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Using Google Docs to Administer Synchronous Collaborative Assessments

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Abstract: Collaborative learning increases student achievement of learning outcomes in a wide range of disciplines, including the natural sciences, and is a hallmark of authentic assessment. To help students collaborate more effectively, I have used Google Docs, a free, online word-processing program accessible using almost any internet-connected device. Assessments that include real-world application problems are composed in Google Docs and shared with students via links. Google Docs has proven to be more efficient than pencil-and-paper assessment, encourages greater collaboration within student groups than is possible with tools embedded in a learning management system, and provides opportunities to give students just-in-time instruction and examine student metacognition, all of which are foundational for authentic assessment. Post-assessment grading is rapid, and corrected documents with instructor feedback can be easily shared with students. Students have adapted readily to the platform and have learned on their own how to use the software beyond my original conception. I describe how I have used Google Docs successfully in a molecular biology course, offer considerations for grading and distributing corrections, and report on students' perceptions of the assessments themselves.

Keywords: collaborative learning, online learning tools, synchronous teaching

There exists a diversity of thought on what constitutes authentic assessment. An editorial on the components of authentic learning promoted four basic themes, "real-world problems that engage learners in the work of professionals; inquiry activities that practice thinking skills and metacognition; discourse among a community of learners; and student empowerment through choice" (Rule, 2006). Another group's analysis of the literature led them to propose eight critical rules for authentic assessment: challenge, performance or product (outcome), transfer of knowledge, metacognition, accuracy, fidelity, discussion, and collaboration (Ashford-Rowe et al., 2014).

One common element in authentic assessment is the importance of collaboration. As collaborative learning techniques have increased student success in biology courses (Tessier, 2007; Hacisalihoglu et al., 2018, reviewed in Rutherford, 2015), I have been using collaborative assessments in my molecular biology (BIOL-L 211) course since 2017. The majority of these are low-stakes assessments that expose students to the real-world application of principles learned in the classroom.

Administering collaborative assessments using paper is problematic. It is difficult to get all students involved in finding solutions to problems when there is only one sheet of paper for groups to record answers on. Providing assistance to students during the assessment is difficult because it requires removing their access to their work product to review it. Finally, handing back graded assessments is cumbersome, requiring either copying the original document for each member of the group or scanning the documents to files and distributing them. Returning graded assessments is tricky because group membership is not static (e.g., a student might come to the Wednesday class because of illness on Monday). Although learning management systems (LMSs) have tools to administer assessments online, these are usually designed for individual assessments. Using LMS tools with collaborative assessments is not an easy task and often requires confusing logistical steps.

Because of social distancing requirements in fall 2020, my students met over Zoom and used Google Docs to complete collaborative assessments. I chose Google Docs as others had reported using it successfully to facilitate online real-time collaboration (Roberts et al., 2019; Spaeth & Black, 2012). Google Docs allows synchronous editing of documents by multiple users and runs on almost any laptop, tablet, or smartphone, eliminating a technology barrier for most students. Preparing, delivering, grading, and returning assessments in Google Docs is a straightforward process.

Helping students figure out "what they know that they know" (i.e., metacognition) is important for authentic assessment. With paper-and-pencil assessments, I had to move from one group to the next, trying to read over shoulders or having to take students' work away from them to assess it. With Google Docs, one can simultaneously monitor multiple groups and intervene when necessary to help students perform better on the assessment. This is far more efficient than walking from table to table, picking up a group's work (necessitating a halt to their work), and then having a discussion. Assessment tools built into LMSs do not generally offer the same synchronous editing ability of Google Docs, nor do they allow the instructor to monitor student work in real time, making Google Docs a far better choice for collaborative assessment. Although I have used Google Docs in a medium-sized class (enrollment varies between 30 and 50 students each fall); it is easily scalable using file sharing tools within Google.

Methodology

Assessments in Google Docs can contain text, images, tables, and links to outside sources. Once a template file is created, copies are made for each independent group in the course. This is done quickly using CopyDocs,[1] a freely available script that easily generates multiple copies of any file in Google Drive (Google Docs automatically stores files on Google Drive). Files can be renamed but do not have to be since they are shared as links.

To share files with students, it is easiest to put the files in a Google Drive folder that is *not* shared ("restricted") and then set the files' access to "Anyone with the link" and then "Editor." (If your institution has an agreement with Google to allow access only to individuals within your institution, this may be preferable to "Anyone with the link.") Links are shared with students online. To avoid students' accessing links early, I pasted the links into an announcement and used my LMS's "delay posting" feature to hide the announcement until the start of class.

