

The Impact of Supervisors feedback in Extended Teaching on Pre-service Mathematics Teachers Practice

IF citations can be updated with recent ones, like 2015 and onwards, the better)

Abstract

This study examined the influence of supervisor feedback on the teaching practices of pre-service mathematics teachers during Extended Teaching (off-campus teaching practice). The research design adopted for the study was action research. The target population was level 400 students of a College and the population size was three hundred and ninety-two (392) whilst the sample size was sixty-three (63), comprising of pre-service mathematics teachers, which was selected based on purposive sampling. The instrument used for the study was Intern Teaching Assessment Form (ITAF). In the pre-intervention stage, a first supervision was conducted to identify the strength and weaknesses of the students before the feedback from the observation was discussed and reflections were held with the pre-service teachers to serve as the intervention. A second supervision was conducted to evaluate the intervention strategies. The results of the study showed a significant improvement in students' second supervision scores ($M=71.0000$) compared to the first supervision scores ($M=64.8033$). A third supervision was conducted 7 weeks after the post-test using ITAF to check students' retention of teaching skills and knowledge, which the result showed no significant improvement in pre-service mathematics teachers' second supervision scores ($M=71.0000$) compared to the third supervision scores ($M=71.1475$), indicating pre-service mathematics teachers' retention of the teaching skills and knowledge had been exceptionally good. Supervisors' post-observation feedback enhances pre-service mathematics teachers' interpersonal communication, classroom management, student support strategies, leadership, and practical knowledge of standard-based curriculum implementation, thereby improving their instructional style. The study recommends the extension of the Extended Teaching duration to encompass an entire academic year in order to enhance the practical component of the preservice teacher training program and potentially impact the quality teaching and learning policy agenda.

Keywords: *Extended teaching, off-campus teaching practice, post-observation discussion, supervisors' feedback, developing teaching skills.*

Introduction

Teacher training programs in all disciplines play a vital role in preparing competent aspiring teachers for the educational needs of upcoming generations. Considering this, the training of a pre-service teacher is more challenging than commonly perceived. The situation is quite intricate due to the numerous aspects that must be taken into account, ranging from imparting pupils with theoretical information to providing them with practical experiences necessary for applying that theory. These experiences allow students to contemplate their own practices in the field and assess their own progress through hands-on experiences. Through this method, students can discover genuine possibilities to assess their progress in terms of achieving their full potential in their professional endeavors.

The significance of teaching practice in teacher training institutes lies in its ability to enhance the pedagogical skills of pre-service teachers. According to Abdulla and Mirza (2020), teaching practice offers pre-service teachers a range of experiences specifically aimed at facilitating their development into effective educators. Gürsoy (2013) agrees that teaching practice is crucial for both the teacher trainer and the pre-service teacher. In addition, engaging in teaching practice allows pre-service teachers to assess their ability level, rectify specific errors, and work on their areas of weakness (Kale, 2011). Copland (2010) emphasizes that teaching practice offers assistance to pre-service teachers through the guidance of experienced teachers at the schools where these students are placed, as well as supervisors from institutions that provide qualifying programs.

Field experiences, such as school practicum, are considered essential components of teacher training programs (Giebelhaus, 1994; Lignugaris-Kraft & Marchand-Martella, 1993; Warger & Aldinger, 1984). A pre-service teacher may demonstrate proficiency in a practicum classroom, but this could be attributed to the assistance of a more experienced classmate or the guidance provided by a senior individual. This perspective aligns with the Zone of Proximal Development framework proposed by Vygotsky, a leading figure in the Social Constructivist View (Chaiklin, 2003). Evidence suggests that teachers can effectively modify their teaching methods when they get constructive and systematic feedback on their practices (Greenwood & Maheady, 1997). Providing feedback to students is widely recognized as one of the most effective methods for improving student learning. Consequently, students have the opportunity to stay focused and generate recommendations for improvement in areas where they may struggle. Receiving appropriate feedback can be beneficial for a student's

understanding of their progress and identifying areas where additional knowledge is needed (Lemley, 2005). Moreover, feedback can also offer instructional insights to the student, elucidating the reasons behind the correctness or incorrectness of an answer. Hence, providing feedback to student teachers is crucial for their professional growth as educators. Through this approach, student instructors can get insight into their strengths and limitations during their practical teaching experiences. Research has shown that any quantity of feedback is more beneficial than no input at all. Additionally, there is a strong association between the amount of information provided in feedback and its impact on students' understanding and subsequent performance (Cyboran, 1995; Olina & Sullivan, 2002; Lemley, 2005).

