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Transitioning into Mathematics Teaching: A Case Study of Non-Education Graduates

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***Abstract*—** This multiple case study examined the professional journeys of four non-education graduates who transitioned into senior high school mathematics teaching in one schools division in Western Visayas. Participants were purposively selected based on their academic backgrounds and current teaching roles. Data were collected through semi-structured interviews and analyzed using Braun and Clarke's six-phase thematic analysis, adapted for a multiple case study approach. The study focused on four core research objectives, each reflected in the subthemes that emerged: motivations for entering teaching, challenges faced, identity formation, and support systems. Findings reveal that participants' initial motivations were shaped by social influences, obligations such as scholarship service requirements, career transitions, and emerging personal purpose. Despite strong content knowledge, they faced challenges related to pedagogical skills, addressing diverse learning needs, classroom management, technology integration, and emotional and psychological strains. Through reflective practice and ongoing social interaction, participants gradually developed confident and student-centered teaching identities. They integrated their prior professional expertise to make mathematics more relevant and engaging. The results align with Situated Learning Theory, illustrating how participants gained professional identity through participation in authentic teaching communities. Vygotsky's Sociocultural Theory explains the vital role of mentorship and peer support in scaffolding their development. Kagan's Stages of Teacher Development are evident in their progression from survival-focused neophytes to competent educators. These findings highlight the complex, dynamic nature of transitioning into teaching for career changers and emphasize the need for structured induction, accessible mentoring, and professional development.

***Keywords*—** Mathematics education, Second-career teachers, Teacher identity, Professional transition, Qualitative study case.

I. INTRODUCTION

In recent years, the Philippine education system has undergone significant changes, particularly with the implementation of the K to 12 curriculum. One major challenge brought about by this reform was the urgent need to hire a large number of qualified teachers to handle specialized subjects in Senior High School (SHS), including mathematics. Due to the limited pool of licensed education graduates, the Department of Education (DepEd) opened teaching opportunities to non-education graduates who possessed strong content knowledge in areas such as science, technology, engineering, and mathematics (Salvador, 2025).

While this solution helped address the shortage of qualified teachers, it also introduced a new set of issues concerning teacher preparedness, instructional quality, and long-term integration into the teaching profession. Non-education graduates entering the teaching profession often bring strong content expertise, particularly in mathematics and other specialized fields. However, many of them lack formal training in pedagogy, assessment strategies, and classroom management. As Ortega et. al. (2022) observed, these teachers are expected to deliver effective instruction while adjusting to the demands of the educational system without the benefit of a professional education background. They are frequently tasked with preparing daily lesson logs, designing instructional materials, and aligning their teaching with the Philippine Professional Standards for Teachers (PPST)—responsibilities that can be challenging without structured pedagogical preparation. Despite these obstacles, many non-education graduates demonstrate a high level of commitment to teaching, often pursuing further studies, obtaining teaching licenses, and continuously seeking ways to improve their practice (Salvador, 2025). The transition of non-education graduates into teaching is not only a matter of learning new skills, but also of developing a professional identity as educators. Their journey is shaped by their past experiences, personal motivations, and the school environments in which they work. As noted by Somosot & Relox (2023), these

individuals often face pressures to meet institutional expectations while adapting to the culture of teaching. Their growth is influenced by interactions with colleagues, participation in professional communities, and access to support systems such as mentoring and in-service training. These conditions reflect the principles of Situated Learning Theory, which emphasizes that identity formation takes place within communities of practice through active participation and social learning. Given these developments, it is important to take a closer look at the experiences and challenges of non-education graduates who are now teaching mathematics. This study seeks to explore their reasons for entering the profession, the difficulties they face in instructional and classroom settings, and how they build their identity as teachers within the school context. It also aims to understand the kinds of support and professional development that help them adjust and succeed in their roles. By using a case study approach, this research aims to provide clear and meaningful insights that can guide educational policies and programs, especially those that support non-traditional teacher pathways and contribute to improving the quality of mathematics education in the country.

II. METHODOLOGY

A. Research Design

This study employed a qualitative multiple case study design to explore the transition, challenges, and identity formation of non-education graduates who are teaching senior high school mathematics. A case study is used to gain in-depth understanding of a real-life phenomenon within a bounded system through detailed investigation of individuals or groups (Coombs, 2022). The multiple case study approach was appropriate as it allowed the researchers to examine and compare the experiences of four participants from two schools within the same division, all undergoing a similar transition into teaching. This design enabled the collection of rich data from semi-structured interviews, documents, and observations, facilitating the identification of shared themes and unique experiences. As Creswell and Poth (2018, as cited by Coombs, 2022) explain, a multiple case study helps illustrate a single issue through several cases, supporting deeper analysis and more comprehensive understanding.

