

Impact of Lecturer's Training on Student Performance in Mathematical Economics Amongst Colleges of Education in Nigeria: A Case Study of Colleges of Education South-South Zone, Nigeria

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Abstract

This study examined the impact of lecturers training on colleges of education students' academic performance in mathematical economics in south-south zone of Nigeria. To achieve the research objectives, three research questions, as well as three hypotheses were formulated to guide the study, ex-post facto design was adopted for the study. The population of this study comprised all the one hundred and sixteen (116) lecturers and fifteen thousand six hundred and eighty (15680) undergraduate students in the Department of economics in public colleges of Education in south-south zone of Nigeria. A sample size of three hundred and ninety-one (391) students and ninety (90) lecturers were selected for the study using Yaro-Yamne formulae. Two-researcher structured questionnaire titled: Impact of Lecturer's Training (ILTQ) and Student Performance in Mathematical Economics Questionnaire (SPMEQ), and interviews scheduled were used to elicit responses from the study respondents. The data collected was analysed using simple linear regression. The findings of the study revealed that lecturer's in-service training, conference training as well as peer mentoring influences students' performance in mathematical economics. Based on the findings it was recommended that, lecturers in the departments of economics in colleges of education should be encouraged financially by the school management to attain higher levels of education such as Masters and Doctorate level, various agencies of Education, such as Tetfund, federal and State ministries of education should ensure that workshops, conferences are organised and encourage lecturers to attain such so as to develop their teaching skills more so Provosts of Colleges of Education should charge lecturers in the department of economics in colleges of Education to peer-mentor the lecturers of junior ranks in the departments especially, on skills of instructional delivery of mathematical economics so as to enhance students' academic performance in mathematical economics.

Keywords: Mathematical Economics In-service, Conferences, Peer-mentoring, Academic performance

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I. Introduction

The quality of graduates in tertiary institutions has become an issue of great concern to stakeholders in the educational sector. But even more important is their mathematical abilities given the prominent role that mathematics plays in the world of business, economics, science and technology. Moreover, every individual needs some level of mathematical knowledge at one level in life to function intelligently and efficiently. According to Usman (2003), everywhere we go, everything we do or propose to do, either the structure of mathematics or its applications plays a vital role little wonder why most countries, races and peoples put emphasis in all aspects of studying, developing, and applying mathematics.

Over the years, researchers have been intellectually occupied with research about factors that limits student's performance. Often, variables which are students centred such as student's background, school infrastructure and class congestion have been proven to have significantly influence students' performance. While

these findings are significant in Nigeria considering her poor social and economic conditions, students' performance in mathematics deserves a special attention.

In Nigeria, colleges of education are specialized tertiary institutions for training teachers for primary and secondary school education. Therefore, a link can easily be drawn between the performance of students in secondary schools and the quality of graduates in colleges of education in Nigeria, this is because secondary level of learning breeds tertiary level of education of which colleges of Education is one of them.

It is disheartening that research and data from national examination bodies like West African Examination Council (WAEC) and the National Examination Council (NECO) have shown a consistent poor performance in general mathematics in Nigeria. For instant WAEC (2009 – 2012) Chief examiners reports of mathematics results in public examinations as retrieved from Musa and Duada (2014) shows a consistence below-average performance in mathematics. This trend has continued even to more recent years. However, if this trend continues into the future, it is certain that the country may not achieve her development goals, which is basically anchored on education. This is consequent upon the fact that without a credit pass in mathematics learners may not be able to proceed to higher educational institutions where highly skilled work force in the field of business, technology, and engineering needed for today's global economy are produced.

Given the prominent role that mathematics play in the society, the implication of the persistence poor performance in mathematics is that Nigeria is producing a generation of people with less mathematical abilities and hence their comprehension and contribution to the highly mathematically sophisticated world of business, information technology, engineering and medicine will be greatly limited both at present and in the future. Ale and Lawal (2010) stated that the line of demarcation between the developed and the underdeveloped nations is based on their level of mathematical attainment and ingenuity. Moreover, the country may produce a generation of poor mathematics teachers resulting in a vicious cycle of poverty in mathematics.

