Assessment of Teaching Performance in Mathematics among Early Childhood Care Education Pre-service Teachers during Teaching Practice

Emenyonu Chibunna, Unamba Eugene Chukwuemeka, Akaraonye James

Abstract— This study assessed teaching performance in Mathematics among early childhood care education Pre-service teachers during teaching practice. Based on the purpose of the study two research questions and two hypotheses were formulated. The population of the study consisted of all the 300 level final year NCE early childhood care education pre-service teachers. The sample size of the study was made of 222 pre service teachers involving 119 males and 103. The instrument used for data collection was Teaching Practice assessment form. Face and content validity were done by one expert in mathematics education and two experts in measurement and evaluation. The internal consistency of the items was established to be 0.88 using Cronbach alpha reliability statistics method. The data generated were analyzed using mean and standard deviation for the research questions while t - test was used to testthe hypotheses at 0.05 level of significance. The results indicated that teaching performance of the pre-service teachers was at the high extent, mean score on parameters of assessment are high on skill of classroom management strategies and communication skill while there are low mean scores on Quality of lesson preparation, skill of evaluation and teacher personality attitude and values and very low mean score on preparation, presentation and development of lesson and the inter-rater reliability was found to be valid percent (66.7%) irrespective of gender performance. The major recommendations were that the supervisors of the pre-service teachers should be trained on the effective use of Teaching Performance Assessment Form in order to obtain reliable assessment scores.

Index Terms— Assessment, Teaching Performance, Mathematics and Teaching Practice.

I. INTRODUCTION

Assessment is the term typically used to describe the activities undertaken by a teacher or in this context an assessor to obtain information about the knowledge, skills and attitudes of students or trainees. This activity can involve the collection of formal assessment data that is the use of objective tests or the use of informal data by involving observation checklists. The assessor typically assigns a grade or mark for work undertaken by students or trainees [1]. Considering the emphasis pointed out here, it is true to the fact that teaching practice exercise is an assessment process whereby teacher -trainees are graded and rank their rate of

improvements as they grow in their training journey. Teaching practice employ all the rules and regulations of assessment so as to make sure that the skills attained by learners in the field are recorded and ranked clearly. According to [2] the main reasons for assessment in teaching practice as in other areas of educational tasks includes diagnosis of learning and monitoring process, grading students, predicting future achievements, motivating students and diagnosis of teaching process. These assessment motives can be met through intensive discussion between the supervisor and student teacher. The discussion is guided by questions, answers and explanations which help the teacher-trainees to understand his or her weaknesses and areas for future improvement.

Teaching practice is the name that denotes the preparation of student teachers for teaching by practical training ([3]; [4]; [5]). Pre-service practical training has been established in many teacher education colleges and universities with teacher education courses both locally and internationally [6]. For instance, preparing effective teachers for school systems require that those teachers are competent in content, theoretical and practical aspects [3] add that during teaching practice, student teachers feel engaged, challenged and exposed when they work in the classroom and school [5]. In fact, the need for teaching practice originates from the concept called learning to teach [7]. insists that learning to teach is a matter of learning the technical skills which enable individuals to function effectively in the education system. The teaching practice is one of the most important aspects of teacher education. It is an exercise designed to expose the student-teachers to the practical aspect of teaching profession and to enable them put into practice the theoretical knowledge acquired during classroom interactions with their teacher educators. Effective teaching requires knowledge and understanding of the subject the student- teacher is going to teach, and learning the curriculum. Teaching students implies exposing the learners to knowledge and skills as well as practical experience as a basis for professional learning.

