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Student Teachers' Perceptions of Mathematics Teaching Practice in Demonstration Schools: Implications for Professional Confidence and Readiness to Teach in Rwanda

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Abstract

Teaching practice is an important component of teacher education because it provides student teachers with opportunities to connect theoretical preparation with authentic classroom experiences. This study examined student teachers' perceptions of mathematics teaching practice in demonstration schools at Teacher Training College (TTC) Save, Rwanda, with particular attention to professional confidence, readiness to teach mathematics, supervision, feedback, and challenges experienced during practicum. The study adopted a pragmatic paradigm and a convergent parallel mixed-methods design. Quantitative data were collected mainly through structured questionnaires, while qualitative information was obtained through open-ended responses and complementary perspectives from demonstration-school teachers, TTC teaching-practice tutors, and the Director of Studies. The intended student-teacher sample was 90, with 88 valid student-teacher questionnaire responses available for analysis. In addition, usable responses were available from five demonstration-school teachers, six TTC teaching-practice tutors, and one Director of Studies. Descriptive statistics were used to analyze quantitative responses, while qualitative responses were organized thematically. The findings revealed strongly positive perceptions of mathematics teaching practice. A total of 95.5% of student teachers agreed that mathematics teaching practice improved their teaching skills, while 97.7% agreed that teaching practice increased their confidence in teaching mathematics. Furthermore, 96.6% agreed that teaching practice prepared them for their future teaching careers. Support from tutors and demonstration-school teachers was also perceived positively, with agreement levels of 84.1% and 86.4%, respectively. Feedback from tutors was particularly important, with 94.3% agreeing that it helped improve their mathematics teaching skills. However, challenges involving inadequate teaching and learning resources, limited preparation time, learner behavior, inconsistent feedback opportunities, and concerns about subject-specific supervision remained. The study concludes that teaching practice at TTC Save is generally perceived as a valuable component of teacher preparation and contributes substantially to student teachers' confidence and professional readiness. Strengthening supervision, feedback, resources, preparation time, and collaboration

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between TTC Save and demonstration schools could further improve the practicum experience.

Keywords: student teachers, mathematics teaching, teaching practice, practicum, professional confidence, teaching readiness, demonstration schools, Rwanda

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1. Introduction

Teaching practice is a fundamental component of teacher education because it provides student teachers with opportunities to connect theoretical knowledge with authentic classroom experiences (Aglazor, 2017). Through practicum, student teachers apply pedagogical knowledge, prepare and deliver lessons, interact with learners, manage classrooms, observe experienced teachers, and receive professional feedback. These experiences enable them to develop practical teaching competencies and understand the responsibilities associated with the teaching profession. Research indicates that the quality of teaching practice depends not only on exposure to classroom teaching but also on effective mentoring, structured supervision and opportunities for reflection (Poveda-García-Noblejas et al., 2023; Njiku, 2024).

The importance of teaching practice is particularly evident in mathematics education, where effective instruction requires teachers to integrate mathematical content knowledge with appropriate pedagogical approaches and an understanding of learners' needs. Mathematics student teachers must be able to explain abstract concepts, select appropriate instructional representations, encourage mathematical reasoning and respond to learners' misconceptions. Shulman (1986) emphasizes that effective teaching requires the integration of subject matter knowledge and pedagogical content knowledge. Similarly, research on mathematics teacher preparation highlights the importance of practical experiences, structured instructional activities and opportunities to develop confidence in teaching mathematics (Fu & Kartal, 2023; Hendricks et al., 2024).

Student teachers' perceptions of teaching practice are important because their experiences may influence their professional confidence, instructional beliefs and readiness to enter the teaching profession. Positive classroom experiences, successful teaching attempts, observation of experienced teachers and constructive feedback can strengthen student teachers' beliefs in their teaching capabilities. Bandura's (1977) social learning perspective explains how observation, modelling and social interaction contribute to learning and behavioural development. In addition, research on mathematics teacher self-efficacy demonstrates that practical teaching experiences and opportunities to engage in instructional activities can contribute to the development of confidence among prospective teachers (Fu & Kartal, 2023; Hendricks et al., 2024).