Fortunately, mathematics and economics seems to be inseperatable, as it roles in economic science spans from aiding the formulation of theoretical relationships with rigor, generality as well as simplicity to allowing the formulation of meaningful, testable propositions about wide- ranging and complex subjects which could less easily be expressed informally. Consequently, to some students, studying mathematical economics is something akin to taking a bitter tasting medicine-absolutely necessary but extremely unpleasant (Chiang2010). Unfortunately, students perception about the subject will not make it be eliminated from the curriculum rather factors that influences poor performance of students in the subjects could be looked into to improve such performances, as any meaningful attempt to solve any problem requires a clear understanding of the causes of such problems.

Contemporary authors of mathematical economics literatures usually make reference to the way mathematics is presented in previous literatures and the way it is taught in class rooms as the reasons behind student's poor performance with the pledge that their literature is meant to solve such problems. As noted by (Chiang 2010), mathematical economics is often presented in an inauspicious manner with the believe that conciseness means elegance, explanation offered are often too brief for clarity, thus giving students an undeserved sense of intellectual inadequacy.

Indeed, if Chiang's statement is anything to go by, then student's performance in mathematical economics is not unconnected with some teachers center variables such as lecturer's qualification and their level of conference training as well as peer mentorship in teaching mathematics. This however remains a tentative assertion because while these variables may be significant in some places, it may not be so in other places. This research, therefore seek to examine how these teachers centred variables affects student's performance in mathematical economics. This study seeks to examine the influence of lecturers training on the performance of students in mathematical economics in colleges of education in Nigeria.

II. Literature Review

Theoretical Framework

Attribution Theory

The study is also based on Weiner's (1992) attribution theory in Psychology. The concept of attribution describes the cognitive process by which a person perceives the causes of what has happened to him or her either as caused by him/her or by others (Asonibare,1986). According to the attribution theory, people tend to explain the causes of success or failure to either internal or external factors. Individuals with internal locus of control believes that events result primarily from their own actions while those with external locus of control believes that other people (eg teachers, parents, guardians) or factors such as fate and luck primarily determines event. The theory applies to this study because people are most likely to attribute failure in mathematics to external factors such as the teachers variables considered in this study.

Empirical Literature.

Conferences Training and Student Performance

In a study conducted by Abubakar, Samaila and Armiyau (2023) on 1,105 academic staff of Shehu Shagari College of Education out of which 291 sample was selected using the Krejcie and Morgan table, which they sought to investigate the relationship between conferences attendance and lecturers' performance, using a structured questionnaire for data collection which was analysed using descriptive statistics of percentage and frequency and Pearson Product Moment Correlation (PPMC), the result of the findings The findings shows a significant relationship between conference and lecture performance.

Subsequently, Akpam et al (2022) examined the influence of Conference Attendance, Information and Communication Technology on teachers' productivity in Calabar Education Zone, Cross River State, data was collected using a structure questionnaire. Simple regression analysis was used for data analysis the result of the analysis revealed that conference and information and communication technology influence teacher's productivity in the study area.

Anho & Akpokiniovo (2023) carried out a study on the title "impact of teachers pedagogical practice and participation in professional development opportunity contribute to improving the quality education in Nigeria" the findings of the study revealed that exposing teachers to conferences had a positive impact on the quality of education of students.

Teachers In-Service Training and Student's Performance

In a study carried out by Ponsiano, Fredrick, and Sarah (2022) in Uganda to assess the role of teacher In-service training as a tool for the student's performance in selected public schools in Kisoro district, of which the study applied a mixed methods research design which involved both quantitative and qualitative methods to collect and analyse data. Quantitative data were collected using questionnaire while qualitative data, in-depth interviews. Study sample included the district inspector of schools and District Education Officer and 238 teachers in Kisoro district. The findings of the study revealed that in- service training contributed positively to teacher's performance and also motivates teachers for better results.

