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Managing the virtual pandemic classroom and beyond: analyzing the implications of resolving arising tech issues

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Abstract
The study analyzed the implications of resolving technological issues that hindered remote teaching over the COVID-19 pandemic era and beyond. The transition of courses from traditional to online settings during the pandemic introduced persistent issues with broader implications. As repurposed courses went online for the first time at this state university in the Southwest, faculty members and students experienced issues in the teaching and learning process. It took the assistance of designated instructional designers to help resolve such issues. The study identified and analyzed various tech and design issues and investigated how resolving them ensured that high-quality teaching and learning were maintained in e-learning settings beyond the COVID-19 pandemic era.

Paper type Research paper

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Conceptual framework

The novel coronavirus's emergence has substantially transformed higher education pedagogy. Since 2020, having a viable online learning system has never been more important in institutions of higher learning worldwide. Traditional courses had to be transformed to allow them to be taught online. It is interesting to note that even when the impact of the pandemic had seemingly subsided, some faculty members opted to continue teaching online rather than go back to traditional ways. Lockee (2021) observed that access is a critical challenge to remote learning. According to Lockee, extensive problems still need to be solved, including the lack of Internet connectivity in some locations, especially rural ones, and the competing needs among

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family members to use home technology. However, as Lockee (2021) further observed, creative solutions have emerged to provide students and families with the facilities and resources needed to engage in and complete coursework (see Table 1).

So, with more classes going online, various tech issues were naturally triggered in e-learning settings that required quick and efficient solutions to maintain quality in online teaching. As Davison (2008) contended, online teachers may also need more technical support and/or resources to design appropriate materials and teach an online course. This meant that when technical issues arose, it took assistance from instructional designers and technologists to allay course-impeding tech issues.

Against this background, this study aimed to analyze the implications of resolving technological issues that hindered remote teaching at a state university in the Southwest. As faculty members transitioned to online teaching, some were technology-savvy and ready to go. In contrast, other faculty members had to go through crush programs that orientated them on using a variety of technology applications for remote teaching. In the same way, some students were technologically prepared to take courses online, while others needed expedited training. That scenario posed a challenge to both faculty and students. So, apart from resolving technological issues with faculty members, designated instructional designers also helped some faculty members to be technologically ready to teach online. Thus, faculty members who taught online because of the pandemic worked with designated instructional designers to resolve tech issues that hindered remote teaching. The study identified and analyzed outstanding issues and the process of resolving such issues. In turn, solutions implemented in one or more courses would be applied to other courses across the curriculum to promote quality in remote teaching beyond the pandemic.

Remote teaching: a new pedagogical dimension

The year 2020 brought an enormous transformation in education to make remote teaching viable and possible. There was no time in higher education when instructors had to quickly identify teaching and learning technological tools to ease the transition to remote teaching in the prevalence of the nouveau COVID-19 pandemic. Thus, synchronous and asynchronous tech tools had to be identified and implemented to facilitate the quick and sudden transition. The most significant effect of the COVID-19 outbreak on education was the loss of classroom learning activities as usual (Liguori & Winkler, 2020; Lynch, 2020; Zhang, Wang, Yang, & Wang, 2020). As Supariani, Rinda, Herlianti, and Djidu (2021) observed, changes in the implementation of the education system around the world today are indeed different from normal, and everyone is forced to use technology suddenly without any preparation.

According to Davison (2008), teachers and students are recommended to acquire adequate technical skills before entering the online environment. Coyner and McCann (2009) observed that to prepare students unfamiliar with technology, teachers may spend more time on technological training than teaching the content material of the course. From a technical point of view, Ko and Rossen (2017) argued that an online instructor needs little to start with. A very basic familiarity with computers and the internet typically suffices, according to Ko and Rossen, that means knowing how to set up folders and directories on a hard drive, use word processing software properly, handle email communications, including attachments and use a browser to access the World Wide Web. However, Ko and Rossen (2017) cautioned that technological proficiency does not essentially make the best online instructors; pedagogy should always come first and technology second. So, thorough preparation of a course with due consideration of the intended learners and medium of delivery becomes vital in ensuring that an online course's teaching is successful. Interestingly, while significant upfront planning and organization are vital in teaching an online course, issues usually occur when well-developed courses go live online. These issues affect online learners and instructors, and it usually takes assistance from a designated instructional designer and technologist to allay course-impeding design.

