Beyond the pandemic: The changing landscape of technology integration in higher education in Central Visayas, Philippines

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ABSTRACT

The pandemic has revealed the differences in how educators use technology to better serve students. This study explored teachers' lived experiences regarding technology use in their teaching functions before the pandemic altered the country's educational system and after the pandemic subsided. It employed descriptive phenomenology as a research design, involving eight college teachers from public and private higher education institutions in Central Visayas, Philippines. A semi-structured interview guide was used, and data were analyzed using the thematic analysis steps. After intensive interpretation and analysis of the data, six themes emerged: 1) pre-pandemic teaching and technology use; 2) changes in teaching and technology use during the pandemic; 3) post-pandemic teaching and technology use; 4) challenges in post-COVID teaching and technology use; 5) opportunities in post-COVID teaching and technology use; and 6) perceptions about the future of teaching and technology use. The results showed that technology has substantially enhanced teaching efficacy and improved technology skills. It is recommended that teachers equip themselves with technological knowledge to meet future demands. For future studies, researchers may focus on exploring how technology affects the health of both teachers and students.

1. INTRODUCTION

The COVID-19 pandemic has altered numerous aspects of people's lives, including how college professors instruct their classes (Gupta, 2021). According to Aminatun (2019), technology has become essential for college teachers to give lectures, run their classrooms, and evaluate student performance because of the move to remote learning and online teaching. College instructors have been compelled to adopt these new teaching methodologies during the pandemic and rely increasingly heavily on technology to deliver their lectures (Sood et al., 2022; Sumalinog, 2022). Researchers must examine how college instructors employed technology during COVID-19 and how that changed how they taught.

Technology will continue to be a crucial teaching tool at colleges even after the pandemic has passed (Barry et al., 2021). Hybrid learning, which mixes in-person and online instruction, and flipped classrooms, where students watch pre-recorded lectures and use class time for discussion and activities, are two new teaching roles made possible by technology (Majumder, 2019). It is critical to

comprehend how college teachers adjust to these developments because these new teaching roles call for different technology uses.

The researchers have first-hand knowledge of the difficulties in utilizing technology during the pandemic as they are also college instructors. They could keep teaching, but it came with a high learning curve and new platforms and tools to grasp. They have also seen some of their colleagues need help to integrate new technologies into their teaching practices. Because of their own experiences, they are curious about how college teachers employ technology in their post-COVID teaching roles.

Using technology by college professors during and after COVID-19 and the factors that influence their acceptance of new teaching functions using technology is not covered in the literature on technology use in education. Some institutions lacking technology are not accurately represented by the facts presented in the ample studies. Due to the unpreparedness of the institutions involved in the study for the post-pandemic period, they had to rely solely on the readily available resources. Little research considers the difficulties and opportunities that college professors encounter when integrating technology into their lesson plans. Therefore, more research is required to better understand college professors' experiences using technology.

Given the gap in research on this topic, the study intends to determine the experiences of college teachers regarding technology use in post-COVID teaching functions. By examining the experiences and perceptions of college teachers, the researchers hope to identify the barriers and enablers to effective technology use and to provide insights into how college teachers are supported to use technology more effectively in their teaching practices. The learning institutions that struggle to survive after the pandemic will have a clear picture of the basic requirements and basic skills that the college instructors under them would need to contribute to the continuity of learning despite the temporary halt. The results will have significant implications for higher education institutions, policymakers, and educators seeking to improve teaching and learning outcomes in the post-COVID era.

2. MATERIALS AND METHOD

The current study used a descriptive phenomenology research approach to investigate college professors' lived experiences using technology in their post-COVID teaching roles. The participants were chosen purposively from public and private higher education institutions in Central Visayas, Philippines. At data saturation, eight college teachers took part in the study. The participants must be college professors who have worked for three years before the pandemic and use technology in their classrooms.

