The Influence of the Pandemic on My Online Math Teaching Style

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Before the Pandemic of 2020-2021, I mainly taught face-to-face classes and asynchronous online classes in Mathematics and Statistics (mainly focused on first and second year courses) managed by the Department of Math Sciences. Particularly for asynchronous online classes, my role focused on posting learning materials including videos and documents, as well maintaining the course pages in the learning management system; producing lecture videos using Kaltura; holding office hours face-to-face each week, and meeting with students outside of office hours, which were also face-to-face. Additionally, students took exams together on campus as coordinated block exams, and office hours were held physically in my office. Hence, these asynchronous online classes may not be viewed as a 100% online. During this period, the traditional face-to-face classes were favored more among students as apparently having more efficient interaction in classes. The benefit of in-person classes is more appreciated among freshmen, perhaps due to the fact that they just stepped out of high school where they got used to traditional learning modalities. I observed that more students in face-to-face classes attended office hours more than online sections.

I taught this type of "asynchronous" online class until I took up a synchronous remote teaching assignment in Spring semester of 2021, right in the middle of the pandemic. The University introduced WebEx to support remote teaching. This app is quite efficient to handle online class meetings; it can generate recordings easily, and it allows the instructor to pull up a PDF file to write on. From my experience, I preferred recording class session videos in WebEx to recording in Kaltura Capture, as the latter often slowed down my computer, so that is not efficient to work on annotations in class with the computer freezing. As for writing on the electronic whiteboard, I needed a writing tool. In my opinion, an iPad with an Apple Pencil is the perfect solution. I liked it more than other larger-sized tablets because of its convenient size and portability, as well as some of its powerful apps with a user-friendly experience. I purchased one on Thanksgiving 2020, and installed WebEx and OneDrive in it.

During lectures, I pulled up documents from my OneDrive and shared them in WebEx, then worked on the problems by writing on the documents. I found the WebEx app worked smoothly on the iPad. Also, lectures could be recorded and posted in our learning manage system, Canvas. From my point of view, the natural deficiency of remote online teaching seeming to be less

effective might be the difficulty of engaging and interacting with learners, but in my online section, this deficiency was addressed by my strategy of writing on the onscreen documents. Learners followed the derivation of formulas, and I encouraged them to ask questions. Sometimes they asked me to let them work the problems out, and I was able handle these requests with nearly the same efficacy as in previous face-to-face classes.

I felt that this course was successful because, in the calculus students' teaching evaluations, they wrote highly appreciative comments to me about my instruction, such as:

- Professor Wang is a very intelligent mathematician and laid the course out very well.
- This was the hardest math I have ever taken but Dr. Wang was an excellent instructor.

In particular, some comments repeated my exact words from lectures, reflecting how remote teaching can communicate course knowledge very well.

Using the university learning management system and the video conferencing apps, I can envision that it will be helpful to supplement online materials in my face-to-face sections in future semesters. I won't be worried about whether there is less effectiveness in online instruction, but on the contrary, surely it will improve the efficiency of my courses by adding these online practices. I plan to make short videos for specific examples and problems to help students grasp key points in my math classes. This method definitely paves a path to a type of "hybrid" mathematic instruction that I can use in all my classes, whether they are face-to-face or fully online.

From a training point of view (usually indispensable in math and physics training), face-to-face interactions will be invoked in recitation sections ("problem-exercise" sections) during which instructors can see students' performance on problems easily, and learners can ask questions conveniently. If recitation goes online, students may need individual group discussion and the instructor may lead and guide these discussions, which I imagine could be hard to manage online. Other than this part, all remaining instruction could be entirely moved online. Office hours could be moved to online, too, if one can also write online communications; this semester (2020 Fall), I am providing online office hours, and I also allow students to see me in person. Up to now, everything in office hours is going pretty well!