# Utilization of Micro-Teaching Laboratory on Mathematics Performance for the Training of Teachers in Faculty of Education, Adamawa State University, Mubi Nigeria

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**Abstract:** This study was carried out to assess the utilization of micro-teaching laboratory on Mathematics performance for the training of teachers in Faculty of Education, Adamawa State University, Mubi. The study adopted quasi-experimental design. The instrument used for this research work was an achievement test designed on mathematics known as Mathematic Achievement Test (MAT). The Mathematics Achievement Test (MAT) was used as pretest, to establish the group equivalence of the experimental and control groups. The instrument for data collection was validated, in the initial draft of the instrument were submitted to expert in the department of Science Education in Adamawa State University Mubi. The analysis involved statistical testing of the hypotheses stated in the study. The level of significance adopted was P < 0.05. The 0.05 level of significance forms the basis for retaining or rejecting each hypothesis. The data was obtained on the achievement of students exposed to the use of microteaching laboratory (X<sub>1</sub>) and those not exposed to the use of microteaching laboratory (X<sub>2</sub>). The analysis reflects students' academic achievement scores in the pre-test and post-test administered to them. Findings showed that the skills of the use of microteaching significantly and positively impacted the students' ability to use instructional materials during teaching practice. The study therefore recommends that the period of microteaching should be extended so that student teachers will be able to have adequate time to teach all the subjects and familiarise themselves with the class.

Keywords: Mathematics, Micro teaching, Performance, Teaching Skills, Teachers.

## INTRODUCTION

Microteaching laboratory is a scaled-down simulated teaching encounter designed for the training of both preservice and in-service teachers. According to Chuajin and Chummei, (2011), microteaching has been in use worldwide since its invention at Stanford University in the late 1950s by Dwight, Robert and Romney. Its purpose is to provide teachers with the opportunity for concept lessons in any teaching subject. Also Mcnight cited in Millis, Hertel, and Noyd, (2007); Romesh (2013), see Micro-teaching as a scaled down realistic classroom training context in which teachers, both experienced and inexperienced, may acquire new teaching skills and refine old ones. Apart from being an essential process of transforming and modifying the student teacher behaviour to demonstrate a given behaviour, it also provides a tremendous opportunity for both pre-service and in-service teachers to develop and improve their pedagogical skills with a small group of students mostly (5 to 8) using limited period of (5-10) minutes, records on video tape for reviewing, responding, refining and re-teaching towards perfection (Peker, 2009).

The micro-teaching environment enables a student teacher to focus attention on the practice of specific skills at a time until he/she acquires competence in it. Provision of feedback accelerates this process. After acquiring competence in a number of skills in this way, the student teacher takes to micro-teaching so as to demonstrate his/her level of competence. It is a vital technique which provides continuous training to serving teachers. Most of professional teachers who have reached their high professional level do not want to improve their skill of teaching. Micro teaching helps in overcoming such pitfalls. It provides setting for experimentation. With the introduction of developed curriculum, teachers are required to acquire new skills of teaching. The National Policy on Education (FGN, 2009) pointed out that "all teachers in our educational institutions, from pre-primary, will be professionally trained. Teacher education programme will be structured to equip teachers for the effective performance of their duties". One way to achieve this government pronouncement is the proactive of micro teaching both at pre-service and in-service training.

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As a modeling instructional skill, the micro teaching setting is meant for the demonstration of good teaching skills by student- teachers which can be recorded on video-tape or observed by a supervisor. Such a recording or observation is analyzed to identify component skills comprising teaching which is a complex activity (Verma & Sharma in Audu,2010). Similarly, sub-behaviours underlying each skill can also be identified. The knowledge obtained will help in building various component teaching skills. These models are presented before the trainees so that they may model their behaviour according to the models of the skills, by practicing in the micro teaching setting.

