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PERSEVERING THROUGH DIFFICULTIES: A STUDY ON THE CHALLENGES FACED BY MATHEMATICS EDUCATION STUDENTS DURING MACRO-TEACHING

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Abstract: This study aimed to examine the challenges encountered by mathematics education students during their macro-teaching practice. A descriptive survey design was employed for the study, and a sample of 35 final year students pursuing a Bachelor of Education (Mathematics) program were selected using the simple random sampling technique. Questionnaires were used as the main instruments for data collection, and the data was analyzed using descriptive statistics. The results showed that student-teachers faced environmental, instructional, and supervisory challenges during their macro-teaching practice. The environmental challenges included inadequate teaching and learning resources and difficulty in accessing transport to the schools. Instructional challenges included difficulties in managing student behavior and a lack of subject content knowledge. Supervisory challenges were related to inadequate support and feedback from supervisors, which hindered the student-teachers' development. The study concludes that addressing these challenges is critical for improving the quality of teacher education programs and ensuring that student-teachers are equipped with the necessary skills and knowledge to become effective teachers. The study recommends that universities and teacher education institutions provide adequate resources and support to student-teachers during their macro-teaching practice, such as access to teaching and learning resources, regular feedback, and mentorship. Furthermore, the study highlights the need for continuous professional development for supervisors and mentor teachers to improve their skills in providing effective support to student-teachers.

Keywords: macro-teaching, mathematics education, student-teachers, environmental challenges, instructional challenges, supervisory challenges, teacher education.

INTRODUCTION AND STATEMENT OF THE PROBLEM

A key aspect of the education system in every state has to deal with the quality of teachers produced to train citizens for a prospective aspirations and development to be achieved. In view of training effective teachers, there has been a transition from the saying that, teachers are not made but rather, effective and competent teachers are produced by modifying their behavior (Yu, Wilson, Singh, Lemanu, Hawken, & Hill, 2011). In this regard, being an effective and professional teacher demands a professional preparation, which will give him or her special and unique completeness in the art of teaching. Professional preparation therefore equips the professional teacher with some completeness and distinguishes him or her from the pupil teacher.

Teaching practice therefore forms a crucial requirement for every student that has been enrolled in tertiary education to pursue educated related programs. This provides students with rich experiences to practice what they have been taught in the various educational courses that would transform them into holistic teachers. Teaching practice could therefore be described as a situation in which a teacher- trainee teaches group of students for superiors to examine and offer constructive critiques and corrections. Similarly, Ngidi and Sibaya (2002), Marais and Meier (2004) and Perry (2004) described teaching practice is an important component of

becoming a teacher. This signifies that it forms an integral component of teacher training since it grants student-teachers experience in the actual teaching and learning environment. According to Karren and Hafen (1990), teaching practice is a preserve education of a teacher, through which his theoretical knowledge, understanding of learning and teaching procedure are put into practice over a specific period of time under competent supervision. Kasanda (1995) also accentuates that during teaching practice, a student-teacher is given the opportunity to try teaching profession. A study commented that teaching puts student-teachers into the "real world" and allows them to put theory and philosophy into practice (Quick and Sieborger, 2005). Teachers also need to know their subject from pedagogical perspective (Wilson, Shulman and Richert, 1987). Moreover, Tamakloe (1997) perceives the teaching practice period as period where students make use the knowledge, skills and teachniques which have been acquired in the form of theories from the academic classroom in the teaching and learning process. In his opinion, trainees are likely to mess up though they have gained adequate skills and knowledge during their studies there by exposing themselves to be laughed at in front of learners.

It is worth-noting that, the duration of teaching practice varies from one institution to the other. Perry (2004) underscored that, teaching practice can be conducted in a number of forms depending on the institution. As it stands now in the University of Cape Coast, teaching practice which is under the auspices of the Teacher Professional Development Unit is in two forms. This are the on- campus teaching practice (Micro teaching) organized for third year undergraduate students in the second semester which last for about eight to nine weeks and the off-campus teaching practice (Macro-teaching) done at the final year level 400 first semester offer students the opportunity to choose any school of their choice in the country and teach for about three months. Both teaching practice programs are supervised by superiors and teaching experts who observe lessons and award marks according to student-teachers' performance. Usually, supervisors assess aspects such as the attitude, verbal and non -verbal language, methodology and content knowledge of the studentteachers. Feedback is often provided to student teachers after each lesson observation for improvement to be made.

