

Beyond the Numbers: A Journey through the Eyes of Pre-Service Teachers

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Abstract

Mathematics is one of the essential subjects a person should learn starting from the beginning of his primary education. Thus, this study navigated the lived experiences of 10 (ten) pre-service teachers in teaching mathematics during the post-pandemic period in a state university in Tacloban City, Leyte, that was purposely selected. Through transcendental phenomenology research methods, the study navigated the challenges faced and highlighted the importance of looking beyond the numbers and examining the individual experiences of pre-service teachers. This study utilized Collaizzi's data analysis, anchored in social cognitive theory and situated learning theory, that used semi-structured questionnaires, focus-group discussions, observation notes, and data recording. The findings revealed that pre-service teachers encountered various challenges in teaching mathematics, including *technological turmoil, focus fizzle of students, fundamental floundering, and student retention resistance*. The study also sheds light on the coping mechanisms adopted by pre-service teachers, including attaining *emotional regulation, adaptability in a situation, and accessibility to interactive learning resources*. Results emphasize the importance of supporting pre-service teachers through their journey to ensure their confidence and effectiveness in delivering high-quality mathematics education that meets the needs of all students.

Keywords: Mathematics; Lived Experiences; Pre-Service Teachers; Transcendental Phenomenology

Introduction

The Covid-19 pandemic significantly impacted education systems worldwide, forcing a sudden shift to remote and online learning. This shift brought about various changes in teaching and learning practices, including mathematics education. The pandemic affected lives, workplaces, and academic pursuits, particularly the pre-service teachers

(Duran, 2022). The Department of Education issued the formal start of face-to-face classes in all public schools despite the occurrence still of the pandemic (Department of Education, 2022). This opening of classes after how many years allows in-service teachers and pre-service teachers to adapt quickly to new instructional methods and technologies to deliver mathematics education.

Internationally, the drastic change in learning caused pre-service teachers to be more vulnerable in adapting to the current issues and trends in teaching, particularly in mathematics, during the pandemic (Mavuru et al., 2022). Additionally, transitioning from in-person to online learning demands improving pre-service and in-service mathematics teachers' online preparations, particularly in technology, pedagogy, communication skills, and classroom management (Pourdavood & Song, 2021). The repercussions of Covid-19 make it more difficult for future educators to prepare for hybrid classrooms, which is especially important in the aftermath of a pandemic. In particular, pre-service teachers must develop their lesson plans and deliver more substantive instruction strategies to capture the students' attention during their teaching demonstration in a blended learning modality.

The Department of Education and the Commission on Higher Education issued Order No. 39 in 2005, requiring pre-service teachers to complete a teaching internship that gives them hands-on experience in a classroom setting (Department of Education, 2005). This joint memorandum does not exempt pre-service teachers from completing their internships, especially in the aftermath of the pandemic, where they need to be more prepared and apply their learning and teaching competencies, particularly in mathematics teaching. However, there were few studies concerning the attitudes and behavior of pre-service teachers in handling mathematics subject before their deployment in their teaching internship during the aftermath of a pandemic. According to Boy et al. (2014), many pre-service teachers have high mathematics anxiety levels about learning and teaching the mathematics curriculum.

Pre-service teachers faced many challenges during teaching internships before and during the pandemic. Therefore, it will be more difficult for them in the aftermath of the pandemic when they need to adjust to the actual online and face-to-face teaching environment. They must have prepared teaching strategies and skills appropriate to the blended learning modality in teaching mathematics. Moreover, pre-service teachers require additional strategies in terms of their dynamics in online teaching as well as knowledge of technology in order to be equipped to participate in the new trend of teaching mathematics. Because of this dilemma, a study was carried out to investigate the real-life experiences of pre-service teachers regarding the difficulties they have encountered in the classroom while teaching mathematics and the strategies they use to overcome those difficulties in the aftermath of the pandemic.

Theoretical Framework

The following theories underpin this study:

According to Albert Bandura's social learning theory (Bandura & Walters, 1977), people acquire knowledge from their surroundings by observing, mimicking, and interacting with others. This theory is pertinent to the study because pre-service teachers can learn from their cooperating teachers about how to handle mathematics in the aftermath of a pandemic and then adapt those lessons to their classrooms. In addition, pre-service teachers can participate in group activities with their peers to discuss and share solutions to the difficulties they encounter while teaching mathematics.