Ojimba (2013) studied teacher quality and senior secondary school students' achievement in mathematics in Rivers state, Nigeria. Already conducted mathematics test scores of students were retrieved and used for the analysis. Furthermore, data were elicited through the teacher quality and students' achievement in mathematics questionnaire (TQASAMQ). A population of 253 principals was involved in the study out of which 151 were chosen for the sample using the Yarrow Yemen's formula. The data were analysed using the Z-test statistic, means and simple percentage. The findings were that to a "high extent", teacher quality which was also measured by teachers' in-service training related to students' achievement in mathematics.

Hariss and Sass (2008) studied the effects of various types of education and training on the ability of teachers to promote student achievement in the United State. They estimated econometric models that include detailed measures of pre-service and in-service training, a rich set of time-varying covariates, and student, teacher, and school fixed effects. The results suggested that content-focused teacher professional development is positively associated with productivity in middle and high school mathematics. There was no evidence that either pre-service (undergraduate) training or the scholastic aptitude of teachers influences their ability to increase student performance.

Jacob and Lefgren (2004) in their study of the impact of in-service professional development on teacher productivity in the United States. They exploit a "natural experiment" that occurred in the Chicago public schools where the level of professional development was based (exogenously) on prior school-level average test scores. They were not able to distinguish the specifics of the professional development that teachers received; however, they distinguish between training that focuses on content and that which emphasizes pedagogy. They include that in-service professional development has a significant impact on learning outcomes.

PEER MENTORSHIP AND STUDENT'S PERFORMANCE

Matsolo (2022) conducted a study in South Africa to ascertain the effects of peer mentoring on academic performance of first-year accounting students in Dr. Central University of Technology, Free State, result of the study revealed that in order to minimize the challenges of poor academic performance of first-year accounting students and high turnover, the university should make participation in peer mentoring program compulsory. Mentors should be continuously developed to keep abreast of current developments in peer mentoring at universities globally. Accounting lecturers must recognise and acknowledge the constructive role played by the peer mentoring program and encourage all first-year students to participate in its activities.

In a study carried out by Nasrudeen, Busurat & Debo (2019) to investigate the effects of peer mentoring strategy on students' performance in mathematics at senior secondary schools in Lagos State, Nigeria, using a quasi-experimental design method, to collect data on 99 senior secondary II students drawn from two randomly selected co-educational schools in Education District I in Lagos State, Nigeria, of which Mathematics

Performance Test (MPT) drawn from standardized WAEC past questions were administered and analysed using t-test statistics. The findings of the study revealed that there was a significant difference in the performance of students involved in peer mentoring strategy and the students involved using traditional strategy.

Similarly, Birgit et al (2014) sought to examine the effects of different mentoring styles on mentee academic performance after 1 year and 2 years of study. The population consisted of 417 psychology students who started their course of study in the 2007/2008 winter term at the University of Vienna. Three hundred twenty-eight students participated voluntarily in the peer mentoring program, Cascaded Blended Mentoring, in which they were supported by 48 peer mentors (advanced students) in small groups. The findings of the study revealed that participants in the mentoring program performed better in their studies than students who did not participate in terms of average grade and number of courses passed. Hence there exist a positive relationship between peer mentorship and student academic performance.

Summary of Empirical Literature

Empirical literatures reviewed within and outside Nigeria revealed that a number of teacher variables which include years of teaching experience, level of educational attainment or academic qualifications, area of specialty, teacher development programs, degree of job satisfaction, motivation and salary affect students learning outcomes. Different analytical techniques such as regression, correlation, Z-test, analysis of variance (ANOVA) and chi-square have also been adopted by researchers. Thus this study adopts simple regression analysis as the analytical technique to analysed collected data for the study and the study area is wide such that inferences from the study findings are drawn to other tertiary institution in the Nation at large.

III. METHODOLOGY

Research Design

The study adopted ex-post-facto design, to examine the cause-effect among the variables.