For the purpose of this study, it is assumed that, they are no problems associated with the micro and macro-teaching since the programs are specifically designed to equip students with on the job teaching skills to make them better teachers. However, it has been discovered that, the performance of most student teachers when it comes to the off-campus teaching practice is not motivating. Hence, most students perform quite abysmally. From observations and inquiries made, students professed that, they have been facing some challenges on the field which affect their performance. Having analysed the various challenges stated by the student- teachers, they are categorized into three aspects. These are the environmental challenges, supervision challenges and the instructional challenges. The quest to look into further into these challenges that such students encounter has necessitated for a study to be conducted to investigate into the problems faced by student-teachers during their off-campus teaching practice program. Regarding the problems that are being encountered during off-campus teaching practice that hinder student-teachers from performing well, the purpose of the study is to examine:

1. The environmental problems faced by the student-teacher during Macro- teaching practice
2. The supervision challenges that will impact on the mathematics student- teachers during the macro-teaching practice programme.
3. The instructional challenges that the mathematics student-teacher will encounter in teaching mathematics during the macro teaching practice.

Challenges of teaching practice associated with school environment

Studies conducted by Ajayi (2001) and Oluchukwu (2000) as quoted in Kile (2012) revealed that the physical facilities, instructional material, class size and school location are some factors within the school environment influence the learning and teaching process with regards to student- teachers. Therefore, the school environment plays a crucial part in the success of the student- teacher.

The above discoveries are therefore in line with the findings of Akpede (2011), whose study revealed that student-teachers faced some environmental challenges when they are on the teaching practice. Among which

include; lack of instructional materials and resources in schools, lack of accommodation, lack of allowances, and lack of cooperation from school-based teachers, excess workload and lack of respect for student- teachers. A similar study carried out by Nwanekezi, Okli and Mezieobi (2011) at university of Port Harcourt also confirmed the same challenges which are:

- Poor learning environment in practices school like congested classroom, poor ventilation.
- Lack of necessary equipment and materials for student teachers Lack of transportation and inaccessibility of some schools Unwillingness of student-teachers to report at their duty post.
- Rejection of student-teachers by schools

A finding by Akpede, (2011) confirms that school location does not have any significant influence on certain problems encountered by student- teachers during teaching exercise. This means that there is a high probability of student- teachers facing similar situations irrespective of where they are posted to. A study conducted by Hormenu, Agyei and Ogum (2014) also discovered that supervisors find it difficult in locating schools. This indicated that some of the schools are very far from town and are located in the hinter land with very poor means of transportation making driving to such places very difficult tasks for the supervisors. This leads to students not meeting the minimum number of supervisions required since supervisors may not be willing to visit those areas. Inadequate knowledge in content and pedagogy and thus are not adequately prepared for teaching practice respectively, as a challenge.

Challenges associated with Instruction

Adesina, Daramola and Taiabi (1989) defined teaching practice as a teacher education program or activity which involves the student- teacher to make use of the theory acquired in teaching under the genuine experience of the normal classroom situations. It serves as an opportunity for student- teachers to encounter the realities in the field of their chosen careers in terms demands, challenge and excitement. It can also be seen as periods when student-teachers are assisted to put into practice the theories and principles of education which they have learnt in the classroom as they teach (Ogonor and Badmus, 2006).

Also, the teaching practice exercise enable the student to be used to various teaching and learning materials, assess and choose those materials that would meet the specific object of the lesson. (Afolabi, 2000). This was summarised by Anupama (2009) as he stated that the positive side of the whole exercise of teaching practice is to give sense of accomplishment to student- teachers. They therefore learn to take responsibility, develop confidence and enhance their classroom management skills. The teaching practice exercise can be compared to industrial training in engineering, sciences and other professions. Subjects in curriculum and teaching methods offered in the Bachelor of Education program are tended to prepare students-teachers in the pedagogical skills in specific subjects. Ojoawo, (1996) like other educators is of the view that the theoretical dimension takes care of the acquisition of theoretical knowledge in the classroom while the practical dimension constitutes all forms of pre-service contact with the act of teaching in the classroom. Connections between theory and practice are accentuated in education programs so that students could draw close professional links between the universities and the secondary schools where their prepared to function as teachers. Urevbu, (2004) noted that the student- teachers demonstrate the knowledge and skills acquired before supervisors who give feedbacks so as to improve their practice before they assessed finally.

The supervisors normally commend that some student-teachers were not adequately prepared in terms of the subject matter and methodology hence, they are unable to deliver lessons with confidence. This is confirmed by Shulman's (1986) proposition that to teach all student according to current standard, teachers need to understand subject matter deeply and flexibly and pedagogically so that they can help students create useful cognitive maps, relate one idea to another and address misconceptions. Gujjar, Naoreen, Saifi and Bajwa, (2010) further opined that due to lack of adequate teaching and learning materials available for student-teachers, their competencies are sometimes impeded in the classroom. Another challenge identified with instruction is that, student was largely the passive recipient of "content" and "theory" while appropriate teaching methodology (student centered pedagogy) and practical teaching strategies were largely ignored (Ghana Education Service [GES], 1993, p.1).