In spite of the fact that the approach to supervision under micro teaching is non-evaluative, the supervisor still functions as a guide or an adviser. The supervisor in micro-teaching tries to help the trainee teacher or the practicing teacher to improve his skills of teaching. Prior to the commencement of micro teaching exercise, both the student- teacher and the supervisor are clear about the objective to be achieved or skill to be demonstrated. They are also clear about the mode and instrument of assessment to be used. Such a procedure provides common frame of reference for the supervisor and teacher trainee for a dialogue. The suggestions given by the supervisor are incorporated in the new lesson for a re-teach practice (Verma & Sharmain in Aggarwal 2009; & Audu 2010).

Consequently, micro-teaching provides a golden opportunity to the student teacher towards exercising control over some variables, which may have tremendous effect in teaching and learning e.g. volume of students in a class, the nature/quality of the student, the length of the period for micro teaching administration, the motivation as well as the evaluation of the student, and so forth.

The in-sufficient use of the skill of reinforcement as a means of encouragement by the student teacher as a result of the positive response in the course of teaching is not appropriately used. The process of drawing the attention of the learner to concentrates in teaching and learning activities and to make the lesson more captivating via the skill of set- induction is completely discouraging. The effort of the student teacher to use the chalkboard towards effective summarization of the lesson to the learners during teaching and learning appears to be very low. The effort of the student teacher in the demonstration of the skills of Stimulus variation through different means of ensuring effective teaching and learning for effective acquisition of knowledge by the learner is absolutely low. A situation which could make the achievement of the designed objective not achievable. Similarly, the possibility of determining the volume of learners understanding through questioning skill during teaching learning process is very narrow. This makes it difficult for the student teacher to appraise the performance of the learner. The above mentioned teaching skills are mostly in-sufficiently and in-appropriately demonstrated by student- teachers, a situation which can lead to in-effectiveness and in-adequacy in discharging their duty of teaching and learning during teaching practice in this contest.

## Statement of the Problem

The essence of posting student- teachers for teaching practice is to enable them showcase the rich experience acquired during the theoretical and practical aspects of micro-teaching to the learners toward efficiency. It has been observed by the researchers that the skill of drawing learners attention towards learning activities via the skill of Set Induction as carried out by a student-teacher as acquired in the micro-teaching session is not passionately used. The process of transforming theoretical knowledge into practical aspect is acquired during micro-teaching. Despite the period taken during micro-teaching session, student teachers are still found in-effective, in the use of skill of the instructional materials. Similarly, the ability of a student teacher in using the skill of controlling, coordinating, arranging and managing both the learners, the teaching materials and the non teaching materials for effective teaching and learning to take place is not adequate.

The poor use of skill of chalkboard management acquired during micro-teaching session by a student-teacher could lead to the display and mismanagement of teaching materials for the achievement of the designed objectives during teaching practice. However, student teachers thus find it very difficult to use the skill of stimulus variation, a situation which could cripple the effort of securing and sustaining learner's attention towards effective teaching and learning for effective service delivery. A teachers effectiveness in applying the questioning skill towards assessing the magnitude of learners comprehension is completely in-effective. Therefore, the ability of a student-teacher to effectively apply the acquired teaching skills for effective service delivery becomes very difficult. Situation which makes the performance of learners' handled by such a student-teacher to be weak, ineffective and inefficient. Moreover, scanty performance of the student teachers in the demonstration of the relevant teaching

skills in the teaching and learning situation has created serious problems in the attainment of designed learning experience during teaching practice session. Therefore, the aforementioned problems inform the need to conduct a study on utilization of micro-teaching laboratory on mathematics skills on student-teacher performance during teaching practice in colleges of education in Nigeria.

## Purpose of the Study

The study sought to find out the utilization of micro-teaching laboratory on mathematics performance for the training of teachers in Faculty of Education, Adamawa State University, Mubi. Therefore, the study is design to:

- i. Examine the effect of microteaching laboratory on teaching competence of prospective teachers through skill of recognizing attending behaviour.
- ii. Find out how microteaching laboratory on mathematics affect student teachers' performance.
- iii. To find out if there is gender difference when exposed to micro-teaching laboratory.

