

Lasting Impact of Pandemic on Online vs. Offline Resources

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Abstract

While education in general was forced online due to the COVID-19 pandemic, many educational institutions have since resumed in-person instruction, either exclusively or as part of a mixed approach. This work addresses the question of which aspects of virtual/online instruction may become permanent, and which may be discarded when health risks return to pre-pandemic levels (or to some post-pandemic normal). Such predictions are based on which aspects of online learning are found to be most desirable by faculty. The present preliminary results are based on surveys of engineering faculty at the author's institution. Results thus far suggest that, for the sample population, all aspects of courses will continue to have a significant online presence, although quizzes and exams will see less of a cumulative shift than other aspects of the course. These results generally hold regardless of length of teaching career and level of previous experience teaching courses online, although some differences are found between these demographic groups. Expanding the scope of the survey and providing additional context are next steps to continue this work.

Keywords

pandemic, COVID-19, teaching, survey

Introduction

Across the United States, universities have had various approaches to dealing with the COVID-19 pandemic; these changes can be generalized to include a sudden and significant shift toward the use of online resources, followed by a (perhaps more gradual) shift back to an in-person instructional model. However, because of both the significant development and adoption of remote instructional resources, as well as the increased familiarity that faculty now have with previously existing and new or improved resources, the post-pandemic teaching model may not converge to the pre-pandemic one. This study uses faculty opinions to gain insight into how the post-pandemic teaching model will look with respect to online resources.

Background

At Mercer University, after all classes were moved online in Spring 2020, classes were again held in-person in the Fall 2020 semester onward, with various accommodations being provided for quarantining students. This puts Mercer among the earliest universities to resume all in-person classes. The university has invested in various hardware and software/services to provide

online classes, then quarantine accommodations. If faculty wish to use such resources far into the future, they university may be wise to continue investing in them; whereas if they do not, it might be of greater benefit to the university to reduce spending on maintenance and services.

In this study, the author has surveyed a number of faculty (full-time or adjunct) who teach engineering at the Mercer University, to determine how their use of technology has changed since before the pandemic, as well as how they anticipate it to change in the future. Two opinion questions and two demographic questions are also included. 16 responses were obtained from a potential pool of less than 50 individuals. Any sub-categories presented in the results consist of the responses of at least 3 surveys.

Survey

In the survey, the first six questions ask about the use of online resources in the pre-pandemic, mid-pandemic, and post-pandemic periods. The responses will be reported as questions 1a, 1b, and 1c, through 6a-c, respectively. Notably, the definition of mid-pandemic excludes the period in which all classes were held online, and is defined to begin in Fall 2020 when classes were required to be held in-person, but with materials being made available to students under quarantine. Additionally, the survey takers are given flexibility in their determination of when the “post-pandemic” period will (or did) start. These first six questions are presented in Table 1.

Table 1: First six survey questions. Sub-numbers a, b, and c in the results correspond to the did/do/will portion of the question (equivalently, to pre-, mid-, and post-pandemic time periods).

Instructions: Please answer the questions 1-6 with numbers 0-10 , where 0 = never and 10 = always . Answer N/A if a question is not applicable. Please use the following definitions: Pre-pandemic is before Spring 2020; Mid-pandemic refers to semesters with in-person classes, starting Fall 2020 and ending either Spring 2021 or now; Post-pandemic is whenever you think we are/will be past the pandemic or in the “new normal”.
1. How often did/do/will you post instructional, non-lecture materials online (e.g., notes, readings, videos)?
2. In classes with in-person lectures, how often did/do/will you post videos of those lectures online?
3. How often did/do/will you assign/receive homework and/or minor assignments primarily online?
4. How often did/do/will you assign/receive quizzes and/or exams primarily online?
5. How often did/do/will you utilize computer proctoring of quizzes and/or exams which include browser lock-down and/or active monitoring services?
6. How often did/do/will you require projects or reports to be turned in online?

While Questions 1-6 address faculty intentions, Questions 7 and 8 address changes in faculty attitudes based on greater access to technology and greater familiarity with the technology. For faculty who did not already teach distance learning courses, it is expected that they have generally experienced greater access to technology resources, and that they have been forced to experience greater familiarity with them as well; thus, the intention of the questions is to measure whether such access and familiarity make online resources more attractive. Questions 9 and 10 divide respondents into demographics based on previous experience with online courses and length of time teaching. Questions 7-10 are given in Table 2.

