

Unraveling the Worldviews of Coaches in Mathematics Competition in Rural Public Secondary High Schools

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Abstract. This qualitative study addressed the significant research gap concerning the lived experiences of mathematics coaches in rural public high schools in Sultan Kudarat, Philippines, a context often overlooked in existing educational research. Employing a transcendental phenomenological design, the study focused on eight purposively selected coaches, allowing for an in-depth exploration of their unique approaches to teaching and mentoring student-mathematicians within challenging rural environments. Data were gathered through comprehensive, in-depth interviews and analyzed using thematic analysis, which facilitated the identification of key patterns and themes in their experiences. The findings revealed that these coaches adopt a holistic educational philosophy—prioritizing deep understanding over rote memorization and emphasizing essential values such as collaboration, empathy, and resilience. Their multifaceted roles foster transformative personal and professional growth, enhancing important traits such as patience, confidence, and emotional intelligence. At the same time, they balance challenges like stress with a profound sense of pride in their students' achievements. The coaches envision a future centered on continuous innovation, expanding mentorship programs, and fostering creativity among their students. They derive immense fulfillment from witnessing student success and aspire to become more effective mentors by employing personalized teaching methods tailored to individual learner needs. The study culminated in the development of the Transformative Achievement Program in Mathematics – Coaches Holistic Passion (TAP Math-CoHoP), designed to enhance math proficiency, emotional intelligence, and community engagement. The findings highlight the dual impact of coaching: enriching coaches' lives through fulfillment and driving student success via personalized methods. Scaling the TAP Math-CoHoP program and providing resources for stress management and collaborative training are strongly recommended to bridge rural-urban educational disparities and support holistic education in similar contexts.

Keywords: Mathematics competition; Rural public secondary; Worldview of coaches.

1.0 Introduction

One fundamental ability needed in daily life is mathematics. It enhances our knowledge of our surroundings, decision-making, and problem-solving (Murtafiah, 2024). Students competing in mathematics contests depend heavily on coaches. They provide direction and encouragement to help kids acquire tactics for various contests and the ability to solve problems. Coaches help cultivate students' confidence and instruct them on stress management and time allocation during competitions. Radmehr and Drake (2017) stated that coaching in mathematics presents challenges due to varying student skill levels, competitive performance pressures, resource limitations, issues in maintaining student engagement, and time limits experienced by coaches.

Globally, Mathematics teachers who act as coaches face significant challenges, including the need for improved mathematics teaching and access to resources. Many students also struggle to understand arithmetic concepts, which can cause a lack of confidence and disinterest in the field (Moon, 2023). Henderson (2024) states that countries must improve math instruction if they want their citizens to be ready for professions in a technologically advanced future. Furthermore, underscoring the pressing need for changes in math education systems, the National Center for Education Statistics (2015) reported that two-thirds of eighth-grade students performed at or below a basic level of proficiency in mathematics due to various reasons. Additionally, Mathematics teachers and coaches face several dilemmas in mathematics competitions, considering that they have become increasingly competitive, such as the International Mathematical Olympiad, which requires not only strong mathematical abilities but also critical thinking and problem-solving skills (Safaei, 2024). Thus, managing students in a competition requires preparation and direction from the coaches (Mallett & Lara-Bercial, 2023).

The Department of Education (DepEd) organizes several math contests in the Philippines to improve students' competency and inspire competitiveness. Included are the Division Mathematics Olympics, a local tournament for schools; the Regional Mathematics Olympics, where division champions advance to regional contests; and the National Mathematics Olympics, culminating in a national competition. The Philippine Mathematical Olympiad is recognized as the oldest and most prestigious national competition for high school students, serving as a pathway for those aspiring to represent the country in international contests such as the International Mathematical Olympiad (IMO). Additionally, the Metrobank-MTAP-DepEd Math Challenge is an annual event that attracts over 500,000 participants from both public and private schools.

However, coaches and teachers need better methods of training their students for competitions. Additionally, numerous obstacles must be overcome by coaches, which can reduce their effectiveness (Sujatha & Vinayakan, 2023). These include varied degrees of student competence as well as a lack of time and money. Likewise, math teachers who simultaneously coach often struggle to inspire their students, who can be under pressure from competition. Moreover, a lack of opportunities for professional growth may render coaches unable to implement effective training strategies (Muir & Lyle, 2024). Many coaches in Sultan Kudarat, particularly those from its leading school, which is known for its competitiveness in various mathematics competitions such as the Division, Regional, and National Mathematics Olympics, face challenges that were raised during the INSET 2024, SMEPA 2023, and LAC 2022–2024 sessions. Students have the potential; however, teachers need to develop their coaching skills further to help enhance students' performance in competitions.

This motivates the researcher to conduct this study because the researcher aims to explore the experiences of mathematics coaches in preparing students for competitions. Understanding these experiences and identifying effective coaching strategies, the researcher aims to contribute to the improvement of training programs for mathematics coaches.

2.0 Methodology

2.1 Research Design

This study utilized a qualitative research approach, explicitly focusing on Transcendental Phenomenology. This design is well-suited for exploring the experiences and perspectives of mathematics coaches regarding their coaching strategies, challenges, and mentoring techniques. Transcendental phenomenology emphasizes understanding human experiences without preconceived notions or biases. The researcher set aside her biases—known as *epoché*—to gain clear insights into the phenomena, allowing true meanings to emerge from the participants' perspectives (Moustakas, 1994). This method is particularly beneficial in educational settings, where grasping the nuances of personal experiences can provide rich insights into effective practices (Creswell, 2014). Additionally, this approach aligns with the goals of qualitative research, which seeks to explore complex social phenomena and understand the depth of individuals' experiences (Ollapally, 2015).