## **Research Questions**

- i. What is the effect of microteaching laboratory on teaching competence of prospective teacher through skill of recognizing attending behaviour?
- ii. What is the influence of microteaching laboratory on mathematics affecting student teachers' performance?

## Hypotheses

 $H_{01}$ : There is no significant relationship between microteaching laboratory on teaching competence of prospective teacher through skill of recognizing attending behaviour.

 $H_{02}$ : There is no significant relationship between the influence of microteaching laboratory of mathematics and student teachers' performance.

#### Scope of the study

The scope for the study is limited to the effects of microteaching laboratory on student teachers' performance in teaching mathematics. The study will cover only student teachers in mathematics education from 100 - 400 level, Faculty Education, Adamawa State University, Mubi.

#### 'Significance of the Study

Microteaching is an integral component of teacher education programme. Therefore the result of this research could be of benefit to many stakeholders, such as student-teachers, in-service teacher's curriculum planners, teacher trainers (lecturer and non-academic staff), and school administrators.

The outcome of this research could assist in polishing student- teachers so as carryout their assignment, especially during Teaching-Practice exercise and after their graduation in order to be more proactive in providing an essential service expected of a professional teacher viz a viz impacting knowledge, managing, controlling, coordinating among others, in order to ensure effective service delivery and academic excellence. Secondly, it could help tremendously in equipping student-teachers and in-service teachers with relevant information regarding the skill of teaching towards professionalization in the Nigeria as contained in the National Policy on Education.

## **RESEARCH METHODOLOGY**

## Research Design

The study adopted quasi-experimental design and assess utilization of microteaching laboratory on mathematics performance for training teachers in faculty of education, Adamawa State University. It is a collection of research designs which use manipulation and controlled testing to understand causal processes. Generally, one or more variables are manipulated to determine their effect on a dependent variable. The diagram below shows sample-

pretest, posttest quasi experimental design.



design.

Where,  $O_1$  and  $O_3$  are the pretest scores in  $X_1$  and  $X_2$  respectively, while  $O_2$  and  $O_4$  are the post test scores to  $X_1$  and  $X_2$  treatments.  $X_1$  and  $X_2$  represent the experimental and control treatment respectively.

## Population of the Study

The population of the study consists of all the students in the department of Science Education 2018/2019 academic session (Mathematics Education Programme) Adamawa state University Mubi. Random sampling techniques was used to chose the students in 300 level and 400 level preparing for teaching practice.

## Sample and Sampling Techniques

The samples used in this study were randomly selected. Random sampling procedure assures that each element in a population has equal chance of being selected in the study. This random sampling procedure has the following characteristics or advantages and is efficient in research works. A total of 10 students at each level were pretested and selected as sample from the Student's population.

## Sample Table

Level of students	No. of respondents
300 level	18
400 level	12
Total	30

The groups were divided into two, two schools each were selected as experimental and control groups. The experimental groups were exposed to treatment, that is were taught mathematics with the use of instructional materials while the control groups were taught the mathematic without using instructional materials.

#### Instrument for Data Collection

The instrument used for this research work is an achievement test designed on mathematics known as Mathematic Achievement Test (MAT). The Mathematics Achievement Test (MAT) was used as pretest, to establish the group equivalence of the experimental and control groups and also used as posttest to ascertain achievement and as post test to ascertain their retention level. Twenty (10) items of Mathematics Achievement Test were drawn from mathematics topics and syllabus.

## Validity and Reliability of Instrument

The instrument for data collection was validated, in the first-place initial draft of the instrument were submitted to expert in the department of Science Education Adamawa State University Mubi. The expert in the department scrutinized the instrument in order to obtain the clarity, relevant and adequacy which a good research instrument

should possess. The researcher constructed the instrument based on the correction of experts. The instrument was trial tested using five teachers on teaching practice in Government day secondary school in Mubi North local government area.

## Procedure for Data Collection

An introductory letter from the Department of Science Education was obtained. The Experimental and Control groups were taught the same content of the curriculum. The Experimental Group was taught with the use of Micro-Teaching Laboratory incorporated into the lesson. The Control Group was not exposed to Micro-Teaching Laboratory. Data were obtained on administering the achievement test from both groups.