Second, the situated learning theory (Lave & Wenger, 1991) emphasizes education within real-world contexts. This theory is pertinent to the investigation because the opportunities for pre-service teachers to gain mathematics experience can be interpreted as situated learning situations. They encountered difficulties in the real world when adjusting to new teaching strategies and incorporating technology into their educator practices. They gain knowledge about understanding mathematics teaching within particular contexts and how their experiences shape their understanding and professional development due to these contexts.

Research Questions

This study aimed to examine the lived experiences of pre-service teachers as well as their coping mechanisms when teaching mathematics in one of the laboratory schools in Tacloban City, Leyte during the post-pandemic period. It sought to respond to the following particular questions:

1. What difficulties do pre-service teachers face when teaching mathematics in the aftermath of the pandemic?
2. How did pre-service teachers face the challenges of teaching mathematics in the aftermath of the pandemic?

Review of Literature

In the Philippines, the government issued Memorandum Circular No. 001, Series of 2022, which emphasized the expansion of face-to-face learning modality, where students, teachers, and parents are now safe in returning to school after two years of lockdown (Department of Education & Department of Health, 2022). The issuance of the said memorandum allows the education sector learning to restore direct teacher-student interactions, fostering better communication, personalized support, and immediate feedback, which are essential elements in effective teaching and learning. However, this decision challenged the Philippine education system regarding preparedness, particularly one of its clientele, the pre-service teachers. As pre-service teachers transition to a new learning

modality, they encounter challenges adjusting their instructional approaches and classroom management techniques to the new modality (Çamlıbel-Acar & Eveyik-Aydın, 2022).

As the world tried to recover from the pandemic's effects, pre-service teachers everywhere encountered difficulties in the classroom (Kurtdeğir & Yıldırım, 2022). In order to help students close the gaps in their mathematical knowledge and skills, pre-service teachers had to assess their students' individual learning needs and devise effective interventions. In addition, they need to create a stimulating learning environment full of interactive and hands-on activities and incorporate technology and digital tools (Jones et al., 2021). Teachers, especially those working with math, must be more resourceful in using supplementary materials and methods to keep their students' attention (Kadir & Aziz, 2021).

Pre-service teachers utilized various coping mechanisms to successfully navigate the shifting educational landscape while confronting the difficulties of teaching mathematics in the post-pandemic period (Cao et al., 2021). They could adapt, grow, and provide adequate support for the student's learning of these coping mechanisms. Pre-service teachers actively sought opportunities to expand their mathematical education knowledge and expertise by participating in various professional development activities such as conferences, webinars, and workshops (Ancho & Arrieta, 2021). This allowed them to remain current with the most current pedagogical practices and technological resources. They were open to working together and sought support from their colleagues and more experienced teachers (Shernoff et al., 2017).

Additionally, pre-service teachers participated in online and offline professional learning, where they could share ideas, discuss the most effective practices, and ask for advice to their peers and mentors (Kearney et al., 2020). They were able to overcome challenges more effectively and gain valuable insights from the collective wisdom of their colleagues as a result of their participation in collaborative problem-solving activities (Alvarez et al., 2013). Also, pre-service teachers engaged in self-reflection activities and solicited feedback from their mentors to critically examine the instructional strategies they had developed (Yang et al., 2021). In addition, future in-service teachers were open to novel methods of classroom instruction. They experimented with integrating technology, interactive resources, and learning through project-based activities to increase student engagement and make mathematics more relevant and meaningful (Naji et al., 2020). Last but not least, pre-service teachers understood the significance of cultivating a classroom atmosphere that is inclusive and supportive of all students in teaching mathematics (Garwood & Van Loan, 2019).

The lived experiences of pre-service teachers in the classroom revealed a dynamic landscape of challenges, growth, and adaptation in mathematics

teaching during the post-pandemic period. As pre-service teachers transitioned from remote and hybrid learning to face-to-face instruction, they faced the challenge of preventing learning loss, meeting students' varying needs, keeping students engaged, and effectively using technology integration. Because of their resiliency and dedication, the experiences highlighted the significance of flexibility, adaptability, and continuous professional growth to meet the varied needs of students and cultivate an environment conducive to learning mathematics that is positive and welcoming to all. The lived experiences of pre-service teachers in teaching mathematics during the post-pandemic period are essential because it allows the academic sector to provide the necessary assistance with the challenges they encountered during the new learning modality and to continue to enhance their pedagogy and approaches to teach diverse learners.

