

# Narratives of Graduates' Students in Bachelor of Secondary Education Major in Mathematics Programs Under Tutelage of Non-Education Instructors

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## ABSTRACT

This study explored the experiences of graduates of the Bachelor of Secondary Education major in Mathematics regarding mathematics courses taught by non-education instructors. Specifically, it examined their reasons for pursuing the program, the challenges they encountered, the ways they coped with those challenges, and their recommendations for future students and higher education institutions. The study used a qualitative design and analyzed semi-structured interview data through thematic analysis. Thirteen graduates of Central Mindanao University were selected through purposive sampling. Interview transcripts were coded, grouped into categories, and refined into interpretive themes. The findings showed that the participants pursued the program mainly because of their interest in mathematics, desire to deepen their content knowledge, improve their teaching skills, and attain professional growth. The findings also indicated that non-education instructors were often perceived as mathematically competent but pedagogically limited, which made lessons fast-paced, highly technical, and less accessible. In response, the participants relied on self-study, peer support, and external learning resources, suggesting that pedagogical gaps shifted much of the work of understanding from the instructor to the student. The participants recommended stronger student initiative and institutional support for pedagogical training, especially for non-education instructors assigned to major mathematics courses. The study therefore underscores the need to align content expertise with pedagogical competence in mathematics teacher education.

**Keywords:** Mathematics education, non-education instructors, graduate narratives, pedagogical challenges, coping strategies, teacher preparation

## INTRODUCTION

Mathematics teacher education is expected to develop not only strong content knowledge but also pedagogical content knowledge, professional readiness, and the capacity to translate mathematical understanding into meaningful classroom instruction. Recent studies show that pedagogical content knowledge grows through teaching, reflection, and exposure to authentic instructional situations, while pre-service mathematics teachers strengthen their competence during teacher education and teaching-related experiences [11]. In the Philippine context, the quality of teacher education graduates continues to be associated with their licensure performance and their actual teaching performance during the first years of service, highlighting the importance of strong pre-service preparation in teacher education institutions [15].

Despite this expectation, concerns remain when some courses in teacher education programs are handled by instructors who are not formally trained in education. A recent Philippine study found that non-education faculty members in higher education experience teaching challenges associated with the lack of formal pedagogical training, even when they possess disciplinary expertise [12]. At the same time, studies in higher education have shown that teachers' pedagogical competence, teaching skills, and even digital pedagogical competence influence students' learning experiences and satisfaction [20][21]. However, based on the recent literature

reviewed, there remains limited attention to the narratives of graduates of a Bachelor of Secondary Education major in Mathematics program who were formed under the tutelage of non-education instructors, especially in the Philippine context. Existing studies have focused more on graduate quality indicators, practicum-based pedagogical content knowledge, or faculty teaching experiences, rather than on how graduates themselves retrospectively interpret the influence of non-education instructors on their development as future mathematics teachers [11][12][14][15].

Graduates' narratives can reveal how subject-matter expertise, teaching approaches, mentoring practices, and classroom experiences were actually encountered and interpreted by those who completed the program. Such narratives may show whether the presence of non-education instructors enriched the graduates' mathematical understanding, limited their pedagogical preparation, or produced a combination of both. This is significant because recent evidence indicates that university teachers' professional knowledge and teaching skills directly affect students' satisfaction and learning experience [21], while mathematics teacher education studies emphasize that pedagogical content knowledge and professional readiness are strengthened through guided teaching-related experiences and reflective practice [11][14]. In the Philippine setting, evidence on graduate quality also suggests that pre-service preparation has implications for later teaching performance, making this inquiry relevant for curriculum review, faculty assignment, and program improvement in teacher education [15].

Guided by these concerns, this study aims to explore the narratives of graduates of the Bachelor of Secondary Education major in Mathematics program regarding their experiences under the tutelage of non-education instructors. Specifically, it seeks to describe how these graduates perceived the contributions, challenges, limitations, and overall influence of non-education instructors on their pedagogical formation, professional identity, and readiness to teach mathematics. In doing so, the study responds to the need for more context-based evidence on teacher preparation raised by recent work on graduate quality, pedagogical competence, and instructional experience in teacher education and higher education [12][15][21].

