

Analysis of student engagement and learning using real-time assessment strategies in a remote Human Anatomy & Physiology Laboratory course

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Extended Abstract

Real-time assessment (RTA) is a philosophy of assessment that relies heavily on formative assessment activities to immediately guide instruction. These activities are low stakes and are frequent. The nature of the activities and their frequency is highly dependent upon the course, the makeup of students in that course, and the individual faculty member. The results of these assessments serve to guide the faculty member to understand: (a) how well students understand the material, and (b) what next steps should be taken to ensure that student learning continues to occur. The use of traditional, periodic assessments (i.e. quizzes, exams, lab reports, etc.) can create a delay in feedback to both the instructor and student as to the status of student content comprehension, and the opportunity for corrective instruction may be lost. The benefits of RTA are that students and faculty are acutely aware of progress towards learning objectives. As such, faculty are able to make course adjustments tailored to ensure that all students have a better opportunity to be successful, while students are able to self-correct their own learning behaviors as necessary (enhancing students' metacognitive skills).

In this small pilot study, RTA interventions were integrated into a Human Anatomy and Physiology Laboratory course of approximately 90 students across five sections. The course was taught remotely during the Fall 2020 and Spring 2021 semesters due to the Covid-19 pandemic. New methods of formative assessment were developed utilizing available online tools, including the following: 1) "no-point quizzes" using Zoom direct message and annotation features; 2) small group work (through Zoom breakout rooms) utilizing a shared Google Jamboard (an online shared whiteboard); and 3) small group work (through Zoom breakout rooms) utilizing a shared Google Docs document with discussion prompts. In addition to instructor observations about the effectiveness of each method from a teaching perspective, students were asked about their enjoyment of, and how well they learned from each assessment strategy. Fifty-four students responded to the survey in the fall of 2020, and 45 students responded in the spring of 2021.

Student survey data indicated that students found variable levels of enjoyment in each of the different types of assessment, but in each case, students recognized the benefit to their learning regardless of their enjoyment. For example, in the fall, nearly 91% of students (49/54) *really enjoyed* or *enjoyed* taking the no-point quizzes. In the spring, almost 89% of students (40/45) *really enjoyed* or *enjoyed* the quizzes, including more students who *really enjoyed* the quizzes in the spring (64.4%; 29/45) compared to the fall (38.9%; 21/54). Importantly, most students (96% in the fall

semester; 93% in the spring semester) thought that this activity *somewhat helped* or *really helped* them to learn.

The instructor observed that no-point quizzes provided an easy, rapid means of assessing basic (core) knowledge of content before advancing to the next topic. This allowed the instructor to pause instruction at the moment when content corrections were needed. It is this instructor's opinion that making these corrections in real-time allowed for a higher level of student comprehension as the content progressively increased in difficulty. In addition, students were able to respond such that they were anonymous to the class as a whole, but not to the instructor. This seemed to increase engagement and participation, perhaps because students were empowered to attempt a response to difficult questions without judgment from their peers. Meanwhile, the instructor could still track individual student progress.

Small group work through Zoom breakout rooms was not viewed as favorably as the no-point quiz activity. For group work paired with discussion questions using Google docs, more students (40.7%; 22/54) *did not like*, or *strongly disliked* small group work than *enjoyed* or *really enjoyed* it (33.3%; 18/54). Regarding the impact on learning, the majority of students viewed group work with discussion questions as neutral at best (51.9%; 28/54), while four students found it actually hindered their learning. Small group work with Jamboard was viewed more favorably, though not as favorably as no-point quizzes. A majority of students (51.9%; 28/54) reported that they *enjoyed*, or *really enjoyed* the activity. Similarly, the majority of students (57.4%; 31/54) found small group work with Jamboard was *somewhat helpful* (22/54) or *really helpful* (9/54) with learning the content, and only one student expressed that the activity hindered their learning.

The instructor observed that it was easier to covertly monitor group work using the shared online documents (Google Docs and Google Jamboard), than moving around a physical classroom. The remote monitoring allowed the instructor to intervene with groups who were headed off track, while at the same time avoid interrupting the "flow" of groups who were working efficiently and on the right path. Although group work was not as enjoyable from the students' perspectives, the related questions were more complex, and thus provided better insight of student progress and comprehension to the instructor than the no-point quizzes.

In summary, students identified the no-point quizzes as both enjoyable and helpful with learning content. Students did not enjoy small group work in general. However, they reported that small group work was more enjoyable, and was of greater benefit to their learning, when paired with Jamboard than with discussion questions. Importantly, more students acknowledged they learned at least somewhat from all of the activities, even if they did not enjoy doing them. Three main implications for future practice include: 1) it is necessary to continue to monitor student progress in real-time and in a variety of ways; 2) frequent and varied assessments should be used to immediately inform course decisions to help students meet course learning outcomes; and 3) steps should be taken to bring the successful assessment methods from the remote environment back into a face-to-face classroom.

Keywords: assessment, anatomy, physiology, quiz, small group work

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