Table 2: Final survey questions. These questions address attitudes/motivations and demographics.

Instructions: Please answer questions 7-8 with numbers 0-10 regarding your level of agreement/disagreement with the statement, where 0 is “strongly disagree”, 5 is “neutral”, and 10 is “strongly agree”.
7. Because of improvements in technology or improved technology being made more available to me, hosting course materials/assignments online has become more attractive to me.
8. Because of my increased familiarity with or awareness of technology solutions, hosting course materials/assignments online has become more attractive to me.
Instructions: Other information: Please circle your response.
9. Pre-pandemic, how often had you taught courses where some or all of your students attended primarily online? Choices: [Never] [1-3 times] [4 or more times]
10. Including this year, how long have you been employed in a university level instructional role? Choices: [1-10 years] [11-20 years] [21 or more years]

Survey Results

Before presenting selected results of the survey, the author wishes to make a few notes. First, the rating for Question 2b is expected to be particularly high, as course instructors were all provided with the means to record in-class and/or offline lectures, and were expected to provide course materials to all students under quarantine per university policy. Second, when grouped according to how many courses a person had taught where some or all students attended primarily online (Question 9; henceforth, “distance learning courses”), respondents will be grouped into categories “never” and “1 or more times”, due to the low number of respondents who selected the two non-zero options. Finally, average ratings for questions 1-8 are rounded to the nearest whole number.

Average responses for the first six questions are shown graphically in Figure 1. Pre-pandemic (part a), the highest usage of online resources was to post notes (Q1) and turn in projects (Q6). Average use of all online resources increased mid-pandemic (part b), and is expected to decrease but generally remain significantly above pre-pandemic levels in the post-pandemic (part c). The lowest average responses in part c are for quizzes and exams (Q4), and the related question of computer proctoring of quizzes and exams (Q5). Thus, of all the teaching resources considered here, faculty have the strongest preference to give quizzes and tests in an offline format.

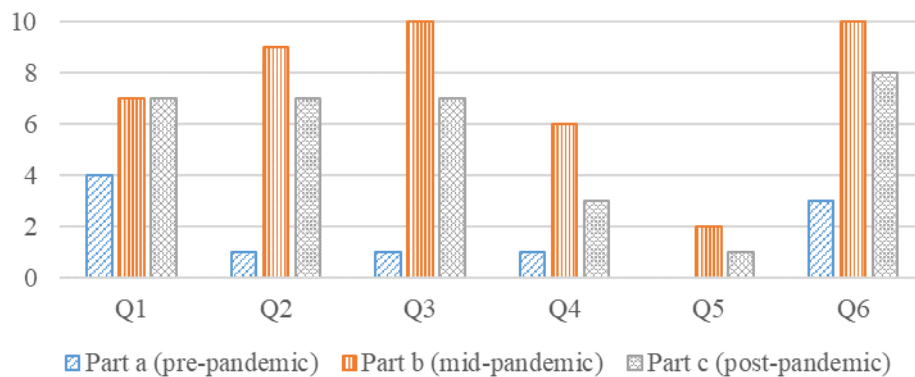


Figure 1: Average responses for Questions 1-6, parts a-c

Next, differences between demographic groups (based on Questions 9 and 10) are explored. In the interest of space, only averages for parts a, b, and c over questions 1-6 are shown, along with responses to Questions 7 and 8. Demographic breakdowns based on prior distance learning experience are given in Figure 2, and based on year of teaching experience in Figure 3. Before seeing the data, the author hypothesized that those who had previously taught distance learning courses might generally utilize online resources more, and that those with the most years of experience might be the most likely to try to return to a pre-pandemic/offline teaching model, having likely used such methods for a longer time than newer faculty. The actual results are not too different from this hypothesis. Those who were experienced in teaching distance learning had higher online utilization than those who were not in the pre-pandemic times, but now that basically everyone has experience teaching remotely, those differences seem to be largely gone (it will be interesting to see if there is a difference in a few years, when the newest faculty will have experienced distance learning, but not necessarily distance teaching). With respect to years of experience, online utilization is similar across the three categories for pre- and mid-pandemic, but the newest faculty indicate the greatest expectation of continuing to use online teaching resources post-pandemic.