Challenges associated with supervision

Teaching practice is not all about knowing what to teach and how to teach. Rosemary, Richard and Ngara, (2013) support this assertion by stating that the aim of teaching practice is to develop several competencies in the student which include; interpersonal, psychological and intercultural competencies. Despite thorough preparations that student-teachers undergo through the teaching practice exercise, they still face challenges which hinder their ability to derive maximum benefit from the program (Rajan, 2013). Okobia, Augustine and Osajie, (2013) admit the study Rajan by saying that the main challenges faced by student-teachers during teaching practice were: duration for supervision by some supervisors were short, and the poor relationship between studentteachers and supervisors. According to them, there were poor relationship between studentteachers and supervisors. The roles of supervisors included are to guide, counsel and be friends to the student -teachers. As the result of the unfriendly nature of supervisors to student-teachers some feel uncomfortable teaching in their presence. Hence, Okobia et al, (2013) study revealed that unfriendly nature of supervisors poses a challenge to student- teachers.

A study conducted by Hormenu et al, (2014) also discovered that the knowledge that student- teachers receive in content and pedagogy are not adequate to prepare them for teaching practice. The supervisors normally comment that some student-teachers were inadequately prepared in terms of content and pedagogical knowledge in the university, hence, student-teachers' do not deliver lessons with confidence. This is in confirmation of Shulman‟s, (1986) proposition that to teach all students according to current standards, teachers need to understand subject matter deeply and flexibly and pedagogically so they can help students create useful cognitive maps, relate one idea to another and address misconceptions.

Zindi, Nyota and Batidzira (2003) study reveal that student-teachers identified the difference in methodology or strategies meted out to them during their practicum as a major challenge. This finding by Zindi et al, (2003) is also similar to findings done by Rome and Moses (1990) who postulated that the lack of uniformity in supervision was a challenge to student-teachers during the off- campus teaching practice. Student-teachers were of the view that a standardized method of supervision must be adopted.

Research Questions

The following research questions served as a guide for the study:

1. What environmental problems do student-teachers of mathematics face during macroteaching practice?
2. What supervision challenges do student-teachers of mathematics do encounter during the teaching practice programme.
3. What instructional challenges do student-teachers of mathematics do encounter in teaching mathematics as a subject during the macro-teaching practice?

Design and Instrumentation

The study employed a quantitative descriptive survey design to gather data on the views and challenges these student-teachers of mathematics face while on the macro-teaching practice. According to Glass, Glass and Hopkins (1984), descriptive research involves gathering data that describe events and then organizes, narrates, depicts and describes the data collected. Descriptive survey design enjoys the strength of explaining educational phenomena in terms of the conditions or relationships that exist, opinions that are held by students, teachers, parents and experts (Cresswell, 2012). This design will provide an accurate picture of events and also seek to explain the challenges student-teachers of mathematics experience during their off-campus (macro) teaching practice on the basis of the data gathered. Despite the strengths of this type of design, there is the likelihood of respondents giving false responses, different interpretation and understanding to the same question due to the wording of questions which could affect the results of the current study. Notwithstanding this demerit, the descriptive design is regarded as the most appropriate design for arriving at the needed responses in this research. The main instrument used in data collection is questionnaire. According to Best and Kahn (2006), the questionnaire serves as the most appropriate data-gathering device in a research project when properly constructed and administered. The questionnaire composed of only closed ended items to

provide a fixedalternative question types for quick and easy way of answering questions. The questionnaire comprised of four sections A, B, C and D. Section A required the respondents to provide their background information on gender, age, and school selected for teaching practice and region of selected school. Section B also provided questions on the environmental challenges of teaching practice. Section C concentrated on instructional challenges student- teachers encounter while section D provided questions on the supervisory challenges that the student-teacher faced.

Selection of Participants

The accessible population used for the study constituted all B.Ed. Mathematics students from the Department of Mathematics and ICT Education. Respondents included in the study were selected by the use of simple random sampling technique. Since the purpose of the study was to investigate the challenges faced by student-teachers of mathematics during off-campus teaching practice, mathematics students who had participated in the teaching practice were sampled using this probability sampling method to give equal opportunities to every person to be selected. This method is said to be one of the most efficient sampling procedure (Cohen, Manion & Morrison, 2000). A total number of 35 students were sampled for the study. Borg and Gall (1979) as cited in Cohen et al., (2000, p. 93) indicates that the sample size of a research that employs the relational survey design should not have a sample size less than 30. Similarly, some discoveries of the central limit theory suggest that 30 or more participants from a given population can produce a normally distributed data. (Kwam & Vidakovic, 2007).

Validity and Reliability of Instruments.

