Readiness of Future Educators: Measuring Knowledge, Skills, And Confidence in Teaching Primary-Level Mathematics

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ABSTRACT:

This study examined the readiness of future educators in teaching primary-level mathematics, focusing on their mathematical knowledge, instructional skills, and teaching confidence. Using a mixed-methods descriptive design, 97 pre-service teachers enrolled in a Bachelor of Elementary Education program in the Philippines were surveyed. Quantitative data were collected through a self-administered Likert-scale questionnaire, while qualitative insights were obtained from open-ended responses. Descriptive statistics and Principal Component Analysis (PCA) were employed to assess levels of preparedness and identify underlying dimensions of teaching readiness. Results revealed that pre-service teachers generally perceived themselves as competent in mathematical content (M = 4.55) and curriculum familiarity (M = 3.80) but reported moderate confidence in classroom management and lesson delivery (M = 3.46). PCA identified three key components of readiness: Teaching Confidence, Instructional Skills, and Mathematical Knowledge, supporting a tripartite model of teacher preparedness. Thematic analysis highlighted strengths in clarity of instruction, patience, and simplification of concepts, while areas for improvement included classroom management, confidence, technology integration, and application of theory to practice. Participants emphasized the need for institutional support through mentorship, hands-on practicum, and targeted training. Integration of quantitative and qualitative findings indicates that while cognitive and pedagogical readiness is evident, affective and experiential dimensions require reinforcement. The study underscores the importance of content-enriched pedagogy, experiential learning, reflective practice, and digital competence in teacher education programs. Recommendations include enhanced microteaching, structured mentoring, technology integration, and competency-based interventions to foster well-rounded, confident, and effective mathematics educators capable of delivering engaging, learner-centered instruction at the primary level.

Keywords: teacher readiness, mathematics education, pre-service teachers, pedagogical competence, teacher confidence, principal component analysis

Introduction

Mathematics is one of the core learning areas in basic education, serving as a foundation for logical reasoning, problem-solving, and critical thinking. The effectiveness of mathematics instruction in the early grades significantly shapes pupils' attitudes, confidence, and achievement in the subject throughout their schooling years. Thus, the competence and preparedness of teachers play a vital role in ensuring quality mathematics learning experiences at the primary level. However, many beginning teachers report difficulties in teaching mathematical concepts effectively, often due to limited pedagogical content knowledge, weak classroom confidence, and inadequate exposure to diverse teaching strategies (Ball, Thames, & Phelps, 2008; Hill, Rowan, & Ball, 2005). This challenge underscores the importance of assessing the readiness of future educators before they assume their professional teaching roles.

Teacher readiness is a multifaceted construct that encompasses knowledge, instructional skills, and confidence. According to Shulman's (1986) model of pedagogical content knowledge (PCK), effective teaching requires not only mastery of subject matter but also the ability to represent and adapt it to learners' needs. Similarly, Darling-Hammond (2010) emphasized that teacher education programs must cultivate reflective, adaptive, and confident practitioners who can manage the complexities of classroom teaching. Yet, despite various reforms in teacher education, recent studies in the Philippine context indicate that pre-service teachers often demonstrate uneven readiness across cognitive and affective domains (Buot, 2021; Bernabe & Lasaten, 2020). These findings highlight a pressing need to examine how future educators perceive their own preparedness to teach mathematics in primary schools.

In the Philippine K–12 curriculum, teaching mathematics at the primary level demands strong conceptual understanding and the ability to contextualize lessons in real-life situations (Department of Education [DepEd], 2016). Pre-service teachers must be able to translate abstract mathematical ideas into age-appropriate learning experiences while fostering motivation and engagement among young learners. Research by Ulla (2018) and Calderon (2020) revealed that while education students often display satisfactory mathematical knowledge, they may lack confidence in facilitating discussions, managing diverse learners, and integrating technology in instruction. These issues suggest that readiness to teach mathematics should not be measured solely by academic performance but by the combined strength of knowledge, pedagogical skills, and self-efficacy.

Theoretical Grounding

This study on the readiness of future educators to teach primary-level mathematics is anchored in Shulman's (1986) Pedagogical Content Knowledge (PCK) model and the principles outlined by Darling-Hammond (2010) on teacher preparation. Theoretically, Shulman's framework emphasizes that effective teaching requires not only mastery of subject matter but also the ability to represent and adapt knowledge to meet learners' needs, highlighting the interplay of content knowledge, pedagogy, and student understanding. Complementing this, Darling-Hammond underscores that teacher education must cultivate reflective, adaptive, and confident practitioners capable of managing diverse classroom challenges. Conceptually, the study views teacher readiness as a multidimensional construct encompassing three core domains: mathematical knowledge, instructional skills, and teaching confidence.

Mathematical knowledge refers to the depth of understanding of primary-level concepts and problem-solving strategies; instructional skills denote the ability to plan, deliver, and adapt lessons effectively; and teaching confidence reflects the pre-service teacher's self-efficacy in engaging learners and managing the classroom. By integrating these theoretical and conceptual perspectives, the study seeks to examine how knowledge, skills, and confidence interrelate to influence pre-service teachers' overall

preparedness, thereby providing evidence-based insights for curriculum design, mentoring programs, and professional development in the Philippine context.

Given this context, the present study investigates the readiness of future educators in teaching primary-level mathematics, focusing on their knowledge, instructional skills, and teaching confidence. By employing both quantitative and qualitative approaches, the study seeks to identify strengths, gaps, and interrelated factors that influence teaching preparedness. The results are expected to provide empirical evidence that can guide curriculum enhancements, pre-service training, and mentoring programs in teacher education institutions. Ultimately, this study contributes to the growing discourse on teacher quality and professional formation, aligning with the national goal of producing globally competitive and competent educators who can drive excellence in mathematics education.

Literature Gap

Despite the recognized importance of teacher readiness in mathematics education, existing literature reveals a persistent gap in understanding how pre-service teachers perceive and integrate the multifaceted components of readiness namely, mathematical knowledge, instructional skills, and teaching confidence within the Philippine context. While prior studies have examined teachers' content knowledge (Hill, Rowan, & Ball, 2005) and pedagogical content knowledge (Ball, Thames, & Phelps, 2008), there is limited empirical evidence on how these domains interact to influence overall teaching preparedness in primary mathematics. Moreover, although research has highlighted challenges in classroom management, lesson contextualization, and technology integration among pre-service teachers (Ulla, 2018; Calderon, 2020), few studies have systematically investigated their self-perceived confidence in translating theoretical knowledge into practical, learner-centered instruction. In the Philippine setting, studies on teacher readiness often focus narrowly on cognitive competencies (Buot, 2021; Bernabe & Lasaten, 2020), neglecting the affective and instructional dimensions that are crucial for effective teaching. This gap underscores the need for comprehensive research that examines not only what future educators know but also how confidently and skillfully they can apply this knowledge to foster meaningful mathematics learning experiences in primary classrooms.