The college teachers who are the informants of this study are the primary sources of data in this phenomenological inquiry. Data was gathered using a semi-structured interview. The researchers interviewed them to learn more about the participants' perceptions and experiences with technology use before, during, and after the epidemic. The semi-structured interviewing aimed to elicit in-depth accounts of the instructors' technology use experiences, including the difficulties and possibilities they faced. There were five main questions and five preliminary questions to prepare the informants.

Before collecting data, authorization for the study was obtained from the authorities, and each participant was requested their informed consent. Ethics were also considered, including protecting participant's confidentiality and anonymity and getting permission to record the interviews. The researchers also gave the volunteers a description of the study's objectives, potential advantages, and potential hazards. The interview time ranged from 45 to 60 minutes.

Braun and Clarke's (2006) thematic analysis was used for the study's data analysis. This strategy involves finding and examining patterns and themes in the data, which were then coded and categorized according to how well they answered the study questions. The researchers also performed member checks to confirm that the data analysis and interpretations were accurate. In the data analysis steps using thematic analysis, the researchers followed the following steps: First, the researchers of this study needed to be familiar with the transcripts. Second, the researchers had to generate initial codes from the transcripts. Third, the researchers had to search, review, and define the themes. Last, the researchers had to write the paper using the themes and vignettes.

3. RESULTS AND DISCUSSION

Interview results were transcribed and coded, and themes emerged. These themes are summarized in Figure 1.
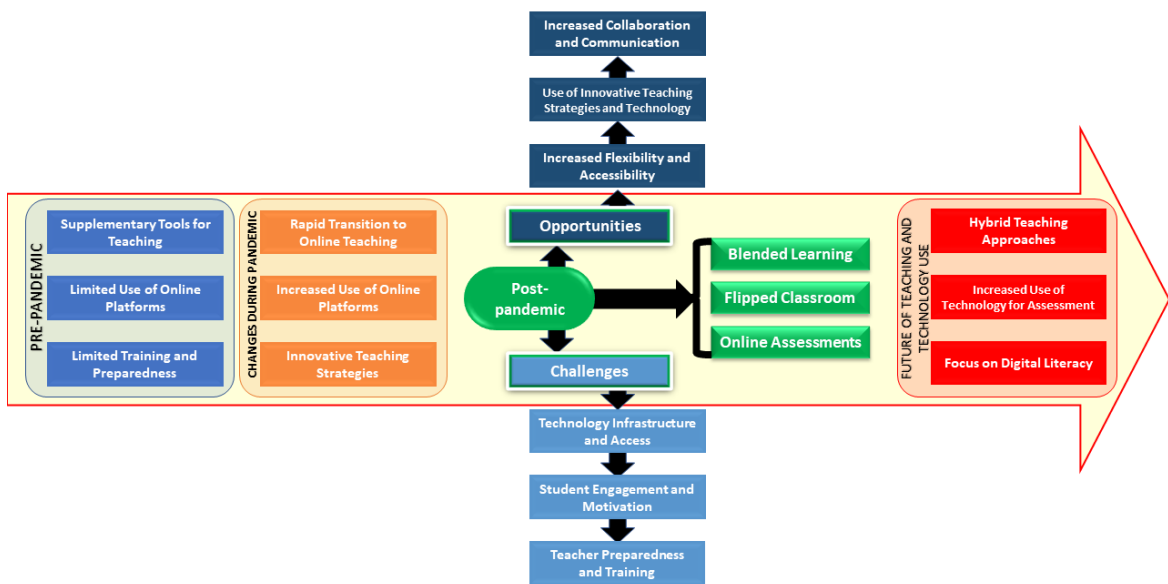
Figure 1. Teaching and technology use over time

3.1. Pre-pandemic Teaching and Technology Use

3.1.1. Supplementary tools for teaching

Before the pandemic, the primary purpose of technology in the classroom was to support traditional face-to-face instruction with additional tools. Projectors, PowerPoint slides, and online resources were among the technologies used. One instructor discussed their knowledge of this technological application:

"Before the pandemic, I mainly used technology as an extra teaching aid. For instance, I would add visual aids to my lectures using PowerPoint slides to help students understand difficult subjects." (P2).