Mentorship, supervision and feedback are also essential elements of effective teaching practice. Demonstration-school teachers and college tutors support student teachers by providing professional guidance, observing classroom performance, identifying areas for improvement and encouraging reflection. A review by Wiese et al. (2024) emphasizes the importance of institutional collaboration, mentor preparation and structured support in ensuring quality learning during teaching practice.

Similarly, Njiku (2024), in a study conducted in Rwanda, found that student teachers generally valued mentorship during teaching practice, although some experienced inadequate support. These findings demonstrate that the quality and consistency of supervision are important considerations in teacher preparation.

In Rwanda, Teacher Training Colleges (TTCs) play an important role in preparing future primary-school teachers. Teaching practice in demonstration schools provides opportunities for student teachers to translate college-based learning into practical classroom competencies. However, the effectiveness of these experiences may depend on the availability of teaching resources, the quality of supervision, preparation time and collaboration between TTC tutors and demonstration-school teachers. Research on teacher preparation in Rwanda highlights the importance of strengthening the relationship between theoretical preparation, practical teaching experiences and school-based mentorship (Njiku, 2024; Wiese et al., 2024).

Against this background, the present study examines student teachers' perceptions of mathematics teaching practice in demonstration schools associated with Teacher Training College Save, particularly EP Save A and EP Save B. It focuses on how teaching practice experiences relate to professional confidence and readiness to teach mathematics, while also examining the support provided by tutors and demonstration-school teachers and the challenges encountered during practicum.

1.1 Problem Statement

Teaching practice is intended to prepare student teachers for the practical responsibilities of the teaching profession by enabling them to apply theoretical knowledge, develop instructional skills and gain experience in real classroom environments. However, the transition from college-based preparation to classroom teaching can present challenges involving lesson planning, classroom management, learner engagement, instructional strategies, teaching resources and professional supervision. Research has shown that the effectiveness of practicum depends on the quality of mentoring, collaboration between teacher education institutions and placement schools, and opportunities for reflection and constructive feedback (Wiese et al., 2024; Njiku, 2024).

These challenges may be particularly important in mathematics education because student teachers are expected to combine mathematical content knowledge with appropriate pedagogical approaches. They must explain mathematical concepts clearly, respond to learners' questions, identify misconceptions and use suitable teaching and learning materials. Limited opportunities to practise these competencies or receive mathematics-specific guidance may affect their confidence and perceived readiness to teach mathematics. Studies on mathematics teacher self-efficacy indicate that practical teaching experiences, instructional support and opportunities to develop teaching competence are important in strengthening prospective teachers' confidence (Fu & Kartal, 2023; Hendricks et al., 2024; Schanke, 2023).

Although research has examined teaching practice and mentorship in different educational contexts, there remains a need for context-specific evidence concerning how student teachers in Rwandan Teacher Training Colleges perceive mathematics teaching practice in demonstration schools. Njiku (2024) examined student teachers' mentorship experiences during teaching practice in Rwanda, highlighting both the value of mentorship and variations in the support received. However, further investigation is needed into how mathematics teaching practice experiences at TTC Save relate to

student teachers' professional confidence and readiness to teach mathematics, particularly in relation to supervision, feedback, teaching resources and classroom challenges. This study therefore seeks to address this contextual gap by examining student teachers' perceptions and identifying aspects of practicum that support or constrain their professional development.

1.2 Objectives of the Study

The general objective of this study was to examine student teachers' perceptions of mathematics teaching practice in demonstration schools, using TTC Save as a case study.

More specifically, this paper focuses on two related aspects of the broader study:

1. To Determine student teachers' perceptions of their mathematics teaching practice experiences.
2. To identify the professional competencies developed by student teachers through mathematics teaching practice
3. To identify the challenges faced by student teachers during Mathematics teaching practice

1.3 Research Questions

The paper addresses the following questions:

1. What are student teachers' perceptions of their teaching practice experiences during mathematics teaching practice in demonstration schools?
2. What are the professional competencies developed by students teachers through mathematics teaching practice
3. To identify the challenges faced by student teachers during teaching practice?