Methodology

Research Design

This study utilized the transcendental phenomenology research design by Edmund Husserl (Martirano, 2016), which investigates the structures of consciousness and how individuals perceive and understand the world around them. In addition, it emphasizes describing and analyzing the fundamental aspects of the human experience as it is subjectively lived. The researcher used transcendental phenomenological approaches to investigate the lived experiences of pre-service teachers to uncover the essential structures of their experiences, particularly the difficulties and coping mechanisms in teaching mathematics in the aftermath of the pandemic, and to gain insights into the meaning and significance of their subjective realities.

Research Locale

The research was carried out at a state university of education in Leyte. This development specializes in the delivery of programs for the education of teachers and is typically funded and governed by the government of Leyte. This university provides pre-service teachers with the education and training they need to enter the teaching profession and become successful future educators. Additionally, the institution takes great pride in its highly qualified and experienced faculty members. These faculty members are specialists in various educational fields and act as mentors to the pre-service teachers who attend the institution. In addition, the faculty members in these pre-service teacher education programs bring a wealth of knowledge, pedagogical expertise, and practical experience.

Research Participants

Ten (10) elementary pre-service teachers were purposefully chosen as they teach mathematics during the aftermath of the pandemic. They were nearing the end of their teacher education programs and were gaining

practical teaching experience in natural classroom settings. These pre-service teachers overcame the difficulties of finishing their teacher education coursework during the pandemic and are now applying their knowledge and skills to teach mathematics. The participants were officially enrolled for the first semester of the School Year 2022-2023, where they will face unique circumstances and adapt to new instructional models.

Research Instrument and Data Collection

The researcher obtained consent from the participants and the school's administration before the beginning of the study. This research aimed to decipher the foundations of human experience and the workings of the mind. Information about everyday subjective experiences is gathered as part of the research process. Semi-structured interviews and focus-grouped discussions were used as part of the research instruments, which are in-depth, open-ended conversations with participants. The researcher talks to the participant, who is then asked to share their thoughts and ideas about the study. Observation notes were also utilized to show the credibility of the results. Moreover, researchers maintain the reliability of the research process and the credibility of the participants' experiences by continually reflecting on and dialoguing with their own experiences and biases to arrive at an accurate and nuanced interpretation of the data. The responses of the participants were kept confidential and secured.

Data Analysis

This study employed Colaizzi's data analysis (Nepangue & Ibanez, 2022), a qualitative research method used to interpret the meanings of individuals' lived experiences. This data analysis involves steps to reveal the phenomenon's underlying essence and structure. The typical steps involved in Colaizzi's data analysis are as follows: 1.) *familiarization*, 2.) *identification of significant statements*, 3.) *extraction of meanings*, 4.) *formulation of meaningful units*, 5.) *development of descriptive structures*, 6.) *integration of descriptive structures*, 7.) *validation*, 8.) *articulation of the fundamental structure*. These steps enable researchers to capture and interpret the essence of people's lived experiences and achieve an in-depth understanding of the phenomenon.

Results and Discussion

The findings from the study's data collection and analysis are discussed here. The themes were gleaned from the interviews and observations with the pre-service teachers. This section presents a detailed discussion of the analyzed results. It provides insight into the real-world challenges faced and approaches used by future math educators in the aftermath of the pandemic.

1. Difficulties encountered by the pre-service teachers when teaching mathematics in the aftermath of the pandemic

Theme 1: Technological Turmoil

The aftermath of the pandemic has brought unprecedented challenges for pre-service teachers in mathematics learning, intensifying technological difficulties. As classrooms shifted to remote and hybrid learning models, educators were thrust into an unfamiliar digital landscape where traditional teaching methods had to be swiftly adapted (Støckert et al., 2021). Pre-service teachers, already acquiring pedagogical skills and content knowledge, grappled with the additional burden of mastering various technological tools and platforms (Sherab et al., 2022). The sudden transition required them to swiftly navigate online learning management systems, video conferencing platforms, interactive whiteboards, and educational apps (Succar et al., 2022). This technological turmoil placed immense pressure on pre-service teachers, who had to learn and troubleshoot on the go while simultaneously focusing on delivering effective mathematics instruction.

Significant response 1: "I had many problems teaching math in blended learning. First, internet connection issues during online classes significantly impact instruction and student learning".

Significant response 2: "I am not very proficient with technology, and I know there are some students who are not participating in online courses because of that".

Significant response 3: "The problem I have been having is that the internet connection is bad, so they will not be able to hear my lesson to them".