B. Participants of the Study

Considering Ahmed's (2025) recommendation of 4–10 cases for a multiple case study, four senior high school mathematics teachers from one schools division in Western Visayas were selected through purposive sampling. This sampling technique, according to Subedi (2021) and Johnson et al. (2020) as cited by Calimpong (2025), is appropriate for qualitative research and enabled the intentional selection of participants to optimize the relevance and richness of the data. All participants in this study were selected based on their background as non-education graduates who had transitioned into teaching mathematics. Participants were further selected based on two criteria: (a) they are non-education graduates, with or without a license to teach; and (b) they are currently teaching mathematics in a senior high school within the specified schools division in Western Visayas. Before the interviews, participants were given an informed consent form that clearly explained the purpose of the study, interview procedures, potential risks and benefits, voluntary participation, the right to withdraw at any time without negative consequences, and confidentiality measures. The form also stated that interviews would be audio recorded with permission and that their identities would be protected through pseudonyms. All participants voluntarily signed the informed consent form, acknowledging their understanding of these terms and agreeing to participate.

C. Data Collection Method

Data for this study were collected using individual semi-structured interviews, which allowed for an in-depth exploration of each participant's experiences. This method facilitated meaningful communication between the researchers and participants, fostering a deeper understanding of their perspectives (Taherdoost, 2022 as cited by Calimpong, 2025). An interview guide consisting of nineteen open-ended questions organized into five sections: background and motivations, challenges in teaching, professional identity formation, support systems, and closing reflections was utilized. The interview instrument underwent content validation adapted from Solanon et al (2020). A panel of five experts validated the instrument, including a case study methodologist, a linguist, a psychologist, and two mathematics educators. The panel rated the interview questions as very satisfactory overall, affirming their clarity, ethical soundness, and relevance to the study's objectives. Evaluators provided constructive feedback to enhance the instrument, such as removing terms like "briefly," refining the sequence of questions for improved narrative flow, and avoiding language that might unintentionally emphasize participants' weaknesses rather than their strengths. These suggestions were incorporated through minor revisions,

resulting in a refined and flexible interview protocol that balanced consistency across cases with the flexibility needed to pursue emergent topics. Moreover, each interview with the participants were audio recorded, with informed consent, to ensure accurate data transcription.

D. Data Collection Procedure

Necessary approvals were obtained prior to the start of data collection. Signed informed consent forms were secured from all participants. Interviews were then scheduled at times and venues convenient and comfortable for the participants. Before each interview, the informed consent form was restated with emphasis on participants' rights and the protocols for audio recording. Following the guidelines of Adhikari (2021) as cited by Calimpong (2025), each participant underwent at least two in-depth interviews, resulting in a total of eight interviews. The initial interviews lasted between 45 3 and 60 minutes, while the follow-up interviews averaged approximately 20 minutes and focused on clarifying ambiguous or unclear responses from the previous interviews. Throughout the interview process, field notes were maintained to capture nonverbal cues such as facial expressions, body language, and gestures. Audio recordings were made using dual devices—a digital recorder and a mobile phone—to ensure data integrity. To protect confidentiality, pseudonyms replaced participants' real names. Audio recordings were deleted after data analysis was completed. As Calimpong (2025) asserts, qualitative research requires rigor to establish trustworthy findings. She cites Johnson et al. (2020), Stahl and King (2020), and Williams and Kimmons (2022), emphasizing four standards essential for trustworthiness: credibility, transferability, dependability, and confirmability. This study ensured rigor by following these standards. Credibility was enhanced through triangulation by integrating multiple data sources—including interview transcripts, field notes, and observations—to identify consistent patterns, reduce bias, and improve accuracy. Rigorous data analysis was supported by the use of NVivo software. Transferability was addressed by providing thick, detailed descriptions of participants' experiences, enabling readers to assess how findings may apply in other contexts. Dependability was ensured through thorough documentation of research methods, data collection, and analytical procedures, supplemented by an audit trail to allow for transparency and possible replication. Confirmability was strengthened through member checking, where participants reviewed and verified their interview transcripts to ensure accuracy and minimize researcher bias. Data collection ceased upon reaching saturation, defined as the point at which no new information or themes emerged, confirming the adequacy of the data.