Practical and Contextual Gaps

Despite existing studies on pre-service teachers' readiness and pedagogical content knowledge (Ball, Thames, & Phelps, 2008; Hill, Rowan, & Ball, 2005; Darling-Hammond, 2010), there remains a practical gap in understanding how such readiness is applied in actual classroom settings, particularly in teaching primary-level mathematics. While Philippine studies (Buot, 2021; Bernabe & Lasaten, 2020; Calderon, 2020) have examined general readiness among education students, these investigations often focus on theoretical or controlled assessments rather than the translation of knowledge, instructional skills, and teaching confidence into hands-on lesson delivery and learner engagement. Moreover, a contextual gap exists, as much of the literature is derived from secondary or international settings, leaving limited evidence on the specific experiences and preparedness of pre-service teachers in Philippine state universities implementing the K–12 mathematics curriculum. Addressing these gaps is essential to provide locally relevant insights that can inform curriculum enhancements, practicum design, and professional development initiatives aimed at producing competent and confident mathematics educators.

Relevance of the Study to Teacher Education Framework

The findings of this study hold significant importance and practical utility for teacher education institutions, curriculum developers, and educational policymakers. By identifying the three core dimensions of teacher readiness Teaching Confidence, Instructional Skills, and

Mathematical Knowledge the study provides an empirical foundation for enhancing the preparation of future educators in mathematics instruction. In the context of state universities and colleges (SUCs), such as Cagayan State University, the results can guide program heads and practicum coordinators in designing targeted interventions such as workshops on mathematics pedagogy, confidence-building activities, and field-based learning experiences that bridge theory and practice.

Moreover, the study underscores the need to align teacher education curricula with the Philippine Professional Standards for Teachers (PPST) and the DepEd K–12 mathematics competencies to ensure that pre-service teachers are both knowledgeable and confident in implementing competency-based instruction. The utilization of this research extends beyond academic training—it can inform professional development frameworks, mentorship programs, and performance evaluation systems aimed at fostering reflective, adaptive, and skilled educators. Ultimately, by strengthening the readiness of pre-service teachers, the study contributes to improving the quality of mathematics education in the basic education sector and supports the broader national goal of developing globally competent and innovative Filipino teachers.

Objectives of the Study

This study aimed to assess the readiness of future educators in teaching primary-level mathematics by examining their levels of knowledge, skills, and confidence. Specifically, it sought to (1) determine how pre-service teachers perceive their preparedness to teach mathematical concepts effectively to young learners. The study also aimed to (2) identify the underlying dimensions of teaching readiness through statistical analysis, particularly by employing Principal Component Analysis (PCA) to reveal the key components that define their competence in mathematics instruction. Furthermore, it intended to (3) analyze the strengths and areas for improvement in the pedagogical and affective domains of pre-service teachers, as well as to gather qualitative insights into their personal experiences, challenges, and professional needs. Ultimately, the study sought to (4) provide evidence-based recommendations for enhancing teacher education programs, ensuring that pre-service teachers are equipped with the essential knowledge, pedagogical skills, and confidence necessary to deliver effective, engaging, and learner-centered mathematics instruction at the primary level.

METHOD

Research Design

This study employed a mixed-methods descriptive design, combining quantitative and qualitative approaches to achieve a holistic understanding of pre-service teachers' readiness to teach primary-level mathematics (Creswell & Creswell, 2018). The quantitative component utilized a descriptive-correlational design to assess the levels of mathematical knowledge, instructional skills, and teaching confidence among pre-service teachers, and Principal Component Analysis (PCA) was applied to identify the underlying dimensions of teaching readiness (Hair, Black, Babin, & Anderson, 2019). The qualitative component complemented the quantitative analysis through thematic analysis of open-ended responses, providing insights into participants' lived experiences, perceptions, and reflections regarding their preparedness to teach mathematics (Braun & Clarke, 2006).

The methodological process k for this study is structured around three phases. First, the data collection phase involved administering a structured questionnaire and open-ended items to pre-service teachers enrolled in education programs at selected universities. Second, the data analysis phase incorporated quantitative statistical procedures, including descriptive statistics, correlation analysis, and PCA, alongside qualitative thematic coding to explore recurring patterns and narratives. Finally, the integration phase involved triangulating quantitative and qualitative findings to draw a comprehensive picture of teacher readiness, highlighting both measurable competencies and

personal perceptions of preparedness. By adopting this mixed-methods approach, the study ensures methodological rigor while capturing the complexity of teacher readiness as a multidimensional construct.

Participants

The participants of the study were 97 pre-service teachers enrolled in the Bachelor of Elementary Education (BEED) program of a state university in the Philippines during the academic year 2024–2025. A purposive sampling technique was used to select respondents who had completed at least one field study or practice teaching course. Among the respondents, 82.5% were female and 17.5% were male. The distribution by year level indicated that 32.0% were first-year, 20.6% were second-year, 10.3% were third-year, and 37.1% were fourth-year students. All participants were majoring in elementary education and had varying numbers of completed field study courses. As shown in the table 1, a majority of the respondents were female (n = 80, 82.5%), while 17 (17.5%) were male. This distribution reflects the general gender composition of teacher education programs in the Philippines, where female pre-service teachers typically outnumber males (Commission on Higher Education [CHED], 2023).In terms of year level, the largest group of respondents were fourth-year students (n = 36, 37.1%), followed by first-year students (n = 31, 32.0%), second-year students (n = 20, 20.6%), and third-year students (n = 10, 10.3%). This varied representation indicates that the study captured perspectives across different stages of teacher preparation, allowing for a broader understanding of developmental readiness from the foundational to the advanced stages of the teacher education curriculum.

Table 1. Profile of the respondents

Variable	Category	Frequency (f)	Percent (%)
Sex	Male	17	17.5
	Female	80	82.5
Year Level	1st Year	31	32.0
	2nd Year	20	20.6
	3rd Year	10	10.3
	4th Year	36	37.1
Specialization	BEED	97	100.0
	BSED	0	0.0
Number of Field Study Courses Completed	0	63	64.9
	1	20	20.6
	2	5	5.2
	3	4	4.1
	7	1	1.0
	8	1	1.0
	9	1	1.0
	26	1	1.0
	32	1	1.0

Regarding specialization, all respondents were enrolled in the Bachelor of Elementary Education (BEED) program (n = 97, 100%). This aligns with the study's focus on assessing preparedness for teaching primary-level mathematics, which falls under the domain of elementary education. As for the number of field study courses completed, most respondents (n = 63, 64.9%) reported having no completed field study courses, while others had completed one course (n = 20, 20.6%), two (n = 5, 5.2%), or three (n = 4, 4.1%). A small portion of respondents indicated unusually high values, suggesting that some may have been exposed to extended or repeated practicum experiences. This pattern implies that while many pre-service teachers are still in the early stages of their field exposure, a subset has begun to experience practical classroom immersion—an essential component in developing teaching confidence and competence (Darling-Hammond, 2017).