Effective teaching basically goes beyond mere impartation of knowledge to include creating good environment, arousing and sustaining students' engagement in learning. Teaching effectiveness largely depends on the quality of the learning environment and delivery system [8]. Effective teaching is undoubtedly a complex task which is achieved by combining many factors. Perrot cited in Afram [9] contends that effective teaching is the ability to guide learners to achieve the intended learning goals. Every teaching must be



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purposeful to achieve some desired end often termed as learning goals to which the teacher directs classroom discourse to ensure its achievement. Effective teaching requires teacher understanding of some basic principles such as acknowledging the individual characteristic nature of learners and providing varied opportunities for development, designing instruction that is responsive to their learning needs and thought processes, focusing on desired academic outcomes, selecting broad range of activities that contribute to individuals 'holistic development and for productivity [10]. With regard to learning environment, it is worth noting that no effective learning can take place in a threatening environment. Teachers, therefore, need to create a conducive learning atmosphere for students 'learning since classroom climate has major impact on students 'learning [11]. The author describes learning environment that facilitates student learning as being purposeful, task-oriented, relaxed, warm, and supportive and has a sense of order. [12]opined that every subject has its own technical language which is bound up with its way of thinking, talking and writing. Indeed, notes that students learn through language and express their understanding of subject matter in language. It behooves the student-teachers therefore to employ the appropriate language in their lesson plans so that new patterns of thinking and understanding are developed in their students.

Another important factor to consider in assessing the teaching performance of pre -service teachers is the teaching skills. It is very crucial for teaching effectiveness. Teaching skills have been defined differently by different scholars. According to [14], "teaching skills are specific instructional activities and procedures that a teacher may use in his classroom. These are related to various stages of teaching or to continuous flow of teacher's performance. [15]defined teaching skills as those activities of teaching that are especially effective in bringing about desired changes in pupils and are related to continuous flow of teacher's performance. According to [16] listed instructional strategies designed to help teachers improve their classroom performance and ultimately student learning as set induction, Stimulus variation deals with both verbal and nonverbal techniques for varying stimuli presented to the students. A variety of techniques can be used by the teacher. The skill is particularly relevant to activities such as direct teaching or teacher-led discussions, in which the teacher's ability to hold the student's attention determines his or her success in the classroom, reinforcement, questioning skills, plan-repetition, closure and evaluation. Basically, the student-teachers are expected to plan their lessons appropriately. Good planning underpins flexibility and provides the teacher with structure and security [17]. The plan of a lesson includes formulation of concise and feasible learning objectives, organization of content and technical language of instruction. The learning objectives express what the teacher intends that the students learn in terms of skills, knowledge and understanding. As explained by [17], learning objectives are the essential planning tools of the teacher, as without clear and concise objectives linked to specific activities, the teacher has little basis on which to define the purpose of a task clearly for the learner or assess learners' progress. However, it is important to note that too many objectives for any one lesson are likely to prevent a clear focus on the core learning that the teacher intends to achieve. More importantly, the content of the lesson needs to be sequentially organized in order to provide instructional steps to be followed by the teacher so that no aspect of the lesson is omitted.

The study by [18] emphasize that the knowledge of subject matter is a critical factor at every point in the teaching process: in planning, assessing and diagnosing, task setting, questioning, explaining and giving feedback. Similarly, [19] notes that some vital attributes of effective teaching include understanding of how students learn and empathy with them. More explicitly, [20] identifies three sorts of subject matter, first, content knowledge which refers to knowledge of the subject held by the teacher, second, pedagogic content knowledge which refers to knowledge of how to use content knowledge for teaching purposes, and third, curriculum knowledge which refers to knowledge of curriculum structures and materials, and how to use them effectively in classroom context. Expectedly, the teachers ought to make judgments about the appropriate teaching of knowledge, concepts, skills and attitudes for the realization of the objectives of the lesson. As reported by [21], there seems to be something of a consensus that teachers with sound knowledge of subject matter are likely to help learners create experiences that actually work to produce learning.