Pre-service teachers can effectively utilize the theoretical knowledge acquired throughout their teaching practice. Surucu, Unal, and Yildirim (2017) contend that the theoretical knowledge of pre-service teachers is meaningful only when they possess the necessary knowledge, abilities, attitudes, and behaviors for classroom practice. The seasoned educators and supervisors of teaching practice provide the necessary expertise and knowledge to prospective teachers regarding the art of teaching and the means to enhance their teaching abilities during practice sessions. Copland (2010) asserts that both the seasoned instructor and the supervisor play a crucial role in providing assistance to pre-service teachers as they acquire teaching skills. They offer guidance and recommendations during teaching practice to enhance performance, and evaluate students based on a predetermined set of criteria.

Numerous researches have been conducted to examine the impact of feedback on the process of learning. As per the literature, feedback is characterized by being systematic, positive, and corrective, as indicated by Cossairt, Hall, and Hopkins (1973) and Hao (1991). Supporters of operant learning theory argue that providing exact, quick, and frequent feedback enhances the effectiveness and efficiency of learning in students of school age (Van Houten, 1980; Wallace & Kauffman, 1973). According to the literature, it is acceptable to believe that providing corrective and quick feedback is applicable to teacher training field experiences. Nevertheless, the evaluation of the influence of feedback from supervisors and pre-service teachers on off-campus teaching practice in Ghana seems to have been neglected. Furthermore, following the introduction of the new college of education curriculum in 2018, it has become evident that there is a dearth of research assessing the impact of supervisors' post-observation feedback on the teaching practices of pre-service mathematics teachers

during off-campus teaching practice in the Western North region of Ghana. Hence, the objective of this research was to examine the impact of supervisors' post-observation feedback on the teaching practices of pre-service mathematics teachers in the off-campus teaching practice within the Sefwi Wiawso Municipality.

Research Questions

1. What is the effect of supervisor's post-observation engagement on pre-service mathematicsteachers teaching performance?
2. To what extent will supervisor's post-observation engagement improve the retention of pre-service mathematicsteachers teaching skills and performance?
3. What are pre-service mathematicsteachers perceptions about the benefits of Extended Teaching to their professional development?

(should ask about the results of the pre and post assessments and then the significant difference of pre and post observation assessments)

Literature Review

Theoretical framework

The conceptual framework is an extensive approach that incorporates elements from the paradigms of professionalization and reflective practice. The professionalization and reflective practice paradigms serve as overarching frameworks for examining the process of teacher development. This literature study examines the concept of reflective practice in the professional growth of teachers.

Enhancing the caliber of teachers frequently relies on engaging in critical analysis of pedagogical approaches. According to Schon (1983), reflection-on-action refers to the process of contemplating how one's actions can be enhanced, modified, or refined after they have taken place. Reflection is a valuable tool for instructors, especially those working in low-resource, remote, rural settings, to enhance their teaching methods. Dewey (1933) and Schon (1983) establish the fundamental basis for molding the practice of teachers to be reflective. Reflective practice is based on the philosophical principles established by John Dewey. Dewey (1933) argued that reflection involves the cognitive process of contemplating and facilitating learners' understanding of the what, how, and why of knowledge absorption. Dewey (1933) advocated for teachers to engage in introspective analysis and discernment of their own selves and the surrounding contexts. Dewey (1933) provided a definition of

reflective practice as, "...the ground or basis for a belief is deliberately sought and its adequacy to support the belief examined" (pp. 1-2). In furtherance, Dewey(1933) described reflection as, "thinking that consists of turning a subject over in the mind and giving it serious and consecutive consideration" (p. 3).

Schon (1983) in his study introduced a framework consisting of four levels of reflective practice. These levels include knowledge-in-practice, which involves applying a teaching technique in a real-world setting; reflection-in-practice, which entails reflecting on a specific practice; reflection-in-action, which involves reflecting on a situation while there is still an opportunity to make changes; and reflection-on-action, which involves critically analyzing past actions to inform future behavior. The professionalization paradigm suggests that teacher education should cultivate reflective practitioners who can adjust their teaching methods to suit the specific setting in which they are working (Darling-Hammond, 2006, 2010). Educational experts argue that engaging in reflective practice enhances the effectiveness of teachers (Fendler, 2003; Mayes, 2001). Weber (2013) contended that reflective practice "is a skill that is beneficial to pre-service teachers because it guides them to bridge the gap between theory and practice, and leads them to be more effective as teachers" (p. 53). Zeichner and Liston (1996) characterize reflective practice as a method for professional growth that prompts practitioners to examine their work "both inwardly at his or her own practice and outwardly at the social conditions in which this practice is situated" (p. 208).