Theme 2: Focus fizzle of students

Pre-service teachers had trouble keeping their learners' attention and interest in mathematics as they tried to engage them (Silber & Cai, 2017). Promoting a collaborative and interactive learning environment was difficult during the blended learning modality (Castro, 2019). Students also felt isolated and exhausted, weakening their ability to concentrate. The fallout from the pandemic served as a timely reminder of the crucial role of social interactions and classroom dynamics in encouraging student engagement and focus in mathematics education (Elumalai et al., 2021). Pre-service teachers have realized the need for novel strategies and pedagogical approaches to rekindle student focus and motivation. They understand that addressing the "focus fizzle" is essential to ensuring their students have meaningful educational experiences.

Significant response 1: "The students showed a tendency to become readily distracted by various social media platforms".

Significant response 2: "I am having difficulties capturing my students' attention and interest to help them improve their mathematics skills".

Significant response 3: "The students' focus in our lesson makes it difficult for me because it reduces my motivation to teach them".

Theme 3: Fundamental floundering

Students' conceptual growth and foundational understanding of mathematics have been significantly impacted by the disruption brought on by the switch to remote and hybrid learning (Attard & Holmes, 2022). The lack of face-to-face instruction and experiential learning opportunities has effectively hampered their understanding of abstract mathematical concepts (Thompson & McDowell, 2019). Students needed immediate support and guidance from pre-service teachers to bridge the gap between theoretical knowledge and practical application. The lack of opportunities for these activities has hampered their capacity to interact with peers and solve problems collaboratively (Yarberry & Sims, 2021). Pre-service teachers know the need to address this problem through cutting-edge teaching techniques, specialized interventions, and opportunities for differentiated instruction. After the pandemic, students' fundamental mathematical struggles must be acknowledged and supported because they need specialized help to rebuild their mathematical foundations and regain their confidence.

Significant response 1: "Those students who do not attend class have difficulty performing basic mathematical operations".

Significant response 2: "As a teacher, it is difficult for me to move on to the next topic because our students cannot get the answer, especially when it comes to multiplying numbers".

Significant response 3: "Students' results in addition, subtraction, multiplication, and division were inconsistent." They are still unsure how to use the basic operations".

Theme 4: Student retention resistance

Students' ability to remain engaged and dedicated to their mathematical studies has been impacted by several difficulties brought on by the shift to remote and hybrid learning modalities (Paudel, 2021). Pre-service teachers find it challenging to maintain students' interest in mathematics due to the decline in motivation and accountability brought on by the blended learning interactions. Furthermore, it has become difficult for students to establish a structured routine and prioritize their mathematical learning due to the blending of the home and school

environments (Darling-Hammond et al., 2020). Pre-service teachers understand how critical it is to combat student retention resistance by implementing tactics that boost motivation, establish clear expectations, and offer individualized support. In order to achieve successful learning outcomes, it is imperative to identify and remove the barriers that prevent students from sticking with mathematics in the aftermath of the pandemic.

Significant response 1: "The students are having trouble recalling the mathematical concepts, concepts and formulas we have taught them".

Significant response 2: "When I am teaching, I see that students struggle to retain the mathematical concepts being taught to them".

Significant response 3: "Other students, let me repeat how many times the problem-solving concept".

2. Coping mechanisms by the pre-service teachers faced about their difficulties when teaching mathematics in the aftermath of the pandemic

Theme 1: Emotional regulation

In the aftermath of the pandemic, pre-service teachers have been actively working to develop and implement emotional regulation strategies to manage their feelings better and keep a positive frame of mind when confronted with difficulties in the classroom related to teaching mathematics. They have developed the ability to recognize and acknowledge their feelings, and they regularly engage in self-reflection and self-awareness activities to comprehend the influence on academic performance (Garza & Smith, 2015). In addition, pre-service teachers have improved their ability to control their emotions and reduce the adverse effects of stress and anxiety on their bodies. Moreover, the assistance and direction their advisors have given them have been critical in effectively developing and putting this coping mechanism into practice. Pre-service teachers have begun implementing strategies that promote emotional regulation and creating a supportive classroom environment that gives awareness of the significance of mental health in mathematics learning (Hen & Sharabi-Nov, 2014). They empower students to navigate mathematical challenges with resilience and maintain a healthy emotional balance during the aftermath of the pandemic by cultivating an environment of empathy, understanding, and emotional support for one another.

Significant response 1: "It is not impossible to deal with different problems in this situation, and what I did was to increase my patience".

Significant response 2: "Even though students keep asking me to repeat my lesson, I just keep my cool and speak to them nicely".

Significant response 3: "Other students are not paying attention to me, but I still reprimand them softly and guide them properly".