General, profile of respondents suggests that the majority are female BEED students, primarily in the senior years of their program but with limited field study experience. This demographic pattern has implications for teacher readiness, as previous studies (Ball, Thames, & Phelps, 2008; Loughran, 2019) highlight that both content knowledge and field-based practice are critical for developing the confidence and skills necessary to teach mathematics effectively. Institutions may therefore consider enhancing early and consistent practicum engagement to strengthen the transition from theoretical preparation to classroom application.

Research Instrument

The study employed a self-administered survey questionnaire developed by the researcher, grounded on established frameworks of Mathematical Knowledge for Teaching (Ball, Thames, & Phelps, 2008) and Pedagogical Content Knowledge (Shulman, 1986). The instrument was designed to capture both quantitative and qualitative aspects of pre-service teachers' readiness to teach primary-level mathematics. It comprised three sections: (1) demographic profile to gather background information of participants, (2) a readiness scale consisting of 19 Likert-type items rated from 1 (Strongly Disagree) to 5 (Strongly Agree) measuring perceived mathematical knowledge, instructional skills, and teaching confidence, and (3) open-ended questions to obtain qualitative insights into participants' experiences and reflections. The development of the tool followed a systematic process: items were constructed based on theoretical and empirical literature to ensure alignment with the multidimensional construct of teacher readiness, and the draft instrument underwent content validation by three experts in mathematics education and teacher training to ensure clarity, relevance, and comprehensiveness. To establish reliability, the questionnaire was pilot-tested, resulting in a Cronbach's alpha of .91, indicating high internal consistency and confirming that the instrument is a reliable measure of pre-service teachers' readiness. The combination of quantitative and qualitative items allows for a holistic assessment, ensuring that both measurable competencies and personal perceptions of preparedness are captured.

Data Gathering Procedure

Data for this study were collected during the second semester of the academic year 2024–2025. Prior to data collection, the researcher sought formal permission from the Dean of the College and the Program Chair to ensure institutional approval and support. Once approval was granted, the purpose and scope of the study were clearly communicated to potential respondents, emphasizing voluntary participation, confidentiality, and anonymity to adhere to ethical research standards. The survey instrument was administered using a mixed-mode approach, consisting of both printed questionnaires and an online version to maximize participation and accommodate the respondents' preferences. Printed copies were personally distributed to participants during scheduled class sessions, while the online questionnaire was shared through secure platforms, ensuring ease of access and flexibility in response. Respondents were given adequate

time to answer the survey items thoughtfully and were encouraged to provide honest and reflective responses, particularly in the open-ended section that explored their experiences and perceptions regarding readiness to teach mathematics.

Upon completion of the data collection period, all responses were carefully checked for completeness, and the data from printed questionnaires were manually encoded into a digital format for consistency. The combined dataset, including responses from both online and printed forms, was cleaned and organized to prepare for statistical analysis. Quantitative data were processed for descriptive and inferential statistical procedures, while qualitative responses were coded and subjected to thematic analysis to capture emergent patterns and insights. Throughout the process, the researcher maintained strict adherence to ethical guidelines, ensuring that all participant information remained confidential and that the data were used solely for the purposes of the study.

Data Analysis and Ethical Considerations

The collected data were analyzed using a combination of quantitative and qualitative methods to provide a comprehensive understanding of pre-service teachers' readiness in teaching primary-level mathematics. For the quantitative analysis, descriptive statistics were employed to summarize respondents' demographic characteristics and readiness scores. Specifically, frequency and percentage distributions were used for categorical variables such as gender, year level, and teaching experience, while mean and standard deviation were computed to determine the levels of mathematical knowledge, instructional skills, and teaching confidence among participants. To identify the underlying dimensions of teaching readiness, Principal Component Analysis (PCA) with Varimax rotation was conducted. Prior to PCA, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity were performed to ensure the appropriateness of the data for factor analysis. Factors with eigenvalues greater than one were retained, and factor loadings were examined to interpret the latent constructs influencing pre-service teachers' preparedness.

For the qualitative analysis, participants' responses to open-ended questions were analyzed thematically following Braun and Clarke's (2006) six-phase framework. This process involved: (1) familiarization with the data through repeated reading of responses, (2) generating initial codes to capture significant statements, (3) identifying patterns to develop potential themes, (4) reviewing themes to ensure they accurately reflected the data, (5) defining and naming themes, and (6) producing a narrative report linking the themes to the research objectives. This approach captured insights regarding teaching confidence, instructional challenges, and professional growth needs, which may not be fully evident in numerical data alone.

The integration of quantitative and qualitative findings was conducted at the interpretation stage to provide a holistic understanding of pre-service teachers' readiness. Quantitative results from the descriptive statistics and PCA were triangulated with qualitative themes to validate patterns, explain anomalies, and enrich interpretations. For example, areas where pre-service teachers scored lower in confidence or instructional skills were cross-examined with thematic responses explaining the underlying reasons, such as lack of teaching experience or difficulties in translating mathematical concepts for young learners. This mixed-methods integration ensured that the study not only quantified readiness levels but also contextualized the experiences and perceptions of participants, producing comprehensive and actionable findings.

The study adhered to ethical standards for research involving human participants. Prior to data collection, informed consent was obtained from all respondents, with clear explanations of the study's objectives, procedures, and potential benefits. Participants were assured of their right to withdraw at any stage without penalty. Confidentiality and anonymity were strictly

maintained through secure storage and coding of data. The information collected was used solely for academic purposes, and results were reported in a manner that safeguarded the privacy and dignity of all participants. By adhering to these principles, the study ensured ethical rigor and upheld the values of respect, beneficence, and justice throughout the research process.