## Method of Data Analysis

The analysis involved descriptive statistics to answer research questions and statistical testing of the hypotheses stated in the study. The level of significance adopted was P < 0.05. The 0.05 level of significance forms the basis for retaining or rejecting each hypothesis. Data collected were analysed in accordance with the stated hypotheses to test the two hypotheses using t-Test statistic.

## RESULTS

This contains the analysis and discussion of the data collected. The presentation is according to the Research Questions and hypotheses tested.

Research Question 1: What is the effect of microteaching laboratory on teaching competence of prospective teacher through skill of recognizing attending behaviour?

## Table 1: Summary of Descriptive Statistics of Post-Test Scores of Students Learning Mathematics with Microteaching Laboratory on Teaching Competence of Prospective Teacher Through Skill of Recognizing Attending Behaviour

Instructional Treatment Group Experimental	Ν	Mean Score	Mean Diff.	Std. Deviation	Std. Error Mean
X <sub>1</sub> : With use of microteaching laboratory	16	38.67	2.40	10.18	1.86
X <sub>2</sub> : Without use of microteaching laboratory	14	36.27		10.15	1.85

The descriptive analysis shows that the mean score of the Experimental Group  $(X_1)$  was 38.67 while that of the Control Group  $(X_2)$  was 36.27. There was a mean score difference of 2.40 in favour of the Experimental Group. Research Question 2: What is the influence of microteaching laboratory on mathematics affecting student teachers' performance?

Instructional Treatment Group		Mean Score	Mean Diff.	Std. Deviation	Std. Error Mean
X <sub>1</sub> : With use of microteaching laboratory	16	43.86	4.52	12.15	2.68
X <sub>2</sub> : Without use of microteaching laboratory	14	39.34		12.19	2.58

 Table 2: Summary of Post-Test Scores of the influence of microteaching laboratory on mathematics affecting student teachers' performance

The descriptive analysis shows that the mean score of the Experimental Group  $(X_1)$  was 43.86, while that of the Control Group  $(X_2)$  was 39.34. Therefore, there was a mean score difference of 2.40 in favour of the Experimental Group.

## Hypotheses

Ho1: There is no significant difference between microteaching laboratories on teaching competence of prospective teacher through skill of recognizing attending behaviour.

Students in the Experimental Group  $X_1$ , were taught with the support of instructional materials. The teacher used various instructional materials during the lesson. While Students in the Control Group  $X_2$ , were not taught mathematics with the use of supporting instructional materials. The performance of students in the two groups was compared to find out if there was a significant difference between the achievement mean scores.

A t-Test was carried out on the results of the two groups. Statistical analysis done on the group means scores were summarized on Table 3.

## Table 3: Summary of t-Test Analysis of Students Post-Test Scores between Microteaching Laboratorieson TeachingCompetence of Prospective Teacher through Skill of Recognizing Attending Behaviour.

Source	Mean	Mean Diff.	SE Mean	df	Т	Sig. (2-Tailed)
<b>X</b> <sub>1</sub>	38.67	2.40	2.62	28	0.914	0.02
$\mathbf{X}_2$	36.27		2.62			

Table 3 shows that the mean scores were 38.67 (X<sub>1</sub>) and 36.27 (X<sub>2</sub>) and there was significant difference between microteaching laboratories on teaching competence of prospective teacher through skill of recognizing attending behaviour (t = 0.914, df = 28, p < 0.05). This implies that there is significant difference between microteaching laboratories on teaching competence of prospective teacher through skill of recognizing attending behaviour.

Ho<sub>2</sub>: There is no significant relationship between the influence of microteaching laboratory of mathematics and student teachers' performance on gender

The achievement scores of male and female students in the Experimental Group,  $X_1$ , were compared to find out if there was a significant difference based on gender. A t-Test was carried out on the results of the male students and the females. Table 5 gives a summary of the descriptive statistics of the results.

