

Special issue: Innovative Teaching Personal Essays

Student-Created Videos in Mathematics Classes

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It happens all the time, right? Students are eager to sign up for mathematics classes, rave about the latest math book they bought online, and drone endlessly about the recent mathematics movie that is all the rage in theatres. Well, not exactly. But mathematics professors can dream on! We will settle for at least the consideration that perhaps, just maybe, there is an opportunity to enable students to see themselves as creative in mathematics. Early on, my goal had been to have students develop confidence and see how math can serve as a great equalizer. This has since also developed into a quest for infusing mathematics into ANY aspect of students' lives that has some meaning for them in order to motivate and encourage. Having observed students in class who appeared to be obsessed with their phones, I read articles and found data claiming millions of hours are spent watching YouTube. I thought YouTube worth exploring to have student-created mathematics videos in order to capitalize on this engagement in videos.

Students often enter my college algebra mathematics classes with preconceptions that categorize the subject as stale and unrelated to their interests. Taking the course is not their choice, but instead a requirement. I hear these students rave about their love for reading or languages or history, and then when I ask how they see the value of mathematics in their lives the response is either silence or a grudging acknowledgement that they probably need to know it for finances or "something." There are of course some students who come with an open mind

and are eager to learn new concepts, but far too many reveal that they are nervous or ambivalent about the subject, making them “math-anxious.” Others state that their mathematical experience is really rote memorization, plug and chug procedures, and they would like some basic “tricks” to make the process less painful. Clearly this is not the ideal setting for an engaged learning session. Perhaps if they are steered away from passively listening, then they can ask more questions and have some chance at seeing that they are part of the math equation.

Because I am admittedly incredibly jealous of English and Foreign Language instructors in particular, and view the linguistic tools they use for language acquisition as enjoyable, then it makes sense to imitate the strategies by adapting them for mathematical procedures. Students often view mathematics notation and descriptions as totally foreign concepts, so adapting language acquisition tools for mathematics purposes seems reasonable. Quite frankly, conversations with non-mathematical teaching peers (typically at the copy machine or in the hallways!) have served as the greatest inspiration. To capitalize on the fact that students were already captivated by videos, I thought student-created videos would address some of the challenges students experience when implementing in-class presentations and verbal exams. Student-created video work would require time, but this was mostly outside of the classroom. This would address the in-class time constraint concerns while simultaneously allowing for the possibility of creative expression on the part of students.

Prior to implementation, a quick perusal of articles related to the student-created videos referred to a level of student technical sophistication and exposure to film and technology (Levin, 2010). There is admittedly a time-consuming aspect to this type of project because of the planning and producing, and many examples are based on a student audience that is technologically savvy. The assumption is that students entering college have used their phones to

create videos and upload these on social media sites to share personal expressions/stories, videos, photos, etc., and it would seem a smooth transition to require application to course work (Benedict & Pence, 2012). In college environments that provide access to electronic learning resources and videos for teaching and learning purposes, it would seem reasonable to expect students to be accustomed to videos as a tool for both leisure entertainment interests as well as educational purposes. Research related to student perceptions regarding video creation for classroom purposes reveal that students not only appreciate the experience, but consider the project work relevant, authentic, and meaningful, for both the learning process and the ability to be creative (Greene & Crespi, 2012; Smith, 2016). Although fascinated by these possibilities, I did consider the unique student backgrounds at our open access college. Could I make the same assumptions regarding equitable access to video recording tools? Given the accessibility to school laptops and other available video recording tools, I decided to take the plunge.

I created pages of mathematics word problems associated with the course learning objectives. I prepared instructions, rubrics, and “how-to” videos. The first time I implemented the project, I set students in groups and randomly assigned the problems. By the given due date, the students were to upload their videos and 30 minutes of in-class time was dedicated to reviewing the requirements and procedures sessions, followed by one dedicated class session to allow students time to complete the video recordings (a consideration of their varied work schedules and challenges traveling to school). Although I expected many questions and concerns related to this new format of assessment, I did not foresee that most of my students who had been on their cell phones and viewing YouTube had no idea how to create a video. My tutorial videos addressed uploading their YouTube or Kaltura video online, but they never viewed the videos!

Another area of surprise for me was how many expressed concern about how their peers would be able to review their videos. Although my rubric addressed creating a safe zone, politeness, respect to peers, etc., I still had to reassure them multiple times that I would remove any inappropriate negative comments. I gave multiple examples of positive constructive comments and questions that are valid and helpful. In hindsight, the time spent on that discussion is well in line with preparing them to communicate mathematically. At the time I thought perhaps this was one of the worst ideas I could have ever attempted to implement. The conversations seemed totally off-the-mark from math questions, and maybe I had unwittingly instilled anxiety instead of providing a tool for motivation.

When I saw their results for the first time, I was awestruck. There had been so many students who barely spoke in whispers when I would go from group to group during class work, but their video projects revealed completely different personalities. It was amazing to really hear their voices. There were humorous videos, as well as serious ones, and it was as if each person was really making an effort to be different. Most students were clearly proud of their work, and a few were fretting regarding how this would be graded (despite the rubric and discussions.) Once they saw the peer comments, which were respectful but varied in terms of helpfulness, they were more relaxed. It was wonderful to see the pride that most took in their work.

Yes, there were still a few challenges with projects that did not meet the four to six minute allotted time frame, and some videos did not address the appropriate level of mathematics. This has led me to keep the final exam in addition to the video so that I can do future analysis comparing the graded results. I have continued to implement student-created math videos for two years now, and each time I work towards addressing one portion of the multi-faceted issues seen from the prior semester's outcomes. The latest phase has been to have

students correct problems that were incorrectly done in prior quiz work or exams. In my opinion, the level of student persistence, critical analysis and growth mindset for that project makes it worth continuing (and it relieves some of the intensity of creating so many unique word problems!) That said, the necessary instructional time is still important. This is still “new” for most students, and it is important to support them throughout the process.

I won't deny that grading math videos is time intensive, but there is no doubt in my mind that it is also one of the most enjoyable projects to grade! I find great joy in seeing how students are motivated to express themselves far more through a video than in any class activity. Their written reflections also express how they are proud of their efforts. Many students comment on their realization that they *can* do the problems! I can honestly say that the project never has a dull moment, and I am eager to continue to learn alongside my students.

References

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