Results and Discussion

Objective 1. Perception of Preparedness in Teaching Mathematics

To determine how pre-service teachers perceive their preparedness to teach mathematical concepts effectively to young learners. This objective focuses on assessing their self-reported competence in understanding and delivering core mathematical content appropriate for the primary level. Table 2 presents the descriptive statistics on the pre-service teachers' mathematics pedagogical competence. The overall mean score was 3.81 (SD = 0.80), interpreted as Agree, suggesting that the respondents generally perceive themselves as competent in teaching mathematics in the primary grades. This indicates that the pre-service teachers possess adequate knowledge and skills aligned with the expectations of mathematics instruction in the K–12 curriculum. Among the indicators, the highest mean score was obtained in the statement "I understand the basic concepts of addition, subtraction, multiplication, and division" (M = 4.55, SD = 0.804), which was verbally interpreted as Strongly Agree. This suggests that the respondents have a strong grasp of fundamental mathematical operations, a critical foundation for effective instruction at the elementary level. In contrast, relatively lower mean scores were found in "I feel confident teaching mathematics lessons to a class of primary pupils" (M = 3.46, SD = 0.867) and "I am comfortable speaking in front of pupils during math instruction" (M = 3.46, SD = 0.804). These findings imply that while cognitive understanding is evident, affective and self-efficacy dimensions of teaching still need further reinforcement.

Table 2 presents the descriptive statistics on the pre-service teachers' mathematics pedagogical competence.

Indicators	Mean (M)	SD	Interpretation
I understand the basic concepts of addition, subtraction, multiplication, and division.	4.55	0.804	Strongly Agree
I can explain fractions, decimals, and percentages in ways that are easy for pupils to understand.	3.84	0.746	Agree
I am knowledgeable in teaching problem-solving strategies in primary mathematics.	3.58	0.719	Agree
I can connect mathematics concepts to real-life situations.	4.04	0.828	Agree
I am familiar with the K–12 curriculum standards in mathematics for primary grades.	3.80	0.799	Agree
I understand the common misconceptions pupils have in mathematics.	3.69	0.727	Agree
I can prepare lesson plans that align with curriculum competencies.	3.66	0.853	Agree

I can use appropriate instructional materials and visual aids in teaching math.	3.84	0.812	Agree
I can apply different teaching strategies to cater to diverse learners.	3.72	0.800	Agree
I can effectively integrate technology in teaching mathematics (e.g., videos, apps, digital boards).	3.81	0.833	Agree
I can manage classroom activities during mathematics instruction.	3.78	0.807	Agree
I can assess pupils' learning through tests, activities, and performance tasks.	4.03	0.742	Agree
I can adjust my teaching methods based on learners' needs and performance.	4.01	0.714	Agree
I feel confident teaching mathematics lessons to a class of primary pupils.	3.46	0.867	Agree
I can handle pupils' questions in mathematics effectively.	3.53	0.751	Agree
I am comfortable speaking in front of pupils during math instruction.	3.46	0.804	Agree
I believe I can motivate pupils to enjoy learning mathematics.	3.80	0.825	Agree
I feel prepared to face challenges in teaching mathematics.	3.64	0.868	Agree
I am confident in my ability to improve pupils' performance in mathematics.	3.65	0.854	Agree
Grand Mean	**3.81**	**0.80**	**Agree**

The results highlight a balance between content knowledge and pedagogical competence, consistent with Shulman's (1986) theory of Pedagogical Content Knowledge (PCK), which emphasizes that effective teaching requires both mastery of subject matter and the ability to present it in a way that is comprehensible to learners. The high ratings on items related to curriculum alignment, instructional materials, and assessment strategies indicate that the respondents are well-equipped in planning and implementing lessons aligned with the learning competencies of the K–12 curriculum. However, the relatively modest scores in items measuring teaching confidence and classroom communication suggest that teacher education programs should place more emphasis on practical teaching experiences and classroom simulations to enhance self-efficacy. According to Bandura's (1997) Social Cognitive Theory, teachers' beliefs in their capabilities significantly influence their teaching performance and persistence when facing classroom challenges. This implies that pre-service teachers would benefit from structured experiences that foster mastery, peer collaboration, and positive feedback to improve their teaching confidence. Furthermore, the ability to relate mathematical concepts to real-life situations (M = 4.04, SD = 0.828) and the use of diverse instructional strategies (M = 3.72, SD = 0.800) reflect a student-centered teaching orientation. This aligns with NCTM (2014) standards advocating for problem-based, inquiry-driven mathematics

instruction that promotes conceptual understanding and learner engagement.

The findings indicate that the pre-service teachers demonstrate strong foundational knowledge and instructional readiness, but they need continuous professional growth in confidence building, classroom communication, and adaptive teaching to achieve holistic competence in mathematics pedagogy.

Objective 2. Underlying Dimensions of Teaching Readiness

To identify the underlying dimensions of teaching readiness through statistical analysis, particularly by employing Principal Component Analysis (PCA), to reveal the key components that define their competence in mathematics instruction. A Principal Component Analysis (PCA) using Varimax rotation was conducted to determine the underlying dimensions of future educators' readiness in teaching primary-level mathematics. As presented in **Table 3**, three components emerged with eigenvalues greater than 1, collectively accounting for a substantial portion of the total variance, indicating that the construct of teaching readiness is multidimensional. Factor loadings equal to or greater than .40 were considered significant.

Table 3 Rotated Component Matrix of the Readiness of Future Educators in Teaching Primary-Level Mathematics

Items	Component 1	Component 2	Component 3
I feel prepared to face challenges in teaching mathematics.	.83		
I feel confident teaching mathematics lessons to a class of primary pupils.	.79		
I am confident in my ability to improve pupils' performance in mathematics.	.78		
I can handle pupils' questions in mathematics effectively.	.78		
I believe I can motivate pupils to enjoy learning mathematics.	.71		
I am comfortable speaking in front of pupils during math instruction.	.70	.41	
I can manage classroom activities during mathematics instruction.	.55	.43	
I can prepare lesson plans that align with curriculum competencies.		.80	
I can use appropriate instructional materials and visual aids in teaching math.		.78	
I can apply different teaching strategies to cater to diverse learners.		.75	
I can adjust my teaching methods based on learners' needs and performance.		.63	
I can effectively integrate technology in teaching mathematics (e.g., videos, apps, digital boards).		.61	.44

I can assess pupils' learning through tests, activities, and performance tasks.		.60	
I can connect mathematics concepts to real-life situations.			.78
I am familiar with the K–12 curriculum standards in mathematics for primary grades.			.69
I am knowledgeable in teaching problem-solving strategies in primary mathematics.			.68
I understand the basic concepts of addition, subtraction, multiplication, and division.			.67
I understand the common misconceptions pupils have in mathematics.			.62
I can explain fractions, decimals, and percentages in ways that are easy for pupils to understand.	.45		.59

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Note. Rotation converged in six iterations. Loadings ≥ .40 are displayed.