Zeichner and Liston (1996) argued that educators should possess the ability to make pedagogical decisions in accordance with specific circumstances and provide justifications for their choices. Weber (2013) proposed that, "Being a critically and reflectively thinking teacher means incorporating metacognition in order to inquire about an event or an issue, review the possibilities and choose the best solution for that event or issue" (p. 53). Anderson and Matkins (2011) also suggested that, "developing critical reflective practice abilities in teachers establishes skills that pre-service teachers need to reflect 'on action' and become skilled reflective practitioners" (p. 36).

Teaching practice in College of Education Context

The study is based on the recognition that teacher education has a significant role in both contributing to and resolving the issue of ineffective instruction by educators and the resulting poor learning outcomes of students (Akyeampong, Pryor, & Ampiah, 2006; Pontefract & Hardman, 2005). It can be inferred that high-quality initial training results in the

development of high-quality novice teachers (Cetin, 2013; Sen, 2010). A high-quality teacher practicum is essential for providing preservice teachers with the necessary training experience to tackle the challenges of teaching in actual schools. The indications of such a system can be inferred from the inputs and operations of the program. The framework for a high-quality practicum in a teacher education program should prioritize a well-structured and efficient design that improves the teaching experiences of aspiring teachers.

A variety of components of classroom instruction, including daily reviews, introduction of new material, guided practice, feedback and corrections, independent practice, and weekly and monthly reviews, have been found to have a significant correlation with students' academic performance. To clarify, the practice of systematically observing classrooms has yielded a significant body of knowledge that has enhanced our understanding of effective teaching. Discussions typically occur before and after observations, making classroom observations an important component of teacher development when considered within the wider framework of teaching practice.

In the opinion of Williams (1989), classrooms should prioritize development over judgment. This means that they should provide teachers with opportunities to enhance their awareness, ability to engage, and analyze their own teaching behaviors (Maingay, 1988; Williams, 1989). Undoubtedly, the classroom serves as a hub for various learning and teaching processes. It is crucial to consider both the subject of observation and the method of observation (Wajnryb, 1992). Typically, the focus is on observing the actions of the teacher and the actual occurrences within the mathematics classroom. Nevertheless, in addition to the teacher's involvement and impact on the situation, it is necessary to delineate the learners and their contribution (Allright, 1988). Moreover, to facilitate ongoing learning and investigation, it is crucial to meticulously and impartially document the occurrences within the classroom, rather than relying solely on subjective impressions (Allright, 1988; Wajnryb, 1992). Observation can vary in its scope, ranging from a broad perspective to a more specific one.

In the observation process there is an observation sheets that serve as valuable tools which allow for the completion of purposeful tasks and the collection of specific data for the purpose of reflecting on a particular area of interest (Wajnryb, 1992; Wallace, 1991). They assist the observer in comprehending and analyzing events in a methodical manner (Wajnryb, 1992). Consequently, they are suitable for use in observing the classroom and its activities, facilitating ongoing learning and discovery. Learning to teach involves both a recycling

process and a decision-making process. To achieve good training and development, a significant amount of reflection is necessary (Wallace, 1991). Observation is crucial for reflecting on the various processes that occur in the mathematics learning classroom. Recalling and analyzing data are essential for facilitating the reflective process.

The process of performing classroom observations involves three essential steps: the pre-observation conversation, the classroom visit, and the post-observation discussion. The pre-observation discussion: The pre-observation talk between the teacher and the observer serves to mitigate nervousness and furnish the observer with insights into the progress of the class and the objectives the pre-service teacher intends to achieve during the visit. Additionally, it allows the teacher to pinpoint specific areas in which they desire feedback. The Classroom Visit: The prospective teacher should have adequately notified the students that the educational institution has a policy requiring teachers to be observed in the classroom and get feedback on their teaching. Therefore, the observer should be formally introduced to the class. The observer should position themselves at the rear or on the periphery and refrain from disrupting the continuity of the class. The observer should document the initial activities witnessed, provide a concise summary, analyze and discuss the different room arrangements observed, identify all areas of the environment that necessitate students to learn and utilize specific procedures, list all classroom activities that occur during the period, including documenting how teachers address inappropriate behavior and reinforce appropriate behavior. The post-observation discussion should consist of a dialogue focused on evaluating the performance of the class, highlighting the areas of strength and shortcomings of the pre-service teachers that require improvement.