E. Data Analysis

This study adapted the six-phase thematic analysis framework advanced by Braun and Clarke (2006, 2019). Modifications were made to align with the multiple case study design which is in consistent with Braun and Clarke's view of thematic analysis as a theoretically flexible method. Minor modifications were made without compromising methodological integrity. The approach was both inductive and reflexive, allowing themes to emerge from the data while remaining responsive to the study's research objectives.

Phase 1. Familiarization and Data Reduction. The analysis began with careful engagement with the data through repeated listening to the audio recordings and multiple readings of the interview transcripts. Following Braun and Clarke's (2006, 2019) approach, initial observations and possible patterns were noted during this stage. To keep the analysis focused, portions of the data that did not relate to the research questions—such as personal stories or off-topic comments—were set aside. This helped manage the data more effectively while keeping the information that was most relevant to the study. Out of around 338 initial excerpts identified during this phase, 179 were considered directly relevant to the research questions. The remaining excerpts were excluded to improve clarity, while still ensuring that the richness and depth of the relevant data were maintained. Phase 2. Generating Initial Codes. Following familiarization with the data, line-by-line inductive coding was conducted on 179 excerpts across all participants' transcripts: 56 excerpts for Participant A, 49 for Participant B, 40 for Participant C, and 34 for Participant D. Codes were generated to capture salient features of the data directly related to the research questions. Coding was performed on a case-by-case basis to preserve the individuality of each participant's narrative and to maintain alignment with the case study methodology. A total of 148 initial codes were identified, distributed as follows: 35 codes from Participant A, 33 from Participant B, 44 from Participant C, and 36 from Participant D. While the coding framework remained flexible throughout this phase, refinements were made in subsequent phases to enhance conceptual clarity and ensure alignment across cases. Phase 3. Constructing Initial Themes through

Cross-Case Analysis. Following the within-case coding, a cross-case analysis was conducted to identify shared patterns and generate preliminary themes. Codes from all participants were grouped according to semantic and conceptual similarities, forming the foundation for initial theme categories. This phase represented a transition from descriptive coding to more interpretive analysis, consistent with Braun and Clarke's emphasis on meaning-making. The resulting themes captured common experiences related to motivations, challenges, identity formation, and support systems among non-education graduates transitioning into mathematics teaching. In total, 17 initial themes were developed: themes aligned with Objective 1, and 4 themes each corresponding to Objectives 2, 3, and 4.

Phase 4. Reviewing and Refining Themes. This phase involved reviewing and refining the initial themes to ensure internal consistency, distinctiveness, and alignment with the research objectives. Each theme was 4 evaluated for coherence by checking that grouped codes and excerpts shared a unified meaning, while also confirming clear differentiation between themes. The entire dataset was revisited to verify that excerpts and codes corresponded accurately to the refined themes, with each theme supported by rich, representative data from multiple participants. Themes were then renamed using concise, theory-informed labels without losing their core meaning, and content was reorganized to improve conceptual clarity. A total of 18 refined themes were obtained: 4 themes each for objectives 1 and 4, and 5 themes each for objectives 2 and 3.

Phase 5. Defining and Naming Themes. In this phase, each theme was clearly defined by its central concept, scope, and coherence. Definitions were developed through an iterative process of summarizing thematic content, refining boundaries, and ensuring each theme represented a distinct aspect of the data. Naming focused on clarity and precision to avoid overlap or ambiguity. This phase ensured all themes were well-defined and aligned with the study's research objectives.

Phase 6. Producing the Report. In the final phase, the refined themes were integrated into a coherent narrative presented in the Results and Discussion sections. The report included vivid, illustrative excerpts from participants, interpretation of thematic meanings, and engagement with relevant literature. The organization of findings mirrored the research objectives, ensuring transparency and analytic coherence. Thematic insights were contextualized within broader discussions on teacher identity, pedagogical adaptation, and professional development—particularly as they relate to non-education graduates entering the field of mathematics education.