2.2 Participants and Sampling Technique

The participants in this study were eight mathematics coaches, selected based on specific criteria to ensure the relevance and depth of their insights. The study employed purposive sampling, a non-probability sampling technique commonly used in transcendental phenomenological research, to select participants who had direct experience with the phenomenon under investigation—mathematics coaching in rural public high schools. This sampling technique ensured that the data collected were rich and relevant to the research questions, enabling an in-depth exploration of the coaches' lived experiences. To be included, participants needed to be willing to share

their experiences openly, possess a background in mathematics education with experience coaching students for competitions, and have coached for at least three consecutive years in various mathematics contests. These criteria ensured that the coaches had substantial experience and a proven track record in supporting student development. Research indicates that selecting participants with demonstrated expertise yields more insightful findings (Bell et al., 2022), and participant openness is crucial for capturing rich qualitative data (Dehalwar & Sharma, 2024).

To maintain confidentiality and adhere to ethical standards, no identifying information about the participants' affiliations or personal details is disclosed. Additionally, two independent debriefers were engaged to validate the data analysis and enhance the trustworthiness of the findings. These de-briefers possess expertise in qualitative research methods and data analysis, are not directly involved in the study, and are familiar with mathematics education contexts. Their role was to review the analysis process and provide objective feedback to ensure interpretations accurately reflect participants' experiences. Including two de-briefers, rather than one, provided a more comprehensive review and strengthened the credibility of the study's conclusions (Creswell, 2014).

2.3 Research Instrument

This study employed in-depth interviews as its data collection instrument, utilizing a semi-structured style. According to Moustakas (1994), semi-structured interviews are suitable for phenomenological research because they enable the researcher to explore participants' lived experiences in depth while maintaining the flexibility to probe emerging ideas and insights during the conversation. This methodology is particularly suitable for the objectives of this qualitative study, which aims to gain a comprehensive understanding of the coaching strategies, challenges, and mentoring techniques employed by exemplary mathematics coaches. The research utilized semi-structured interviews to capture the depth and complexity of participants' experiences, enabling them to articulate their opinions comprehensively. This method enables a comprehensive examination of various perspectives and facilitates the identification of patterns and themes within their narratives, thereby enhancing the understanding of effective mathematics coaching practices.

2.4 Data Gathering Procedure

The study employed a systematic approach to ensure that the collected information was reliable and relevant. Before data gathering, permission was obtained from the Dean of the Graduate School of Sultan Kudarat State University, followed by a formal request to the school principal to conduct interviews with the selected teachers. Participants received an orientation about the study's specifics, including assurances of anonymity and confidentiality, which helped promote trust and encouraged truthful responses. The introductory meeting also addressed ethical considerations, during which participants completed consent forms. To refine the interview questions and ensure the clarity and appropriateness of procedures, a mock interview or simulation was conducted prior to the actual data collection. This step allowed the researcher to identify and address any issues with the interview guide, which had already undergone validation by a panel of experts to establish credibility and transferability. During the interviews, recording applications on a cellular phone were used for data analysis and transcription. Interview scheduling was flexible, based on participant availability, and participants were informed they could terminate the interview at any time, particularly if discussing specific topics caused distress. This careful preparation and ethical consideration enhanced the quality and trustworthiness of the data collected.

2.5 Data Analysis Procedure

The study employed transcendental phenomenology to explore the worldviews of eight mathematics coaches in rural public secondary schools. Data was collected through audio-recorded semi-structured interviews, transcribed verbatim for thematic analysis following Moustakas (1994). Audio files were securely stored on password-protected devices accessible only to the researcher and retained for five years before being securely deleted to ensure confidentiality and data integrity. Data analysis involved repeated reviews of transcripts, coding of significant statements, and clustering of themes to capture the coaches' experiences accurately. Data saturation was reached when no new themes or insights emerged from the interviews, justifying the adequacy of the sample size and signaling the conclusion of data collection. Direct participant quotations supported the findings. To ensure trustworthiness, member checking was conducted, and two external debriefers with expertise in qualitative research and mathematics education independently reviewed the analysis. Detailed contextual descriptions supported transferability, while thorough documentation and reflexivity maintained dependability and confirmability. Ethical standards were upheld, including informed consent, confidentiality, and participants'

right to withdraw without penalty. The researcher disclosed positionality and implemented measures to minimize bias and protect participant dignity.

2.6 Ethical Considerations

In this phenomenological study exploring the worldviews of mathematics coaches in mathematics competitions, ethical safeguards were carefully prioritized to protect participants and uphold research integrity. First, informed consent was obtained by clearly explaining the study's purpose, participation requirements, and potential implications, as per Creswell's (2014) guidelines, before securing signed agreements. This ensured participants fully understood their involvement and voluntarily agreed to participate. Second, confidentiality protocols were strictly observed by assigning pseudonyms and reporting sensitive information in an aggregated form to protect anonymity, consistent with Pascale et al. (2022). Third, voluntary participation was emphasized, with participants informed they could withdraw at any time without consequences, recognizing the personal nature of their narratives (Subedi, 2025). Finally, respect for participants' expertise and emotional well-being was maintained through the use of sensitive interview techniques. Additionally, artificial intelligence (AI) tools were utilized during the research process to enhance the quality and clarity of the written work. Grammarly was used for refining sentence construction, ensuring polished and coherent academic writing, while Perplexity.ai assisted in organizing and synthesizing information to support transparency and accuracy. The use of these AI tools was limited to writing assistance and did not influence data collection, analysis, or interpretation.

3.0 Results and Discussion

This section presents the lifeworld of mathematics coaches in teaching and mentoring student mathematicians. The themes emerged through a rigorous thematic analysis, which involved identifying significant statements, formulating initial themes, clustering related themes, and determining the emerging themes.