### **Objective of the study**

This study aimed to explore the narratives of graduate students in the Bachelor of Secondary Education major in Mathematics program regarding their experiences in studying mathematics courses under instructors who were not graduates of education programs. Specifically, it seeks to answer the following question

1. What are your reasons for enrolling in or pursuing a Bachelor of Secondary Education Major in Mathematics Programs?
2. How would you describe the challenges you experienced while studying mathematics courses under instructors who are not education graduates?
3. How did you manage or cope with these challenges during your undergraduate studies in mathematics?
4. What advice or recommendations can you give to future undergraduate students and to higher education institutions regarding the teaching of major mathematics courses, particularly when handled by instructors who are not graduates of education programs?

## **METHODOLOGY**

### **Research Design**

This study employed a qualitative research design anchored in an interpretivist orientation. The inquiry focused on how graduates made meaning of their experiences in studying mathematics courses under non-education instructors. Although the interviews elicited narrative accounts, the primary analytic frame of the study was thematic analysis. This approach was appropriate because it allowed the researcher to identify recurring patterns of meaning across participants' accounts while still preserving the contextual richness of their experiences.

### **Research Locale**

The study was conducted at Central Mindanao University in Musuan, Maramag, Bukidnon. The university

served as the research locale since it offered the Bachelor of Secondary Education major in Mathematics under the College of Education. The setting was appropriate for the inquiry as the participants were graduates of the program under investigation.

### **Research Participants and Sampling**

The participants of the study were graduates of the Bachelor of Secondary Education major in Mathematics at Central Mindanao University who had experienced being taught by one or more non-education instructors during their undergraduate preparation. The study used purposive sampling in selecting the participants. This sampling technique enabled the researcher to choose individuals who had direct and relevant experiences related to the phenomenon being explored. A total of 15 participants were initially targeted. The final number depended on the richness, completeness, and depth of the narratives gathered during the conduct of the study.

### **Research Instrument**

The primary data-gathering instrument used in the study was a researcher-made semi-structured interview guide. This instrument enabled the researcher to gather detailed narratives from the participants while maintaining focus on the objectives of the study. The semi-structured format also gave the participants enough freedom to express their thoughts, feelings, and experiences in a natural manner. Prior to the actual data gathering, the interview guide was subjected to expert validation by qualified faculty members and research experts in the fields of qualitative research, teacher education, and mathematics education.

### **Data Gathering Procedure**

Before the conduct of the study, the researcher secured the necessary permissions from the appropriate university authorities. After obtaining approval, the researcher identified possible participants through alumni records, referrals, and available communication channels connected to the program. Each participant received an invitation letter and an informed consent form. These documents explained the purpose of the study, the nature of participation, and the ethical safeguards observed throughout the research process. Participation in the study was entirely voluntary. The data were gathered through one-on-one in-depth interviews conducted either face-to-face or online, depending on the participant's availability and preference. Each interview lasted approximately 45 to 60 minutes. With the participants' consent, the interviews were audio-recorded to ensure accuracy in data collection. The researcher also maintained field notes and a reflexive journal to document observations, contextual details, and personal reflections throughout the process. After each interview, the audio recordings were transcribed verbatim. The participants were then given the opportunity to review their transcripts or summarized accounts for verification and clarification. This process helped ensure that their intended meanings were accurately represented in the study.

### **Data Analysis**

The data were analyzed through thematic analysis. First, the researcher transcribed the interviews verbatim and read each transcript several times to gain familiarity with the participants' accounts. Second, the researcher generated initial codes by marking significant statements, repeated ideas, and meaning units related to each research question. Third, related codes were grouped into preliminary categories to identify patterns across the data set. Fourth, the preliminary categories were reviewed and compared across participants in order to refine broader themes that captured shared meanings. Fifth, the themes were defined and renamed in more interpretive terms so that they explained not only what the participants said but also what those patterns suggested about their learning experiences. Sixth, representative quotations were selected to illustrate each theme, including at least one quotation that qualified or challenged the dominant pattern. Finally, the themes were organized into a summary table and discussed in relation to the context of mathematics teacher education and the relevant literature.