Student teachers get the chance to learn about the relationships and interactions between various concerns through observation and post-lesson conversations. This helps individuals advance their professional development and experience while also enabling them to acquire certain skills and approaches. Therefore, it is possible to view observation as a crucial tool for professional development for math teachers.

Method

Research Design

The researchers chose to use an action research design for the present study. This is a comprehensive investigation of school culture, pedagogy, and student accomplishment carried out by educators specifically for educators. The purpose of gathering this data is to

gain a deeper comprehension of the educational setting in schools and overall teaching methods, with the aim of implementing significant modifications that enhance student achievements.

Sample

The study was undertaken in a College of Education in Ghana. The participants were the second batch of fourth-year pre-service mathematics teachers who had experienced at least six semesters of field experience and one semester off-campus teaching practice as part of their professional preparation. A purposive sampling technique was used to select the population of the study. There are currently 392 level 400 pre-service teachers enrolled at the college, which served as the population of the research. Convenience sampling was employed in this study to select the sample. In total, 63 pre-service mathematics teachers from a level 400 classes participated in the study (51 males and 12 females). All the students who are pursuing mathematics at level 400 in the college took part in the study. They were between the ages of 18 and 26, of varying mathematical abilities.

Instrument

The main instrument for data collection were Intern Teaching Assessment Form which served as an observation checklist and a semi-structured interview guide. The researchers used these instruments to explore the impact of the post-observation engagement on the pre-service mathematics teachers' professional preparation. The Intern Teaching Assessment Form (ITAF) were used to collect quantitative data in order to determine the impact of post-observation conference on teaching performance of pre-service mathematics teachers. The ITAF consisted of 25 items that is designed to measure pre-service mathematics teachers' performance during off-campus teaching practice. Aspects of the program such as the number of supervisors assigned to observe each pre-service teacher and the duration of the lessons were observed. Each trainee had an average of 50 minutes to deliver a lesson under a supervisor at two separate instances, including post-teaching comments. Students' scores were recorded after each performance was graded out of a possible hundred (100) marks. Additionally, an open-ended questionnaire was used to collect qualitative data on students' views about the perception of post-observation engagement to their professional development.

Data collection

The commencement of data gathering took place in the partner schools throughout the period from February to May 2023. Written communication was used on February 14, 2023, to contact the headteachers of the partner schools in order to discuss the possibility of gaining admittance and access to the basic educational institutions and students for the study. The study's objective and the data to be gathered were elucidated to them. As a result, we received the dates for the off-campus teaching practice of the final year students in the 2022-2023 academic year, and we shared the data collection plan with each basic school. Researchers inquired for the agreement of students at every school, allowing them to participate and withdraw at their own discretion, following a clear explanation of the study's objectives and approach to ensure they were fully aware of what to anticipate. In order to address the potential outcomes of the interview and ensure confidentiality, the participants were informed about the potential effects of the study on them and were assured that their information would be kept secure and anonymous. A total of 3 months was allocated for conducting off-campus teaching practice observations in 56 elementary schools, with a 100% participation rate in each instance.

In the second phase of data collection which followed immediately after the off-campus teaching practice observation with the same group of final year students, 4 days were used to conduct students' interviews involving five pre-service mathematics teachers. In some cases, interviewee words were recorded directly, and sometimes the researcher paraphrased the interviewee's word, and with their consent.

Validity and Reliability

The accuracy of the test items (I believe the better word is a likert scale questionnaire) was verified by an experienced senior lecturer in mathematics education at University of Education, Winneba and two other members of the researcher's department. The validation of the test was influenced by various factors, including the concepts, skills, difficulty level, clarity of the questions, and the language used. The views and ideas provided by the experts were utilized to refine the assessment tools. The dependability (Me: I believe the better word is RELIABILITY) coefficient, determined by the application of the Cronbach Alpha method, yielded a value of 0.78. The rating is exceptional, signifying a significant level of instrument reliability.