3.1 Lifeworld of the Mathematics Coaches in Teaching and Mentoring Student-mathematician

Five (5) emerging themes were identified through thorough data analysis and interpretation, synthesized from 21 initial and 13 clustered themes. The following emerging themes are: *personal and professional growth*, *passion-driven mentorship*, *interpersonal and collaborative dynamics*, *the emotional landscape of coaching*, and *adaptive instructional strategies*. These themes encapsulate the lifeworld of the mathematics coaches in teaching and mentoring student-mathematician.

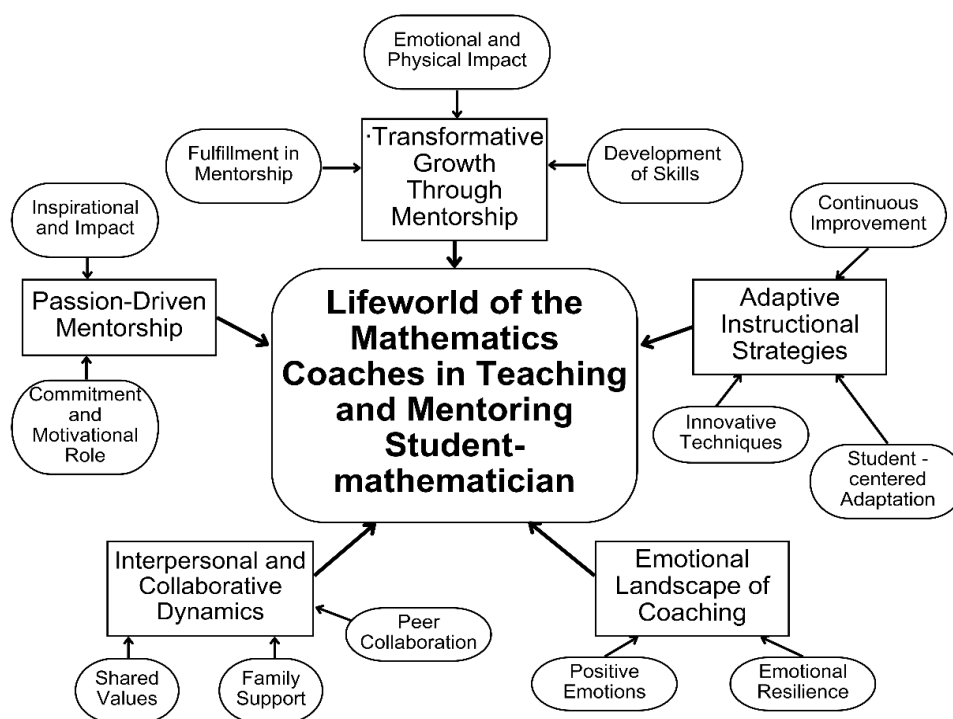


Figure 1. Schematic Diagram on the Lifeworld of the Mathematics Coaches in Teaching and Mentoring Student-mathematician

Transformative Growth through Mentorship

This emerging theme captures the experiences of mathematics coaches in terms of development, fulfillment, and impact that extend beyond their professional duties. It was divided into three (3) clustered themes: *fulfillment in mentorship, development of skills, and emotional and physical impact*, drawn from three (3) initial themes: *experiencing professional fulfillment, acquiring new teaching techniques, and enhancing personal adaptability*. It reveals how their role profoundly influences their personal growth, skills, and overall sense of well-being. The coaches find their role transformative, leading to both professional enrichment and a more profound sense of purpose. Participants expressed:

"I have learned some techniques, I mean shortcut techniques which made me improve and learn, and those techniques I shared also with my students, mentees." (P2)

"As a mathematics coach, my role affects me greatly in my personal growth and development. I became more open to new knowledge, and I acquired some techniques in solving problems." (P5)

"It motivates me to do my best so that my students-mathematicians will do their best too. And I am more eager now to widen my horizon or knowledge." (P4)

These experiences transcend individual achievements, fostering a collective sense of fulfillment and purpose. Mathematics coaches highlighted how their role motivates them to excel alongside their students, reinforcing the value of dedication and teamwork. For mathematics coaches, these moments validate their mentorship and emphasize the impact of their work on both their own professional identities and the lives of their students. The transformative impact extends beyond the students. This growth aligns with research emphasizing the importance of personalized instruction and collaborative learning environments in fostering success (Kiefer, 2024). Empowering students through effective coaching strategies, mathematics coaches not only enhance their professional skills but also redefine what excellence in mathematics education looks like. Additionally, this aligns with research highlighting the importance of ongoing professional development for educators to stay updated on the latest teaching strategies and educational trends (Lee, 2018).

Passion-Driven Mentorship

This emerging theme highlights the passionate dedication and inspirational impact that mathematics coaches bring to their role. It is characterized by two (2) clustered themes: *inspirational and impact and commitment and motivational role*. These clusters emerged from four (4) initial themes: *experiencing joy and satisfaction, demonstrating dedication and perseverance, feeling pride, empathy, and responsibility, and being motivated to inspire student success*. Their sense of pride, empathy, and responsibility highlights a deep emotional connection to their students, motivating them to inspire success. This suggests that coaching is not merely a professional duty but a calling that fosters meaningful relationships and personal growth for both coaches and students. Participants expressed:

"I just love solving math problems, hindi ako makatulog na if may problem na hindi ko ma answeran. I find solutions Talaga sa mga problems na yan." (I love solving math problems. I cannot sleep if there is a problem I have not solved. I always find solutions to those problems.) (P3)

"The feelings that are generated by your role as a mathematics coach are determination, compassion, and patience. How are those feelings generated, maybe through sessions, through time, and maybe because I learned the student's background as well." (P2)

"Pride and joy for the children, empathy, and responsibility." (P5)

"It motivates me to do my best so that my students-mathematicians will do their best too. And I am more eager now to widen my horizon or knowledge." (P4)

This aligns with research highlighting the importance of emotional support and personalized guidance in mentoring (Thompson et al., 2024). Participants highlighted aspects of passion-driven mentorship, demonstrating the depth of emotion, commitment, and intrinsic motivation that fuels their work with student-mathematicians. This theme emphasizes the transformative impact of passionate mentorship on both the coaches and their

students, creating a collaborative learning environment that fosters growth and excellence. The passion and dedication of mathematics coaches not only enhance their professional identities but also contribute to a more engaging and supportive educational experience for their students.

