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INFLUENCE OF PEER LEARNING ON UNDERGRADUATE STUDENTS' PERFORMANCE IN MATHEMATICS

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ABSTRACT

Peer learning at the university has been an issue of concern to educators and researchers alike considering it influence on academic performance. Correlational research design was adopted in the study. Population consisted of 340 undergraduate mathematics students from two public universities in north western Nigeria. Sample of 181 students who participated in the study was obtained using Krejcie and Morgan table. Instruments for data collection was Peer Learning Questionnaire PLQ used alongside students GPA Proforma. PLQ was validated by experts in Mathematics Education and Educational Psychology. Reliability coefficient of 0.76 was obtained using Cronbach's alpha. Data were analysed using multiple regression at 0.05 level of significant. Findings of the study revealed peer learning at F- 205.74, p 0.000 significantly influence undergraduate students' performance in mathematics additional result gives the standardize coefficient beta as .73, t – 14.34, p,0.000 indicating peer learning is a significantly predictor of performance in mathematics. Based on the findings the study recommends university authorities in encouraging peer learning activity among undergraduate students due to its influence on academic performance also putting into consideration issues relating to peer learning when planning the curriculum.

Keywords: Peer Learning, Students, Performance and Mathematics.

Introduction

Students learning at the university has been a burning issue among educators and researchers alike in recent time. Studies such as Boud *et al.*, (2013); Naidoo and Governder (2021); Brook and Robert (2021) have consistently linked peer learning, self-regulatory learning and self-efficacy as significant contributors to students' academic performance. However, among these variables peer learning has gained recognition among researchers as the most influencer of students' academic performance.

Griffiths, Houston and Lazenbatt (1995) defined peer learning as collaborative in which students assist each other in understanding course material. Stone Cooper and Cant (2013) opine that peer learning help students to be more focus to learning activities and taking academic responsibility. Students assume leadership role, monitor progress, identify each other

strengths and weaknesses (Williamson, 2007). Landis (2000) stated that students who work together as a team obtained higher academic performance. Peer learning involves group of students taking collective responsibility in identifying learning needs, planning how these might be addressed and prompted by desire to acquire knowledge by working with others in the group (Boud, 2000).

Peer learning increases academic activities among students who come together to learn for optimal academic performance. Muller *et al.*, (2017) stated that a strong positive relationship exists between peer learning and students' academic performance. Topping (2005) found effective learning enables students to develop valuable social interaction skills. Idris *et al.* (2018) described peer as students working collaborativly for critical thinking and optimal performance.

In spite of importance of peer learning on academic performance not much is known on influence of peer learning on undergraduate students' performance in mathematics.

Objectives of the Study

The study aimed at achieving the following specific objectives:

i) To determine the extent peer learning influence undergraduate students' performance in mathematics.
ii) To determine the extent peer learning predict undergraduate students' performance in mathematics.

Research Questions

i) To what extent do peer learning influence undergraduate students' performance in mathematics?
ii) To what extent do peer learning predict undergraduate students' performance in mathematics?

Research Hypotheses

H01: Peer learning do not significantly influence undergraduate students' performance in mathematics.
H02: Peer learning do not significantly predict undergraduate students' performance in mathematics.

Literature Review

Learning theories sees the environment as major force to development. (Hoffman, 1993). Social learning theory is an essential component of sustainability and promotion of desirable behavioural change. (Muro & Jeffrey 2008). Bandura (1977) stated that social learning theory is based on idea that learning occurred as a result of interactions among students in the class. This theory was rooted in the concepts of learning theory and serves as bridge between behavioural and cognitive learning theories (Muro & Jeffrey 2008). Vygotsky (1978) stated that interaction is linked to theory of social constructivism which places emphasis on learning among students. Vygotsky further emphasised that students are opportune to share knowledge as they work collaboratively (Stone, Cooper, & Cant, 2013).

Peer learning has it root in context of social learning theory and recognized as

beneficial to students of different educational levels (Falchikov, 2001). Peer learning was first developed in the 60's as response to primary school pupils learning in North-American (Johnson *et al.*, 1998). Peer learning encourages interaction and students' involvement in critical thinking through peer-assessment. Importance accorded to peer learning made it appear in the curriculum of various disciplines (Tariq, 2015; Muller *et al.*, 2017). Cohen *et al.* (1995) described peer learning as student-center in promoting and sharing of knowledge. Peer learning encourages effective students participation in learning activities for better academic performance (Cohen *et al.*, 1995). Bandura (1977) stated that a socially encouraged and self-directed learning promotes behavioral and cognitive learning.