## RESULTS AND DISCUSSION

### Summary Table of Themes

Interpretive Theme	Representative Quote	Interpretation
Choosing mathematics as a route toward competence, identity, and future opportunity	“I happen to love mathematics as a subject” (R1).	Participants linked enrollment to mathematical interest and becoming an effective teacher.
Pedagogical gaps shifted the burden of understanding from instructor to student	“[They] lacked the skills to teach step by step” (R1); “some of them exerts effort to make their discussion engaging” (R11).	Most participants experienced pedagogical difficulty, although one response qualified the pattern.
Students compensated for instructional limitations through self-teaching and peer scaffolding	“I relied heavily on independent study” (R6).	Understanding often depended on self-study, peers, and external resources.
Participants framed improvement as a shared responsibility of students and institutions	“Institutions must provide training” (R12).	Participants called for both student initiative and institution-led pedagogical support.

### Interview Question 1: What are your reasons for enrolling in or pursuing a Bachelor of Secondary Education Major in Mathematics Programs?

Table 1. Representative responses on the reasons for pursuing the Bachelor of Secondary Education major in Mathematics

Responses	Respondents
To be honest, I did not know what program to pursue. However, I happened to love mathematics as a subject, so I enrolled in the program.	R1
Mostly because it is one of the requirements for applying to the Department of Education.	R2
Honestly, I pursued the program to enrich my knowledge, especially in mathematics subjects that I believe I was not able to learn deeply during my undergraduate studies, and of course, to improve my ability to teach mathematics. In other words, I wanted to widen my knowledge and improve my skills. I also pursued the graduate program, especially the Master of Science degree, because of the research subjects, which I consider one of my weaknesses. I wanted to enhance my ability in this field so that if I am assigned to teach such subjects in the future, I will have something meaningful to share. Lastly, I was also motivated by the scholarship and the opportunities it may bring in the future.	R3
I wanted to learn more about research because that was something I lacked in my previous studies. I also learned about the DOST scholarship in the graduate program at CMU. I felt that studying with a scholarship was much better because it meant I would not have to work at the same time.	R4
To enhance my knowledge in the field of teaching mathematics.	R5
I chose to pursue a graduate program in mathematics because I wanted to deepen my understanding of advanced mathematical concepts and strengthen my analytical and problem-solving skills. Mathematics plays an essential role in developing logical thinking and precision, which are valuable not only in academic settings but also in real-world applications.	R6
At first, Mathematics was not really my first choice because I preferred Science, and my mother encouraged me to pursue Education. During my interview at the College of Education, I was advised to take Mathematics since my Senior High School strand was ABM, which is closely related to math. As I continued studying the subject and eventually teaching it during my internship, I began to appreciate it more. It became fulfilling to see students who once struggled with mathematics gain confidence and realize that they were capable of improving, which motivated me to continue growing in this field.	R7

To gain advanced knowledge in my field as well as career advancement in the future.	R8
I chose to pursue a graduate program in mathematics to deepen my knowledge of the subject and enhance my skills so that I could become a more effective and competent mathematics educator and help students who struggle in learning mathematics.	R9
A graduate program will help me strengthen my analytical, critical thinking, and problem-solving skills, which are essential not only in mathematics but also in real-world applications.	R10
For professional and academic growth.	R11
I simply love solving problems and working with numbers.	R12
I chose to pursue a mathematics program because I enjoy problem-solving and logical thinking. I also want to improve my teaching skills and help students understand mathematics better.	R13

**Theme 1: Choosing mathematics as a route toward competence, identity, and future opportunity**

This theme suggested that participants did not simply enroll in the program to satisfy an academic requirement. Rather, they framed mathematics as a field through which they could build competence, strengthen a professional identity, and open future opportunities. Across the responses, interest in mathematics was repeatedly linked to becoming a more capable teacher, sharpening problem-solving ability, and preparing for career advancement.