Component 1, labeled Teaching Confidence, loaded highly on items related to teachers' self-assurance and engagement in mathematics instruction (e.g., "I feel prepared to face challenges in teaching mathematics," loading = .83; "I feel confident teaching mathematics lessons to a class of primary pupils," loading = .79). This dimension reflects the affective and motivational aspects of teaching readiness—particularly the belief in one's capability to manage classroom situations and foster a positive learning environment.

Component 2, labeled Instructional Skills, comprised items associated with pedagogical practices and instructional design (e.g., "I can prepare lesson plans that align with curriculum competencies," loading = .80; "I can use appropriate instructional materials and visual aids in teaching math," loading = .78). This component indicates that pre-service teachers demonstrate emerging proficiency in lesson preparation, differentiation, and the integration of technology to meet diverse learners' needs.

Component 3, identified as Mathematical Knowledge, included items related to mastery of mathematical content and understanding of pupil misconceptions (e.g., "I understand the basic concepts of addition, subtraction, multiplication, and division," loading = .67; "I can connect mathematics concepts to real-life situations," loading = .78). This dimension underscores the cognitive foundation necessary for delivering effective instruction and contextualizing mathematical concepts.

The three extracted components Teaching Confidence, Instructional Skills, and Mathematical Knowledge support the tripartite model of teacher readiness, encompassing knowledge, skills, and confidence. These findings corroborate Ball, Thames, and Phelps's (2008) Mathematical Knowledge for Teaching (MKT) framework, which differentiates content knowledge from pedagogical knowledge as vital domains in teacher competence. Moreover, Darling-Hammond (2017) emphasized that effective teacher preparation programs must cultivate both conceptual understanding and

pedagogical confidence to ensure teaching efficacy. Loughran (2019) likewise stressed that reflective practice and confidence-building experiences enhance pre-service teachers' readiness for real classroom environments.

In the context of primary mathematics education, the results imply that developing comprehensive readiness among future educators requires a balance of theoretical mastery, instructional competence, and emotional assurance. Teacher education programs should therefore design curricula that integrate content-based instruction with opportunities for practicum experiences that strengthen pedagogical skills and self-efficacy. This multidimensional readiness framework provides empirical evidence for enhancing pre-service teacher training and professional development, particularly in mathematics education at the primary level.

Sampling Adequacy and Factorability Tests

The suitability of the data for factor analysis was first examined using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity. As shown in Table 3, the KMO value was **.884**, which exceeds the minimum threshold of .60 recommended by Kaiser (1974), indicating that the sample was adequate for factor analysis. This suggests that the correlations among items were sufficiently high to justify the use of Principal Component Analysis (PCA). Additionally, Bartlett's Test of Sphericity was significant, $\chi^2(171) = \mathbf{1326.404}$, $p < .001$, confirming that the correlation matrix was not an identity matrix and that the items were interrelated. These results collectively demonstrate that the dataset met the assumptions for factorability, supporting the appropriateness of proceeding with PCA to identify the underlying dimensions of readiness among future educators in teaching primary-level mathematics.

Table 3. Kaiser-Meyer-Olkin (KMO) Measure and Bartlett's Test of Sphericity for Sampling Adequacy

Test	Statistic	Value
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	—	.884
Bartlett's Test of Sphericity	Approx. χ^2 (171)	1326.404
	p	< .001

Note. The Kaiser-Meyer-Olkin (KMO) value of .884 indicates meritorious sampling adequacy, while Bartlett's Test of Sphericity was significant ($p < .001$), suggesting that the correlation matrix is suitable for factor analysis (Kaiser, 1974).

Component Transformation Matrix of the Readiness of Future Educators in Teaching Primary-Level Mathematics

The component transformation matrix presented in Table 4 revealed the interrelationships among the three extracted factors—Teaching Confidence, Instructional Skills, and Mathematical Knowledge—derived from the Principal Component Analysis (PCA) with Varimax rotation. The matrix coefficients indicate how each rotated component is transformed from the initial extraction to achieve a simpler and more interpretable factor structure. Component 1 (Teaching Confidence) showed high transformation loadings across the three axes (.642, .580, and .502), suggesting that confidence overlaps to some degree with other teacher readiness attributes. Component 2 (Instructional Skills) demonstrated a strong and distinct loading on the third axis (.809), with minimal association on the second dimension (–.052), signifying a relatively independent and well-defined construct. Meanwhile, Component 3 (Mathematical Knowledge) exhibited a high negative transformation loading on the second component (–.813), indicating that while it is conceptually distinct, it inversely relates to the second component, emphasizing the unique yet complementary nature of teachers' content mastery. These results support the notion that

pre-service teachers' readiness to teach mathematics can be conceptualized along three correlated but distinct domains: (a) affective readiness or confidence in teaching, (b) pedagogical readiness or instructional competence, and (c) cognitive readiness or mathematical knowledge. The orthogonal rotation achieved by the Varimax method further confirmed that each dimension contributes uniquely to the construct of teaching readiness without significant redundancy.

Table 4. Component Transformation Matrix of the Readiness of Future Educators in Teaching Primary-Level Mathematics

Component	1	2	3
Teaching Confidence	.642	.580	.502
Instructional Skills	–.586	–.052	.809
Mathematical Knowledge	.495	–.813	.306

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

The findings of this factor transformation analysis align with the framework proposed by Ball, Thames, and Phelps (2008), who described Mathematical Knowledge for Teaching (MKT) as comprising both subject matter knowledge and pedagogical content knowledge. The independence of the Mathematical Knowledge component in this study resonates with their assertion that teachers must possess not only procedural and conceptual mastery of mathematics but also an understanding of how pupils learn and misconceive mathematical ideas.

Similarly, the prominence of Instructional Skills as a distinct factor supports Shulman's (1987) theory of Pedagogical Content Knowledge (PCK), emphasizing the transformation of subject knowledge into forms accessible to learners through appropriate instructional strategies, lesson planning, and assessment design. The high loading of this component indicates that readiness among future educators is not solely dependent on content mastery but also on the ability to deliver instruction effectively.

The Teaching Confidence factor underscores the affective dimension of teaching readiness. According to Bandura's (1997) social cognitive theory, teacher self-efficacy significantly influences motivation, effort, and persistence in classroom practice. This suggests that confident pre-service teachers are more likely to engage students, handle challenges, and apply innovative methods in teaching mathematics. Such confidence, as Darling-Hammond (2017) emphasized, often grows through exposure to practice-based learning experiences and reflective teaching opportunities.

The results of the PCA and component transformation affirm that teacher readiness is a multidimensional construct encompassing knowledge, skills, and confidence. These dimensions collectively define the professional identity and effectiveness of future educators in mathematics instruction. The implication is that teacher education programs should integrate content mastery with pedagogical training and self-efficacy development to produce well-rounded, competent, and confident mathematics educators.