2. Literature Review

2.1 Teaching Practice as a Bridge between Theory and Practice

Teaching practice is widely recognized as an essential component of teacher education because it enables student teachers to connect theoretical knowledge acquired during coursework with practical classroom experiences. Through school-based practicum, student teachers develop opportunities to prepare lessons, apply instructional strategies, interact with learners and evaluate their teaching performance. Poveda-García-Noblejas et al. (2023) found that student teachers generally perceive teaching practicum as beneficial for professional skill development. Similarly, Wiese et al. (2024) emphasize that effective practicum requires meaningful connections between university-based learning and school-based experiences.

Practical teaching experiences also enable student teachers to develop instructional competencies by engaging with authentic classroom situations. In mathematics education, this includes explaining mathematical concepts, selecting appropriate instructional approaches, encouraging learner participation and responding to different levels of understanding. Fu and Kartal (2023) demonstrated

that structured mathematics teaching experiences can contribute to the development of preservice teachers' self-efficacy and teaching practices. In addition, Zonnefeld and Helming (2024) reported improvements in mathematics teaching self-efficacy following a structured field experience course. These findings support the importance of practical experiences in preparing student teachers for mathematics instruction.

2.2 Student Teachers' Perceptions of Practicum

Student teachers' perceptions provide an important indication of how they experience teacher preparation. Perceptions are influenced by the quality of supervision, relationships with mentor teachers, classroom environment, teaching resources, opportunities to teach, and feedback received.

The literature reviewed in the study suggests that positive practicum experiences can contribute to professional development and confidence. Bwiruka et al. (2021), for example, examined student teachers' perceptions and experiences of school practice and competence development in Uganda and highlighted the importance of school-based experiences in developing instructional preparedness.

Research in African contexts has also emphasized the importance of institutional support. Murangira, Uworwabayeho, and Twagilimana (2024), as discussed in the original study, indicate that mentoring and supportive environments influence the quality of teaching practice experiences.

The present study extends this discussion to mathematics teaching practice within a Rwandan TTC context.

2.3 Teaching Practice and Professional Confidence

Professional confidence is an important aspect of teacher preparation because student teachers need to believe in their ability to explain concepts, manage classrooms, respond to learners' questions and make appropriate instructional decisions. Bandura's (1977) social learning theory provides a useful perspective for understanding how observation, modelling and interaction contribute to learning. During teaching practice, student teachers observe experienced teachers, attempt instructional activities and receive feedback, which may strengthen their confidence and professional development. Research by Fu and Kartal (2023) indicates that structured mathematics teaching experiences can improve preservice teachers' self-efficacy, while Schanke (2023) highlights the importance of developing mathematical self-efficacy among prospective elementary teachers.

In mathematics education, professional confidence is particularly important because teaching mathematical concepts requires both subject knowledge and the ability to communicate abstract ideas effectively. Hendricks et al. (2024) examined self-efficacy among preservice mathematics teachers and highlighted its importance in relation to mathematics teaching. Similarly, Zonnefeld and Helming (2024) found that structured field experiences were associated with improvements in preservice elementary teachers' mathematics teaching self-efficacy. These studies suggest that opportunities to practice teaching, reflect on performance and receive guidance can contribute to the development of professional confidence.

2.4 Mentorship, Supervision and Feedback

Mentorship and supervision are essential components of teaching practice because they provide student teachers with professional guidance and opportunities to improve their instructional performance. Tutors and demonstration-school teachers support student teachers by observing lessons, discussing teaching approaches, identifying areas requiring improvement and encouraging professional reflection. Wiese et al. (2024) emphasize that the quality of school-based practicum depends on effective collaboration, structured mentoring and adequate support for mentors. In the Rwandan context, Njiku (2024) found that student teachers generally appreciated the mentorship they received during teaching practice, although the quality of support was not uniform across all experiences.

Feedback is particularly important because it enables student teachers to understand their strengths and weaknesses and make improvements in subsequent lessons. Effective feedback should address lesson planning, subject knowledge, instructional methods, classroom management, learner participation and assessment. Heinz (2024) identifies feedback, observation and post-observation reflection as important but sometimes challenging elements of practicum supervision. Furthermore, Mok and Staub (2021), through a meta-analysis of coaching, mentoring and supervision interventions, found that these forms of support can improve preservice teachers' instructional skills, particularly when supervisors model effective planning and teaching practices. This demonstrates the importance of providing timely, constructive and specific feedback during mathematics teaching practice.