Representative responses reflected this pattern. R1 said, “I happen to love mathematics as a subject”; R6 wanted to “deepen [an] understanding of advanced mathematical concepts and strengthen analytical and problem-solving skills”; R9 aimed to become “a more effective and competent math educator”; and R13 wanted to “improve [my] teaching skills and help students understand math better.” These responses indicated that personal interest and professional formation operated together in the participants’ decision to pursue mathematics.

A qualifying response came from R2, who stated that the program was pursued “because it is one of the requirements in DepEd application.” This response did not overturn the dominant pattern, but it showed that not all decisions were driven by disciplinary passion alone; some were also shaped by institutional and employment realities.

The theme implied that the program was experienced not merely as content specialization but as a site for becoming a mathematics teacher. In this context, motivation was tied to both mathematical interest and anticipated teaching practice. The finding supports the view that mathematics teacher education is shaped by identity, aspiration, and perceptions of professional readiness.

This interpretation is consistent with studies showing that preservice teachers’ self-concept, self-efficacy, and attitudes are associated with mathematics achievement, and that aspirations to become mathematics or science teachers are linked to self-ascribed teacher identities. Recent work also shows that professional identity and motivation are closely related in teacher preparation, and that practice-based experiences help strengthen preservice mathematics teachers’ professional identities.

This data showing that teacher education quality is tied to graduate preparation and early teaching performance, that preservice teachers’ self-concept, self-efficacy, and attitude are associated with mathematics achievement, and that aspirations to become mathematics or science teachers are shaped by self-ascribed teacher identities [6] [15] [18]. Additionally, recent studies also show that professional identity, self-efficacy, and motivation are interrelated in teacher preparation, and that practice-based teacher education helps strengthen preservice mathematics teachers’ professional identities [2] [4] [10].

**Interview Question 2: How would you describe the challenges you experienced while studying mathematics courses under instructors who are not education graduates?**

Table 2. Representative responses on the challenges experienced under non-education instructors

Responses	Respondents
I struggled because the instructors, who were not education graduates, lacked the skills to teach step by step with detailed instructions. They often skipped essential explanations or failed to break down the concepts in a way that made the steps easier for me to understand. This made it more difficult for me to fully grasp the mathematical concepts because there was a lack of clear guidance and structured teaching methods.	R1
There is really a significant difference between how education graduates and non-education graduates teach. So far, most of my professors in major subjects have given very few assessments. If you fail one test, it is difficult to recover because assessments are seldom given.	R2
They are really different from education graduates who handle mathematics courses. My first observation was their assessment methods. They grade differently and often do not provide clear expectations. Although some professors may say that since we are not Master of Science in Mathematics students, they will not make the topics too difficult, it is still hard to achieve the target grade.	R3
They were more content-based, teaching in their own way rather than following educational pedagogy. They were unpredictable and, for me, not well-structured. There was little interaction or discussion beyond the lesson itself. They focused more on the subject matter than on its application.	R4
They had difficulty explaining the concepts clearly.	R5
One of the main challenges I experienced was related to teaching approaches. Some instructors who were not education graduates had strong expertise in mathematics, but they did not always use teaching strategies that were effective for diverse learners. At times, their explanations of complex concepts were very brief or highly technical, which made it difficult for students to fully understand the material.	R6
One challenge I experienced was that some instructors focused more on solving difficult mathematical problems than on explaining how the concepts could be taught to students. Since they were not education graduates, their approach was often more theoretical. There were times when the explanations were difficult to follow, and we did not always discuss how to make the lessons easier for students to understand. Because of this, I had to exert extra effort to understand the concepts and think about how I would explain them better when I teach.	R7
One challenge I experienced with my instructor, who was not an education graduate, was that although they were very knowledgeable in mathematics, they taught very quickly. They did not use varied teaching strategies, and they also lacked motivational strategies for their students.	R8
One challenge I experienced was that some instructors focused more on complex theories and technical explanations rather than teaching strategies, which sometimes made the concepts harder to understand and limited classroom interaction and feedback.	R9
One of the main challenges I experienced when studying mathematics under instructors who were not education graduates was the difference in teaching approach. Although they had strong content knowledge, some struggled to present concepts in a way that was easy for students to understand. Lessons were often more focused on procedures and solutions than on building conceptual understanding.	R10
Their teaching approach was different. Some of them only read from the textbook, and then you had to study the rest on your own. The discussion was dull and boring. Although some of them exerted effort to make their discussion engaging, most were still uninteresting.	R11