Interpersonal and Collaborative Dynamics

This emerging theme examines the impact of interpersonal relationships and collaborative efforts on the lifeworld of mathematics coaches. It is characterized by three (3) clustered themes: *family support, peer collaboration, and shared values*. These clusters emerged from four (4) initial themes: *receiving strong family encouragement, experiencing ongoing spousal support, engaging in collaborative discussions, and upholding common educational beliefs*. It highlights the importance of family support, peer collaboration, and shared values in shaping their experiences and approaches to mentoring student-mathematicians. Participants expressed:

"My wife also is a mathematics teacher, so parehas din kaming mathematics coach, especially during mga contest. So may mga times na kaming dalawa yung nag – uusap baka may alam siyang technique ako rin baka may alam din akong technique so co-collaborate lang gid kami sa ano." (My wife is also a mathematics teacher, so we both serve as math coaches, especially during competitions. There are times when we discuss things together, thinking maybe she knows a technique or maybe I do, so we collaborate on that.) (P3)

"My significant other has been very supportive of me since the beginning. That is why whenever I am doing my role as a mathematics coach, it has never been a burden or additional task to me because I know I have always had a number one supporter." (P5)

"We collaborate by discussing techniques." (P3)

"Shared values in education, and maybe mentoring and leadership at home." (P6)

Participants highlighted aspects of interpersonal and collaborative dynamics, underscoring the significance of relationships and shared values in their role as mathematics coaches. This aligns with research emphasizing that collaborative environments improve coaching outcomes by fostering shared learning experiences (Herrera et al., 2019). Additionally, studies suggest that interpersonal dynamics, such as family support and professional collaboration, enhance coaches' ability to address challenges effectively while maintaining motivation (Kang, 2023). These findings underscore the need for institutions to recognize and support the relational aspects of coaching. Fostering opportunities for collaboration among peers and acknowledging the role of family support, educational systems can enhance the effectiveness of mathematics coaching programs. This approach aligns with frameworks that emphasize social constructivist theories and communities of practice as essential components of coaching success (Liu et al., 2024).

Emotional Landscape of Coaching

This emerging theme examines the emotional aspects of the mathematics coach role. It is characterized by two (2) clustered themes: *positive emotions and emotional resilience*. These clusters emerged from four (4) initial themes: *experiencing joy and excitement, managing frustration and motivation, facing nervousness and fear, and feeling fulfillment and satisfaction*. The ability to balance this emotional landscape is crucial for effective coaching and mentoring. Successfully balancing these emotions is crucial for effective coaching and mentoring, as it enables coaches to remain motivated and supportive despite the challenges they face. Participants expressed:

"Being a mathematics coach brings out a wide range of emotions. I can feel joy and excitement when I witness my mentees understand and comprehend what I am teaching." (P5)

"Frustration when you lose, but motivation and drive to succeed, and gratitude when you win." (P1)

"I get nervous and scared when encountering problems I cannot grasp." (P5)

This aligns with research emphasizing the role of emotional intelligence in effective mentoring, as it enables coaches to navigate complex emotional situations and maintain a supportive learning environment (Tcharkhalashvili, 2023). Furthermore, studies suggest that emotional resilience is crucial for educators to manage stress and maintain motivation, ensuring they can provide consistent support to their students (Kassymova et al.,

2023)—a need that institutions should address by supporting the emotional well-being of mathematics coaches. By recognizing the emotional demands of coaching and providing resources for emotional resilience, educational systems can enhance the effectiveness and sustainability of coaching programs.

Adaptive Instructional Strategies

This emerging theme highlights the dynamic and responsive approaches that mathematics coaches employ in their teaching and mentoring practices. It consisted of three (3) clustered themes: *innovative techniques, student-centered adaptation, and continuous improvement*. These were formulated from six (6) initial themes: *learning and sharing new techniques, developing creative problem-solving methods, adapting instruction to student needs, simplifying complex concepts, practicing reflective teaching, and embracing openness to continuous learning*. Their commitment to continuous improvement and adaptability reflects a deep dedication to professional growth and student success. This suggests that effective coaching is not only about applying strategies but also about fostering an evolving practice that responds to students' unique needs, ultimately promoting meaningful learning experiences and personal development for both coaches and students. Participants expressed:

"I learned techniques that improved my skills and shared them with my students." (P2)

"I look for easier ways and shortcuts before teaching problem-solving." (P3)

"I find other techniques that are easier for them to grasp." (P3)

"I became more open to new knowledge and improved my ability to communicate." (5)

This aligns with research emphasizing the value of personalized instruction and collaborative learning environments in enhancing student outcomes (Kettler & Taliaferro, 2022). Additionally, studies highlight the role of technology integration and reflective practice in fostering adaptive instructional strategies, allowing coaches to tailor their teaching to meet the evolving needs of their students (Kamei, 2020). These findings underscore the need for educational institutions to support mathematics coaches in developing and refining their adaptive instructional strategies. By providing resources for ongoing professional development and encouraging innovative teaching practices, educational systems can enhance the effectiveness of mathematics coaching programs and improve student learning outcomes.

3.2 Lived Experiences of the Mathematics Coaches in Teaching and Mentoring Student-mathematicians

Five (5) emerging themes were identified through thorough data analysis and interpretation, synthesized from 16 initial and 12 clustered themes. These emerging themes encompass *memorable moments and achievements, influential figures and mentors, reflective practices and challenges, bodily and emotional states, as well as significant experiences and lessons*. These themes encapsulate the lived experiences of mathematics coaches in teaching and mentoring student-mathematicians.