3.1.2. Limited use of online platforms

The sparing use of internet platforms for teaching was another common element in pre-pandemic technology use in education. It was not a common practice for teachers to upload materials or share announcements via internet platforms, despite some doing so. One instructor discussed their knowledge of this technological application:

"I mostly used internet channels before the pandemic to distribute information and notifications to my pupils. However, I did not use them frequently for teaching since I believed in-person instruction was more successful." (P5).

3.1.3. Limited training and preparedness

The third theme in pre-pandemic technology use in teaching was teachers' limited training and preparedness for using technology. Numerous teachers needed more experience and training in using technology for teaching, making integrating technology into their teaching practices challenging. One teacher shared their experience with this challenge:

"Before the epidemic, I had little training or experience using computers in the classroom. I was competent with some tools, but hesitant to use them in teaching. This little experience made incorporating technology into my teaching methods difficult." (P6).

Before the pandemic, education technology was mostly used as supplemental teaching aids (Mulyadi et al., 2020). Using technology in the classroom could have been improved by the need for more experience and training teachers had in integrating it into their methods of instruction. Online platforms were also hardly used for teaching, and when they were, teachers mostly used them to provide notices and information to their students (Prestridge et al., 2019). Many teachers were reluctant to adopt online platforms for education because they felt that face-to-face instruction was more effective than online instruction (Gherheș et al., 2021). The COVID-19 pandemic, however, forced a change in teaching

strategies as online instruction became the standard, and teachers had to adjust to it (Mohamad et al., 2020; Mananay et al., 2022). This change has increased awareness of the value of technology in education and drawn attention to the necessity of providing teachers with the training and preparation to use technology in their lesson plans effectively (Spiteri & Rundgren, 2020; Eiland & Todd, 2019).

3.2. Changes in teaching and technology use during the pandemic

3.2.1. Rapid Transition to Online Learning

The sudden shift to online instruction was one significant change in the way teachers used technology during the pandemic. Teachers had to swiftly adjust to using online platforms for teaching after schools and universities closed. One educator discussed how they dealt with the change:

"We had to quickly switch to online instruction due to the epidemic, which was a significant change for me. I had to pick up new skills quickly to present my lessons and interact with my students effectively online." (P1).

3.2.2. Increased use of online platforms

The growing use of online platforms for education during the pandemic was another change in how teachers used technology. Because of the shift to online learning, teachers have to rely more heavily on online platforms to give courses, engage with students, and share materials. One educator talked about how they dealt with the change:

"We had to use online learning tools more frequently because of the pandemic. I had to learn how to use various platforms to present my lectures, communicate with my students, and share materials. At first, it was difficult, but over time, it grew easier." (P4).

3.2.3. Innovative teaching strategies

Using cutting-edge teaching techniques was the third significant change in how teachers used technology during the pandemic. Due to the shift to online learning, teachers had to develop new strategies for interacting with their students and enhancing the learning process. New techniques and approaches were used, like online collaboration tools and virtual simulations. One educator talked about how they dealt with the change:

"The pandemic compelled me to adopt more avant-garde teaching techniques, like employing online collaboration tools and virtual simulations.

Although first difficult, it helped me give my pupils more productive and interesting learning opportunities." (P8).

As a result of the COVID-19 pandemic, which forced numerous colleges and universities to close their campuses to stop the virus's spread, online learning has increased and is without precedent (Bao, 2020; Sanchez et al., 2021; Dhawan, 2020; Picardal & Sanchez, 2022). As a result, new online teaching techniques had to be adopted by professors and students, and remote education required video conferencing platforms and other online resources (Lowenthal et al., 2020). Additionally, due to the pandemic, more teachers are employing learning management systems to distribute course materials, assignments, and evaluations (Legarde, 2022). Many cutting-edge teaching techniques, including gamification, personalized learning, and flipped classroom models, have been developed in response to the difficulties of remote teaching (Gómez-Carrasco et al., 2020). These developments have brought attention to the value of technology in education and sparked discussions about the direction of education and technology's place in it (Reddy & Bubonia, 2020; Mustapha et al., 2020).

