent days.

For 75-minute class periods, it's possible to complete both the individual and group exams on the same day. I budget ~2/3 of the time for the individual exam and allow for 5 minutes to hand out exam and review the exam procedure at the beginning of class. Students will need much less time to complete the group exam as they come to consensus quickly on most questions.