I had a hard time catching up with the concepts and topics during class. Non-education graduates were more focused on mathematical concepts than on translating them into understandable lessons. I also found it difficult to submit all the required activities within a short period because I did not fully understand the topics discussed during class.	R12
The teaching style was sometimes too fast and not student-friendly. Some lessons lacked examples and step-by-step explanations, which made complex topics confusing.	R13

**Theme 2: Pedagogical gaps shifted the burden of understanding from instructor to student**

This theme captured a recurrent tension in the data: participants generally recognized the mathematical competence of non-education instructors, yet they also described instruction as fast, technical, and difficult to follow. The core issue was not lack of content expertise but limited pedagogical translation. Concepts were often presented in ways that assumed understanding rather than building it step by step.

Participants repeatedly described this pattern. R1 reported that instructors “lacked the skills to teach step by step”; R4 described the classes as “content-based” and “not structured”; R8 said the instructors were “very knowledgeable in the concept of mathematics but they taught us very fast”; and R13 noted that the teaching style was “too fast and not student friendly.” Together, these responses showed that mathematical expertise alone did not guarantee accessible instruction for future mathematics teachers. A counter-pattern appeared in R11, who observed that “some of them exerts effort to make their discussion engaging.” Although this was not the dominant view, it suggested that a non-education background did not automatically result in ineffective teaching. Instead, the findings pointed to variation within the group, with some instructors attempting to bridge the gap despite the broader pedagogical difficulties described by most participants.

The theme implied that when major mathematics courses were taught in ways that privileged content delivery over pedagogical mediation, students had to work harder to transform technical explanations into meaningful learning. For graduates in a teacher education program, this mattered twice: it affected how they learned mathematics and how they imagined teaching it. The finding aligns with literature showing that pedagogical content knowledge and teaching competence shape students’ learning experiences and are central to mathematics instruction.

This finding showing that non-education faculty may face teaching challenges due to lack of formal pedagogical training, that pedagogical content knowledge remains important in mathematics instructional management, and that teaching competence influences student satisfaction and justifies faculty development planning [5] [12] [17]. Moreover, recent studies show that pedagogical content knowledge develops through teaching practice, that pedagogical competence improves students’ learning experience and satisfaction, and that teaching practicum helps preservice teachers manifest mathematics pedagogical content knowledge [11] [14] [21].

**Interview question 3: How did you manage or cope with these challenges during your undergraduate studies in mathematics?**

Table 3. Representative responses on the ways participants coped with the challenges

Responses	Respondents
I coped with these challenges through self-study, collaboration with my peers, and the use of online resources. I made sure to review the materials on my own and sought additional explanations whenever needed. I also formed study groups with classmates, where we discussed difficult topics and shared our understanding. In addition, I used the internet, including educational videos and forums, to supplement the explanations I received from the instructors.	R1
As a graduate student, coping mostly involved independent study and consulting other resources to widen my knowledge.	R2
I engaged in independent study. I preferred reading books to understand the topics better and then asking for clarification during class. When it came to assessments, I also sought help from	R3