Population of the Study The population of this study comprised of all one hundred and sixteen (116) lecturers and fifteen thousand six hundred and eighty (15680) undergraduate students in the department of economics in the Twelve (12) public colleges of Education in south-south zone of Nigeria

Sample and Sampling Procedure A sample size of three hundred and ninety-one (391) students was selected from the study population using Yaro-Yamne formulae as well as ninety (90) lecturers.

Research Instrument

Two-researcher structured questionnaire titled: Impact of Lecturer's Training (ILTQ) and Student Performance in Mathematical Economics Questionnaire (SPMEQ), and interviews scheduled was be used to elicit responses from the study respondents.

Validation of Instrument

To ensure instrument validity, survey questions was given to expert in measurement and evaluation, to a certain the relatedness of the instrument to study variables.

Reliability of instrument

Instrument reliability was tested through a simple test re-test. The instrument was administered twice on twenty (20) mathematical economics lecturers and students in the study population.

Data Collection Procedures

The instruments were administered to the study respondents with the aid of research assistants' researcher.

Method of Data Analysis

The R-value of simple linear regression statistic was used to answer the research questions. The simple linear regression shows the percentage influence of lecturers training on the performance of students in mathematical economics in colleges of education in Nigeria. The decision rule by Uzoagulu (2011) was used to determine the strength and direction of influence (relationship) of lecturers training on the performance of students in mathematical economics. According to Uzoagulu (2011), the following was used to determine the strength and extent of influence of the independent variable on the dependent variable: ± 1.00 = highest influence, ± 0.98 = very high influence, ± 0.80 = high influence, ± 0.40 = moderate influence, ± 0.30 = low influence, ± 1.0 = very low influence, and ± 0 = no influence. In testing the hypotheses, P-value were compared with 0.05 level of significance. The decision was taken at $p\text{-value} \leq 0.05$, if $p \leq 0.05$ the null hypothesis is rejected and if $p > 0.05$. The package for data analysis Statistical Package for Social Science (SPSS).

IV. Results

Research Question 1: what is the extent to which lecturers' in-service training influenced students' performance in mathematical economics?

Table 1: Simple Linear regression analysis for the effect of lecturers' in-service training on students' performance in mathematical economics

Variables	R	R Square	Extent of Prediction	Remark
In-service training	.352	.124	12.4%	Low influence
Students' performance				

The result in Table 1 shows the R for the strength of the effect and R^2 for the determination of the extent to which lecturers' in-service training affects students' performance in mathematical economics. The R-value of .352 indicates a low effect of lecturers' in-service training on students' performance in mathematical economics. The calculated R^2 of .124 which is the coefficient of determinant indicates that only 12.4% of students' performance in mathematical economics is influenced by lecturers' in-service training. This implies that lecturers' in-service training to a low extent have influenced students' performance in mathematical economics.

Research Question 2: what is the influence of lecturers' conference training on students' performance in mathematical economics?

Table 2: Simple Linear regression analysis for the effect of lecturers' Conference training on students' performance in mathematical economics

Variables	R	R Square	Extent of Prediction	Remark
Conference training	.558	.311	31.1%	Moderate Influence
Students' performance				

The result in Table 2 shows the R for the strength of the influence and R^2 for the determination of the extent to which lecturers' conference training influence students' performance in mathematical economics. The R-value of .558 indicates a moderate influence of lecturers' conference training on students' performance in mathematical economics. The calculated R^2 of .311 which is the coefficient of determinant indicates that only 31.1% of students' performance in mathematical economics is influenced by lecturers' conference training. This implies that lecturers' conference training to a moderate extent have influenced students' performance in mathematical economics.

Research Question 3: what is the extent to which lecturers' peer mentoring influence students' performance in mathematical economics?