3.3. Post-pandemic teaching and technology use

3.3.1. Blended learning

In the Philippines, blended learning has acquired popularity as a teaching strategy that combines in-person and online learning. More adaptability and tailored learning are made possible through blended learning, which has been viewed as a strategy to raise educational standards. According to a teacher,

"Blended learning has allowed me to tailor my teaching to the needs of my students. I can use online resources to supplement face-to-face instruction, and students have the flexibility to access these resources at their own pace." (P2).

However, putting blended learning into practice can also be difficult, especially for teachers who are not accustomed to integrating technology into their lesson plans. Another educator revealed:

"Blended learning implementation has proven difficult, especially with the tools and training. Creating online materials and ensuring students are interested in and motivated to learn takes much time and work." (P3).

3.3.2. Flipped classroom

Flipped classrooms have become a well-liked teaching method. Before attending in-person sessions, which are subsequently used for debates, group projects, and other interactive activities, students in a flipped classroom view pre-recorded lectures or read materials online. This method has encouraged critical thinking and problem-solving abilities since it enables more active and collaborative learning. One instructor provided the following account of their use of flipped classrooms:

"Instead of giving lectures, flipped classrooms have allowed me to concentrate more on supporting discussions and activities in class. Additionally, it has enabled me to recognize pupils who might be having difficulty with the subject matter and offer them additional specialized support." (P5).

Flipped learning environments cause much planning and preparation, especially when creating excellent online resources that students can access before class. According to another teacher,

"A lot of planning and preparation must go into flipped classes, especially when creating interesting and interactive online resources. It also calls for students to be motivated by their interests and in charge of their education, which might be difficult for some pupils." (P6).

3.3.3. Online assessments

Online tests have become popular as a teaching tool that enables quicker and more accurate grading of student work. Online tests also help more objective grading because multiple-choice and other factual questions can be evaluated using automated grading methods. Online quizzes, however, often have drawbacks, particularly when assessing complicated activities and higher-order cognitive abilities. According to a teacher:

"I've been able to mark student work more quickly thanks to online tests, which is especially helpful for classes with more students. However, evaluating complicated tasks and higher-order thinking abilities can be difficult and require a more subjective assessment." (P1).

Online tests can also be difficult for students, especially those who need consistent internet access or are unfamiliar with the technology involved. As another educator mentioned:

" Some students may find it difficult to complete online tests, especially those who do not have dependable internet access or are unfamiliar with the technologies involved. To ensure that students can successfully complete examinations, it is crucial to offer support and advice." (P2).

The emphasis has turned to blended learning, which combines conventional classroom instruction with online learning, as schools reopen and resume in-person learning (Stein & Graham, 2020). Flipped classroom models are gaining popularity because they let students learn at their own pace and review content as necessary outside of class, with discussion and application of knowledge taking place during the actual class time (Guo, 2019). Online tests have also established themselves as a mainstay in many courses, allowing for more effective grading and giving students quick feedback (Butler-Henderson & Crawford, 2020). These teaching techniques have been adopted more quickly due to the pandemic (Michalíková & Povinský, 2020; Mananay et al., 2022). They will also likely be used in post-pandemic schooling, providing chances for more individualized and adaptable learning experiences (Majumder, 2019). To guarantee that these technologies are used effectively, there are worries about the possibility of a digital divide and the continual training requirements for teachers (Becking & Grady, 2019).

3.4. Challenges in post-COVID teaching and technology use

3.4.1. Technology infrastructure and access

One of the significant challenges faced by college teachers in the Philippines during the adoption of new teaching functions post-COVID was the need for adequate technology infrastructure and access. This concern includes unreliable internet connectivity, insufficient devices, and limited access to software and platforms needed for effective online teaching. One teacher shared their experience with this challenge:

"Unreliable internet connectivity has been a problem for me, making it challenging to run online lessons and communicate with students. Accessing the platforms and software students require for online learning is particularly difficult, especially for those without their own devices." (P1).