Theme 2: Adaptability in a situation

The sudden changes brought about by remote and hybrid learning models have required pre-service teachers to be flexible and adapt quickly to new learning environments. Pre-service teachers have had to navigate unfamiliar online platforms, adjust to different modes of instruction, and overcome technical challenges (Leach & Wheeldon, 2022). Through their experiences, they developed the ability to embrace change and approach new situations with resilience and openness. Specifically, they have become adept at adjusting their study routines, managing time effectively, and seeking additional resources to supplement their learning. Their supervising teachers' guidance and support have played a vital role in nurturing this adaptability, as they have encouraged students to embrace challenges as learning opportunities and provided them with the necessary tools and strategies to thrive in the evolving educational landscape (Anderson et al., 2021).

Significant response 1: "Even if the challenges remain unavoidable, I will continue to be courageous in carrying out my responsibilities as a pre-service teacher, and I will inform students if they make mistakes in our activities".

Significant response 2: "The difficulties in teaching mathematics cannot be avoided; as a teacher, I should be able to consider possible solutions".

Significant response 3: "I deal with it daily by practicing solving mathematics problems because it is an effort of attempting to solve several hard problems."

Theme 3: Accessibility to interactive learning resources

Pre-service teachers are resourceful when gaining access to traditional learning materials and resources. However, the availability of interactive learning resources such as online simulations, virtual manipulatives, and educational apps has been critical in assisting their mathematical learning journey (Räsänen et al., 2019). These resources have enabled students to better understand mathematical concepts through hands-on exploration, visual representations, and interactive problem-solving opportunities. Students have been able to cope with the limitations imposed by the pandemic while maintaining their motivation and enthusiasm for mathematics by using these accessible and engaging tools (Capone &

Lepore, 2022). Pre-service teachers understand the value of incorporating interactive learning resources into their instruction and ensuring that students have equitable access regardless of location or technological resources.

Significant response 3: "I provide window cards that are helpful to the students to unlock their difficulties in multiplication".

Significant response 2: "If they forgot to bring their books, I let them answer on a worksheet."

Significant response 3: "I share the Powerpoint Presentation by uploading it to their learning management system."

In the aftermath of the pandemic, pre-service teachers addressed the difficulties they encountered while teaching mathematics and discussed their strategies to overcome them. They have maintained a positive outlook despite their difficulties, contributing to their accomplishments in the teaching internship they have been participating in. Because of these experiences, they fulfilled their obligations and met the demands placed on them to deliver the necessary skills required for teaching mathematics. In addition, the findings of the study indicate that in light of the difficulties pre-service teachers face, it is necessary to offer them essential support, in particular, an adequate internet connection; additional knowledge about mathematical concepts, in order for them to have an easy time transferring that knowledge to the students; more strategies and approaches for supervising teachers who deal with pre-service teachers; and methods for assisting students who are having academic difficulty with mathematics.

In addition to this, the results of the study indicate that it is necessary for pre-service teachers to The provision of interventions to the challenges encountered by pre-service teachers in the aftermath of the pandemic, assist them in boosting their confidence and having a positive learning environment, both of which could lead to high performance on the part of the students. In addition, the findings of the study, in particular the teaching internship coordinators, will be provided with the necessary actions to resolve those challenges and will provide those coping mechanisms that result from this study.

Conclusion

The post-pandemic period showed significant challenges and opportunities for pre-service mathematics teachers. They needed to adapt quickly and develop new skills to engage students in online or blended learning environments. Pre-service teachers demonstrated resilience and innovation in their pedagogical approaches, utilizing technology and digital resources to support student learning and maintain an active teaching-learning process. Pre-service teachers' experiences emphasized the importance of fostering a stable internet connection,

achieving a solid foundation of basic mathematical concepts, prioritizing students' learning ability, and ensuring access to quality mathematics materials.

With these study findings, there is still a need to continue pre-service teachers' professional development, particularly in exploring technological knowledge in using different applications and platforms in teaching. Continuous learning and reflective practices are encouraged to improve pedagogical skills and student outcomes. Furthermore, pre-service teachers' lived experiences teaching mathematics during the post-pandemic period demonstrated their resilience, adaptability, and commitment to student learning, which could assist school administrators in tracking this effectiveness and using it for those who will undergo teaching internships. Additionally, the insights gained from their lived experiences provide valuable lessons for teacher education programs and professional development initiatives, emphasizing the need for ongoing support and preparation to navigate future educational research related to pre-service teachers' lived experiences in other subject areas and endeavors.

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