my peers to evaluate my understanding and learn other strategies from them. One really has to be resourceful.	
Most of the time, I relied on independent study. Sometimes, I asked my classmates about certain topics, especially those whom I thought understood them well. I also followed the modules given by the professors in order to keep up.	R4
I coped by asking help from my peers and through self-study.	R5
To cope with these challenges, I relied heavily on independent study. I reviewed additional textbooks, online lectures, and scholarly resources to gain a deeper understanding of the topics discussed in class. This helped me clarify concepts that were not fully explained during lectures. I also collaborated with classmates through group discussions and peer study sessions. Working together allowed us to exchange ideas, solve difficult problems collectively, and support one another's learning. In addition, whenever possible, I sought clarification from instructors during consultations or after class to better understand complex mathematical concepts.	R6
To cope with these challenges, I spent more time studying the concepts on my own and looked for other resources such as books and online materials that explained the topics more clearly. I also discussed some lessons with my classmates so we could help one another understand the difficult parts. Since I was a bit shy to ask questions during class, I usually reviewed the lessons again on my own until I understood them better.	R7
What I did most of the time to cope with those challenges was independent study and peer tutoring. We also conducted group study sessions with my classmates, especially for difficult topics.	R8
I managed these challenges through independent study, collaboration with classmates, the use of additional learning resources, and asking instructors for clarification whenever concepts were difficult to understand.	R9
To manage the challenges I encountered during my graduate studies in mathematics, I developed several coping strategies that helped me stay on track and continue learning effectively. First, I became more proactive in my learning. I invested extra time in self-study by reading additional references, watching online lectures, and practicing more problems to strengthen my understanding of difficult concepts. Second, I sought support from peers and classmates. Forming study groups allowed us to discuss complex topics, share insights, and learn from one another's perspectives, which made challenging lessons more manageable. I also made an effort to communicate with my instructors whenever possible. Asking questions and seeking clarification helped address confusion, even if explanations were sometimes limited. In addition, I applied my background in education by creating my own strategies to simplify concepts, such as breaking down problems into smaller steps, using examples, and relating topics to real-life situations. Lastly, I developed resilience and discipline. I learned to be patient with the learning process and remained committed despite difficulties, which helped me grow both academically and personally.	R10
Independent study was necessary; you really had to help yourself to survive. However, there were times when I needed help from my classmates, especially when I felt overwhelmed by the amount of information. As for seeking clarification from instructors, I did not usually do that because I was afraid.	R11
I was able to manage all those struggles through independent study, watching videos online, and receiving help from my friends and classmates, who were always willing to lend a hand.	R12
I coped by studying on my own, watching online tutorials, and reading other resources. I also asked classmates for help and clarified topics with instructors whenever possible.	R13

**Theme 3: Students compensated for instructional limitations through self-teaching and peer scaffolding**

The responses indicated that participants did not remain passive when classroom teaching was difficult. Instead, they compensated for instructional limitations by teaching themselves, seeking out alternative explanations, and

relying on classmates. The coping strategies were therefore not simply study habits; they represented a transfer of instructional work from the classroom to the learner and peer network.

This pattern was evident across the interviews. R1 used “self-study, collaborating with my peers, and utilizing online resources”; R6 relied on “additional textbooks, online lectures, and scholarly resources” as well as peer discussions; R8 mentioned “independent study and peer tutoring”; and R13 combined self-study, online tutorials, reading, and clarification from classmates and instructors. These responses suggested that understanding mathematics often required students to build a parallel support system outside the formal teaching encounter. The theme implied both resilience and displacement. On one hand, the graduates demonstrated self-regulation, initiative, and collaborative learning. On the other hand, the data suggested that the responsibility for making lessons understandable frequently shifted from the instructor to the students themselves. In the context of the study, this meant that persistence and peer support became compensatory mechanisms for pedagogical insufficiency.

This interpretation is consistent with studies showing that self-regulated learning is associated with mathematics performance, that peer tutoring supports motivation and academic engagement, and that self-directed learning is especially important in university mathematics where students often extend learning beyond classroom instruction.

Recent studies showing that self-regulated learning is associated with strong mathematics performance, that peer tutoring is linked to academic motivation in mathematics, and that self-regulation significantly correlates with mathematics self-efficacy [13] [16] [19]. In addition, emphasize that self-regulated learning is especially important in university mathematics because of the large share of self-study, that peer learning can support self-directed learning processes, and that students’ learning strategies and self-regulated learning matter in solving higher-order mathematical tasks [1] [8] [9].