III. RESULTS AND DISCUSSION

A. Results

Participant Summaries

The study involved four non-education graduates who transitioned into mathematics teaching. While three participants share a background in electrical engineering, each brought motivations, pathways and teaching experiences. Their profiles provide essential background for interpreting the thematic results. Participant A, an Applied Mathematics graduate and former college instructor, entered teaching through a scholarship obligation and family encouragement. Initially motivated by duty and job security, this participant's passion grew around making math relevant through real-world applications and technology. Despite early pedagogical challenges, the participant developed adaptive strategies via self-study, mentorship, and professional development, shaping an identity grounded in compassion and community advocacy. Participant B, a licensed electrical engineer, initially viewed teaching senior high STEM subjects as a secondary career. Over time, his motivation deepened as he sought to apply his technical knowledge practically and inspire students. Lacking formal teacher education, he adapted by integrating real-life examples and interactive strategies, with growing confidence and reflective practice. Peer and mentor support were crucial, alongside calls for more structured training for non-education graduates. Participant C, also an electrical engineering graduate and licensed math teacher, transitioned to teaching after discovering a passion for tutoring. Starting with a structured, efficiency-driven approach, this participant gradually adopted student-centered, empathetic methods to address diverse learner needs. Continuous reflection, mentorship, and engagement in professional communities supported this growth, alongside advocacy for systematic support for career shifters. Participant D, likewise an electrical engineering graduate, entered teaching as a scholarship return-service obligation, initially unmotivated and struggling with pedagogy and management. Over time, student appreciation and recognizing their impact fostered a purposeful teaching identity. This participant emphasized structure and fairness in the classroom, relied on personal adaptation, and advocated strongly for formal mentorship and pre-

service training to aid new teachers without education backgrounds.

The following section presents a cross-case synthesis of these participants' experiences, organized around the study's four research objectives. The analysis is structured by themes and supporting codes developed using Braun and Clarke's (2006, 2019) thematic analysis framework.

1. Experiences and Motivations for Entering the Mathematics Teaching Profession

Participants shared diverse experiences that influenced their decision to pursue teaching. Their motivations were shaped by a combination of external obligations, social influences, practical career considerations, and developing personal purpose.

1.1 Obligations. Financial and contractual obligations, such as scholarships requiring return service, played a pivotal role in the transition for two participants. Participant A stressed that his entry to public service was due to a government scholarship: "…as a DOST graduate, …, I have to render service to the government, and that is how I entered public service." Participant D also mentioned a similar obligation tied to DOST scholarship, stating, "My DOST scholarship… I was just required…" He clarified further, "Part of our return service required teaching… I was just doing it for compliance."

1.2 Social Influence. Beyond institutional obligations, participants also highlighted the role of social surroundings in shaping their entry into the teaching profession. For both Participant A and Participant D, family and social expectations played a role alongside contractual commitments. Participant A mentioned how his siblings, both teachers, encouraged him to consider teaching as a viable career: "My two sisters were teaching in DepEd, and they told me that I have to enter DepEd because of tenure." Similarly, Participant D described his entry into the profession as partly shaped by external expectations: "I didn't really choose it, but I had to comply."

1.3 Career Transition. After entering the teaching field, participants described formal steps they have taken to become qualified educators. These included completing required education units, enrolling in bridging programs, and taking licensure examinations to fulfill credentialing requirements during their transition to teaching. Participant B shared being "currently enrolled in 18 units of basic education course." Participant C explained, "I hold a Bachelor's degree in Electrical Engineering…earned my professional teaching license after completing education units through an evening program."

1.4 Sense of Purpose. Participants expressed an intrinsic motivation to teach, driven by a love for mathematics, a desire to inspire, and a deeper sense of mission or contribution. Participant A shared: "The love of patterns, numbers… influenced my decision to enter the field of mathematics teaching." Participant C stated: "Math was always something I found comfort in—it has structure and logic." Participant B reflected: "…I wanted to share my experiences and knowledge… to inspire young minds to become future engineers." Participant C further emphasized: "I saw that a lot of students feared mathematics, and I wanted to help change that perception." Over time, this motivation developed into a deeper commitment. Participant C observed: "I found meaning in it—especially when I saw how my students responded, asked questions, and grew more confident. Their curiosity and appreciation made me realize I can make a real impact." Participant D noted a similar shift: "I realized the impact I was making, and that changed my perspective." For Participant A, teaching took on a broader social role: "Helping the community… has become my advocacy now." Participant B reflected on the evolution of his commitment: "At first, I saw teaching as a temporary role. But over time, I found meaning in it… I feel happy and encouraged… to inspire more young minds to be a better lifelong learner." Participant C summarized this transformation simply: "I wanted to make a difference." 2. Challenges in Adapting to Mathematics Teaching While participants developed a growing sense of purpose and fulfillment in teaching, their transition into the classroom was not without difficulties. As non-education graduates, they encountered a range of challenges as they adapted to the demands of mathematics teaching. These challenges included pedagogy, learner diversity, classroom management, technology, and emotional and psychological strains.