Meanwhile, research in classroom management [22] shows that effective classroom management has the largest effect on students' achievement. Similarly, in a meta-analysis of more than 100 studies, [23] finds that the quality of teacher-student relationships is the keystone for all other aspects of classroom management. [24] and [25] agree that effective classroom management entails arrangement of classroom in a way conducive to effective management, alertness to classroom problems, acknowledgement of students' behaviours, reinforcement of acceptable behaviour, provision of negative consequences for unacceptable behaviour, establishment of clear learning goals, taking personal interest in students, exhibition of assertive behaviour by the teacher and awareness of high-needs of students. Indeed, [26] notes that students are likely to engage more deeply and master their lessons more thoroughly when their teachers care about them, control the classroom effectively, clarify complex ideas, challenge them to work hard and think hard, deliver lessons in ways that captivate, confer with them about their ideas and consolidate lessons to make learning coherent. This makes intuitive sense that students can hardly learn in a chaotic and poorly managed classroom. Indirectly, teachers of various categories are enjoined to follow the golden rules of class management so as to achieve the objectives of the lesson and maintain high discipline during teaching-learning process. [27] identify classroom management as factor in assessing pre-service teaching performance including building a supportive environment by establishing teacher-student and peer relationships, optimizing learning by using instructional methods, gaining a commitment from students to appropriate behavior standards, creating a safe and caring classroom community, and using counseling and behavioral methods to change students' inappropriate behaviors. Thus, in order to be



an effective educator/teacher, a pre-service teacher generally should master the classroom management as it is the most essential aspect of the teaching and learning process.

The use of teaching resources in reinforcing a skill fact or idea in the classroom [28];[29] and [30]) has acknowledged that effective use of relevant and quality teaching resources by the teachers helps learners to improve their perceptive skills thus arousing their interest, relieving their anxiety and boredom. In fact, experience shows that students of the present age hardly feel comfortable learning concepts in abstract. They tend to enjoy learning when instructions are given using concrete materials such as charts, models, scientific equipment, video and audio cassettes, radio, projectors, multimedia information television, and communication technology (ICT) resources and others. These various media are means of deepening, enriching and broadening the lesson and providing first-hand experiences that may allow each student to observe and indirectly experience other environment. It is important for the student-teachers to identify and utilize the most appropriate teaching resources to illustrate and clarify the intents of the lesson so that the learners can understand the importance of each concept.

The entire purpose of teaching is to make positive change in learners [31]. However, the skill of teaching is inherent in individuals which needs to be developed through training and practice. A teacher is presumed to be at his or her best if he or she is able to impart knowledge acquired over the years to produce positive change in behaviour of the learners. However, for a teacher to teach meaningfully demands so much of his or her attention that an essential element in the teaching-learning process is not lost.

Essentially, the conduct of any meaningful lesson involves relevant, interesting and imaginative introduction, orderliness of presentation that interest and motivate students and make learning objectives clear to the learners. It also involves the use of language and dictions that command respect from the learners, even distribution of quality questions that pose challenges or stimulate the curiosity of the learners. Further, the lesson is expected to involve students' active participation. That is, instruction is to be more student-centered and less teacher-directed [32] so that students can solve their problems interestingly and share information on various concepts and gain much confidence, skills and competence to perform satisfactorily in the subjects. Moreover, the lesson is expected to entertain variety of instructional techniques (demonstration, discussion, practical exercise, etc), masterly, use of chalkboard for illustration of concepts, meaningful evaluation of learners' achievement, summary of lesson and follow-up assignments.

Researches in educational studies like [33] and [34] demonstrate that teacher's personality or self-identity, is intimately concerned with classroom discipline and effective teaching. In essence, teacher's personality is likely to promote positive learning or destroy a well-planned lesson. Beyond exaggeration, it is likely that a teacher who presents himself or herself admirably in the class, demonstrates confidence to project and assert self, shows enthusiasm at lessons, maintains emotional stability at all situations, displays

amiable mannerism when communicating with the learners and exhibits eagerness to learn, may create stable impression in the hearts of the learners and consequently motivate them to learn and achieve satisfactorily.

Conversely, a teacher who appears in the classroom ruffled, uncoordinated and hard of understanding may scare the learners and destroy the gamut of teaching and learning process. The practical issue in the foregoing, however centers on the question of whether the student-teachers possess the pedagogical skills to satisfy the criteria measure. Really, the answer is speculative. This is so because some of the student-teachers may find it difficult to enact change from student role to teacher role, especially those who are engaging in teaching for the first time (300-Level students). It may be assumed then that effective practices of the first timers may not be as efficacious as when used by those who had taught previously (400-Level students) or experienced permanent teachers. Moreover, there is a problem of agreement in the rating of teaching performance of student-teachers by the assessors as there may be demerits of leniency or harshness. There is also a further problem concerning the dispositional ability of male and female student-teachers to teaching itself because much of the problem militating against academic quality in Nigerian schools has been attributed to poor teaching [35]. Nevertheless, it is believed that the outcome of this study would provide concise answer to the question. Therefore, this study intends investigate assessment of teaching performance in mathematics among early childhood care education pre-service teachers during teaching practice.