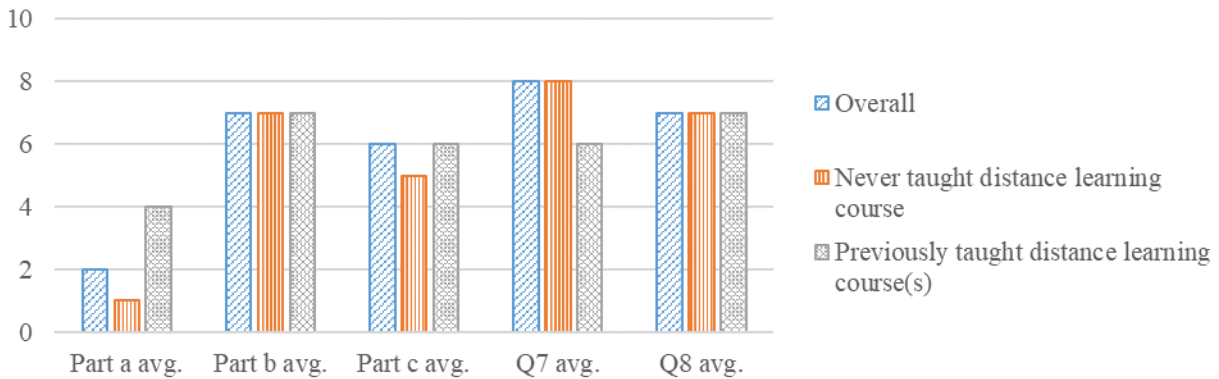


Figure 2: Average responses for parts a-c of Questions 1-6, and average responses for Questions 7 and 8, based on previous experience with distance learning

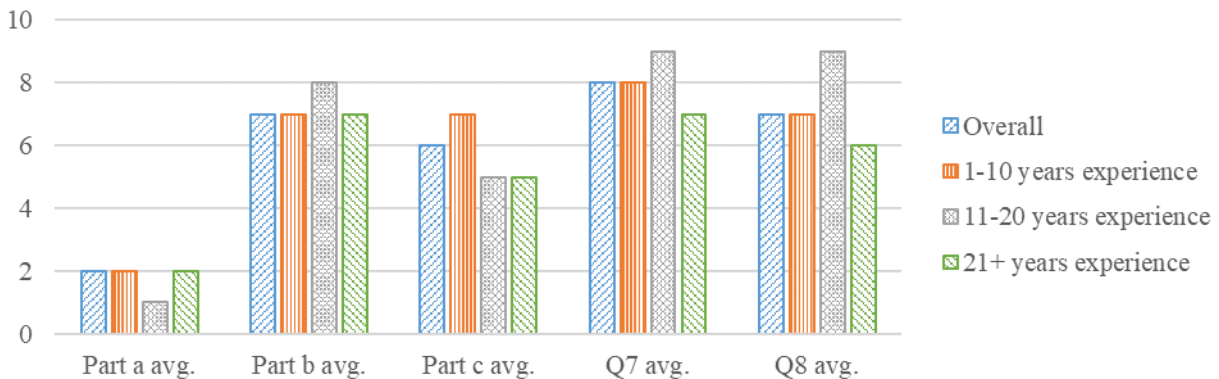


Figure 3: Average responses for parts a-c of Questions 1-6, and average responses for Questions 7 and 8, based on years teaching experience

Regarding questions 7 and 8, the overall results suggest that both improvements/availability and increased familiarity/awareness of technology solutions slightly or moderately encourage faculty to host course materials online.

Summary and Conclusion

With the caveat that this survey has a small sample size, some tentative conclusions can be drawn from the data presented herein. Improved access to technology (and access to improved technology) and the forced familiarity therewith experienced during the COVID-19 pandemic have made many aspects of university courses more appealing to conduct or host online for engineering faculty. While online resource usage may decline with time, it appears that it will remain significantly higher than in the pre-pandemic times, possibly even for those faculty who already had experience conducting courses online. Online resource utilization will remain higher for faculty at all ranges of experience, although new newest faculty members may retain the highest amount of utilization. Quizzes and exams are the course areas most likely to not be conducted online, although some online proctoring solutions will continue to be utilized. Results of this study may be improved by widening the scope to include other departments or institutions. It may be interesting but also challenging to categorize how responses vary between institutions which applied different approaches to teaching in the COVID-19 pandemic.

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Kenneth Marek is an Instructor in the Department of Mechanical Engineering at Mercer University. He earned a Ph.D. in Mechanical Engineering from the Georgia Institute of Technology in 2014. In addition to striving to be a better educator, he enjoys working in the areas of acoustics and vibrations.