**Interview question 4: What advice or recommendations can you give to future graduate students and to higher education institutions regarding the teaching of major mathematics courses, particularly when handled by instructors who are not graduates of education programs?**

Table 4. Representative responses on recommendations for students and institutions

Responses	Respondents
For future graduate students, I recommend developing strong independent learning skills and maintaining patience and persistence when studying challenging mathematical topics. Participating in group discussions, asking questions, and using various learning resources can greatly improve understanding. For higher education institutions, it may be helpful to provide training or professional development programs for instructors, particularly in effective teaching strategies and student engagement. Even instructors who are highly knowledgeable in mathematics can benefit from learning methods that make complex concepts clearer and more accessible to students. Combining strong subject expertise with effective teaching practices can greatly improve the overall learning experience in graduate mathematics courses.	R1
For future graduate students, I would suggest being patient and putting extra effort into understanding the lessons, especially when some topics are difficult. It also helps to review on your own, use other learning resources, and discuss ideas with classmates. For higher education institutions, it would be helpful if instructors who are not education graduates also considered different teaching strategies and explained concepts more clearly, so students could better understand the lessons and see how these can be taught to their own students in the future.	R2
Develop pedagogical content knowledge, provide training to non-education graduate instructors, and do not focus only on the content; instead, relate it to the real world.	R3
Future graduate students should actively seek additional resources and collaborate with peers, while higher education institutions should support instructors in using clear teaching methods	R4

<p>and providing more interactive discussions and constructive feedback to help improve students' understanding of mathematics.</p>	
<p>I would advise future graduate students to take an active role in their own learning. When faced with challenges, especially in classes handled by instructors who may not have formal training in teaching, it is important to be proactive and seek additional resources such as books, online lectures, and tutorials to reinforce understanding. Building a strong support system is also essential. Collaborating with classmates through study groups can make complex topics more manageable and less overwhelming. Do not hesitate to ask questions, seek clarification, and consult other mentors when needed. Moreover, developing good study habits, discipline, and resilience is crucial. Graduate-level mathematics can be demanding, so consistency and patience play a significant role in overcoming difficulties.</p>	R5
<p>There are many teaching methods that can be found on the internet and YouTube. There is always room for improvement.</p>	R6
<p>Higher education institutions must provide training to non-education graduate instructors who are teaching mathematics courses so that they become familiar with effective teaching approaches, explanation of concepts, assessment methods, and classroom interaction strategies.</p>	R7
<p>For students, be proactive: study in advance, ask questions, and use different learning resources. For schools, I suggest providing training for instructors on teaching strategies, clear explanations, and giving helpful feedback to students.</p>	R8
<p>For future graduate students, I recommend developing strong independent learning skills and maintaining patience and persistence when studying challenging mathematical topics. Participating in group discussions, asking questions, and using various learning resources can greatly improve understanding. For higher education institutions, it may be helpful to provide training or professional development programs for instructors, particularly in effective teaching strategies and student engagement. Even instructors who are highly knowledgeable in mathematics can benefit from learning methods that make complex concepts clearer and more accessible to students. Combining strong subject expertise with effective teaching practices can greatly improve the overall learning experience in graduate mathematics courses.</p>	R9
<p>For future graduate students, I would suggest being patient and putting extra effort into understanding the lessons, especially when some topics are difficult. It also helps to review on your own, use other learning resources, and discuss ideas with classmates. For higher education institutions, it would be helpful if instructors who are not education graduates also considered different teaching strategies and explained concepts more clearly, so students could better understand the lessons and see how these can be taught to their own students in the future.</p>	R10
<p>Develop pedagogical content knowledge, provide training to non-education graduate instructors, and do not focus only on the content; instead, relate it to the real world.</p>	R11
<p>Future graduate students should actively seek additional resources and collaborate with peers, while higher education institutions should support instructors in using clear teaching methods and providing more interactive discussions and constructive feedback to help improve students' understanding of mathematics.</p>	R12
<p>I would advise future graduate students to take an active role in their own learning. When faced with challenges, especially in classes handled by instructors who may not have formal training in teaching, it is important to be proactive and seek additional resources such as books, online lectures, and tutorials to reinforce understanding. Building a strong support system is also essential. Collaborating with classmates through study groups can make complex topics more manageable and less overwhelming. Do not hesitate to ask questions, seek clarification, and consult other mentors when needed. Moreover, developing good study habits, discipline, and resilience is crucial. Graduate-level mathematics can be demanding, so consistency and patience play a significant role in overcoming difficulties.</p>	R13