3.4.2. Student engagement and motivation

Student involvement and motivation posed another difficulty for college instructors in the Philippines as

they adopted new teaching practices following COVID-19. While online instruction might offer greater flexibility and tailored learning, it can also decrease student motivation and engagement because there is no face-to-face connection and a higher chance of distractions at home. One instructor described how they overcame this challenge:

"Unlike face-to-face sessions, I've seen that certain students are less driven and interested in online courses. It might be challenging to maintain their interest and make sure they are actively taking part in talks and activities." (P4).

3.4.3. Teacher Preparedness and Training

Lack of preparation and training for online teaching was the third significant issue college professors in the Philippines had when adopting new teaching roles following COVID-19. Numerous teachers had to swiftly adjust to new tools and platforms because they needed to familiarize themselves with using technology in their classrooms. The challenges in developing high-quality online materials, delivering effective online education, and managing virtual classrooms can all stem from inadequate preparation and training. One instructor described how they overcame this challenge:

"Since I was unfamiliar with them, I had to quickly get used to using online tools and platforms for teaching, which was difficult. Creating successful online learning resources and ensuring that students are interested can be challenging. More support and training are required to ensure teachers are ready to teach online." (P8).

Several issues with post-COVID technology use and education need to be resolved. The availability and accessibility of technology are significant issues (Novo-Corti et al., 2019). Not all students can access a fast enough internet connection or the equipment needed for online learning. This divide makes it difficult for teachers and students to adjust to new learning environments (Rice & Deschaine, 2020; Mananay, 2022). Also, post-COVID education significantly needs help with student motivation and engagement (Chiu et al., 2021). Teachers must develop novel strategies to keep students motivated and interested in a distant or mixed learning setting (Maron, 2020; Hermoso et al., 2022; Sumalinog et al., 2022). This need causes using new and creative teaching methods that consider the limits of online education. Last but not least, it is essential to guarantee that instructors have the preparation and

training to use technology in the classroom effectively (Thompson & Sorbet, 2020). Teachers need training and support that is adequate to successfully integrate technology into teaching practices and solve any issues that may occur (Santoso & Lestari, 2019).

3.5. Opportunities in post-COVID teaching and technology use

3.5.1. Increased Flexibility and Accessibility

Increased flexibility and accessibility were two advantages of deploying new instructional functions after COVID. Both students and teachers can benefit from the more flexible schedules and individualized learning opportunities offered by online learning. One educator discussed how they used this chance:

"I have discovered that teaching online has given me the freedom to give my students greater flexibility, especially those who have other responsibilities or live distant from college. It has also allowed me to design more individualized educational experiences tailored to my pupils' wants and interests." (P1).

3.5.2. Use of Innovative Teaching Strategies and Technology

Using innovative teaching methods and technology was another chance provided by introducing new teaching roles post-COVID. Using various tools and platforms to improve the learning process and make it more interactive and engaging while teaching online. One educator discussed how they used this chance:

"I've been able to leverage various internet resources and technologies to give my students more involved and engaging learning opportunities. For instance, I have employed virtual reality simulations to help my pupils visualize difficult topics and enhance learning." (P4).

3.5.3. Increased Collaboration and Communication

Increased collaboration and communication were the third significant possibility brought about by implementing new instructional functions post-COVID. Regardless of their geographical location, online learning gives students and teachers more excellent options for collaboration and communication. This learning mode may contribute to developing a more encouraging learning environment and a sense of community. One educator considered how they used this chance:

"I've discovered that teaching online has made it easier for me to work with colleagues and students wherever they may be. This online teaching has fostered a sense of community and a more supportive learning environment, which are crucial for student achievement." (P8).