The purpose of this study was to examine the challenges faced by student-teachers of mathematics during the off-campus teaching practice in mathematics. To ensure that the instruments measured what it is supposed to measure, the face validity of the questionnaire was determined by the researchers and other colleagues in the area of mathematics education after systematic review of the instrument. A careful examination of the instruments was done to ensure each section on the questionnaire addressed the need for which it was meant to. Cronbach alpha reliability test conducted on the twenty-eight Likert scale question items yielded an alpha value of 0.811. The individual subscales as reported in this study also recorded the following Cronbach alpha reliability coefficient values: Environmental Challenges Subscale (= 0.792), Supervisory Challenges (α = 0.768), and Instructional Challenges Subscale (α = 0.872).

Data Collection Procedure

Before data was collected, a consent was sought from the respondents, and the purpose for the research was communicated to them. Respondents were thus assured of anonymity and confidentiality of their information. In the process of data collection, ample time was given to respondents to complete the questionnaire and supervision was made by the researchers to address questions and explanations from respondents. Data was then collected after each respondent was done for further analysis. It must be stated that consent seeking and data collection were done on different days.

Data Analysis

Data was obtained from final year B. ED Mathematics education students from the university of Cape Coast who at the time were back from off-campus teaching practice with the use of a fivepoint Likert scale questionnaire starting from 1 representing strongly agree to 5 which indicates strongly disagree. These responses were edited, coded and entered into a statistical software for further analysis to be made. Data was analysed based on the research questions that guided the study to provide information that would address the purpose for which the research was conducted. Data was analysed and discussed quantitatively using descriptive statistics, specifically means and standard deviations. Data analysed was then presented using tables to answer research questions that were put forth for this study.

Since responses were based on a five-point Likert scale, a mean score below 2.5 depict that respondents were in agreement of that particular item hence, it did pose a great challenge to them while a mean score above 2.5 means that item was not really ascribe to them as a challenge encountered during the off-campus teaching practice.

RESULTS AND DISCUSSION

Research question one:

What environmental problems do student-teachers of mathematics face during macroteaching practice?

The first research question that guided this study was, "What environmental problems do student teachers of mathematics face during macro-teaching practice?" To answer this research question, data gathered from 35 final year mathematics education students were used. Table 1 presents results on the environmental challenges faced by student-teachers of mathematics during off campus (macro) teaching practice.

Table 1: Mean and Standard Deviation Scores of environmental challenges that student teachers of mathematics encountered.

Statements	N	M	SD
1. Rules and regulations of the schools were cumbersome for me to follow	35	2.89	1.022
2. I had difficulty getting transportation to my school of practice.	35	2.31	1.131
3. There was congestion in the class I was assigned to teach.	35	2.66	0.873
4. There was poor ventilation	35	2.83	0.954
5. Inadequate TLMs in the school	35	2.37	0.873
6. Inadequate teaching and learning facilities in the school such as labs, ICT center etc.	35	2.54	1.120
7. The school authorities were not concerned of my overall teaching practice success.	35	2.97	0.785
8. Lack of cooperation from students.	35	2.86	0.912

Results in Table 1 shows that out of eight items used to determine the environmental problems faced by student-teachers, only two of them posed major challenge to the student-teacher of mathematics. Respondents agreed to the statement that yes inadequate TLMs posed a challenge. This was indicated by the mean of 2.37 which was less than 2.5 indicating agreement and the associated standard deviation of 1.120 indicating how diverse respondents responded to the statement of inadequate teaching and learning materials (TLMs). This presupposes that there were woefully inadequate TLMs in the schools to facilitate smooth running and implementation of the curriculum. Again, when respondents were asked whether they had difficulty getting transportation to their schools of practice, respondents asserted that they had difficulty getting means of transport to their respective schools of practice. This as matter of fact could go a long way to affect instructional time as in some cases these teachers would get to the schools late as a result of difficulty in getting transport. This was indicated by a mean of 2.31 which is lesser than 2.5. Nevertheless, respondents also indicated their strong disagreement towards the variables used in determining the environmental problems faced by them. A cursory look at Table 1 indicates that respondents refuted the claim that there was congestion in the classroom and this is represented by the mean of 2.66 which is greater than the mean of 2.5 with a standard deviation of 0.873 showing a low dispersion in the responses of the respondents regarding the congestion in the classroom.

Additionally, respondents debunk that poor ventilation in the school was a challenge. This is represented by the mean of 2.83 which is greater than 2.5 with a standard deviation of 0.954. In addition, rules and regulations was cumbersome for me to follow, inadequate teaching and learning facilities, the school authorities were not concerned about my overall teaching practice success and lack of cooperation from student were disproved by the respondents to be some of the challenges they faced during the said practice.