Benefits of Peer Learning

Peer learning enhances knowledge sharing, students learn by participating in class activities with peers. Peer learning is use in a variety of disciplines, it occurs without teachers' involvement and students who are effective learners tends to benefit. Peer learning is a well-established practice in institution of learning and considered to be component of other learning strategies (Brookfield & Preskill, 1999). Peer learning covers a wide range activity which can be combined with others in different ways to suit the needs of a particular course of study (Falchikov, 2001). Students centre instructional techniques such as peer learning has become increasingly use in educational institutions (Baeten, *et al.*, 2010).

Several studies such as Effiom (2020) determined effects of peer learning on students' performance and found a significant improvement in performance of students who engage in peer learning. Asmamaw (2020) in his study found peer learning as significant influencer of students' academic performance. Utha and Rinzin (2019) study on peer learning as alternative teaching pedagogy found peer learning as most dominate learning activities which enhances students' academic performance. Idris *et al.* (2018) in their study found peer learning as a positive influencers of students learning outcomes. Muller *et al.* (2017) in their study found peer learning improves students academic performance. Tariq (2015) in his research on peer learning among first-year undergraduate students found peer learning as a significant influencer of students academuc performance.

Methods

Correlational research design was adopted to determine the extent peer learning influences students' performance in mathematics. Study population consist of 340 undergraduate mathematics students from two public universities in north western Nigeria. Sample of 181 students who completed the questionnaire was obtained using Krejcie and Morgan table for determining sample. Peer Learning Questionnaire (PLQ) was used alongside students first semester Grade Point Average (GPA) Proforma for data collection. The PLQ of 20 items statements measure on five points Likert scale was subject to face validation by experts in Mathematics Education and Educational Psychology

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whose reports of validity adjudged the instrument valid in measuring students peer learning. Reliability coefficient of 0.76 was obtained for PLQ using Cronbach's alpha. Data collected for the study were analysed using multiple regression at 0.05 significant level.

Results

The results of this study were presented based on the formulated null hypotheses at 0.05 significant level.

H01: Peer learning do not significantly influence undergraduate students' performance in mathematics.

Table 1: Regression Model on Peer Learning and Performance in Mathematics

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.731[a]	.535	.532	.82067	.535	205.745	1	179	.000

a. Predictors: (Constant), Peer Learning

Table1 gives Adjusted R Square as .53 indicating peer learning accounted for about 53 percent of undergraduate students' performance in mathematics however 47 percent could be attributed to other factors influencing academic performance.

Table 2: ANOVA on Peer Learning and Performance in Mathematics

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	138.568	1	138.568	205.745	.000[b]
	Residual	120.556	179	.673		
	Total	259.124	180			

Dependent Variable: Performance in Mathematics

Table 2 gives F-value as 205.74 significant at 0.000 hence rejecting the null hypothesis indicating peer learning significantly influence undergraduate students' performance in mathematics.

H02: Peer learning do not significantly predict undergraduate students' performance in mathematics.

Table 3: Coefficient Beta on Peer Learning and Performance in Mathematics

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	-3.072	.382		-8.036	.000
	Peer Learning	.090	.006	.731	14.344	.000

Table 3 gives the standardized coefficient beta as 0.73 and t-value 14.34 significant at p, 0.000 indicating peer learning significantly predicts undergraduate students' performance in mathematics this implies the more students engage in peer learning activities the higher their performance in mathematics.

Discussion of Findings

Peer learning significantly influence undergraduate students' performance in mathematics this finding was consistent with Asmamaw (2020) reported that peer learning significantly influences students' academic performance. Effiom (2020) found a significant positive effect of peer learning on students' academic performance. Swapna and Laila (2023) reported peer learning improves students learning outcomes. Peer learning was found to be a significant predictor of undergraduate students' performance in mathematics this implies that the more students engage in peer learning activities the higher their academic performance.

Conclusion

Peer learning plays a significant role on academic performance in mathematics, engagement of students in peer activities would help to develop positive social interaction in the class room. The study explored the influence of peer learning on undergraduate students' performance in mathematics and found students who involved in peer learning perform better in mathematics. Educational implication is that this study would bring to awareness of educational stake holders on the need of encouraging students to engage in peer learning activities for optimal performance in mathematics.

Recommendations

Based on the findings the study recommends university authorities in encouraging peer learning activities among undergraduate students due to its influence on academic performance and putting in to consideration issues relating to peer learning when planning the curriculum.

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