During class I opened each file being worked on in a separate tab in my web browser. I could easily switch from tab to tab and monitor the progress of each group in real time and could intervene when needed. If a group had a simple error in their work, I could type into the body of their document (using a distinctive font color) or add a comment to the document. If the issue seemed to indicate a metacognitive issue (i.e., the students did not know what they did not know), I could intervene in person to guide the students' discussion. I chose to give some feedback in person because of the size of my class, but in larger classes all feedback could be done within Google Docs. It would also be simple to have teaching assistants (TAs) monitor groups in this way also. Selecting all the files being used in that period and changing access from "Editor" to "Viewer" ensures that all students have equal time to work on the assessment.

Graded assessments are distributed by using the "Add people and groups" option in Google Drive sharing. For each file, the email address of each group member is pasted into the window, and access is set to "Commenter" to allow students to see the instructor's comments. Students receive an email that lets them know that they have been given access to the file and contains a direct link. Setting

[1] CopyDocs is available at http://tinyurl.com/copydocscript. For a helpful article on how to use this tool, see https://go.iu.edu/4HCB

up a simple spreadsheet that lists the names and email addresses of each group makes this process much faster. For larger classes, the spreadsheet could be kept in a Google Drive folder that TAs can access so that they can grade and distribute materials to the students they are responsible for. Sharing using email addresses makes it simple to add extra members or remove absent members from those given access.

Results and Discussion

Google Docs makes administering assessments and returning graded work much easier. Additionally, it allows all students in a group to access and participate in the assessment process, promoting the "discourse among a community of learners" highlighted by Rule (2006). Allowing closer monitoring of work by instructors and TAs also helps foster metacognition and transfer of knowledge (Ashford-Rowe et al., 2014). Few barriers were encountered in using Google Docs. In all semesters, students have always had at least one device that could be used. Students used Google Docs in ways I did not anticipate. For example, students learned on their own that they could use their phones to take pictures of information they had written on scratch paper and paste those pictures directly into their document.

There are some minor drawbacks to using Google Docs. First, deciding what types of questions to use requires careful consideration. For example, although it is possible to require students to draw as part of their answer, it is difficult to draw inside the Google Docs environment. However, as mentioned earlier, students can upload pictures of pencil-and-paper drawings into the document. This may necessitate the instructor demonstrating how to do this. There is also the risk of having students look up information on their devices, which would be greater in nonproctored or difficult-to-proctor environments (e.g., hybrid learning scenarios, large classrooms). However, as authentic assessment should avoid relying on information that can be easily looked up, instead asking students to complete tasks that require application of core principles to real-world tasks, careful composition of the assessment should minimize this issue.

I surveyed students (N = 19) in fall 2021 about their perception of the value of collaborative assessments. Table 1 provides the questions asked ("group discussion questions" are low-stakes assessments; "group exams" are high-stakes assessments) and a synopsis of students' responses. Students overwhelmingly agreed that the authentic collaborative assessments used in the course benefitted them. At least 50% of students strongly agreed that collaborative assessments increased their understanding of concepts learned in the classroom and improved their grade in the course. These data suggest that students find value in the authentic collaborative assessments delivered via Google Docs.

Table 1. Student perceptions of the value of collaborative assessments.

Question text	Agreed	Agreed strongly	Agreed somewhat
Working on the group discussion questions helped me understand concepts covered in the lecture.	88.89%	50.00%	38.89%
I feel that the group discussion questions have improved my grade in this course.	68.42%	57.89%	10.53%

I feel that the group exams have improved my grade in this course.	78.95%	57.89%	21.05%

As noted throughout, using Google Docs to deliver authentic assessments is easily scalable. For instance, I have started using it to deliver collaborative assessments in my human anatomy and physiology course, which had 186 students in the spring 2022 semester. Grading and distribution are easily handled by changing sharing permissions on files and sharing only with students who participated on a particular document. Because Google Docs looks and functions like other word-processing software, there is very little new learning required for either the instructor or students in the course. The multiuser editing experience has been excellent, with very few reports from students of errors or bugs. Because Google Suites (of which Google Docs is a part) includes spreadsheet and presentation tools, there are opportunities to adapt what I describe to courses that require complicated mathematical calculations or presentations. These attributes, combined with its compatibility with devices nearly all students already own, make Google Suites a remarkably robust means for incorporating authentic collaborative assessments.

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