From the data analyzed, a conclusion can be drawn that these environmental challenges such as rules and regulations of the school being cumbersome for student-teachers to follow, congestion in the classroom, inadequate teaching and learning materials in the school, school authority not concerned about student-teachers success so far as teaching and learning is concerned, lack of cooperation and inadequate teaching and learning facilities in the school (i.e. library, laboratories, ICT services) were all not a problem to the student-teachers used for the study. On the other hand, difficulty in transportation to the school and inadequate TLMS in the school were the major challenges they encountered. This conforms the findings of Akpede (2011) and Nwanekezi, Okli and Mezieobi (2011) who discovered that, lack of instructional materials and difficulty in transportation were major challenges faced by student-teachers during teaching practice.

The implication of these findings is the fact that these student-teachers of mathematics would find it difficult explaining and impacting certain mathematical concepts to the students they teach as a result of the absence of the TLMs. Also, the fact that student-teachers of mathematics find it difficult getting means of transportation to their schools of practice implies that there is the likelihood of instructional time been affected which eventually would affect completion of content to be taught.

Research Question Two:

What instructional challenges do student-teachers of mathematics do encounter in teaching mathematics as a subject during the macro-teaching practice?

The second research question sought to find out from respondents the kind of instructional challenges they encounter in teaching mathematics as a subject during the macro-teaching practice. To address this question, respondents were presented with a five-point Likert scale questionnaire to respond to. Results from responses on instructional challenges are presented in Table 2.

Table 2: Mean and Standard Deviation on Instructional challenges encountered by studentteachers of mathematics during macro-teaching

Statement	N	M	SD
9. I had difficulty in preparing lesson note	35	2.83	0.857
10. I had difficulty in presenting my lessons in logical sequence (according to my lesson plan)	35	2.83	0.923
11. I had difficulty teaching the principle and Concepts of mathematics	35	2.91	0.853
12. I had difficulty teaching the practical application of the principles and concepts in mathematics	35	2.28	1.001
13. The periods allocated for mathematics were inadequate for me to teach my lesson.	35	2.14	1.061
14. I had difficulty preparing instructional materials (TLMs)	35	2.54	0.886
15. I had difficulty in individualizing instructions, i.e providing activities to meet the needs of slow, average and fast.	35	2.46	0.780
16. I had difficulty maintaining the interest of learners throughout the lesson.	35	2.49	0.887
17. I was deficient in my questioning strategy	35	3.20	0.901
18. I had difficulty providing varied learning tasks	35	2.77	0.910

Results in Table 2, showed that out of 11 items containing issues bothering on instructional challenges faced by student-teachers of mathematics, only four of them posed a serious challenge to the student-teachers. A cursory look at Table 2 indicates that items 12, 13, 15, and 16 were the issues that posed serious or major

challenges to these student-teachers of mathematics. The first of the things or issue that posed a major challenge to these student-teachers of mathematics was the fact that "the periods allocated for mathematics were inadequate for me to teach my lesson" with mean and standard deviation scores of 2.14 and 1.061 respectively. This means that time allotted for teaching mathematics especially for these student-teachers of mathematics is woefully inadequate and has the potential of not permitting them to complete or finish content outline allocated to them. This could also be as a result of the fact that authorities of the said institutions where these student-teachers did their macro-teaching assume that because it's macro-teaching they don't need the required number of periods (credits) as the regular teachers do to meet the required credits for their practice. Also, one other item that saw student-teachers of mathematics agreeing to it was "I had difficulty teaching the practical application of principles and concepts in mathematics" This item recorded a mean and standard deviation scores of 2.28 and 1.001 respectively. This is indicative of the fact that the schools do not have the requisite TLMs for these student-teachers to demonstrate conceptually what they are supposed to be teaching their students. This could also stem from the fact that these student-teachers themselves are not privy or exposed to applicative uses of the concepts they taught their students hence their inability to expose their students to the practical applications of principles and concepts in mathematics. The other two items which respondents also agreed to are "I had difficulty in individualizing instructions, i.e providing activities to meet the needs of slow, average and fast learners" and "I had difficulty maintaining the interest of learners throughout the lesson" and with mean and standard deviation of 2.46,0.780 and 2.49,0.887 respectively. This presupposes that class sizes of these schools where these student-teachers teach might be clouded and for that matter making it difficult for them to provide individualise instructions to their students. It could also mean that these student-teachers have no idea or not been taught the concept underlying how to organize individualise instructions hence the difficulty. Also, the fact that these student-teachers involved in the study had difficulty maintaining interest in their students presupposes that they have not had the full complement of the programme or course(s) which is/are supposed to empower them to do so.