2.1 Pedagogical Gaps. Participants consistently faced challenges due to a lack of formal training in pedagogy. Coming from non-education backgrounds, they initially relied on self-directed strategies and learned through experience. Participant A shared, "But when I entered DepEd, even some subjects were easy, my problem was in the pedagogy... Initially, I relied heavily on self-

study." Participant B described teaching math as "very challenging especially on how we deliver the objectives or learnings to our students," adding that a key difficulty was adapting to "different teaching styles… since there are different kinds of learners in each class… to catch up all their attentions during discussion." Participant C noted, "I had to learn how to break things down in ways I wasn't trained to do in engineering school… I had to juggle lesson planning, classroom management, and unfamiliar pedagogy," and further admitted, "When I started, I relied heavily on lectures and handouts." Participant D reflected on being unprepared: "I wasn't prepared at all… There were no trainings when we were deployed. I think trainings before deployment would be a big help especially in lesson plan making and lesson deliveries… I didn't know how to teach in a way that students could understand. I mostly learned through trial and error." 2.2 Addressing Diverse Learning Needs. In addition to general pedagogical gaps, participants also struggled to meet the varying learning needs of students. They encountered a broad range of abilities, preferences, and emotional sensitivities among learners. Participant A observed, "Teaching students who have different learning styles and abilities is a challenge. Today's generation is more emotional, and they are very soft-hearted and have a high level of stress… as teachers… we just learnt how to adjust." Participant B explained adapting assessments by saying, "I usually try to identify their strengths and weaknesses then give them different levels of difficulties in exams." Participant C expressed a desire for deeper skills in learner management: "I wish I had known more about managing different types of learners and how to assess understanding beyond quizzes and exams."

2.3 Classroom Management. Building on the challenges related to pedagogy and addressing diverse learning needs, participants also found classroom management as a major difficulty - particularly in managing student behavior and maintaining engagement. Participant C conveyed, "I initially had difficulty managing classroom dynamics…" On the other hand, Participant B adapted by designing more engaging activities: "It is also challenging to fit in myself with their different behaviors. I made different and more interesting ways of learning to catch up their attentions." Participant C emphasized the need to go beyond delivering content: "I had one class where students refused to engage during a lesson on probability." He added: "Your content knowledge is important, but your ability to connect with students is just as crucial." Participant D highlighted the limits of content expertise without classroom management skills: "I didn't know how to manage a class… I am very strict in my rules. I set the rules and regulations beforehand… Even if you know the content, it's useless if you can't handle the class."

2.4 Technology Integration. Technology integration brought additional difficulties to the participants, such as access issues, student distraction, and adapting assessments for online or blended formats. Participant A explained the challenge of balancing engagement and distraction: "… the effectiveness of incorporating technology into my math classroom without distractions is a challenge. Although some students engaged well, others used the time to scroll through social media. … not all technology integration is effective without clear boundaries. Access was a huge issue—not everyone had smartphones or stable data. Some students also found the navigation confusing at first. Another challenge was aligning the game with learning outcomes…" Participant B briefly noted, "… during an online class, we had connectivity issues."

2.5 Emotional and Psychological Strains. Underlying these practical challenges were emotional and psychological strains. Participants experienced self-doubt, frustration, and isolation—particularly during their early teaching experiences. Participant A recalled: "When I was first asked to handle a class for STEM students, I was nervous." Further stating that: "During my early years in DepEd, I had a class with very low performance in algebra. I felt frustrated." Participant B admitted: "There were times I wondered if I made the right choice." Participant C said: "It was a bit frustrating to realize that students didn't always respond to that approach.", referring to the challenges of applying an engineering mindset in the classroom. Participant D shared: "It felt so disappointing. The entire system was new to me. I just get used to it. You need to be stronger. They tend to look at you differently when you're new. Not all will help you as you start so you need to find ways to manage things on your own. I felt lost most of the time and doubted myself a lot. My first evaluation was really bad. I almost quit…"

3. Identity Formation as a Mathematics Teacher

As non-education graduates adapted to their roles, their professional journeys were marked by growth in confidence, evolving pedagogical styles, deepening

empathy, and a desire to make mathematics more meaningful for students.