Memorable Moments and Achievements

This emerging theme highlights the significant impact of memorable moments and achievements experienced by mathematics coaches. It consisted of three (3) clustered themes: *notable incidents, student success, and personal satisfaction*. These were formulated from five (5) initial themes: *experiencing aha moments of understanding, observing student skill improvement, feeling pride in student achievements, deriving joy from the mentorship role, and receiving acknowledgment through student success*. Mathematics coaches find these moments crucial, as they not only foster a sense of accomplishment but also enhance their personal satisfaction and pride through their students' successes. This theme is emphasized by statements such as the joy and pride felt when students improve their math skills or win competitions. The participants asserted that:

"It was the AHA moments, it is gratifying to see their face light up with understanding and confidence." (P1)

"Every time I coach or mentor students, when I observe that the students improve on their mathematics skills, that is a great improvement and a great happiness as a mathematics coach." (P2)

"When my students/children win in competitions." (P4)

"Watching students I mentored compete and excel in math competitions has been incredibly rewarding." (P1)

These memorable moments and achievements underscore the importance of student-centered coaching practices. By focusing on student success and progress, mathematics coaches create a supportive environment that fosters growth and motivation. Studies highlight the significance of emotional support and mentorship in mathematics education, as these factors contribute to students' confidence and resilience in the face of challenges (Phoong, 2021). These findings underscore the need for educational institutions to recognize and celebrate the achievements of both students and coaches, as these moments serve as powerful motivators for continued excellence in mathematics education. By acknowledging the emotional and psychological benefits of these experiences, educational systems can foster a more supportive and rewarding environment for mathematics coaching.

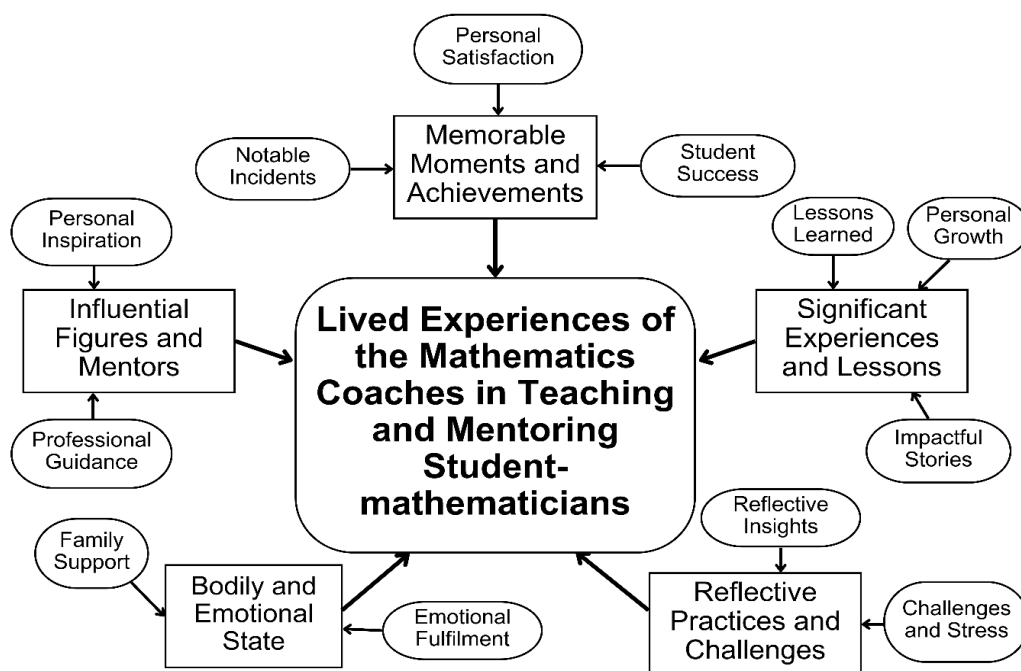


Figure 2. Schematic Diagram on the Lived Experiences of the Mathematics Coaches in Teaching and Mentoring Student-mathematicians

Influential Figures and Mentors

This emerging theme highlights the significant role of influential figures and mentors in shaping the experiences of mathematics coaches. It consists of two (2) clustered themes: *professional guidance* and *personal inspiration*. These were formulated from four (4) initial themes: *influential high school teachers, named mentors as personal role models, academic and coaching support from professors and peers, and students and mentors as sources of motivation*. These individuals, including high school teachers, college professors, co-coaches, and student mathematicians, serve as role models who offer professional guidance and personal inspiration. Their mentorship fosters confidence, cultivates skills, and instills a passion for mathematics that coaches aim to instill in their students. The participants asserted that:

"It was my high school teachers who heavily influenced me to be a mentor/coach for such activities/competitions." (P1)

"Personally, my high school coaches, my high school mathematics teachers, and college professors." (P2)

"My math teachers in high school were Sir Ali Madriaga and Sir Jerry Madriaga, who are brothers." (P3)

"My co-mathematics coaches and, of course, the highlight is our student-mathematicians." (P4)

These influential figures played a critical role in shaping the professional paths of mathematics coaches by sharing valuable techniques, inspiring a love for mathematics, and encouraging them to pursue coaching. They not only influenced teaching styles but also motivated coaches to foster excellence and confidence in their students. This aligns with research emphasizing the importance of mentorship in education, as it enhances professional

development and fosters a supportive learning environment (Saclarides & Kane, 2021). These findings underscore the importance of educational institutions recognizing and supporting the role of mentors in mathematics coaching. By fostering a culture of mentorship and collaboration, educational systems can enhance the effectiveness of coaching programs and promote a passion for mathematics among students. This approach aligns with frameworks that emphasize the importance of social support networks in educator development and student achievement (Ovais & Jain, 2024).