II. RESEARCH QUESTIONS

The following questions were raised to guide the study:

- I. What is the mean teaching practice performance score of pre –service teachers?
- II. What are the mean performance scores of students in the different parameters of assessment?
- III. Is there any difference between teaching performance of male and female pre-service teachers?
- IV. Is there any difference between teaching performances of the two raters on teaching practice?

III. HYPOTHESES

The following null hypotheses tested at 0.05 level of significance further guided the study.

 H_{o1} : There is no significant difference between mean scores performance of male and female pre service teachers.

 H_{o2} : There is no significant difference among the mean scores performance of the two raters on teaching practice performance.

IV. METHODS

The researchers adopted descriptive research design in carrying out the study. The participants were drawn from department of early child hood and primary education studies in the Faculty of Education, Alvan ikoku federal college of education Owerri Imo State, posted to various nursery and



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primary schools in Imo State for their mandatory six weeks teaching practice during 2018/2019 academic session. They consisted of 222 pre-service teachers (male=119, female=103) 300-Level pre-service teachers. The instrument for collecting data was a typical rating scale, titled Teaching Practice Assessment Form (TPAF) designed by the school of general Education, Alvan Ikoku Federal College of Education. TPAF had six parameters with varied items and scoring weights: Parameter 1—Preparation (four items=10marks); Parameters 2— Presentation (nine items=40marks); Parameter 3 Skills of Class Management (three items= 7marks); Parameter 4— Communication skills (two item=6marks); Parameter 5— Evaluation Skills (two items= 6marks); CAT 6-Teacher's personality/ Professional Attitude and Values (four items=2marks). Each item in CAT 1, CAT 2, CAT 3, CAT 5 and CAT 6 was rated on a five-point scale namely Excellent=5, Very Good=4, Good=3, Fair=2, Poor=1. (see Appendix A). The internal consistency of the instrument was estimated at 0.88 using Cronbach-alpha (1951). Prior to the commencement of the teaching practice exercise, participants

were inducted on the importance of teaching practice to teacher education. Emphasis was placed on regular attendance and punctuality in schools, active participation in school activities, effective teaching in the classroom and mode of assessment of teaching performance. Participants were allowed to ask questions based on the teaching practice and their expectations during the exercise. Data were collected using their different supervisors scores. They were assigned to objectively observe and rate teaching performance of each pre service teacher twice (3rd and 5thweeks of six weeks). The average score for each participant was computed and presented for analysis. Data were analyzed using mean and standard deviation for the research questions, t-test statistics and inter- rater at 0.05 level of significance were used to test the hypotheses.

V. RESULTS

Research Question 1: What is the Mean Teaching Practice performance score of the students

Table 1: Mean performance score of TP students						
Ν	Max score	Mean	SD			
222	80	50.65	3.25			

Result in table shows that the mean performance score of the students is 50.65 with SD 3.25. This shows that the students have High mean score.

Research Question 2: What are the Mean Performance scores of the students in the different parameters of assessment?

Table 2: Mean and SD on different parameters of assessment.

S/N	Parameters of Assessment	Mean	Mean	SD
		score		
1	Quality of lesson preparation	10	44.30	3.20
2	Presentation and development of lesson	41	38.34	3.01
3	Skill of classroom management strategies	7	56.00	4.05
4	Communication skill	6	53.50	4.00
5	Skill of evaluation	6	48.33	2.8
6	Teachers personality/professional attitude and values	10	48.00	2.8

Result in table 2 shows that mean score on parameters of assessment are high on skill of classroom management strategies and communication skill while there are low mean scores on Quality of lesson preparation, skill of evaluation and teacher personality attitude and values and very low mean Table 3: t-test on gender performance scores. score on preparation, presentation and development of lesson.