Gender	Ν	Mean Score	Mean Diff.	Std. Deviation	Std. Error Mean
Male Students	16	56.33	1.16	9.90	2.33
Female Students	14	55.17		12.55	3.62

 Table 4: Descriptive Statistics of Post Test Scores of Male and Female Students Taught Mathematics in the Experimental (X1) under microteaching laboratory Use Treatment

Table 4 shows that there was a marginal difference of 1.16 between the achievements of the male and female students. The difference was in favour of the male students who scored 56.33 as against 55.17 for the females. The t-Test was carried out to check if this difference was statistically significant.

## Table 5: t-Test Analysis of Post Test Achievement Scores of Male and Female Students Taught Mathematics using microteaching laboratory Lessons

Source	Mean Score	Mean Diff.	SD	SE Mean	Df	t	Sig. (2-Tailed)
Male	56.33	1.17	9.90	2.33	28	0.80	.428
Female	55.17		12.55	3.62			

Not Significant; p > 0.05.

The results in Table 5 show that there was no statistically significant difference between the mean achievement of the male and female students taught mathematics with the support of instructional materials (t = 0.80; df = 28; p > 0.05). The male and female students exposed to the use of instructional materials to learn mathematics achieved equally in learning. This implies that there was no gender effect on learning mathematics when teacher use microteaching laboratory to teach the topics.

## Discussion

This research was aimed at determining to find out the utilization of micro-teaching laboratory on student teachers mathematics performance for the training of teachers in Faculty of Education, Adamawa State University, Mubi. Two hypotheses were tested on the data obtained from the Utilization of Microteaching Laboratory on Mathematics Performance for Training Teachers (MLMPTT). The data was obtained on the achievement of students exposed to the use of microteaching laboratory ( $X_1$ ) and those not exposed to the use of microteaching laboratory ( $X_2$ ). The analysis reflects students' academic achievement scores in the pre-test and post-test administered to them.

Findings showed that the skills of the use of instructional materials acquired during the microteaching significantly and positively impacted the students ability to use instructional materials during teaching practice. This is to say that, drilling students in the use of instructional materials during micro-teaching is very helpful; for students going on teaching practice since it not only give them the knowledge of how to us the instructional materials, but provides them with the know-how on the use of instructional materials. It makes them willing and committed to the right use of instructional materials during teaching practice. This finding is similar to that of Dagnew (2011) which revealed that micro-teaching program provides the students teacher with positive impacts on the use of teaching and materials needed for use during teaching practice.

Findings showed that the skills of the use of classroom control acquired during the microteaching significantly and positively impacted the student's ability to use classroom control during teaching practice. This is to say that, drilling students in the use of classroom control during micro-teaching is very helpful for students going on teaching practice since it does not only give them the knowledge of how to us the skill of classroom control, but

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provides them with the know-how on the use of classroom management. It makes them willing and committed to the right use of classroom management during teaching practice. This finding was found to be similar to that of Abdurrahman (2010) which revealed that micro-teaching provides the student teacher with the knowledge of how to use the skill of classroom control as it modified their behaviour toward planning teaching process, classroom management, communication and evaluation. This finding is also similar to that of Liang and Xiaojong (2010) whose study suggested that, in order to ensure the needed constant improvement by the student-teacher on practical aspect and theoretical knowledge, micro-teaching must be student-led; and that stake holders should be made to understand that, with the use of multimedia aids constantly, students level of intelligence would be developed so as to achieve improvement on skills of teaching

## Conclusion

Based on the findings made, it was therefore concluded that, micro-teaching is an important tool for the performance of student-teacher during teaching practice. In essence, it provides the student teacher with an opportunity to acquire the basic skills of teaching such as the skill of the use of instructional materials, classroom control, chalkboard management, stimulus variation and questioning skill, in preparation for teaching practice.

## Recommendations

Based on the findings of this study, the researcher made the following recommendations:

- i. The period of microteaching should be extended to allow student teachers have adequate time to teach all the subjects and familiarise themselves with the class.
- ii. A well-researched micro-teaching design and policy should be put in place to improve the quality of teacher preparation.

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