To throw more light on some of the issues of interest concerning the challenges these studentteachers of mathematics faced during the macro-teaching, respondents were asked if they had difficulty in preparing lesson note which forms core of their teaching practice, they responded by saying that they had no difficulty in preparing their lesson notes. This item recorded a mean and a standard deviation scores of 2.83 and 0.857 respectively indicating easiness of their lesson plan preparation. To ascertain why they claim they have no problem in their lesson note preparation, some respondents were interviewed and this was what they had to say:

Student A:

"*I had no problem preparing my lesson plan/note because while on campus I was taken through the rudiment of lesson plan preparation in EMA 208: Methods of Teaching Secondary School Mathematics. Quite apart from that, we did micro teaching during the third year second semester while on campus which saw us preparing lesson plan and our on-campus supervisors corrected us which made us learn a lot."*

Student B:

"Preparing lesson plan during the off-campus (macro-teaching) because myself and my colleagues have had the chance of doing micro teaching whiles on campus and our supervisors corrected those errors we made during that time which made us learn a lot hence the easiness to prepare my lesson plan during the macro-teaching."

Student C:

"I had the chance of listening to my micro teaching supervisors correct the mistakes I made in my lesson plan and also read and observe the good ones which were commented on by same supervisors. This to a large extent made me not to repeat those mistakes I made during the offcampus (Macro-teaching) teaching practice."

These confirms why student-teachers of mathematics strongly objected to the fact that they had difficulties in preparing their lesson plan during the macro-teaching.

Another item of interest used to ascertain the challenges that these same teachers faced was "I had difficulty in presenting my lessons in logical sequence (according to my lesson plan)". Again, respondents disagreed with the assertion that they had difficulty in presenting lessons logically. They were of the view that presenting lessons logically was one of the easiest thing they were able to do since they have been exposed to that technique before embarking on the macro-teaching. This item recorded a mean and standard deviation scores of 2.83 and 0.923 respectively. Again, difficulty in preparing TLMs was also objected to by respondents as one of the challenges they encountered on the field during the macro-teaching. This item recorded a mean and standard deviation score of 2.54 and 0.889 respectively. This result indicates that respondents remained indifferent on the issue of having difficulty preparing their TLMs. This presupposes that studentteachers of mathematics involved in this study were neither efficient nor inefficient in preparing TLMs to help explain the concept taught their students. This was also buttressed by the point that the schools where these student-teachers had their macro-teaching had inadequate TLMs. Furthermore, respondents indicated that they had no difficulty providing varied task, and also were not deficient in questioning strategies. A cursory look at Table 2 indicates that these items recorded means of 2.77 and 3.20 respectively and associated standard deviations of 0.910 and 0.9001 respectively. This presupposes that student-teachers of mathematics at the time were able to tease the minds of their students with the needed and necessary tasks which helped in addressing students' difficulties in the course of the lesson delivery. Also, their ability to provide varied tasks using appropriate questioning strategies is indicative of the fact that they were able to ask relevant questions using the right procedure.

From the data analyzed, a conclusion can be drawn that these instructional challenges such as difficulty in lesson notes preparation, difficulty in preparing lessons in a logical sequence, difficulty in teaching the principles and concepts of mathematics, difficulty in questioning strategies, difficulty in providing varied learning tasks were not problems to student-teachers when it comes to instructional challenges. Rather, difficulty in teaching the practical application of principles and concepts in mathematics, inadequate periods being allocated for mathematics lessons, difficulty maintaining the interest of learners throughout the lesson and individualizing instructions were the major instructional challenges faced. However, Shulman's (1986) proposed that to teach all students according to the current standards, teachers need to understand subject matter deeply, flexibly and pedagogically so that they can help students create useful cognitive maps, relate one idea to another and address misconceptions. Since student-teachers did not encounter the stated instructional challenges, then they might had understood the subject matter deeply and had flexible methodology in teaching.

Research Question Three:

What instructional challenges do student-teachers of mathematics do encounter in teaching mathematics as a subject during the macro-teaching practice?

The results analysed from the responses of student-teachers on the supervisory challenges they encounter during macro-teaching are presented in Table 3 below.