Intervention Activities (Me: what is the name of the intervention? What is the design of this intervention? How it is conducted and implemented?) What is first supervision, second supervision, third supervision?

To obtain a level of independence is not something that materializes overnight: it is established overtime as supervisors interact with their supervisees and provide feedback on their performance. Therefore, delivering feedback is crucial to the supervisory process, as it provides a significant type of teaching. The post-observation discussion was conducted based on the guidelines proposed by Martin and Atteh (2021). The activities are elaborated below;

Supervisors feedback on observed teaching performance

- ✓ Identifying strength and achievements.
- ✓ Identifying weaknesses and areas for development.
- ✓ Agreeing supports needs with the mentee.

Supervisors engage in a comprehensive discussion with pre-service teachers

- ✓ Exploring options in terms of teaching methods and resources for delivery.
- ✓ Coaching specific skills and techniques related to teaching some selected topic/concept.
- ✓ Engaging in discussions on professional issues.

After a successful supervisory process, the pre-service mathematics teacher sets new target for future action.

Data Analysis

The study employed descriptive and inferential analysis techniques in analysing the quantitative research data. The scores recorded base on pre-service mathematics teachers first, second and third supervision during off-campus teaching practice observation were analysed using Statistical Package for Social Science (version 20) software, and the findings were presented in mean, standard deviation, and t-test. Data from the interviews were transcribed and thematically analyzed. I suggest you use statements of the participants of the participants to support the result of study instead of themes . Thematizing is a rigorous process. You are utilizing action research not a mixed method or pragmatic research

Results and Discussion

The pre-service teachers' data was analyzed using the Statistical Package for Social Science (SPSS) software version 20. Descriptive statistics and a paired sample t-test were used to analyze the data to determine the level of the **impact of the interventions**.

The effect of supervisors' feedback on pre-service mathematics teachers' teaching practices

The researchers undertook inferential analysis of the first and second supervision, and the data used for this analysis were the scores obtained by the students on both supervisions. Table 1 indicates the mean and standard deviation of the paired samples. The results showed that the second supervision scores were higher than the first supervision scores. The mean scores of the first and second supervision were 64.8033 and 71.0000, respectively, resulting in a mean difference of 6.2, indicating an appreciable difference. This demonstrated that pre-service teachers improved in their teaching practices after the post teaching interaction with the supervisors in the first supervision. And this was attributed to the intervention processes the researchers took the students through.

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Table 1: Paired sample statistics of first and second supervision scores

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 first supervision	64.8033	61	4.47146	.57251
Pair 1 second supervision	71.0000	61	3.67877	.47102

Table 2: Paired T-test analysis of means of first and second supervision

	Mean	Std Deviation	T	Df	Sig (2-tailed)
First&Second Supervision	-6.2	2.6	-18.4	60	.000

A paired-samples t-test in Table 2 indicated a test statistic of -18.4 and a p-value of 0.000 with 60 degrees of freedom. The two-tailed p-value of 0.000 is far less than the conventional 0.05 level of significance. There is therefore enough evidence to conclude that there is a

significant difference between the pre-service teacher's first and second supervision mean scores. This suggests that the feedback provided by supervisors during the first supervision in off-campus teaching practice which served as the intervention was effective in improving the pre-service mathematics teachers' achievement in the teaching practice. In other words, the results indicate that the intervention (post observation discussion) had a positive impact on the participants' performance, and the feedback provided by supervisors played a crucial role in this improvement.

Moreover, the statement that "the feedback provided by supervisors during the teaching practice intervention was effective" is supported by the fact that the mean scores increased significantly from the first to the second supervision. This indicates that the feedback provided by supervisors was helpful in improving the pre-service teachers' teaching skills and knowledge. This highlights the common experience of researchers that providing constructive feedback after observing teaching sessions is beneficial for the growth of pre-service teachers, enabling them to become proficient prospective professionals (Abdulla and Mirza, 2020). This feedback can be delivered through both oral and written means, fostering contact and communication between the observer and the teacher (Ali and Al-Adawi, 2013). (Me: Use ampersand "&" when you use parenthetical citations. Make changes of the rest of the citations)

This emphasizes the significance of delivering efficient feedback to educators, both during their educational preparation and throughout their professional trajectories. Offering teachers continuous feedback and support from their peers or superiors can enhance their teaching methods and keep them informed about current research and optimal educational approaches. Supervisors and mentors should undergo training to acquire the skills necessary to deliver constructive feedback that is precise, practical, and centered on the areas in which the teacher can enhance their performance. Efficient feedback can assist educators in pinpointing areas for improvement and advancement, hence enhancing their teaching methodology. This finding aligns with the research conducted by Akcan and Tatar (2010), which suggests that engaging in post-observation reflections enables pre-service teachers to engage in critical evaluation of their lessons.