Synchronous online conferencing systems, such as Zoom and Google Meet, enabled students from many places worldwide to access online education and allowed presentations to be recorded for individual learners to watch at a time most convenient for them. Again, the importance of hands-on, experiential learning has led to innovations such as virtual field trips and virtual labs (Fulton, 2020; Pennisi, 2020). These asynchronous applications in learning management systems made the process viable.

Lockee (2021) contended that the COVID-19 pandemic would likely have a lasting effect on lesson design. She elucidated that the constraints of the pandemic provided an opportunity for educators to consider new strategies to teach targeted concepts. Lockee (2021) argued that though rethinking instructional approaches were forced and hurried, the experience has served as a rare chance to reconsider strategies that best facilitate learning within the affordances and constraints of the online context. She pointed out that, in particular, more significant variance in teaching and learning activities would continue to question the importance of "'seat time"' as the standard on which educational credits are based, that lengthy Zoom sessions are seldom instructionally necessary and may not align with the psychological principles of how humans learn. She concluded this argument by emphasizing that interaction is essential for learning, but forced interactions among students for the sake of interaction are neither motivating nor beneficial.

A recent study investigated the experience of online teaching during the COVID-19 lockdown in the United Kingdom and the opportunities and challenges associated with the online course delivery mode. The study found that focusing on pedagogy should be prioritized over-focusing on technology following the emergency transition to distance learning. The study further highlighted the importance of challenging and exceeding fixed pedagogies to enhance the productive capacities of resilient and adaptive approaches to online teaching and remote learning (Kamalipour, 2022; Peimani & Kamalipour, 2021). In another survey conducted in the United Kingdom, many academic respondents from various disciplines and positions debated critically about the dark side of the rapid digital transformation; only a small group of optimistic academics articulated the capacities and viewed the pandemic as an opportunity to deliberate its impacts on higher education (Watermeyer, Crick, Knight, & Goodall, 2021).

The transition to emergency online teaching was successfully implemented at many institutions of higher learning. Although some issues were resolvable, many technological tools were utilized successfully. Interestingly, Djidu *et al.* (2021, p. 141) posed an intriguing question: "What would happen if learning now had to be carried out 100% online, without face-to-face?" They argued that the question of how practicum activities can be carried out with online learning, whether higher education institutions are ready to implement it, and whether students are also ready to take part in this online learning are still big questions for all educators in higher education.

Purpose, methods and questions

Context and participants

A state university in the Southwest repurposed and transitioned as many as 100 traditional courses to remote teaching in response to the emergence of the COVID-19 pandemic. The Center for Excellence in Teaching and Learning (CETL) was charged with overseeing the transition, which was, in the end, successful. Designated instructional designers from CETL worked with faculty members who had taught online before and others who taught remotely for the first time. The process began with giving the latter group instructors crush programs to prepare them for remote teaching quickly. Thus, as courses went remote, during and beyond the COVID-19 era, various technological issues would arise from the whole process, and it took the assistance of designated instructional designers to help resolve such issues. These issues presented various challenges and impacted teaching and learning from the perspective of the teacher and learner. They had to be resolved quickly so that teaching and learning would

go smoothly. The process of overcoming these hurdles had broader implications beyond the pandemic.

Research questions

What technological issues impacted teaching and learning as faculty members taught remotely during the COVID-19 era?

How did resolving technological issues impact future remote teaching and learning beyond the COVID-19 pandemic?