3.1 From Uncertainty to Confidence. Participants initially questioned their abilities but gradually gained confidence through experience, reflection, and feedback. Participant A shared, *"As I get more familiar with my craft, I feel more confident in my ability to explain complex concepts in mathematics… I also sought feedback from my students and mentor teachers to improve continuously."* Further reflecting, *"Over time, I gained more confidence because I saw my methods working for diverse learners."* Similarly, Participant B expressed, *"I became more confident in sharing my knowledge… It forces me to keep learning and be open to feedback and innovation."* For Participant D, early challenges became turning points: *"My first evaluation was really bad… I almost quit, but I decided to use the feedback to improve instead. I can say that I am now very effective."* Participant C, *"I changed my approach... It worked—they saw relevance and became more participative."*

3.2 Developing a Personal Teaching Style. Building on their growing confidence, participants began crafting teaching styles that fit their personalities and classroom realities. They shifted from heavily lecture-based methods to more interactive, student responsive approaches. Participant C described this development: *"I'd describe myself as a facilitator… I try to balance structure with creativity. Now, I've embraced more interactive methods—like inquiry-based tasks and digital tools. I've become more reflective and open to feedback."* Participant B highlighted a growing adaptability, stating, *"I became more flexible especially with different kinds of learners…"* This shift also involved becoming *"more responsible and innovative in delivering lessons."* Participant D explained a similar process of adjustment, noting, *"I changed my methods and things got better. I mostly learned through trial and error… Sometimes I looked things up online or asked co-teachers for help."* Participant A also emphasized growth through practical experience: *"I have developed better classroom management… Over time, I created my own style by integrating strategies like collaborative learning, peer teaching, and concept mapping."*

3.3 Embracing a Compassionate, Student-Centered Approach. With time and reflection, participants reported a growing awareness of the emotional and individual needs of their students. This marked a shift toward a more compassionate, student-centered teaching identity. Participant A illustrated this shift: *"I am more of a compassionate teacher,"* adding, *"I also give them some freedom—like letting them choose topics for their performance tasks so they feel more involved and curious."* Participant C emphasized the broader role of educators: *"It's not just about imparting knowledge—it's about building character, patience, and empathy."* He continued, *"I also became more empathetic—understanding that students come with diverse backgrounds and learning needs helped me adjust my teaching style."* Participant C further elaborated on creating an inclusive classroom climate: *"I found that creating a respectful and predictable environment works best. I involve students in setting classroom norms, and I give them structured yet flexible routines."* Similarly, Participant D described becoming more attuned to student needs: *"I am now becoming more pro students. I now consider their pace and background more. I also adjust my methods based on their feedback."* Participant B echoed this shift: *"I also ask for feedback from students and adjust based on their responses. Also, I make sure they feel supported and not judged when they make mistakes. I adjusted… and gave students time extensions so they could still learn without added stress."*

3.4 Teaching for Relevance. An emerging aspect of their teaching identity was the effort to make mathematics relevant to students' lives. Participants emphasized application, meaning, and real-world connections over rote learning. Participant A explained, *"Math is not about memorization… connect it to real life. I hope they become critical thinkers and don't give up easily."* Similarly, Participant B stressed, *"Understand and apply what they've learned, not just memorize formulas. I think they appreciate how I connect lessons to real-life situations. They often say that my examples help them understand why they need to learn these things."* Participant C shared, *"I often use thematic or scenario-based lessons… I use datasets from everyday life— like electricity bills or mobile data usage."* He added, *"I can relate to students who are more practically minded and help them see how mathematical thinking can benefit them, no matter their future careers."* Participant D affirmed how outcomes validated this approach: *"When students started passing their entrance exams and telling me my class helped them a lot—that's when I knew I was doing something right."*

3.5 Integrating Prior Professional Expertise. Participants take advantage of their previous professional experiences to shape and enrich their teaching identities. Drawing from engineering and applied mathematics, they used real-world scenarios to enhance classroom engagement, deepen understanding, and build relevance. This integration of prior expertise helped bridge abstract mathematical concepts with practical applications, supporting a more contextualized approach to instruction. Participant B shared, "I often share stories from the field… My engineering background helps me explain concepts with clarity, especially when linking them to real-life scenarios. It's when students understand and apply what they've learned, not just memorize formulas." Participant C noted, "I bring a deep appreciation for how math functions in the real world. Since I worked briefly in the engineering field, I often tie lessons to industry-related scenarios." He further reflected, "I brought with me the mindset of an engineer—structured, precise, and focused on results. Engineering trained me to always seek a purpose behind every equation. So, I naturally lean toward making math applicable." Participant D emphasized the credibility his experience provided: "They have high regard for me as an engineer and teacher… I try to include engineering-related problems when teaching Calculus, so they get a glimpse of how it's applied in real life." Similarly, Participant A said, "The first math subject I taught was business mathematics for accounting students and business majors… I find it easy since I am an applied math graduate majoring in business."