Reflective Practices and Challenges

This emerging theme highlights the reflective practices and challenges faced by mathematics coaches. It consists of two (2) clustered themes: *reflective insights, challenges, and stress*. These were formulated from four (4) initial themes: *embracing the mentorship role beyond teaching, experiencing mental and emotional stress, facing cognitive overload and physical symptoms, and finding fulfillment despite difficulties*. They also face challenges such as mental stress and cognitive demands, which require adaptability and continuous learning to overcome. The participants asserted that:

"The role of mentorship. Beyond teaching math, being a mentor involves providing support, encouragement, and guidance." (P1)

"It is not easy. It is not easy, but once the child understands and they win, even if it is not first place, as long as they place, it is still fulfilling at the end of the day." (P3)

"Mental stress because my cognitive level should be higher than the students." (P4)

"Sometimes, there are moments when I go into a mental block, resulting in a headache." (P5)

These reflective practices enable mathematics coaches to tailor their strategies to meet students' needs effectively. Research supports the significance of reflective thinking in teaching practices, emphasizing its role in improving instructional approaches and fostering student learning (Theisen et al., 2022). Reflective teachers often self-assess their methods to identify gaps in teaching practices and implement changes that align with current educational needs (Xu, 2023). This process contributes to professional growth and enhances their ability to address challenges such as cognitive demands and emotional stress. This aligns with findings that reflective thinking is a crucial component of professional development for mathematics educators (Tachie & Sekhonyane, 2020). By engaging in reflective practices, coaches can gain a deeper understanding of their teaching experiences and enhance their ability to support students effectively.

Bodily and Emotional States

This emerging theme explores the bodily and emotional states experienced by mathematics coaches. It consists of two (2) clustered themes: *physical and mental fatigue and emotional fulfillment*. These were formulated from three (3) initial themes: *experiencing mental and physical exhaustion, feeling joy and satisfaction, and adrenaline rush during coaching*. Coaches often face mental fatigue due to the demanding nature of their role, but they also experience emotional fulfillment and an adrenaline rush from successful coaching experiences. The participants asserted that:

"Mental fatigue. Teaching and mentoring can be mentally demanding." (P1)

"When I experienced this mentoring and coaching times for the first time, I knocked out at night after a day of coaching, but today, as of this time, the feeling is okay, it is light and it is satisfying." (P2)

"Whenever I do the coaching, I would feel the adrenaline rush on the highest level." (P5)

"Joy, sense of fulfillment." (7)

These bodily and emotional states underscore the complex nature of coaching. While the role can be physically and mentally exhausting, it also brings significant emotional rewards. The emotional fulfillment and personal satisfaction derived from coaching align with research emphasizing the importance of intrinsic motivation and emotional support in educational settings (Husain et al., 2022). These highlighted aspects of bodily and emotional states demonstrate how these experiences shape their role as mathematics coaches. These findings underscore the importance of recognizing and addressing both the physical and emotional demands of coaching. By providing

resources for stress management and acknowledging the emotional rewards of coaching, educational institutions can foster a more sustainable and fulfilling environment for mathematics educators. This approach aligns with frameworks that emphasize the importance of teacher well-being in achieving educational excellence (Chen et al., 2025).

Significant Experiences and Lessons

This emerging theme highlights the significant experiences and lessons learned by mathematics coaches. It consists of three (3) clustered themes: *impactful stories, lessons learned, and personal growth*. These were formulated from four (4) initial themes: *witnessing student success in competitions, receiving positive feedback from mentees, engaging in post-competition reflection and evaluation, and emphasizing fundamental concepts amid limited experiences*. Coaches share stories of students' successes in competitions and the lessons they have learned from these experiences, which contribute to their personal growth as educators. The participants asserted that:

"During math competitions: Watching students I mentored compete and excel in math competitions has been incredibly rewarding." (P1)

"The experience I have so far that my mentee or my coach na assign is when a mentee approaches me after a day of passing the PMA exam." (P2)

"Yes, for the first question and every competition we have to evaluate ourselves together with my co-coaches." (P4)

"I do not have many significant experiences as a mathematics coach. I am just telling my mentees to focus on the basic concepts of mathematics." (P5)

These significant experiences not only provide valuable lessons but also foster personal growth as coaches reflect on their practices and strive for continuous improvement. Research supports the idea that experiential learning, such as participating in competitions or collaborative evaluations, enhances both student outcomes and teacher development (Anto & Coenders, 2019). Experiential activities allow coaches to observe real-world applications of mathematical concepts, enabling them to refine their instructional strategies and better support their students (Woodburn, 2019). Moreover, studies highlight the importance of mentorship in fostering reflective practices among educators. Coaches who engage in reflective evaluations after competitions can identify areas for improvement and implement strategies that promote student success (Siegeris & Pfennig, 2023).

3.3 Future Perspective of the Mathematics Coaches in Teaching and Mentoring Student-mathematician

Four (4) emerging themes were identified through thorough data analysis and interpretation, synthesized from 24 initial and 12 clustered themes. The following emerging themes are as follows: continuous growth and innovation, role evolution and expansion, personal fulfillment and legacy, and a vision for future impact. These themes encapsulate the Future Perspective of the mathematics coaches in teaching and mentoring student-mathematician.