2.5 Challenges in Teaching Practice

Although practicum is generally beneficial, student teachers may encounter several challenges. These include inadequate teaching materials, limited preparation time, learner behaviour, large classes, difficulties with learner engagement, and insufficient opportunities for feedback.

The present study identified similar challenges at TTC Save. These challenges are important because they demonstrate that positive perceptions of teaching practice coexist with difficulties. Therefore, the effectiveness of practicum should not be understood as an absence of problems. Rather, teaching practice can be valuable precisely because it exposes student teachers to authentic challenges, provided adequate support is available to help them respond to those challenges.

2.6 Theoretical Framework

The study was grounded in Bandura's Social Learning Theory (1977) and Shulman's Pedagogical Content Knowledge (PCK) perspective (1986).

Bandura's Social Learning Theory is particularly relevant because demonstration-school teaching practice is inherently social. Student teachers observe experienced teachers, interact with learners, practise teaching, receive feedback and modify their behaviour. Through these processes, student teachers develop perceptions of teaching and beliefs about their own capacity to teach.

Shulman's PCK perspective complements Social Learning Theory by emphasizing the relationship between content knowledge and pedagogy. Mathematics student teachers need not only mathematical knowledge but also knowledge of how mathematical ideas can be represented, explained and taught to learners.

For this paper, Bandura's framework is especially useful in explaining the development of confidence. Repeated opportunities to observe, practise and receive feedback may contribute to student teachers' perceptions of their capability. Shulman's framework provides additional understanding of why mathematics teaching practice requires student teachers to transform mathematical knowledge into teachable forms.

3. Methods

3.1 Research Paradigm

The study adopted a pragmatic research paradigm. Pragmatism was considered appropriate because the study combined quantitative and qualitative forms of evidence to develop a practical understanding of mathematics teaching practice at TTC Save.

3.2 Research Approach and Design

A mixed-methods approach was employed. The study used a convergent parallel mixed-methods design in which quantitative and qualitative information were considered together to provide a more comprehensive understanding of the research problem.

Quantitative data were obtained mainly through structured questionnaires. Qualitative information was obtained from open-ended questionnaire responses and complementary perspectives from other participants involved in teaching practice.

3.3 Study Context

The study was conducted at Teacher Training College Save and its associated demonstration schools, EP Save A and EP Save B. The participants were primarily Year Two student teachers enrolled in Science, Mathematics and Education (SME) and Early Childhood and Lower Primary Education (ECLPE) programmes.

The demonstration schools provide practical environments in which student teachers can observe experienced teachers, conduct lessons, interact with learners and receive feedback.

3.4 Participants and Sample

The intended student-teacher sample consisted of 90 participants: 45 student teachers from one selected Year Two SME class and 45 from the Year Two ECLPE class. The final dataset contained 88 valid student-teacher questionnaire responses.

For triangulation, the study also included five demonstration-school teachers, six TTC teaching-practice tutors and one Director of Studies. These participants were selected because of their direct involvement in supervising, supporting or coordinating teaching practice.

3.5 Data Collection

Structured questionnaires containing closed-ended and open-ended items were used. Closed-ended items were measured using a five-point Likert scale ranging from strongly disagree to strongly agree.

The questionnaire addressed student teachers' perceptions of mathematics teaching practice, support and guidance, confidence, readiness, teaching skills, challenges and feedback.

3.6 Data Analysis

Quantitative responses were organized and analyzed using frequencies and percentages. The findings were presented in tables and interpreted according to the research questions. Qualitative responses were analyzed thematically. Responses were organized into recurring themes relating to professional development, confidence, support, feedback, resources, preparation time, classroom management, learner engagement and supervision. The perspectives of demonstration-school teachers, TTC tutors and the Director of Studies were used primarily to triangulate the student-teacher findings.

3.7 Validity, Reliability and Trustworthiness

Content validity was supported through consultation with experts in mathematics education. The questionnaire was also pilot tested with student teachers who were not part of the main study. Reliability was addressed through clear questionnaire items and standardized administration procedures. The original methodology also proposed the use of Cronbach's alpha to assess internal consistency, with 0.70 or above identified as an acceptable threshold. For qualitative evidence, credibility, transferability, dependability and confirmability were considered.