Data collection

The study employed qualitative content analysis to collect data. Content analysis originated in communication sciences and examined text and images to identify messages and meanings (Hartley & Morphew, 2008; Krippendorff, 2013). A more modern definition of content analysis is "a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005, p. 1278). Krippendorff (2013) stated that content analysis often explores trends, patterns and differences among similar components. Again, Fraenkel, Wallen, and Hyun (2015) argued that one of the major reasons for using content analysis is to formulate themes out of large amounts of descriptive information and obtain information useful in solving educational problems. In this study, the content of online courses was analyzed for technological issues encountered by instructors and students. These courses were taught synchronously and asynchronously.

Data analysis

Table 1. Tech issues that impacted remote teaching beyond COVID-19 disrupt

Connectivity and exams
• Issue taking exams with Lockdown browser monitor from home
• Students are locked out of the final exam in the lockdown browser
• The student was kicked out of a new quiz and knockdown browser and lost 30 minutes
• Help to allow the use of iPads on all her lockdown-enabled exams
• Lockdown browser blocking file uploads for students
• Need help enabling the lockdown browser on a new quiz
• Need help creating a quiz from quiz banks and copying it to another course
• The quiz was automatically adding grades to the grade book
• Issues using annotations in speed grader
• Need help locating the speed grader in a new quiz
• The exam does not load questions for students
• Need help hiding quiz grades while grading essay questions
• The student took an exam, but Canvas did not record their responses
• Help to export classic quiz banks into new quiz item banks
• Help create a new quiz and make it draw from several item banks
• Help migrate classic test banks to new quiz item banks
• Looking for a faster way to convert classic quizzes into new quizzes
• Help create a blank quiz and enable the Lockdown browser on it
• Is it possible to share new quiz item banks with colleagues within Canvas, and how?
• How do I grade essay questions in new quizzes?
• The student took a quiz, and the grade did not transfer to the grade book, only a zero
• Want to learn how to migrate classic quizzes into new quizzes?
• Set up quizzes so they can only be accessed once relevant week content opens up
• Need help exporting banks in new quizzes and importing them

(*continued*)

Table 1. Continued

General content and other graded events
- Issues adding attachments in announcements
- Prepare instructions on how her students could access peer reviews
- Issues generating an E-Portfolio shared a link to submit to the professor
- Help create an assignment in Canvas to enter grades manually
- Students failing to access files uploaded in modules; Students receive an "unavailable" message
- Students are having issues uploading a video to a discussion post
- Help to create pages with outside links in Modules
- Assignment giving students a zero before being graded
- Want help creating a peer-reviewed assignment and assigning peers
- Four students were kicked out of an exam and needed the exam to reset for them
- How do I set up assignment group weights?
- Need help shifting certain graded events into different weighting groups
- Want help giving extra time for one student in 5 exams
- Help uploading a picture on the homepage
- Students were not able to access graded events that were well-published
- Cannot upload a video to a discussion post in my online class
- Students need help to see or post on a published discussion topic in their course

Integrated applications
- Attendance application-graded events do not count toward the final grade
- A student needs help generating the submittable link for her E-portfolio assignment
- Students need help using Canvas Studio to make videos for class and submit them
- Student Studio-created videos are not submittable in Canvas
- Need help inserting a Zoom video link on a Canvas page
- How best do I use Studio videos for students to turn in Pp presentations to the rest of the class?
- I need to download the lockdown browser onto my computer, which will not let me
- Need help developing instructions for use by students to create Studio videos and be able to submit them as an assignment
- YouTube links on pages not showing the title of the video
- Turnitin score generates the message "assignment submitted in an expired course."
- The student watched an entire video on a Canvas Studio assignment, but their grade did not post
- Issues creating and operationalizing a JB Learning Courseware link in a new course module

Discussion

RQ1. What technological issues impacted teaching and learning as faculty members taught remotely during COVID-19?

Results uncovered various thought-provoking tech issues that impacted teaching and learning during remote teaching. These hurdles ranged from as basic as issues with creating modules, adding content, and setting up assignment group weights. Other issues emanated from students' struggles with taking examinations remotely. Instructors also needed help with using a variety of applications integrated into the Canvas Learning Management System. To address these issues, faculty members would contact their designated instructional designer, who would work with them to rectify them. Instructional designers recorded all issues and solutions so they would apply the same if they arose in other courses.