Continuous Growth and Innovation

This emerging theme emphasizes the importance of continuous growth and innovation in mathematics coaching. It consists of three (3) clustered themes: *professional advancement, innovative practices, and commitment to excellence*. These were formulated from four (4) initial themes: *envisioning ongoing professional development, aspiring to inspire confidence and curiosity, developing personalized and creative coaching methods, and mentoring diverse learners in the future*. Their dedication to professional growth and innovation reflects a strong commitment to excellence that goes beyond routine coaching. This suggests that effective mathematics coaching involves a forward-looking mindset, where coaches actively seek to refine their skills and adopt creative strategies to meet the evolving needs of diverse learners. The participants asserted that:

"I see a future filled with continuous growth, innovation, and deep commitment to nurturing the next generation of young mathematicians." (P7)

"I could see myself mentoring diverse learners in the future." (P5)

"I want to mentor them to inspire confidence and curiosity." (P5)

"Develop personalized coaching methods, cultivate creativity, and perseverance." (P8)

These reflections highlight the coaches' dedication to fostering innovation in their teaching practices. Research supports this emphasis on continuous growth through professional development frameworks that prioritize active learning, coherence, and sustained engagement (Attié et al., 2022). Studies show that instructional coaching programs significantly improve teaching practices and student outcomes by enabling educators to adopt innovative strategies aligned with rigorous standards (Subash, 2019). Furthermore, action research projects within professional learning communities have been found to promote incremental growth among mathematics teachers, encouraging them to refine their methods and adapt to students' needs (Beswick, 2014). This aligns with findings that emphasize the role of reflective practices and technology integration in enhancing instructional approaches (Digital Promise Global Narrative, 2021). By fostering a culture of innovation and adaptability, mathematics coaches can inspire confidence and creativity in their students while preparing them for lifelong success. These findings underscore the importance of educational institutions in supporting mathematics coaches through structured professional development programs that emphasize creativity, personalized instruction, and reflective practices. Such initiatives can enhance the effectiveness of coaching programs while empowering coaches to grow and innovate in their roles continually. This approach aligns with frameworks that advocate for sustained teacher development as a cornerstone of educational excellence (Desimone & Pak, 2017; Young et al., 2017).

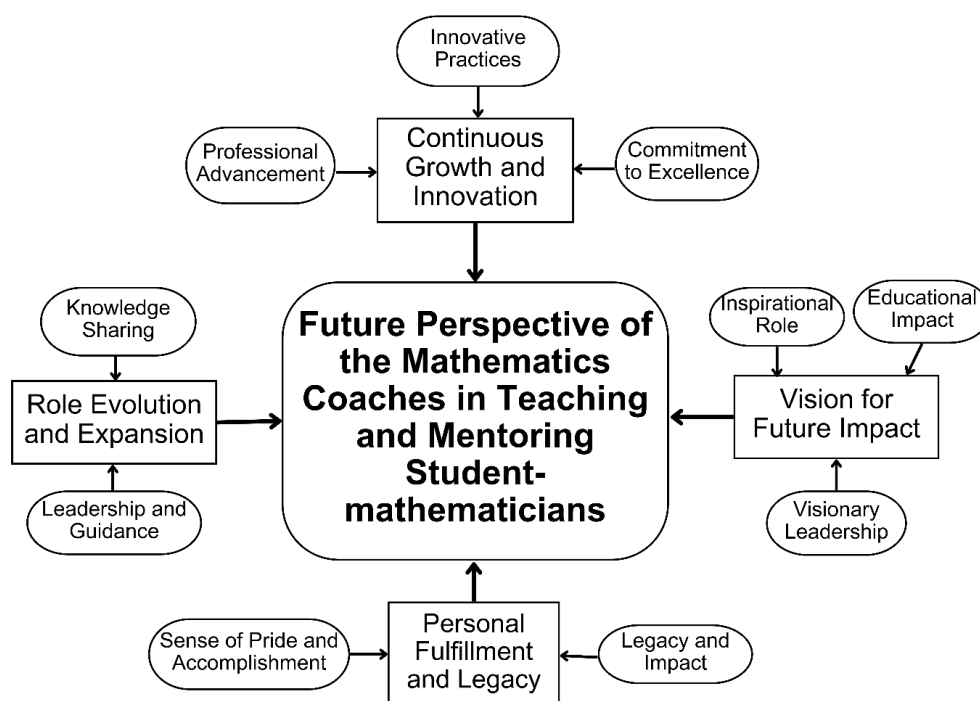


Figure 3. Schematic Diagram on the Future Perspective of the Mathematics Coaches in Teaching and Mentoring Student-mathematician

Role Evolution and Expansion

This emerging theme highlights the evolving roles and expanding responsibilities of mathematics coaches. It consists of two (2) clustered themes: *leadership and guidance*, and *knowledge sharing*. These were formulated from four (4) initial themes: *expanding leadership roles in mentorship*, *continuing to mentor students and new teachers*, *aspiring to emulate patient and talented mentors*, and *promoting real-world application of mathematics*. Coaching extends beyond individual instruction to encompass broader leadership and collaborative functions. Coaches not only guide students but also support the professional growth of new teachers, embodying qualities of patience and expertise they wish to pass on. Their emphasis on connecting mathematics to real-world contexts demonstrates a commitment to making learning relevant and meaningful. The participants asserted that:

"A mathematics enthusiast as always, a statistician for research students and maybe a mentor to a colleague in teaching." (P1)

"I will still be a mathematics coach, continuing to mentor student-mathematicians and hopefully mentoring new teachers to become math coaches as well." (P2)

"I aspire to be like Sir Marlon, who is very patient and talented in mathematics." (P3)

"I want to be someone who helps students see that math applies to all aspects of life." (P4)

These aspirations align with research emphasizing the importance of clearly defined coaching roles that extend beyond classroom instruction. Studies suggest that mathematics coaches play a pivotal role in supporting teachers' professional development, improving instructional practices, and fostering a collaborative learning environment (Shafee et al., 2019). Furthermore, research highlights the need for coaches to assume leadership roles that involve mentoring peers and guiding systemic improvements in mathematics education (Polly et al., 2015). Coaching requires not only subject matter expertise but also the ability to inspire confidence and foster critical thinking among students and colleagues (Pratama, 2020). Embracing these expanded roles, mathematics coaches can play a crucial role in fostering a culture of excellence in mathematics education. These findings feature the importance of providing professional development opportunities that prepare mathematics coaches for evolving responsibilities. Educational institutions should support coaches in developing leadership skills, fostering mentorship capabilities, and promoting innovative teaching practices.