The retention of teaching skills among pre-service mathematics teachers after supervisors feedback during Extended Teaching

From Table 3, the mean scores of the second and delayed supervision were 71.0000 and 71.1475, respectively, resulting in a mean difference of 0.15, indicating no appreciable difference. Since there was no statistically significant difference between second and third supervision scores, this suggests that students retained a high level of knowledge regarding the teaching skills covered during the interventions. This is due, once again, to the supervisor's intervention procedures through post teaching discussions that they went through with the students.

Table 3: Paired sample statistics of second and delayed supervision scores

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1 Second supervision	71.0000	61	3.67877	.47102
Third supervision	71.1475	61	3.40507	.43598

Table 4: Paired T-test analysis of means of first and second supervision

	Mean	Std. Deviation	T	Df	Sig. (2-tailed)
Second&ThirdSupervision	-0.15	1.4	-0.8	60	.425

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A paired-sample t-test in Table 4 indicated a test statistic of -0.8 and a p-value of 0.425 with 60 degrees of freedom. The two-tailed p-value of 0.425 is far greater than the conventional 0.05 level of significance ($p > 0.05$). There is therefore enough evidence to conclude that there is no significant difference between the pre-service math teacher's second and delayed supervision scores. There is therefore a clear indication that there is good retention of teaching skills among pre-service math teachers when they are engaged in a positive discussion and feedback section after teaching practice observations. The results suggest that positive discussion and feedback sessions can be an effective way to help pre-service math teachers retain their teaching skills. Such sessions may involve discussions of effective teaching strategies, reflection on teaching practice, and feedback from peers or mentors. This further indicates that providing pre-service math teachers with opportunities to engage in

positive discussion and feedback sessions after their teaching practice observations can help them retain their teaching skills over time. These findings align with the research conducted by Calleja et al. (2016), which indicates that providing feedback after classroom observations enhances the critical thinking abilities and strengthens the pedagogical skills of pre-service teachers. This could be an effective way to ensure that pre-service teachers are well-prepared for their future careers and are able to provide high-quality instruction to their students.

The pre-service mathematics teachers' perceptions about the benefits of teaching practice to their professional development

Students' general views about the relevance of post-observation engagement during teaching practice were collected through an open-ended interview after the delayed test was conducted. The opinions of five (5) pre-service mathematics teachers who participated in the interview were presented below.

PT 1: I have developed an interpersonal communication skill through rigorous interaction with my mentors and learners. And through this interaction I have acquired new knowledge from my mentors through observation thereby igniting my interest in the profession over this period of time.

The comment from PT 1 suggests a purposeful endeavor to improve one's ability to communicate with others by engaging in deep interactions with mentors and learners. Their recognition of gaining new knowledge through observation suggests a thoughtful learning method, igniting a true enthusiasm for their career over a prolonged duration. In summary, the comment highlights the significance of mentorship, incremental skill enhancement, and the profound influence of human interaction on professional advancement.

PT 2: The engagement with supervisors in teaching practice helped me in the acquisition of new knowledge in teaching methodologies, classroom management and student support strategies. This activity deepened my commitment towards teaching and fostering a passion for student empowerment.

The response from PT 2 underscores the tangible advantages of actively involving supervisors during teaching practice, placing particular emphasis on the acquisition of knowledge in teaching approaches, classroom management, and student assistance measures. This event is depicted as a catalyst for professional development, implying a practical learning style that surpasses just theoretical comprehension. In addition, the response highlights the significant influence on the individual's dedication to teaching and enthusiasm for empowering students, demonstrating a substantial congruence between personal values and the broader objectives of education.