There are numerous opportunities for educators and students alike in the post-COVID era of teaching and technology use (Charlotte et al., 2021). As remote learning has become more common and has allowed students to access education from anywhere, it has become one of the most critical opportunities (Ndibalema, 2022). The transition to online learning has created the potential for the classroom application of innovative technology like virtual reality and artificial intelligence (Rangel-de Lázaro & Duart, 2023). The increased use of technology has also improved collaboration and communication, enabling better collaboration between students and professors (Fonseca & García-Peñalvo, 2019; Gonzales et al., 2023). Overall, the post-pandemic era offers a unique chance to reconsider conventional teaching strategies and use technology to give students more effective and engaging learning opportunities (Singh et al., 2021).

3.6. Perceptions about the future of teaching and technology use

3.6.1. Hybrid teaching strategies

Implementing hybrid teaching strategies is one future possibility for technology use in post-COVID teaching roles in the Philippines. Making learning more flexible and productive entails mixing both online and in-person instruction. One educator offered their opinions on this potential course of action:

"Post-COVID teaching roles will see a rise in hybrid teaching methods. This role will enable us to integrate the most beneficial elements of both online and in-person instruction, giving our students access to a more flexible and productive learning environment." (P1).

3.6.2. Increased use of technology for assessment

The greater use of technology for evaluation is another future trend for technology use in post-COVID teaching activities in the Philippines. Teachers can now use various tools and software to evaluate their students' performance thanks to the availability of Internet platforms. One educator offered their opinions on this potential course of action:

"Technology, in my opinion, will have a bigger impact on assessment in post-COVID educational activities. We can now more effectively evaluate our students' performance thanks to the availability of internet platforms, which will help us better grasp their strengths and limitations." (P4).

3.6.3. Focus on Digital Literacy

The emphasis on digital literacy is the third prospective route for technology use in post-COVID instructional activities in the Philippines. Both teachers and students must possess the appropriate digital skills and competencies because of the growing technology usage in education. One educator offered their opinions on this potential course of action:

"I think digital literacy will become a crucial aspect of post-COVID teaching functions. As technology becomes more integrated into teaching, teachers and students must have the digital skills and competencies to fully utilize these tools and platforms." (P8).

There is growing speculation about the future of teaching and technology in education as the pandemic has compelled various schools and institutions to adopt new technologies and teaching approaches (Barrett-Fox et al., 2020; Sumalinog et al., 2022). One widely accepted idea is that in-person and online learning will increasingly coexist in hybrid teaching strategies in the future (Sheridan & Irish, 2022). Technology for evaluation may also be given increasing attention as systems like AI-based grading acquire popularity (Prieto et al., 2020; Sanchez et al., 2023). As students and instructors alike must be equipped with the skills to traverse the digital environment of education, a greater focus on digital literacy may also become a trend (Ocaña-Fernández et al., 2020; Boholano et al., 2022). The pandemic has accelerated the adoption of new technologies in education and brought to light the potential advantages of utilizing technology to improve teaching and learning (Orlanda-Ventayen et al., 2021).

4. CONCLUSION

Teachers emphasize that technology is very important in the post-COVID time. Their use of technology has substantially altered their teaching methods, accentuating the need for help and instruction in digital literacy. The pandemic has expedited developments in college teachers' use of technology, opening up the potential to improve student engagement and learning. As a result, higher

education institutions should continue prioritizing technological integration to meet the changing demands of education.

Study implications include ramifications for policy-making, future education, and higher education. College teachers should receive ongoing support and training from higher education institutions to improve their digital literacy and integrate technology into their lessons. The funding and resources needed to support technology integration in higher education institutions should be provided by policymakers. Future educational efforts should create technologically advanced learning environments that promote critical thinking, teamwork, and active learning.

The study recommends that higher education institutions create policies and methods that support technology integration in post-COVID teaching tasks considering its findings. To ensure that college teachers have the knowledge and abilities to use technology in their classrooms effectively, institutions should assist and train them. Future research should evaluate the effectiveness of various digital literacy training programs and investigate the long-term consequences of technology use on student learning outcomes. Future studies should examine the efficacy of different technological integration models to determine the best techniques that could be used in higher education institutions.

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