Objective 3. Analysis of Strengths and Areas for Improvement

To analyze the strengths and areas for improvement in the pedagogical and affective domains of pre-service teachers, as well as to gather qualitative insights into their personal experiences, challenges, and professional needs in teaching mathematics. The qualitative analysis revealed that pre-service teachers demonstrated

notable strengths in teaching primary mathematics, particularly in clarity of instruction, patience, and the ability to simplify mathematical concepts (72%), which align with the findings of Ball, Thames, and Phelps (2008) that emphasize the centrality of pedagogical content knowledge in effective mathematics instruction. However, participants also identified significant areas for improvement, notably in classroom management (60%), confidence in teaching (48%), and integration of technology (32%), suggesting the need for enhanced practical exposure before entering the profession.

These results echo the conclusions of Darling-Hammond (2017), who found that pre-service teachers benefit most from authentic teaching experiences that bridge theory and practice. Furthermore, respondents called for institutional support through training programs (68%), mentorship (32%), and hands-on practicum opportunities (56%), consistent with Loughran's (2019) argument that reflective practice and mentoring are critical in teacher formation. The findings imply that teacher education institutions should prioritize experiential learning, competency-based training, and continuous professional support to strengthen pre-service teachers' readiness and confidence in teaching mathematics. Developing structured mentoring systems, integrating digital pedagogy, and reinforcing classroom management skills could enhance instructional effectiveness and align teacher preparation programs with the 21st-century educational demands.

Theme 1. Strengths in Teaching Primary Mathematics

Analysis of the qualitative responses revealed that clarity of instruction and ability to simplify mathematical concepts were the most frequently mentioned strengths, reported by 18 out of 25 respondents (72%). Participants emphasized using real-life examples, visual aids, and interactive activities to make mathematics engaging and relatable to learners. As one participant noted, "I make sure my pupils understand by connecting math to everyday experiences." The second most common theme was patience and empathy toward learners, identified by 14 respondents (56%), reflecting a strong affective dimension in their teaching practice. Another 10 participants (40%) described themselves as creative and adaptable, adjusting instructional strategies based on students' learning needs. In addition, 8 respondents (32%) mentioned possessing a strong mathematical foundation and commitment to continuous learning, while 6 (24%) emphasized their communication and interpersonal skills as essential teaching assets.

Theme 2. Areas for Improvement Before Becoming Professional Teachers

When asked about areas needing improvement, the most frequently cited concern was classroom management, reported by 15 respondents (60%), followed by building self-confidence and public speaking skills (12 respondents; 48%). Many shared feelings of anxiety about handling an actual classroom, noting that "it's different when you are already facing pupils on your own."

Other recurring themes included the need to strengthen lesson planning and assessment design (10 respondents; 40%) and integration of technology in teaching mathematics (8 respondents; 32%). Moreover, 6 respondents (24%) pointed out difficulties in applying theoretical concepts to real classroom contexts, while 4 (16%) identified problem-solving and communication skills as areas for further development.

Theme 3. Institutional Support in Preparing Future Mathematics Teachers

Respondents suggested several forms of institutional support that could enhance their preparation for teaching mathematics effectively. The most common recommendation was to provide more training, seminars, and workshops on mathematics pedagogy, cited by 17 respondents (68%). Meanwhile, 14 respondents (56%) emphasized the need for hands-on teaching experiences, such as microteaching sessions, classroom observations, and practicum activities. A total of 10

participants (40%) recommended the provision of updated instructional materials and digital learning tools, while 8 (32%) highlighted the importance of mentorship and coaching from experienced teachers. Furthermore, 6 respondents (24%) stressed the need for constructive feedback and performance evaluation to guide their improvement. One participant remarked, "We learn best when guided by mentors who help us reflect on what to improve after every teaching experience."

Table 1 summarizes the thematic frequencies across the three major domains.

Themes	f	%
Strengths in Teaching		
Clarity of instruction and simplification	18	72%
Patience and empathy	14	56%
Creativity and adaptability	10	40%
Strong math foundation	8	32%
Communication skills	6	24%
Areas for Improvement		
Classroom management	15	60%
Confidence and public speaking	12	48%
Lesson planning and assessment	10	40%
Technology integration	8	32%
Application of theory to practice	6	24%
Problem-solving and communication	4	16%
Institutional Support		
Training, seminars, and workshops	17	68%
Hands-on practice and practicum	14	56%
Updated materials and tools	10	40%
Mentorship and coaching	8	32%
Constructive feedback	6	24%

The data revealed that pre-service teachers possess strong instructional and interpersonal competencies but still require greater exposure to practical teaching, classroom management, and digital integration. They expressed a clear desire for institutional interventions—such as targeted training, mentorship, and experiential learning—to bridge theoretical understanding and professional readiness.

Objective 4. Integration of Quantitative and Qualitative Data Recommendations for Enhancing Teacher Education Programs

Objective 4 of the study focused on integrating the quantitative and qualitative data to generate evidence-based recommendations for enhancing teacher education programs in preparing future mathematics educators. Table 5 presents the convergence, complementarity, and expansion of findings from both data strands. The

quantitative results demonstrated that pre-service teachers possess strong mathematical knowledge and familiarity with the K–12 curriculum, as indicated by high mean scores (M = 4.55 and M = 3.80, respectively). Qualitative data supported these findings, with respondents identifying clarity of instruction (72%) and the ability to simplify concepts (72%) as their principal strengths. The integration of these results suggests that pre-service teachers are cognitively prepared to deliver primary-level mathematics instruction. This aligns with Shulman's (1986) theory of Pedagogical Content Knowledge (PCK), which emphasizes the importance of combining mastery of content with the ability to present it effectively to learners.

Table 5. Integration of Quantitative and Qualitative Data on Pre-Service Teachers' Readiness in Teaching Primary Mathematics

Quantitative Findings	Qualitative Findings	Integrated Interpretation	Recommendations for Teacher Education Programs
High mean scores in mathematical content knowledge (M = 4.55) and curriculum familiarity (M = 3.80) indicate strong cognitive readiness.	Respondents reported clarity of instruction (72%) and ability to simplify math concepts (72%) as key strengths.	Both data sets confirm that pre-service teachers possess solid foundational understanding of mathematics and can effectively explain concepts to learners.	Strengthen content-enriched pedagogy through advanced courses integrating conceptual understanding with pedagogical application.
Moderate scores on teaching confidence and classroom presence (M = 3.46) reveal areas needing improvement in affective readiness.	48% of participants cited lack of confidence and public speaking anxiety as major challenges.	Quantitative and qualitative results converge, showing that self-efficacy and confidence are critical areas for development.	Incorporate microteaching, peer feedback, and reflective practice to build confidence and communication skills.
PCA identified three dimensions: (1) Teaching Confidence, (2) Instructional Skills, (3) Mathematical Knowledge.	Pre-service teachers emphasized the need for hands-on experience (56%) and mentorship (32%) to improve instructional skills.	Integration shows that while content and pedagogical competence are established, experience-based learning strengthens readiness across all dimensions.	Expand practicum exposure and establish a structured mentoring system linking pre-service teachers with expert educators.