4. Support Systems and Professional Development Participants described various avenues that supported their professional development and transition into teaching. These included mentorship, formal training, and self-directed learning. While most participants highlighted similar types of support, some also shared individual coping strategies for personal well-being.

4.1 Mentorship Support. Mentoring from experienced teachers and colleagues played a vital role in participants' adjustment to the classroom. Participant A shared, "Guidance and support from co-workers helped me in this job. That mentoring moment taught me the value of support." Participant B recalled, "Some of my colleagues helped me or gave me advice… especially in preparing lessons and classroom management strategies." He also remembered, "One mentor told me to start each lesson with motivation or a real-life hook. That small advice made a huge difference." Participant C was also mentored closely: "I was lucky to have a department head who mentored me during my first year. She reviewed my lesson plans, observed my classes, and gave constructive feedback." Participant D similarly received informal support: "Some co-teachers would give me copies of their lesson plans and let me observe their classes. Sometimes I asked co-teachers for help." 4.2 Professional Training. While mentorship offered vital on-the-ground guidance, participants also highlighted the importance of formal training programs in equipping them with foundational teaching knowledge and strategies. Participant A noted, "Workshops from DOST helped me a lot," and emphasized, "I have participated in various trainings sponsored by DOST and DepEd… opportunities that helped me become grounded and appreciate the teaching job." Participant C shared, "I've attended several workshops on outcomes-based education, technology integration, and assessment practices. These trainings were eye-opening, especially in helping me transition from a technical expert to a more learner-centered educator." Participant D expressed, "Trainings before deployment would be a big help."

4.3 Self-Learning. Beyond structured professional development, participants took the initiative to pursue self-directed learning as a way to continuously improve and adapt their teaching practices. All participants engaged in self-learning to fill gaps in pedagogical knowledge. Participant A said, "I subscribe to newsletters… follow math educators and join online communities. I also regularly read journals." Participant C shared, "I read research articles on teaching strategies and student motivation… I follow professional networks online." Participant B added, "Self-learning has been a big part of my growth. I read resources online and constantly reflect on what works and what doesn't." Participant D echoed, "Sometimes I looked things up online."

4.4 Emotional Resilience (Distinct Subtheme from Participant D). While most participants emphasized instructional and institutional support, Participant D highlighted an often-overlooked area: emotional resilience. This case-specific insight underscores the personal coping strategies some non-education graduates must develop independently during their transition. He reflected, "You need to be stronger… ready and resilient," and added, "Not all will help you

as you start… you need to manage things yourself." He shared personal coping strategies: "I make sure to take breaks on weekends, go out with friends, and sometimes just disconnect from work completely."