4. Findings

4.1 Overall Perceptions of Mathematics Teaching Practice

The findings demonstrate that student teachers generally held positive perceptions of mathematics teaching practice.

Table 1. Student Teachers' Perceptions of Mathematics Teaching Practice

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Agreement
Mathematics teaching practice helped me improve my teaching skills	71 (80.7%)	13 (14.8%)	2 (2.3%)	2 (2.3%)	0 (0%)	95.5%
I received enough support from tutors during teaching practice	38 (43.2%)	36 (40.9%)	8 (9.1%)	3 (3.4%)	3 (3.4%)	84.1%
Demonstration-school teachers guided me effectively	30 (34.1%)	46 (52.3%)	8 (9.1%)	4 (4.5%)	0 (0%)	86.4%
Teaching practice increased my confidence in teaching mathematics	77 (87.5%)	9 (10.2%)	0 (0%)	2 (2.3%)	0 (0%)	97.7%
Teaching practice prepared me for my future teaching career	75 (85.2%)	10 (11.4%)	1 (1.1%)	1 (1.1%)	1 (1.1%)	96.6%

Source: Study questionnaire data.

The findings in Table 1, indicate that student teachers generally perceived mathematics teaching practice as an important contributor to their professional development. A total of 95.5% agreed that it

improved their teaching skills, suggesting that the practicum provided opportunities to translate theoretical knowledge into practical classroom competence.

The support provided by tutors and demonstration-school teachers was also positively evaluated, with 84.1% and 86.4% of respondents, respectively, expressing satisfaction with the guidance received. However, the neutral and negative responses indicate that the quality and consistency of supervision could be improved.

Regarding professional confidence, 97.7% of respondents agreed that teaching practice increased their confidence in teaching mathematics, while 96.6% indicated that it prepared them for their future teaching careers. Qualitative findings suggest that these outcomes were associated with opportunities to teach, interact with learners, observe experienced teachers and receive feedback. This is consistent with Bandura's Social Learning Theory, which emphasizes the role of observation, experience and feedback in learning and developing confidence.

Feedback was also considered an important contributor to professional development, with 94.3% of respondents agreeing that feedback from tutors helped improve their mathematics teaching skills. Student teachers indicated that feedback supported improvement in lesson planning, classroom management, teaching methods, learner engagement and time management. The positive views expressed by tutors and demonstration-school teachers further support the importance of feedback in strengthening student teachers' teaching practices.

4.2 Professional Competencies developed by student teachers

The findings indicate that mathematics teaching practice contributed positively to the development of student teachers' professional competencies, confidence and readiness to teach mathematics. Through practical classroom experiences, student teachers had opportunities to translate theoretical knowledge into practice, prepare and deliver lessons, manage classrooms, interact with learners and reflect on their teaching performance. These experiences provided opportunities to develop instructional skills and become more familiar with the responsibilities associated with mathematics teaching.

Figure 1, presents the percentage of student teachers who agreed that teaching practice contributed to the development of different teaching competencies.