#### **Theme 4: Participants framed improvement as a shared responsibility of students and institutions**

The final theme showed that participants did not locate the solution in student effort alone. Their recommendations revealed a dual expectation: students should be proactive and disciplined, but institutions should also ensure that non-education instructors receive pedagogical support. The participants therefore interpreted effective mathematics preparation as a shared responsibility rather than a purely individual struggle.

This view was strongly reflected in the responses. R1 recommended that students seek clarification and that institutions provide workshops on effective teaching strategies; R4 suggested that instructors integrate educational pedagogy through institutional training; R8 explicitly called for the development of pedagogical content knowledge; R12 stated that institutions “must provide training” on teaching approaches, explanation of concepts, assessment methods, and classroom interaction; and R13 recommended both student proactivity and training for instructors. These responses consistently linked better learning to both learner initiative and institutional action.

The theme implied that improving major mathematics courses required more than assigning mathematically knowledgeable instructors. It required institutional investment in pedagogy, especially in a teacher education program where students learn content and absorb models of teaching at the same time. In this context, faculty development, assessment clarity, and student-centered explanation emerged as program-level concerns rather than isolated classroom issues. This interpretation echoes literature showing that faculty pedagogical development improves teaching practice and student satisfaction, and that mathematics teacher preparation is strengthened when content expertise is combined with pedagogical content knowledge, guided practice, and reflective teaching support.

Studies showing that non-education faculty need targeted pedagogical support, that lesson study and collaboration contribute to professional development and teaching improvement, and that faculty competence is a basis for development planning [3] [5] [12]. Moreover, recent studies shows that pedagogical training in higher education positively affects teachers’ practices and professional growth, that university teachers’ pedagogical competence improves students’ learning experience and satisfaction, and that mathematics pedagogical content knowledge is strengthened through guided teaching experiences and structured preparation [7] [14] [21].

### **CONCLUSION AND RECOMMENDATION**

The study concluded that the participants pursued the Bachelor of Secondary Education major in Mathematics largely through a combination of personal interest, professional aspiration, and perceived future opportunity. It also concluded that the most difficult aspect of learning under non-education instructors was not the absence of mathematical knowledge but the limited pedagogical translation of that knowledge into clear, structured, and student-responsive teaching. The study further concluded that participants coped by assuming a substantial share of the instructional burden through self-study, peer support, and external learning resources. Finally, the study concluded that the participants understood improvement as a shared responsibility: students needed to be proactive, but institutions also needed to support non-education instructors through pedagogical development.

#### **Based on the study's findings, the study has the following recommendations.**

First, future students in the program should strengthen independent learning habits, use varied learning resources, ask questions when needed, and work closely with peers to manage difficult mathematics courses more effectively.

Second, non-education instructors assigned to major mathematics subjects should be encouraged to improve their teaching practices by giving clearer explanations, using step-by-step presentation, applying more interactive and student-friendly strategies, and providing more understandable assessment and feedback.

Third, higher education institutions should provide regular seminars, workshops, and faculty development activities focused on pedagogy, classroom interaction, assessment methods, and concept explanation so that

instructors with strong mathematical expertise can also become more effective teachers.

Fourth, program administrators may consider assigning major mathematics courses to instructors who possess both strong content knowledge and sound pedagogical competence in order to better prepare future mathematics educators.

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