To begin with, the biggest issue students had while taking classes remotely was taking examinations in the lockdown browser testing environment. While the browser generally worked well, many hurdles came with the Respondus monitor. A slight drop in connectivity made the monitor environment challenging to navigate. In most instances, students needed help to go through the initial identification process and environmental check successfully. During the examination, students would be kicked out in the middle of the examination while others struggled to take an examination on iPads. Students would then reach out to their instructors for help, who would, in turn, seek help from their designated instructional designers. Most of these issues arose from poor connectivity at home. As with using iPads,

instructors had to be shown how to enable their use in lockdown browser settings before students could use them. In some instances, students were required to upload documents to an examination. However, with the exam lockdown enabled by the teachers, the browser would block the file upload because it would see it as a student uploading a file for cheating purposes. In instances like these, designated instructional designers would recommend temporarily turning off the lockdown browser so that students would successfully upload documents.

When the University transitioned to remote teaching, classic quizzes were upgraded to new quizzes in Canvas. Thus, faculty members had to quickly learn how to transition to new quizzes and manage them properly. To that end, one of the issues that faculty members teaching remotely grappled with was importing classic question banks into courses as new quiz item banks. This was an intricate process, and usually, designated instructional designers had to do it with the concerned instructor asynchronously and sometimes synchronously using tools such as Zoom. In related issues, while administering quizzes online, sometimes a quiz would not automatically add some grades to the grade book. With help, affected instructors would find out some items required manual grading, and doing so would solve the problem.

Again, with new quizzes, instructors needed help creating new ones and setting them up to draw questions from item banks randomly. This came up mainly because the process differed from how it was done in classic quizzes. Other related issues included converting classic quizzes to new quizzes, sharing item banks with other instructors outside of a course, grading essay questions in new quizzes, enabling a lockdown browser on a new quiz, and also setting up a quiz so it could only be accessed by students when the relevant week and time came up. To address these issues, designated instructional designers created a workshop that walked instructors through using the new quiz engine. However, some instructors could not attend the workshop, so individual support was available to such faculty members.

Issues with general content were as fundamental as adding attachments to announcements and preparing instructions on how students can access and make peer reviews. Students grappling with generating an E-Portfolio shared link for submission to their professor. Typically, students would reach out to their instructors when affected by the latter, and instructors would, in turn, seek help from their designated instructional designer. In certain cases, students would fail to access files uploaded in modules, instead receiving an "unavailable" message. Such issues would be found to have emanated from instructors unintentionally putting restrictions on files or linking them from a past course. In some instances, students also had issues uploading a video to a discussion post. Usually, a video would be too large since Canvas gives users limited space. Faculty members teaching remotely also needed help creating pages with outside links in modules and would seek help from their designated instructional designer.

In some instances, students were kicked out of an examination, and it would have to be reset for them. With the new quiz engine in Canvas, they could continue from where they left off and with the exact amount of time they had remaining. Setting assignment group weights was another issue for some instructors. With this need, designated designers would walk the faculty members through setting them up correctly. Following the weight set-up, some instructors would need help shifting certain graded events into different weighting groups. In some instances, students would need help accessing graded events that their instructor published. Diagnosis would reveal that even though published, such graded events were saved in an unpublished module. Some faculty members had issues uploading media on a course homepage, which is paramount to course design, and would seek immediate help from their designated instructional designer. On the other hand, students would have issues seeing or making a post on a published discussion topic in a course. They would report to their instructor, who would seek help from their designer.

A typical speed grader issue was when the integrated application would not save annotations. This was a frustrating experience because faculty members would spend a lot of time grading and making feedback annotations, only to lose all annotations. As advised by instructional designers, the quickest solution would be to switch browsers between Google Chrome and Firefox. In certain instances, especially when using new quizzes, it was a

challenge to find the speed grader itself. This issue was reported to Canvas, which quickly inserted a speed grader button on new quizzes a few months later.