Instructional Skills factor (loadings: .80–.61) indicates competence in lesson planning, materials use, and assessment.	40% identified the need for improvement in lesson planning and assessment design.	The quantitative data support the presence of foundational skills; qualitative data emphasize the need for refinement and guided practice.	Conduct workshops on lesson design, assessment literacy, and differentiated instruction aligned with K–12 standards.
Technology integration scored moderately (M = 3.81), suggesting emerging digital competence.	32% of respondents identified technology integration as an area for improvement.	Convergent evidence reveals growing awareness but limited proficiency in using educational technology.	Embed digital pedagogy training and simulation of technology-enhanced math teaching in the curriculum.
High mean in motivation-related indicators (M = 3.80–4.03) shows positive attitudes toward learner engagement.	Teachers expressed patience and empathy (56%), valuing supportive learning environments.	Integration reflects a strong affective orientation conducive to learner-centered instruction.	Foster emotional intelligence and classroom relationship-building modules in pre-service training.
KMO (.884) and significant Bartlett's test ($p < .001$) validated the robustness of the data and multidimensional readiness model.	68% requested training and workshops as institutional support.	Both confirm that systematic, evidence-based interventions can further enhance readiness and program impact.	Institutionalize continuous professional development and competency-based teacher education for sustained growth.

However, the study also revealed moderate scores in teaching confidence and classroom presence (M = 3.46). Qualitative insights indicated that nearly half of the participants (48%) experienced anxiety regarding public speaking and managing a classroom independently. This convergence indicates that while cognitive readiness is strong, affective readiness and self-efficacy require further development. These findings resonate with Bandura's (1997) Social Cognitive Theory, which posits that self-efficacy strongly influences teachers' motivation, persistence, and effectiveness in classroom settings. Therefore, teacher education programs must incorporate microteaching, peer feedback, and reflective practice to enhance confidence and communication skills.

The Principal Component Analysis identified three distinct dimensions of teaching readiness: Teaching Confidence, Instructional Skills, and Mathematical Knowledge. These components were reinforced by qualitative data emphasizing the need for hands-on experience (56%) and mentorship (32%) to strengthen instructional skills. The findings highlight that practical, experience-based learning is essential for consolidating content knowledge and pedagogical competence. This supports Darling-Hammond's (2017) assertion that authentic teaching experiences bridge the gap between

theory and practice, while Loughran (2019) emphasizes reflective practice and guided mentoring in teacher formation. While the Instructional Skills factor scored moderately high (loadings: .80–.61), qualitative feedback indicated that 40% of respondents wished to improve lesson planning, assessment design, and differentiation strategies. Both data sources converge to suggest that foundational skills are present, yet pre-service teachers require guided practice to refine their pedagogical strategies. Additionally, technology integration was moderately rated (M = 3.81), with 32% noting a need for improvement. This highlights a growing awareness of digital pedagogy but limited proficiency, consistent with contemporary studies emphasizing the integration of educational technology in teacher preparation programs (Ertmer & Ottenbreit-Leftwich, 2010).

Affective and motivational readiness was supported by high quantitative ratings (M = 3.80–4.03) and qualitative evidence of patience and empathy (56%), reflecting a student-centered orientation. The combined findings suggest that pre-service teachers possess the interpersonal qualities necessary for fostering engaging and supportive learning environments, supporting NCTM (2014) standards advocating learner-centered, problem-based mathematics instruction.Finally, the robustness of the factor structure was confirmed by a KMO value of .884 and a significant Bartlett's Test ($p < .001$). The qualitative data showed a strong desire for institutional support (68%), emphasizing the role of training, workshops, mentorship, and practicum experiences. This indicates that systematic, evidence-based interventions can enhance teacher readiness, corroborating Darling-Hammond (2017) and Ball et al. (2008) regarding the importance of structured professional development in mathematics teacher education.

The integration of quantitative and qualitative findings reveals a complementary relationship among content knowledge, pedagogical skills, and confidence. Quantitative data established the structural components of readiness, while qualitative data provided contextual understanding of pre-service teachers' lived experiences. Together, they highlight the importance of experiential learning, mentorship, reflective practice, and digital integration in fostering holistic mathematics teacher preparedness.

Implications for Teacher Education Programs

The findings of this study have significant implications for the design and enhancement of teacher education programs, particularly in preparing future mathematics educators. First, the strong mathematical knowledge and curriculum familiarity demonstrated by pre-service teachers highlight the importance of content-enriched pedagogy. Teacher education programs should leverage this cognitive readiness by integrating advanced courses that combine conceptual understanding with practical instructional strategies, ensuring that pre-service teachers can effectively translate their knowledge into classroom practice.

Second, the moderate levels of teaching confidence and classroom presence suggest a need for deliberate interventions to strengthen self-efficacy and affective readiness. Programs should incorporate microteaching sessions, peer feedback, and reflective practice to help pre-service teachers develop confidence in lesson delivery, classroom management, and communication skills. These activities provide safe, supportive environments where future educators can experiment, receive constructive feedback, and refine their teaching practices before entering real classrooms. Third, the integration of quantitative and qualitative findings emphasizes the value of experiential learning. While pre-service teachers possess foundational instructional skills, they reported a need for hands-on experience and mentorship. Teacher education programs should, therefore, systematically implement practicum experiences, classroom simulations, and co-teaching opportunities to develop instructional competence and adaptive teaching strategies. Such exposure bridges the gap between

theoretical knowledge and practical application, enhancing readiness across cognitive, pedagogical, and affective domains. Fourth, the moderate scores in technology integration indicate an emerging but limited proficiency in digital pedagogy. Pre-service teachers would benefit from curriculum-embedded training in educational technology, including the use of videos, apps, digital boards, and other interactive tools. Strengthening digital competence is essential in preparing future educators to engage 21st-century learners and implement innovative, technology-enhanced teaching strategies.

Finally, the study underscores the critical role of mentorship and institutional support. Respondents emphasized the need for guidance from experienced educators, structured feedback, and professional development workshops. Teacher education institutions should institutionalize mentoring systems, ongoing competency-based training, and reflective practice opportunities to ensure sustained growth in pedagogical competence, confidence, and professional identity. By addressing these areas, programs can cultivate well-rounded, competent, and student-centered mathematics teachers equipped to meet the demands of primary education.