Hypotheses 1:

 H_{o1} : There is no significant difference between mean score performance of male and female early childhood pre-service teachers. During teaching practice

Variables	Ν	Mean	SD	df	t-cal	t-tab	Decision
male	119	215.12	11.32	71	2.18	1.96	Accept
female	103	214.05	11.147				

The result of the t-test presented in table 3 shows that the calculated t-value of 2.18 is not significant at ($P \le 0.05$). the null hypothesis is accepted. Therefore, there is no significant difference in the mean score performance by lecturers in science department and education.

 H_{o2} : There is no significant difference among mean scores of the two raters (Department and Education) on teaching practice performance scores of students.



		Table 4. Rater difference				
		FREQUNCY	PERCENT	VALID PERCENT	CUMLATIVE PERCENNT	
Valid	- 3.00	1	5.6	5.6	5.6	
-	1.00	3	16.7	16.7	22.2	
	.00	12	66. 7	66.7	88.9	
	2.00	1	5.6	5.6	94.4	
	3.00	1	5.6	5.6	100.00	
Total		222	100.00	100		

Results in table 4 shows that the percentage of agreement is 66.7%.Note, always use the "Valid Percent" column since it is not influenced by missing data.

VI. DISCUSSION

The focus in this study was to assess the teaching performance inMathematics among Early Childhood Care Education Pre-service Teachers During Teaching Practice. Interestingly, the results in table 1 showed favorable teaching performance as students haveabove mean score performance in teaching practice. The reason might be connected with the fact that the student-teachers were formally inducted on the importance of teaching practice to teacher education which might have led to their strict adherence to the pedagogical principles of effective teaching.

The results in table 2 showed with regard to performance in different parameters of assessment reveal that students performed below mean in preparation and presentation of lesson. These areas need to be addressed seriously especially in the light of acquisition of critical 21st century science teaching skills. This is so even as Udosen (2019) joins Schrum to condemn the old ways of teaching in Nigerian schools which was more of presentation driven and teacher directed with students listening to teachers and doing monotonous note copying. This approach sure does not encourage creativity in the learners especially in the acquisition of science related skills.

there was no significant difference between teaching performance of male and female early childhood pre-service teachers. This finding is logical in the sense that the participants were drawn from one-cohort of undergraduates in the Faculty of Education, in one university with similar exposure to pedagogical experiences resulting to similarity in the range of scores. Moreover, similar study in this area, Ohikena&Anam (1994) did not find any significant difference in teaching effectiveness of males and females in secondary education in Nigeria. This implies that gender or sex of the student-teachers had no significant influence on their teaching performance.

Furthermore, there is no significant difference in the mean performance scores of students by the two raters (Department and Education). Also the rater reliability of 0.76 is considered substantial enough. It is interesting to note that there is consistency and high degree of agreement amongst the raters. However, it may still be helpful to report here the findings of Asaya (2010) and Mutende (2017) who questioned the validity of teaching practice assessment by lecturers. This is an important matter to determine even as we look forward to preparing our pre-science teachers for 21st century teaching. Moreover, whether the skills we are presently testing are critical in acquisition emerging science skills for the 21stcentury is an issue for further consideration and research.

VII. CONCLUSION

It could be concluded in this study that the teaching performance of the student-teachers was

satisfactory and that gender and previous teaching experience of student-teachers had no significant influence on their teaching performance.

VIII. RECOMMENDATIONS

Based on the findings, the following recommendations were made:

- 1. Stakeholders in teaching practice in colleges of education and universities should formally induct their Pre-service teachers on the importance of the exercise to teacher education to ensure satisfactory teaching performance of the students.
- 2. The supervisors of the pre-service teachers should be trained on the effective use of Teaching Performance Assessment Form in order to obtain reliable assessment scores.
- 3. The cooperative teachers in respective subjects in various secondary schools should be allowed to separately assess the pre-service teachers for comparability of standard in scoring.
- 4. The teaching practice must be thoroughly monitored to ensure total compliance with the principles guiding the exercise.

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