One issue that faculty members experienced with the attendance tool in Canvas was when an attendance-created assignment would not generate the required grade in the grade book. That graded event had to be reviewed and recreated. With the E-Portfolio application, many students had issues generating a submittable link to the project and would contact their instructor. Instructional designers would discover that students had to set their projects as private, not public, for the submittable link to be auto-generated. Canvas Studio also gave students various issues to record and submit videos to fulfill class requirements. Students often made more extensive videos than allowed, which brought issues. Also, grades for graded events would not be posted to the grade book, and it was found that students had to watch the whole video for their grades to be posted. It must be pointed out that a workshop on using the application for both faculty and students helped to unravel most of these issues.

With the lockdown browser, it was a hassle for many students to download and get the application going. To address this issue, a working link was inserted in an all-student succeeding online course, and students were advised to use that link only. However, problems persisted with many students attending classes from home, and this was alluded to poor connectivity, especially when using the Respondus monitor application. The JB Learning Courseware application also raised issues for faculty members. It was often hard for instructors to transfer the link between two-course shells from semester to semester. Upon checking with their designated instructional designer, it was found that the publisher added new updates to the application each new semester, and users had to use the latest version rather than copy over the previous semester's settings.

RQ2. How did resolving technological issues impact future remote teaching and learning beyond the COVID-19 pandemic?

Making remote teaching and learning work came with numerous challenges, as discussed. However, interestingly, some benefits came with the whole intervention. For example, the most significant unintended objective achieved from the intervention was that beyond the pandemic itself, more faculty members who had been hesitant to teach online before the pandemic hit continued to teach online. In fact, at some point, the University had to make a directive that faculty members who continued to teach from home way past the peak period return to campus and resume teaching some courses traditionally. There was a significant increase in the number of online and blended courses taught at the institution beyond the pandemic, and this reduced traffic in campus corridors. Perhaps faculty members found it convenient to teach remotely and enjoyed it. Despite all that spike, however, the CETL ensured that the University policy for developing and implementing distance courses was appropriately adhered to. This ensured that that were no shortcuts in the whole process.

It became known that the upturn of tech and design issues hindered the whole teaching and learning intervention process. However, the positive side of having such issues affecting teaching and learning was that resolving them promptly gave the institution much experience in dealing with a similar situation should it arise again. Thus, it would be easy to deal with similar tech and design issues if they reoccur. So, the whole teaching and learning intervention became helpful preparation for the future, and it was likely that a recurrence would be much easier to deal with.

It is also worth mentioning that, even more importantly, students themselves came into the problematic situation and worked with their instructors to have various issues resolved as they went through courses and adapted to the process. This experience made them more prepared to take courses remotely at any time.

The CETL was no exception; the process gave them many lessons, too, and they acquired the necessary experience to deal with a recurrence in the future. CETL put modalities and structures in place that would enable it to seamlessly work with faculty and students to ensure emergency remote teaching and learning would go smoothly at any time.

Conclusions and implications

Managing the virtual pandemic classroom brought various challenges that were successfully dealt with. However, several lessons were learned beyond the pandemic that would give the institution thorough preparedness for dealing with a similar scenario. The experience gained cut across all stakeholders: teachers, students, CETL and the University Administration itself.

Issues that hampered the teaching and learning intervention were technological and pedagogical and, in most cases, required urgent attention, something that called for a sound communication structure. The University ticketing system helped, but traditional channels like telephone and email also kicked in, making communication very viable.

It, therefore, became clear that in an emergency like this one, the four stakeholders had to work in vibrant coordination. The University administration would provide direction; students would have to communicate well with their instructors, and the CETL would have to work closely with instructors and provide pedagogy and technological support. Crush training programs would have to be put together by CETL to address a particular need in instructors and students. In all, it had to be a well-coordinated system, made ready for any emergency and intervention going into the future.

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Further reading

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