Table 3: Mean and Standard Deviation Scores on Supervisory challenges encountered during Macro (off-campus) teaching practice

Statement	N	M	SD
20. Some supervisors never informed me of their coming.	35	2.74	1.094
21. Most often I was tensed when supervisors came around.	35	2.31	0.867
22. There was poor attitude of some of the supervisors towards me.	35	2.69	0.932
23. Some supervisors failed to commend me for lesson well taught but only dwell on my mistakes.	35	2.34	0.968

24. I had difficulty reading the hand writing of my supervisors.	35	3.00	0.804
25. I understood the comments written by my supervisors.	35	2.57	1.037
26. I encountered situation of conflicting comments by the supervisors.	35	2.57	1.037
27. Some supervisors did not supervise all the stages of the lesson.	35	2.57	1.037
28. I did not get the required number of supervisions during my teaching practice.	35	2.23	1.060

Table 3 indicates 9 items that were used to find out the kind of supervisory challenges student-teachers of mathematics faced during the macro-teaching. Out of these 9 items used only three of them were seen to pose challenge to these student-teachers of mathematics. One of these three items which indicated a supervisory challenge faced by these student-teachers was "Most often I was tensed when supervisors came around". This item recorded a mean and standard deviation score of 2.31 and 0.867 respectively. This indicates that most of the respondents involved in this study felt uncomfortable with the presence of supervisors in the schools and for that matter their classrooms. Some respondents were further interrogated as to why they got tensed anytime a supervisor came around and the following were what they had to say:

Student A:

"As a matter of fact I always got tensed whenever there is a supervisor around because most of the supervisors who come around are not friendly"

Student B: *"In fact, I felt tensed because some of the supervisors when coming would not call to inform you so you prepare. You would be there and all of a sudden they pop up. When they see you not even say hi or anything and they just follow you straight to the classroom. Instead of talking to you to calm you down it wouldn't happen because some of them would get to the place late and so hardly would they do that"*

Student C: *"Some of this supervisors come and they don't even talk to you to calm you down rather all they do is to walk you straight to the classroom. In some cases, some of them when you even buy water for them before the start of the lesson they don't even collect the water let alone give you audience to calm your nerves down."*

Student D:

"I became tensed at some points because some of the supervisors who came collect your lesson plan before they walk you into the classroom and immediately they detect something wrong with any aspect of your lesson plan they tell you you are not serious and that after all the micro teaching practice is that the best you can do. Also, I always got tensed whenever there is a supervisor around because most of the supervisors who come around are not friendly. The behave towards you as if you are a total stranger"

These are some of the things said by some of the students to justify why they felt tensed anytime there was a supervisor in the school. These revelations, however, indicate that most often than not supervisors who supervise these student-teachers are not friendly and tend to use derogatory words on the students hence their fear.

The next thing that posed a challenge to student-teachers of mathematics was that "Some supervisors failed to commend me for lesson well taught but only dwell on my mistakes". A critical look at Table 2 indicates that this item had a mean score below the average score of 2.5 indicating that they strongly agree to the fact that some supervisors failed to commend them on good lesson delivery and rather dwelt on the negative side of the lesson delivered. It was asserted by some of the students that instead of these supervisors to acknowledge the good work done they rather end up lambasting you on the little error you made. This was what some of these students said:

Student A:

"Instead of some of the supervisors appreciating you for the good work done they rather end up discouraging you over the small mistake you have made for which I think doesn't speak well of them as professionals".

Student B:

"I was once teaching and made a mistake of pronouncing a certain English word and after the class instead of the supervisor to commend me for the wonderful work done I was rather told I speak bad English so I should work on it and the pitch used in saying that as an eye saw. This same supervisor also told me I smells and that I should make sure I bath well and use good perfume before coming to class. It was after these I was told all the best"

Student C:

"The supervisor dwelt only on my weakness and gave it to me after the lesson meanwhile there were some positive things I did which was not talked about. I was only told to up my game in my next lesson."

These reactions from students indeed indicate that some of these supervisors are a thorn in the flesh of student-teachers of mathematics. Also, it presupposes that some of these supervisors hardly discuss what they write concerning the student-teachers' lesson delivery with them and in most cases they end up not appreciating what these student-teachers have done but dwell on their weaknesses.

The last but not the least item that was commented on and for which respondents saw as one of the challenges they faced was "I did not get the required number of supervisions during my teaching practice". This item recorded a mean and a standard deviation score of 2.23 and 1.060 respectively. This presupposes that in most cases student-teachers involved in this study didn't get the required number of supervisions during their macro-teaching practice. This could stem from the fact that the schools in which these student-teachers were placed may be in remote areas and for that matter do not encourage supervisors in any way to go there. When some of the studentteachers who claimed not to have received the required number of supervisions during the macroteaching this is what they said:

Student A:

"I had three supervisions during the stipulated time for the macro-teaching meanwhile I was supposed to have received a minimum of four supervisions and a maximum of six. I believe this was the case because where the school was located was a bit far and more so the road leading to the place was in a deplorable state".

Student B:

"Getting to the tail end of the entire exercise, I have had only two supervisions and had to be calling supervisors to tell them that I don't have the required number of supervisions. When I called some of the supervisors they tell me they can't come to where my school is located because it's too far and the road is not also goo".