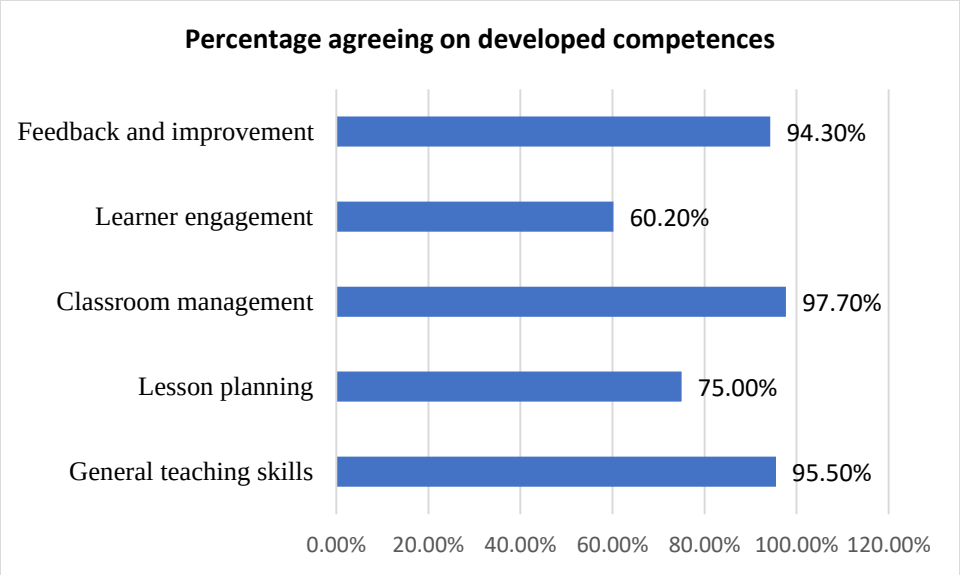


Figure 1: The student teachers' perceptions of the competencies developed through mathematics teaching practice

Figure 1 presents the student teachers' perceptions of the competencies developed through mathematics teaching practice. The findings indicate that the experience contributed positively to several aspects of their professional development, particularly classroom management (97.7%), general teaching skills (95.5%), and feedback and improvement (94.3%). These high percentages suggest that teaching practice provided student teachers with valuable opportunities to strengthen their instructional skills, manage classroom activities, and use feedback to improve their teaching. In addition, 75% of the respondents indicated improvement in lesson planning, suggesting that the teaching practice experience also supported their ability to prepare and organize mathematics lessons.

However, learner engagement received a comparatively lower percentage (60.2%), indicating that this remained a more challenging area for some student teachers. This difference suggests that, although student teachers felt they had developed important teaching competencies, engaging learners effectively in mathematics lessons may require further practice and support. Overall, the findings demonstrate that mathematics teaching practice contributed to the development of essential professional competencies, while also highlighting learner engagement as an area that requires additional attention in teacher preparation and school-based practice.

4.3 Challenges Affecting the Practicum Experience

Despite the strongly positive overall findings, 84.1% of student teachers agreed that they experienced challenges during mathematics teaching practice. The qualitative evidence identified several recurring challenges.

Teaching and Learning Resources

Inadequate teaching and learning materials were repeatedly identified by participants. Respondents referred to shortages of mathematics teaching aids, textbooks, chalk and other resources. The

Director of Studies also recommended additional mathematics videos and curriculum materials. These findings indicate that resource availability remains an important contextual factor affecting mathematics teaching practice.

Limited Preparation Time

Limited preparation time was another recurring challenge. Demonstration-school teachers reported that some student teachers prepared lessons hurriedly because of inadequate preparation time. Tutors similarly recommended adequate time and appropriate timetables for preparation. This suggests that teaching-practice scheduling can influence lesson quality and student teachers' preparedness.

Learner Behaviour and Engagement

Student teachers and supervisors reported challenges involving learner inattentiveness, disruptive behavior, large classes and differences in learner abilities. Although teaching practice improved classroom management for many student teachers, the persistence of classroom challenges demonstrates that authentic school experiences expose student teachers to situations that require continued professional development.

Limited Time for Feedback

Feedback was highly valued, but some participants indicated that there was insufficient time for detailed post-lesson discussion. This finding highlights an important distinction between observation and developmental supervision. Observation becomes more useful when accompanied by sufficient time for reflection and constructive feedback.

Subject-Specific Supervision

Some student teachers expressed concerns about receiving mathematics-specific feedback from supervisors who were not mathematics specialists.

General pedagogical supervision remains valuable for areas such as classroom management, communication and organization. However, mathematics teaching may also require subject-specific feedback concerning mathematical explanations, representations, questioning and problem-solving.

5. Discussion

The findings demonstrate that student teachers generally held positive perceptions of mathematics teaching practice. A total of 95.5% of respondents agreed that teaching practice improved their teaching skills. This finding suggests that practical classroom experiences provided opportunities to translate theoretical knowledge into instructional competencies. The result is consistent with Poveda-García-Noblejas et al. (2023), who highlighted the contribution of practicum to professional skill development. Similarly, Wiese et al. (2024) emphasized that meaningful school-based experiences help student teachers connect theoretical preparation with practical teaching responsibilities. Njiku (2024) also reported that student teachers in Rwanda regarded teaching practice as valuable for their professional development.