PT 3: *The experience gained during this extended teaching aided in improving my speaking and listening skills, strengthen of leadership skills. Learning of how to navigate challenging situations in the classroom. This experience can impact me positively to become a good mathematics teacher in a near future.*

The notion emphasizes the beneficial effects of a internship teaching experience on individuals' communication and leadership abilities, specifically focusing on enhancements in articulation, listening skills, and adeptly handling difficult classroom circumstances. The experience is considered a valuable preparation for becoming a proficient mathematics teacher in the near future, indicating a practical and hands-on learning method. In summary, the response highlights how the teaching experience has a profound impact on developing the individual's abilities and preparedness for their future profession.

PT 4: *The internship attachment helped in developing effective teaching practices which helped in enhancing my instructional style as prospective teacher. Thus, assisting me to develop the skills of engaging, exploring, explaining, elaborating and evaluating lessons in mathematics and its related subjects.*

The PT 4 emphasizes the beneficial impact of an internship attachment on their acquisition of good teaching practices, resulting in an improved instructional approach as a future teacher. The acquisition of specific abilities, such as effectively engaging, investigating, explaining, elaborating, and evaluating lessons in mathematics and related disciplines, demonstrates a focused enhancement in pedagogical strategies. In summary, the response highlights the tangible influence of the internship on the individual's preparedness and proficiency in the realm of mathematics education.

PT 5: *The activities involved in the whole internship period aided me and my colleagues to gain practical knowledge about the standard based curriculum and its implementation by teachers. It taught us how to teach using the National Teaching Standards (NTS) as a classroom manual.*

The response stresses that the internship activities provide practical knowledge regarding the standard-based curriculum, providing hands-on experience in implementing it. In addition, the response highlights the significant educational benefit of comprehending the utilization of the National Teaching Standards (NTS) as a guide for classroom instruction, emphasizing a pragmatic and uniform methodology for classroom instruction. Overall, the internship has provided the individual and colleagues with a comprehensive understanding of theory and practical skills in curriculum implementation and adherence to teaching standards.

Major Findings

1. The post-observation feedback from supervisors in the Extended Teaching had a positive impact on pre-service mathematics teachers teaching skills and knowledge since there was a significant difference between their first and second supervision scores in favor of the second supervision result.
2. The post-observation feedback from supervisors in the Extended Teaching had a positive impact on pre-service mathematics teachers by aiding good retention of teaching skills over time among them since there was no significant difference between their second and third supervision results.
3. The post-observation feedback from supervisors in the Extended Teaching gives pre-service mathematics teachers benefits such as developing interpersonal communication skills, classroom management skills, student support strategies, speaking and listening skills, leadership skills, practical knowledge about the standard based curriculum and its implementation by teachers and enhancing prospective teachers instructional style.

Conclusion and recommendation

This study examined the influence of supervisor feedback on the teaching practices of pre-service mathematics teachers during Extended Teaching (off-campus teaching practice). The results of this study demonstrated that post-observation feedback offers specific advantages for pre-service teachers. Evidence clearly indicates that post-observation feedback has significantly enhanced the pedagogical practices of pre-service mathematics teachers. (Me: The result of the study indicates only that the difference between first and second supervision is significant but not the second and third supervision). This feedback has played a crucial role in retaining and further developing their acquired skillset, as well as fostering the essential skills required for the teaching profession. This improvement has been achieved through the process of reflecting on lessons and engaging in discussions with their supervisors. Ultimately, our research indicates that the Extended Teaching program effectively achieves its objective of familiarizing trainees with the teaching profession and providing them with a clear understanding of what they might anticipate in their future work environment. This includes various aspects such as developing lesson notes, preparing teaching and learning materials, evaluating lesson notes, delivering lessons, overseeing the teaching process, and engaging in post-lesson discussions. This experience proves to be useful as it allows them to evaluate and improve their lesson ideas, teaching materials, and delivery

through constructive criticism. Consequently, this process helps alleviate their fears and enhance their confidence for future teaching endeavors.

Furthermore, the timing of the Extended Teaching and the brief duration of the exercise tend to diminish the important role of the exercise in fully developing the trainees' reflective and critical teaching skills. However, it is recommended to extend the duration to encompass an entire academic year in order to enhance the practical component of the preservice teacher training program and potentially impact the achievement of the Ministry of Education's quality teaching and learning policy agenda. It is important to note that due to the limited scope of this study, a comprehensive longitudinal study may be necessary to fully comprehend the initial traits of pre-service teachers, their teaching skills during training, and their subsequent performance in schools after training. This information would be valuable for shaping policies and practices in the field.

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