Conclusion

The findings of this study indicate that pre-service teachers demonstrate strong foundational knowledge in mathematics and a solid understanding of the K–12 curriculum, reflecting adequate cognitive readiness for teaching primary-level mathematics. However, their affective readiness, particularly teaching confidence, classroom presence, and self-efficacy, requires further development. The study also identified instructional skills, such as lesson planning, use of instructional materials, assessment design, and technology integration, as areas that benefit from practical reinforcement. The integration of quantitative and qualitative data highlights that teacher readiness is a multidimensional construct encompassing knowledge, pedagogical competence, and confidence, all of which are interrelated yet distinct. Strengthening these dimensions through experiential learning, reflective practice, and mentorship is essential for preparing pre-service teachers to deliver effective, student-centered mathematics instruction.

Recommendations

Based on the findings, it is recommended that teacher education programs implement a holistic approach to developing pre-service teachers' readiness. This includes integrating advanced content-enriched pedagogy with practical teaching experiences, such as microteaching, classroom simulations, and extended practicum placements, to enhance instructional competence and confidence. Programs should also embed training in digital pedagogy to improve proficiency in technology-enhanced mathematics instruction. Furthermore, establishing structured mentorship and peer feedback systems will provide ongoing professional guidance and reflective opportunities. By combining theoretical mastery with experiential learning, affective development, and institutional support, teacher education programs can cultivate well-prepared, confident, and adaptive mathematics educators capable of fostering meaningful learning experiences for primary-level pupils.

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APPENDIX

DEVELOPED TOOL OF THE STUDY

Readiness of Future Educators in Teaching Primary-Level Mathematics Scale (RFETPM)

Component	Details
Purpose of Utilization	Assess the readiness of pre-service teachers to teach primary-level mathematics, covering Teaching Confidence, Instructional Skills, and Mathematical Knowledge. Guide

	teacher education programs in identifying strengths, gaps, and training needs.
Target Users	- Teacher education institutions (program evaluation)- Faculty mentors and supervisors (monitor progress, design interventions)- Researchers (study teacher readiness and professional development outcomes)- Pre-service teachers (self-assessment and reflection)
Administration Procedure	1. Explain purpose, voluntary participation, and confidentiality.2. Administer the 19-item scale in print or online.3. Respondents rate each item on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).4. Allow 10–15 minutes for completion.5. Collect and encode responses for analysis.
Scoring and Interpretation	**Subscales:**- Teaching Confidence: Items 1–7- Instructional Skills: Items 8–13- Mathematical Knowledge: Items 14–19 **Overall Readiness:** Average of all 19 items**Interpretation:**4.21–5.00: Very High Readiness3.41–4.20: High Readiness2.61–3.40: Moderate Readiness1.81–2.60: Low Readiness1.00–1.80: Very Low Readiness
Utilization in Teacher Development	- Provide individual feedback on strengths and areas for improvement.- Aggregate data to evaluate program effectiveness.- Inform mentorship and targeted guidance.- Monitor readiness over time through repeated assessments.
Ethical Considerations	- Voluntary participation with informed consent.- Maintain confidentiality of individual scores.- Use results only for educational or research purposes.- Report aggregate data for program-level decisions.
Recommended Frequency of Use	- Initial assessment: Start of program or before practicum.- Mid-program evaluation: Monitor progress and adjust interventions.- End-of-program assessment: Measure readiness improvement and provide final feedback.

Overview

The Readiness of Future Educators in Teaching Primary-Level Mathematics Scale (RFETPM) was developed to measure the multidimensional construct of teacher readiness among pre-service education students. The scale consists of 19 items distributed across three factors: Teaching Confidence, Instructional Skills, and Mathematical Knowledge. Responses are rated on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Higher scores indicate greater readiness to teach mathematics at the primary level.

Factor 1. Teaching Confidence

(α = .89)

This dimension measures the pre-service teachers' level of assurance, motivation, and perceived self-efficacy in teaching mathematics to primary pupils.

Item No.	Item Statement
1	I feel prepared to face challenges in teaching mathematics.
2	I feel confident teaching mathematics lessons to a class of primary pupils.
3	I am confident in my ability to improve pupils' performance in mathematics.
4	I can handle pupils' questions in mathematics effectively.
5	I believe I can motivate pupils to enjoy learning mathematics.
6	I am comfortable speaking in front of pupils during math instruction.
7	I can manage classroom activities during mathematics instruction.

Factor 2. Instructional Skills

(α = .86)

This dimension assesses pedagogical competence in planning, delivering, and assessing mathematics instruction, including the integration of technology.

Item No.	Item Statement
8	I can prepare lesson plans that align with curriculum competencies.
9	I can use appropriate instructional materials and visual aids in teaching math.
10	I can apply different teaching strategies to cater to diverse learners.
11	I can adjust my teaching methods based on learners' needs and performance.
12	I can effectively integrate technology in teaching mathematics (e.g., videos, apps, digital boards).
13	I can assess pupils' learning through tests, activities, and performance tasks.

Factor 3. Mathematical Knowledge

(α = .84)

This factor measures understanding of mathematical concepts, problem-solving, and curriculum standards essential for primary-level instruction.

Item No.	Item Statement
14	I can connect mathematics concepts to real-life situations.
15	I am familiar with the K–12 curriculum standards in mathematics for primary grades.
16	I am knowledgeable in teaching problem-solving strategies in primary mathematics.
17	I understand the basic concepts of addition, subtraction, multiplication, and division.
18	I understand the common misconceptions pupils have in mathematics.
19	I can explain fractions, decimals, and percentages in ways that are easy for pupils to understand.

Scoring Procedure

Each item is rated on a **5-point Likert scale**:

Scale Point	Description
5	Strongly Agree
4	Agree
3	Neutral
2	Disagree
1	Strongly Disagree

Computation:

- **Teaching Confidence Subscale:** Sum of items 1–7
- **Instructional Skills Subscale:** Sum of items 8–13
- **Mathematical Knowledge Subscale:** Sum of items 14–19
- **Overall Readiness Score:** Average of all 19 items

Interpretation

Range	Interpretation
4.21–5.00	Very High Readiness
3.41–4.20	High Readiness
2.61–3.40	Moderate Readiness
1.81–2.60	Low Readiness
1.00–1.80	Very Low Readiness

Validation Notes

The PCA with Varimax rotation revealed three clear factors explaining a significant proportion of the total variance. Internal consistency reliabilities (Cronbach's alpha) were all above .80, indicating high internal reliability for each subscale. Factor loadings ranged from .55 to .83, meeting the recommended threshold for construct validity (Hair et al., 2019).