B. Discussion

Drawing from four research objectives, the cross-case synthesis reveals a complex journey marked by changing motivations, early challenges, growing professional identity, and reliance on support systems. The findings highlight both the personal and situational difficulties of becoming a teacher and the strategies participants used to succeed. At first, many participants chose teaching because of outside pressures—such as scholarship return service obligations and family suggestions. These external reasons show that teaching was not always their personal choice. Similarly, Somosot & Relox (2023) and Salvador (2025) found that many entered teaching out of commitment to students and society despite lacking formal training. Over time, participants' motivation grew stronger and more personal as they gained classroom experience and saw their positive impact. This growing motivation reflects findings by Pelecio and Paglinawan (2025) and Pantaleon (2024), who noted that non education graduates were driven by passion for teaching and a desire to make a difference, respectively. This development of deeper, personal motivation aligns with Situated Learning Theory, which explains how identity forms through active participation in real social settings. Even with increasing motivation, participants faced major challenges early on, especially because they lacked formal teaching training. While they had strong math knowledge, they struggled with lesson planning, teaching methods, and reaching diverse learners. This gap between knowing content and how to teach matches Shulman's (1986) idea of pedagogical content knowledge and Kagan's (1992) description of new teachers focusing on surviving in the classroom. This finding is also strengthened by the study of Pelecio & Paglinawan (2025) who highlighted that second careers in education faced significant challenges including pedagogical gaps. Participants' stories of managing classrooms, meeting student needs, and using technology clearly show this struggle. Difficulties in adapting lessons for different learners made things harder. Somosot & Relox (2023) and Salvador (2025) confirm that non-education teachers often find lesson planning and differentiated instruction challenging, leading to lower confidence and slower skill development. Ortega et al. (2022) also found that while these teachers excelled in content knowledge, they were less strong in managing classroom environments and diverse learners, showing the need for teaching preparation beyond subject expertise. Emotional stress was common at the start. Some felt alone and unprepared; one nearly quit due to self-doubt and inner conflict. These feelings show the emotional toll of starting teaching without enough preparation or support. According to Vygotsky's Sociocultural Theory, learning depends on social context, so lack of support affected both teaching and emotional well-being. With more experience, participants' professional identities started to take shape. They developed their own teaching styles, moving beyond just lecturing to more interactive and student-centered methods. Pantaleon (2024) asserts that non-education graduates prioritize student-centered teaching. They became more aware of students' feelings and learning needs. They focused on including all students, building good relationships, and listening to feedback—signs of caring teaching. They also made math more meaningful by connecting it to real-world examples from their engineering and math backgrounds. This matches Salvador (2025) and Somosot and Relox (2023), who found that new teachers show commitment by going beyond and caring deeply for students. Developing a teaching identity was not a straight path but involved constant reflection and adjustment based on experience and feedback. Participants shifted from seeing themselves as just content experts to seeing themselves as responsive teachers, helped by both personal reflection and encouragement from others. Support systems—especially mentors and colleagues—were vital in overcoming early struggles. Those with mentors improved in lesson planning, classroom control, and confidence. Mentorship fits Vygotsky's Zone of Proximal Development, where more experienced people help novices learn more effectively. Informal help from peers and formal training through DepEd and DOST programs also helped bridge theory and practice, 10 though access to these supports was uneven. Those without early mentors faced longer periods of uncertainty, showing the need for schools to ensure timely support. Salvador (2025) points out that mentors help build skills, confidence, and emotional support. Likewise, Pantaleon (2024) asserts that despite the challenges, non education graduates persisted through ongoing professional development and collaboration. This is affirmed by Pelecio & Paglinawan (2025) who found out that career shifters in teaching who adapted most successfully actively sought mentorship and pursued formal training. It is through seeking support that non-education graduates can thrive

in their new teaching careers, positively impacting students' lives and enriching the field of education (Pantaleon, 2024). Besides formal mentoring, participants took initiative by engaging in self-directed learning through online materials, blogs, and journals. This demonstrates their reflectiveness and willingness to grow—important traits for effective teaching. Pantaleon (2024) highlights determination as a key strategy employed by non-education graduates to succeed in teaching. While emotional strength was not a major theme for all participants, it was strongly evident in one, reflecting the emotional demands of becoming a teacher. Pantaleon (2024) also recommends prioritizing mental health initiatives to support non-education graduates and enhance their transition success. These findings align with Salvador (2025), who concluded that teaching profoundly transforms both students and teachers. In sum, this study shows how non-education graduates move into math teaching: starting with external reasons, shifting to personal purpose, facing early teaching and emotional challenges, developing professional identity, and relying on mentorship and support networks. These findings point to the need for tailored induction and mentoring programs that recognize the unique paths of alternative route teachers. By addressing their specific needs, schools can better support their growth and long-term success.

IV. CONCLUDING STATEMENT

This study provides a deeper understanding of how non-education graduates transition into mathematics teaching. Their journeys often began with external motivations but gradually developed into meaningful, student-centered commitments as they spent more time in the classroom. While they had strong content knowledge, many struggled at first with lesson planning, classroom management, and meeting diverse student needs due to a lack of formal teaching training. These challenges often led to emotional stress and self-doubt. Over time, participants learned to adapt through reflection, experience, and the support of mentors and colleagues. They began to form their teaching identities, shifting from content experts to responsive and empathetic educators. The study highlights the importance of mentoring, peer support, and professional development in helping career-changers succeed in the classroom. To support non-education graduates entering the teaching profession, schools and institutions must provide early, consistent, and tailored support. By recognizing their unique challenges and strengths, educational systems can better prepare them for long-term success and help ensure quality teaching for all learners.

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