Section C:

"At time of the final supervision week I had only three supervisions which was not even up to the minimum supervisions. I had to call the unit in charge of the macro-teaching practice and they assured me that supervisors would be coming to supervise me so I should remain calm. I then also called a supervisor to draw attention to my predicament and he said that he wouldn't promise me of his coming but would think about it and see because the road leading to my place is too bad and the school is also far from town. In my case supervisors had to travel like almost three-hours before getting to my place for supervision".

Interaction with these students indicated that the major things that lead to they not having the required supervision was the fact that the distance mostly to the location of the school was too far and also roads leading to these respective schools were in deplorable state hence their inability to get the required number of supervisions during macro-teaching practice.

From the data analyzed, a conclusion can be drawn that these supervisory challenges such as supervisors not informing student-teachers of their coming, difficulty in reading supervisors' comment and conflicting comments from supervisors were all not a problem to the studentteachers used for the study. These findings are in total agreement with the findings by Zindi et al (2003) which is also in line with the study done by Rome (1990) who postulated that the lack of uniformity in supervision was a challenge to student-teachers during the off-campus teaching practice. Student-teachers were of the view that a standardized method of

supervision must be adopted. However, the findings contrast the discoveries of Okobia et al (2013) which revealed that the main challenge faced by student-teachers during teaching practice was the poor relationship between student-teacher and supervisors but in agreement with the findings that most of the respondents involved in this study felt uncomfortable with the presence of supervisors in the schools and for that matter their classrooms.

CONCLUSIONS AND IMPLICATIONS FOR TEACHING AND LEARNING MATHEMATICS

Analysis of the data revealed that two environmental challenges were visible which were inadequate teaching and learning materials (TLMs) as well as difficulty getting transportation to school. The implication of these findings is the fact that these student-teachers of mathematics would find it difficult explaining and impacting certain mathematical concepts to the students they teach as a result of the absence of the TLMs. Also, the fact that student-teachers of mathematics find it difficult getting means of transportation to their schools of practice implies that there is the likelihood of instructional time been affected which eventually would affect completion of content to be taught. It is recommended based on these findings that heads of schools and the authorities in charge of the education sector provide the necessary instructional material for the smooth running and implementation of the curriculum. Since student-teachers also have challenges in transportation to school, it is also recommended that accommodation facility be provided by the school authorities or the community where the school is located to these student-teachers to get them closer to the school premise to avoid its affecting instructional time and provide comfort for them.

Also, based on the analysis conducted, three instructional challenges were identified which includes inadequate allocation of mathematics periods, difficulty in individualizing instruction as well as difficulty in maintaining interest of student. The implication of this finding is that, mentors or supervisors under which these student-teachers find themselves must make it a point to offer coaching and guidance to them when necessary in order to gain practical knowledge on how these student-teachers could resolve the problem of maintaining student interest and individualizing instructions. Also, the finding that student-teachers complained of inadequate time allocation for mathematics implies that there is the highest possibility of not completing scheme of work. As a result of these findings, enough time be allocated to teaching of mathematics by school authorities to these student-teachers to enable them meet their target.

Lastly, supervisory challenges were identified during the data analysis. It was revealed that some supervisors failed to commend student-teachers for lesson well taught but dwelt on their mistakes. Based on this finding it can be concluded that most supervisors according to student-teachers of mathematics always dwelt or spoke about their weaknesses and failed to appreciate them. Also, the finding that student-teachers did not get the required number of supervisions as well as being tensed when supervisors came around presupposes that there isn't good relationship between student-teachers and that of the supervisors. It can also be concluded based on the finding that student-teachers do not get the required number of supervision as result of where the schools of practice are located as well as the deplorable nature of the roads leading to these schools of practice. This implies that supervisors must ensure that they offer constructive criticisms and bear in mind that, these student-teachers are novice in the field who are still learning hence, opportunities should be given to them to make and correct their own mistakes. In the same way, student-teachers should be commended when they perform well in order to motivate them to do better. Supervisors should therefore create a cordial environment for student-teachers to teach without any panic or anxiety. Finally, sending more supervisors to various schools for supervision would ensure that, each student-teacher meets the minimum number of supervisions required. Addressing all these needs would contribute greatly to an improvement in the performance of student-teachers in their macro-teaching (off-campus teaching) practice.

Suggestions for Further Studies

The study dealt with only mathematics student-teachers in one of Ghana's public universities concern with training mathematics educators for the country's public and private basic schools as well as tertiary institutions across the country. It is therefore recommended that;

1. This study be replicated and extended to mathematics student-teachers in other universities in the country to have a broader picture of what is happening in this regard.
2. This study should also be replicated and extended to student-teachers of different subject areas or discipline to ascertain their views of the phenomenon.
3. The study should also explore the impact of off-campus (macro-teaching) challenges on student-teachers' academic performance.

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