Table 3: Simple Linear regression analysis for the effect of lecturers' peer mentoring on students' performance in mathematical economics

Variables	R	R Square	Extent of Prediction	Remark
peer mentoring	.540	.291	29.1%	Moderate Influence
Students' performance				

The result in Table 3 shows the R for the strength of the influence and R^2 for the determination of the extent to which lecturers' peer mentoring have influenced students' performance in mathematical economics. The R-value of .540 indicates a moderate influence of lecturers' peer mentoring on students' performance in mathematical economics. The calculated R^2 of .291 which is the coefficient of determinant indicates that only 29.1% of students' performance in mathematical economics is influenced by lecturers' peer mentoring. This implies that lecturers' peer mentoring to a moderate extent have influenced students' performance in mathematical economics.

Test of Null Hypotheses

Hypothesis 1: The extent to which lecturers' in-service training influence students' performance in mathematical economics is not significant

Table 4: Simple linear regression analysis for the influence of lecturers' in-service training on students' performance in mathematical economics

Variables	Source of variation	Sum of square	df	Mean square	F-cal	P-Value.	Decision @P<.05
In-service training	Regression	557.608	1	557.608			
Students' academic performance	Residual	3936.892	88	44.737	12.46	0.001	significant
	Total	4494.500	90				

*Significant at .05 alpha level, N=90; df= 1 and 88

The entries in Table 4 illustrate the simple linear regression results and present the lecturers' in-service training on students' performance in mathematical economics. The result revealed that the P-value of 0.001 is less than the significant level of 0.05 with 1 and 88 degrees of freedom. With this result, the hypothesis which states that the extent to which lecturers' in-service training influences students' performance in mathematical economics is not significant is rejected. This result is significant.

Hypothesis 2: The extent to which lecturers' conference training influence students' performance in mathematical economics is not significant.

Table 5: Simple linear regression analysis for the influence of lecturers' conference training on students' performance in mathematical economics

Variables	Source of variation	Sum of square	df	Mean square	F-cal	P-Value.	Decision @P<.05
Conference training	Regression	1398.75	1	1398.725			
Students' academic performance	Residual	3095.775	88	35.179	39.76	0.000	Significant
	Total	4494.500	90				

*Significant at .05 alpha level, N=90; df= 1 and 88

The entries in Table 5 illustrate the simple linear regression results and present the lecturers' conference training on students' performance in mathematical economics. The result revealed that the P-value of 0.000 is less than the significant level of 0.05 with 1 and 88 degrees of freedom. With this result, the hypothesis which states that the extent to which lecturers' conference training influence students' performance in mathematical economics is not significant is rejected. This result is significant.

Hypothesis 3: The extent to which lecturers' peer mentoring influence students' performance in mathematical economics is not significant.

Table 6: Simple linear regression analysis for the influence lecturers' peer mentoring on students' performance in mathematical economics

Variables	Source of variation	Sum of square	df	Mean square	F-cal	P-Value.	Decision @P<.05
Peer mentoring	Regression	1308.335	1	1308.335			
Students' academic performance	Residual	3186.165	88	36.206	36.13	0.000	Significant
	Total	4494.500	90				

*Significant at .05 alpha level, N=90; df= 1 and 88

The entries in Table 6 illustrate the simple linear regression results and present the lecturers' peer mentoring on students' performance in mathematical economics. The result revealed that the P-value of 0.000 is less than the significant level of 0.05 with 1 and 88 degrees of freedom. With this result, the hypothesis which states that the extent to which lecturers' peer mentoring influence students' performance in mathematical economics is not significant is rejected. This result is significant.

V. Discussion of Findings

Findings of hypothesis one revealed the extent to which lecturers' in-service training influences students' performance in mathematical economics is significant. The research question showed that, lecturers' in-service training to a low extent have influenced students' performance in mathematical economics. These results imply that lecturers' in-service training significantly influence students' performance in mathematical Economics in Colleges of Education South-South Zone, Nigeria. The reason for the outcome of this study may be premised on