Personal Fulfillment and Legacy

This emerging theme highlights the personal fulfillment and legacy that mathematics coaches derive from their roles. It consists of two (2) clustered themes: *sense of pride and accomplishment*, and *legacy and impact*. These were formulated from six (6) initial themes: *pride in students' future success*, *personal achievement through coaching*, *joy derived from mentoring role*, *inspiring confidence and curiosity in students*, *promoting lifelong relevance of mathematics*, and *aspiring to leave a lasting educational impact*. Coaching is advantageous on a personal level, as coaches take pride in their students' achievements and find joy in nurturing their growth. Their desire to inspire confidence and curiosity underscores a commitment to fostering meaningful learning experiences that extend beyond the classroom. Moreover, the aspiration to leave a lasting legacy reflects coaches' recognition of their broader impact on education and community. The participants asserted that:

"I just see myself as a proud coach of my students-mathematicians. In the future, if they are successful in their lives." (P1)

"Feeling of fulfillment and greatness sharing my knowledge and my expertise." (P2)

"I want to be someone who inspires confidence and curiosity in students." (P3)

"Develop a deeper understanding that mathematics is always relevant in life." (P4)

These reflections align with research emphasizing the importance of intrinsic motivation and personal satisfaction in educational roles. Studies show that when educators feel a sense of fulfillment and pride in their work, they are more likely to maintain high levels of engagement and commitment (Egan, 2020). Furthermore, research highlights the role of mentorship in fostering a sense of legacy among educators, as they strive to leave a lasting impact on their students' lives (Wu et al., 2020). Mathematics coaches, by inspiring a love for mathematics that extends beyond the classroom, contribute to their students' future successes and personal growth, thereby creating a lasting legacy. These findings underscore the importance of educational institutions recognizing and supporting the personal fulfillment of coaches, as it directly impacts their motivation and effectiveness. By acknowledging the legacy that coaches aim to leave, institutions can foster a culture that values long-term impact and student success.

Vision for Future Impact

This emerging theme highlights the vision that mathematics coaches have for their future impact. It consists of three (3) clustered themes: *visionary leadership*, *inspirational role*, and *educational impact*. These were formulated from five (5) initial themes: *promoting math as a life-relevant subject*, *fostering a deeper understanding of mathematics*, *inspiring*

confidence and curiosity in students, preparing future mathematicians, and aspiring to make a lasting educational difference. Coaches' forward-looking mindset and their commitment to shaping not only students' academic skills but also their attitudes toward mathematics as a meaningful and applicable discipline. Their visionary leadership and inspirational roles underscore the importance of motivating students to explore and appreciate mathematics in a deep and meaningful way. The participants asserted that:

"I want to be someone who helps students see that math is not just about the subject itself, but about how it applies to all aspects of life." (P1)

"Develop a deeper understanding that mathematics is always relevant in life." (P2)

"Inspire confidence and curiosity in students." (P3)

"Provide students who will become mathematicians." (P4)

These reflections align with research emphasizing the transformative potential of mathematics coaching in shaping both student outcomes and teacher practices. Studies suggest that coaches play a critical role in fostering conceptual understanding and demonstrating the real-world relevance of mathematics, which helps students develop critical thinking skills and confidence (Wang & Abdullah, 2024). Furthermore, visionary leadership in coaching has been shown to improve instructional practices and inspire both teachers and students to achieve excellence (Naz & Rashid, 2021). This aligns with findings that effective coaching involves not only improving mathematical knowledge but also cultivating a mindset that emphasizes effort, persistence, and confidence as key drivers of success (Tarken & Hart, 2023). Inspiring curiosity and demonstrating the relevance of mathematics in everyday life, coaches can create a lasting legacy that empowers students to excel both academically and personally. These findings emphasize the importance of supporting mathematics coaches in their aspirations for future impact. Educational institutions should provide resources for professional development programs that focus on visionary leadership, innovative teaching strategies, and personalized learning approaches.

4.0 Conclusion

This study offers significant contributions to the field of mathematics education by revealing how mathematics coaches in rural public secondary schools embody continuous growth, evolving leadership, personal fulfillment, and visionary impact in their roles. The findings demonstrate that effective mathematics coaching is characterized by commitment to ongoing professional development, adoption of innovative and student-centered practices, and a dedication to fostering both academic achievement and personal growth among students. These insights underscore the importance of structured professional development programs that prioritize creativity, reflective practice, and leadership training, enabling coaches to effectively adapt to diverse learner needs and mentor both students and colleagues. It also emphasizes the importance of establishing institutional frameworks that recognize the expanding responsibilities of mathematics coaches, providing resources for leadership development, mentorship, and the integration of real-world mathematics applications. The study suggests that fostering a culture that values the personal fulfillment and legacy of coaches can enhance motivation, retention, and ultimately, student outcomes. The study emphasizes the need for further investigation into the long-term effects of mathematics coaching on student achievement and teacher development, particularly through longitudinal and comparative studies in diverse educational settings. Future work may focus on evaluating the effectiveness of specific professional development models, exploring the role of technology in adaptive coaching, and identifying scalable strategies for successful coaching practices. Supporting the mathematics coaches with resources, recognition, and opportunities for growth, educational systems can cultivate a new generation of leaders who inspire confidence, curiosity, and excellence in mathematics both inside and outside the classroom.

5.0 Contributions of Authors

The principal author contributes to the study's writing and implementation. The co-author edits and supervises the data.

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7.0 Conflict of Interests

The authors assert no conflicts of interest regarding the publication of this paper.

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