The findings concerning support from tutors and demonstration-school teachers indicate that most student teachers experienced positive supervision during practicum. Specifically, 84.1% agreed that they received sufficient support from tutors, while 86.4% reported effective guidance from demonstration-school teachers. These findings suggest that both college-based and school-based professionals contributed to student teachers' professional development. This is consistent with Njiku (2024), who identified mentorship as an important aspect of teaching practice in Rwanda. Wiese et al. (2024) similarly emphasize that effective practicum depends on collaboration between teacher education institutions and placement schools. However, the neutral and negative responses in the present study suggest that supervision was not experienced uniformly, reinforcing the need for consistent mentoring arrangements (Bjørndal et al., 2024).

Professional confidence was the strongest positive outcome reported in the study, with 97.7% of student teachers agreeing that teaching practice increased their confidence in teaching mathematics. The qualitative findings suggest that confidence developed through repeated opportunities to teach, interact with learners, observe experienced teachers and receive feedback. This finding can be explained through Bandura's (1977) social learning theory, which emphasizes observation, modelling and social interaction as important processes in learning. It is also consistent with Fu and Kartal (2023), who found that mathematics teaching methods experiences contributed to improvements in preservice teachers' self-efficacy. Hendricks et al. (2024) similarly highlight the importance of self-efficacy in preparing prospective mathematics teachers for instructional responsibilities.

The finding that 96.6% of student teachers agreed that teaching practice prepared them for their future teaching careers indicates that participants viewed practicum as an important transition between college-based preparation and professional teaching. Through practical experiences, student teachers had opportunities to prepare and deliver lessons, interact with learners, manage classroom situations and receive professional guidance. These findings are consistent with Poveda-García-Noblejas et al. (2023), who identified practicum as an important contributor to professional development. Wiese et al. (2024) also emphasize that authentic school-based experiences support the development of professional competencies when they are connected effectively with teacher education programmes. In addition, Njiku (2024) found that student teachers in Rwanda generally regarded teaching practice as valuable for their future careers.

Feedback emerged as another important component of professional development, with 94.3% of student teachers agreeing that feedback from tutors helped improve their mathematics teaching skills. Participants indicated that feedback contributed to improvements in lesson planning, classroom management, instructional approaches, learner engagement and time management. This finding supports the argument that supervision should involve more than classroom observation and should include constructive discussion and reflection. Mok and Staub (2021) found that coaching, mentoring and supervision can improve preservice teachers' instructional skills, particularly when supervisors demonstrate effective teaching and planning practices. Similarly, Bjørndal et al. (2024) emphasize the importance of feedback and reflection while identifying challenges that may affect their effective implementation during practicum.

Despite the positive perceptions, 84.1% of student teachers reported experiencing challenges during mathematics teaching practice. The qualitative findings identified inadequate teaching and learning resources, limited preparation time, learner behaviour, insufficient feedback opportunities and

concerns about subject-specific supervision. These challenges demonstrate that positive practicum experiences can coexist with institutional and classroom difficulties. This finding is consistent with Bjørndal et al. (2024), who identified several challenges affecting the supervision process, including time limitations, feedback and collaboration. Wiese et al. (2024) also highlight the importance of institutional support and effective partnerships in addressing difficulties associated with school-based teacher preparation.

The challenges involving subject-specific supervision are particularly relevant to mathematics education. Although general pedagogical supervision may help student teachers improve classroom organization, communication and lesson delivery, mathematics teaching also requires guidance on mathematical explanations, representations, questioning and problem-solving. Shulman (1986) emphasizes the importance of pedagogical content knowledge in transforming subject matter into forms that learners can understand. Similarly, Hendricks et al. (2024) highlight the importance of developing the knowledge and confidence required for effective mathematics instruction. Therefore, mathematics student teachers may benefit from supervision that combines general pedagogical guidance with subject-specific professional support.

The convergence of findings from student teachers, demonstration-school teachers, TTC tutors and the Director of Studies strengthens the interpretation of the study results. Different participant groups identified similar strengths and challenges relating to teaching skills, professional confidence, feedback, resources and preparation time. Such triangulation provides a broader understanding of the practicum experience by incorporating perspectives from individuals directly involved in teaching practice. This approach is consistent with the emphasis on collaboration and multiple forms of professional support in effective teacher preparation (Wiese et al., 2024; Bjørndal et al., 2024; Njiku, 2024).