the fact that lecturers in colleges of education have been granted sponsorship for further studies to improve their performance, state organizes refresher courses to build lecturers' capacity for enhance effective teaching and lecturers are sent granted study leave to further their postgraduate programmes to enhance their performance. These may have directly influence the academic performance of students in Economics. This findings is in line with the findings of Ajani (2019), which revealed that relevant, very objective and well-designed in-service training of teachers promoted effective institutional tasks delivery of teachers which lead to better academic performance of students in internal and external examinations. Therefore, the in-service training of teachers is important to quality education as it equips the teachers with the current and effective knowledge, skills, values and attitudes that promote academic excellence in the teaching and learning in the school system. The findings also conforms with the findings of Cohen & Hill (2020) who emphasized that in-service training helps teachers to acquire more conceptual and technical knowledge, skills and competencies in their teaching subjects and pedagogy which improve their efficiency in the classroom..

Findings of hypothesis two revealed the extent to which lecturers' conference training influences students' performance in mathematical economics is significant. The research question showed that, lecturers' conference training to a moderate extent has influenced students' performance in mathematical economics. These results imply that when lecturers attend conferences as part of their professional trainings it will significantly influence students' performance in mathematical Economics in Colleges of Education South-South Zone, Nigeria. The reason for the outcome of this study may be due to the fact that lecturers in colleges of education have seen the positive effect of attending conferences in terms of acquiring new pedagogical knowledge, research skills, and professional benefit via promotion. These culminate to commitment in the school and effective teaching of students. The findings of this study is in agreement with the findings of Musa, Bello and Bala (2023) who found a significant relationship between conference and lecture performance in Sokoto State College of Education, Sokoto. The findings of this study also agree with the findings Ollor (2021) whose findings revealed that conferences are very significant and vital in enhancing quality instructional delivery by teachers in secondary school due to their ability to develop teaching methods, knowledge, and skills.

Furthermore, the findings of hypothesis three revealed the extent to which lecturers' peer mentoring influences students' performance in mathematical economics is significant. The research question showed that, lecturers' peer mentoring to a moderate extent has influenced students' performance in mathematical economics. These results imply that when lecturers are subjected to peer mentoring it will significantly influence students' performance in mathematical Economics in Colleges of Education South-South Zone, Nigeria. The reason for the outcome of this study may be due to the fact that lecturers who have been peer mentored see their mentees in situation as themselves, thereby fostering a sense of inclusiveness and well-being. This may have created a more equitable environment for modeling by mentees, this will ultimately result to higher academic performance of students. The findings of this study is in agreement with the findings of Karanja and Gukingu (2014) and Pfund (2016) found that mentorship/mentoring program has a positive relationship with students' academic excellence. The findings is in agreement with Crisp and Cruz's (2009) who viewed that mentorship enhances academic excellence and there is a positive relationship between proper mentoring and high academic achievement at all levels of education including tertiary education level. The findings also support the views of Jekielek and Moore (2002) that many mentoring programs have led to improving the academic and cognitive skills and experiences of young people and other learners.

VI. Conclusion

Staff training and retraining is a basic requirement for every lecturer for effective teaching and learning in the tertiary level of education. This study examined the influence of lecturers' training on the performance of students in mathematical economics in colleges of education in Nigeria. Findings of the study revealed that in-service training, conference training, and peer mentoring significantly influence performance of students in mathematical economics. The study therefore, concluded that lecturers' training has a significant influence on the performance of students in mathematical economics in colleges of education in Nigeria.

VII. Recommendations

Based on the conclusion of this study, the following recommendations are made:

1. Lecturers should be encouraged by the school management to go on in-service training, this can be done through sponsorship.
2. Ministry of Education, professional bodies in economics and colleges of Education should on a regular basis organize training programmes for lecturers. Such programmes should relate to an orientation on the importance of teachers' development programmes like conferences.
3. Provosts of Colleges of Education should charge lecturers in higher ranks to peer-mentor the lecturers of junior ranks especially, on article for publication writing, project supervision and instructional delivery. This can

go a long way in helping newly employed lecturers to increase their skills and it may also save the cost of sending the teachers to acquire skills off-the-job as it requires more money.

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