5.1 Implications for Teacher Education

The findings have several implications for teacher education in Rwanda.

First, teaching practice should continue to occupy an important position within TTC programmes because student teachers perceive it as contributing substantially to teaching skills, confidence and professional readiness.

Second, supervision should be strengthened. The generally positive findings should not obscure the minority of student teachers who reported insufficient support. TTCs and demonstration schools should therefore establish consistent supervision arrangements.

Third, feedback should be protected within teaching-practice schedules. Supervisors need adequate time not only to observe lessons but also to conduct meaningful post-lesson discussions.

Fourth, teaching-practice arrangements should provide adequate preparation time. Student teachers need time to understand the learners, prepare lesson plans, select resources and anticipate classroom challenges.

Fifth, mathematics-specific supervision should complement general pedagogical supervision. Student teachers can benefit from general advice concerning classroom organization while also receiving mathematics-specific guidance from mathematics teachers or mathematics teaching-method tutors.

Finally, teacher education institutions should address resource constraints. Mathematics teaching may require appropriate textbooks, teaching aids, curriculum materials and digital resources.

6. Conclusion

This study examined student teachers' perceptions of mathematics teaching practice in demonstration schools at TTC Save, with particular attention to professional confidence, readiness, support and challenges. The findings show that student teachers generally have highly positive perceptions of teaching practice. Most respondents reported improvement in their teaching skills, while very high proportions reported increased confidence and greater readiness for their future teaching careers. The study also demonstrates the importance of tutors, demonstration-school teachers and feedback. The majority of student teachers perceived tutor support and school-based guidance positively, and 94.3% agreed that feedback from tutors helped them improve their mathematics teaching skills. Nevertheless, positive perceptions coexist with challenges. Inadequate teaching and learning materials, limited preparation time, learner behavior, limited time for detailed feedback and concerns about subject-specific supervision remain important issues.

The study therefore concludes that mathematics teaching practice at TTC Save is a valuable component of teacher preparation. Its contribution can be strengthened through consistent supervision, adequate preparation time, constructive feedback, improved teaching resources and closer collaboration between TTC Save and demonstration schools.

6.1 Recommendations

Based on the findings, the following recommendations are made.

Teacher Training Colleges

Teacher Training Colleges should strengthen pre-practicum preparation so that student teachers are better equipped to deal with authentic classroom situations. TTCs should establish clear coordination mechanisms between college tutors and demonstration-school teachers to ensure consistency in expectations, supervision and assessment. Adequate time should be allocated for classroom observation and post-lesson feedback. TTCs should strengthen student teachers' preparation in learner engagement, classroom management and mathematics-specific teaching strategies. Adequate mathematics teaching and learning resources should be made available to student teachers during teaching practice.

Demonstration-School Supervisors

Supervisors should provide timely, constructive and specific feedback after classroom observations. They should support student teachers in lesson preparation and classroom management and should demonstrate practical strategies where difficulties occur. Where possible, mathematics lessons should receive subject-specific guidance from mathematics teachers or supervisors with appropriate mathematics expertise. Supervisors should maintain regular communication with TTC tutors to ensure that student teachers receive consistent guidance.

Rwanda Education Board

The Rwanda Education Board should support TTCs and demonstration schools with relevant mathematics textbooks, curriculum materials, teaching aids and appropriate digital resources.

REB should strengthen guidance concerning the roles of tutors, demonstration-school teachers and other supervisors involved in teaching practice. Professional development opportunities for teachers who mentor student teachers should be strengthened, particularly in mentoring, classroom observation and feedback.

6.2 Limitations and Suggestions for Further Research

This study was conducted as a case study of TTC Save and its associated demonstration schools. Therefore, the findings should be interpreted within this specific context rather than assumed to represent all TTCs in Rwanda. The student-teacher analysis was based on 88 valid responses, while the other stakeholder groups were relatively small and were used primarily for triangulation. Future studies could include student teachers from several TTCs across different provinces of Rwanda. Comparative studies could examine whether perceptions differ according to institutional and school contexts. Longitudinal research could also investigate whether the confidence and readiness developed during teaching practice are maintained after student teachers enter the teaching profession. Further research could examine the relationship between supervision quality and professional confidence using more detailed quantitative measures.

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