

Effect of Buzz Group Strategy on Pupils' Academic Performance in Numeracy in Moro Local Government Area, Kwara State

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Abstract: Education is the foundation of economic development of every Nation. This study determined the effect of buzz group strategy on pupils' academic performance in numeracy in Moro Local Government Area, Kwara State. Pre-test, post-test, non-equivalent control group quasi-experimental research design. Population comprise all primary three pupils Three public and three private primary three classes were sampled. Four instruments were used. Seven hypotheses were formulated and also tested at 0.05 level of significance. Data were analysed with the use Analysis of Co-Variance (ANCOVA). Findings revealed that there was significant main effect of treatment on pupils' academic performance in numeracy ($F_{(1; 40)} = 6.184; P < 0.05$). There was no significant main effect of gender on pupils' academic performance ($F_{(1; 40)} = .009; P > 0.05$). There was no significant main effect of school type on pupils' academic performance in numeracy ($F_{(1; 40)} = .783; P > 0.05$). There was no significant interaction effect of treatment and gender on pupils' numeracy academic performance ($F_{(1; 40)} = .065; P > 0.05$). There was no significant interaction effect of treatment and school type on pupils' numeracy academic performance ($F_{(1; 40)} = .446; P > 0.05$). There was no significant interaction effect of gender and school type on pupils' numeracy academic performance ($F_{(1; 40)} = .554; P > 0.05$). There was no significant interaction effect of treatment, gender and school type on pupils' numeracy academic performance ($F_{(1; 40)} = .824; P > 0.05$). It was recommended that this strategy may be adopted by the teachers for teaching numeracy

Keywords: Buzz group strategy, Academic Performance, Pupils, Numeracy, School-Type, Gender

Introduction

Education constitutes the foundational pillar for the economic progress of any nation. The primary objective of instruction and learning within a classroom setting is to improve a positive change in both the knowledge and behaviour of learners. This transformation is predominantly assessed based on the performance of pupils during learning exercises. As far as the researcher is aware, the choice of instructional methods significantly impacts the academic achievements of pupils in mathematical proficiency. However, it is crucial to certify the suitability of the chosen approach by the teacher before commencing the lesson. Mathematical proficiency serves as the groundwork for advancements in Science and Technology, serving as a fundamental tool for achieving progress in these fields. Mathematical proficiency holds significant importance in expressing scientific concepts, with its methods being extensively utilized in observation, data collection, measurement, hypothesis formulation, and predicting the outcomes of scientific inquiries. Cangiano, 2008 and Gauss (2010) emphasized that the absence of modern technology implies the absence of a society. They further asserted that mathematical proficiency stands as the precursor and paramount aspect of science and technology, representing an essential component in the development of modern societies. Mathematical proficiency equips individuals with robust mental tools that have resulted in remarkable progress in contemporary science and technology.

Primarily, numeracy stands as an essential prerequisite for advanced training and lifelong career choices, holding relevance in individuals' daily lives while also playing a crucial role in a nation's scientific and technological progression. According to FGN (2013), numeracy forms the backbone of technology for modern society. Akinoso (2013) observed that instructional strategies positively influenced pupils' attitudes towards learning numeracy. Olusi and Anolu (2010) emphasized numeracy's significance in the interrelation of numeracy, science, and technology, asserting that science cannot exist without numeracy. This aligns with the Federal Government of Nigeria's assertion (2013) that acquiring adequate literacy, numeracy, communication skills, and ethical values are pivotal for establishing a strong foundation for lifelong learning, ensuring enduring literacy, numeracy, and effective communication skills. Therefore, incorporating numeracy as a mandatory component in the primary education curriculum becomes imperative.

The Buzz Group lies in the phenomenon where, upon its implementation, the classroom becomes lively with the discussions among pupils, creating a 'buzz.' Following a specific duration, one student from each group is required to present a summary of their group's discussion to the entire class. Within these group discussions, students have the opportunity to "exchange ideas derived from their collective abilities, knowledge, and experiences" (Fernando & Marikar, 2017). In the work of Komarudin, Ismanto, Rodiawati, Septina, Agustina, and Rosmawati (2019), the Buzz Group discussion model, when applied to numeracy learning abilities, has the potential to enhance the reasoning and mathematical communication skills of eighth-grade students at Bina Mulya Junior High

School in Bandar Lampung. Pupils using the buzz group discussion methods exhibit improved mathematical reasoning and communication skills compared to those exposed to conventional learning models.

One may also be aware that some researchers have in one way or the other worked on buzz group strategy or related areas. For instance, Sofroniou and Poutos (2016) conducted research on the effectiveness of group work in numeracy. Komarudin, Ismanto, Rodiawati, Septina, Agustiana and Rosmawati (2019) carried out research work on buzz group application methods to improve the pupils' reasoning ability and mathematical communication skills of class viii Budi Mulya High School Bandar Lampung. The learning model improve the ability of mathematical reasoning and communication skills of learners SMP Bina Mulya Bandar Lampung. Ramadhani (2017) conducted research work on the influence of using buzz group technique on the pupils' speaking performance at eighth grade of smp n 5 metro. Pangaribuan and Manik (2017) stated that there was positive and significant influence of buzz group technique on the Pupils' speaking performance at eighth grade of Sekolah Menengah Pertama Negeri 5 Metro in Indonesia. Elisabeth (2013) worked on the effectiveness of buzz group method to teach reading comprehension viewed from pupils learning motivation. Karali and Aydemir (2018) investigated on the effect of cooperative learning method on pupils' academic achievements and attitudes towards numeracy in primary school.

From the foregoing, it is established that some researchers carried out work on the buzz group strategy and other areas related to it but none of them worked on effects of concrete representational abstract and buzz group strategies on primary school pupils' academic performance in numeracy. Hence, this research study aimed to fill this gap as well as examine gender and school type as moderator variables. Gender possesses some characteristics which allow the researcher to be able to get accurate result. It is a variable to be considered in any research work in order to get a meaningful result. Gender differs and varies within and across cultures overtime; results in different roles; responsibilities, opportunities, needs and constraints for women, men, boys and girls (Bronfenbrenner, 2005). Kamla-Raj (2009), in his study of pupils performance in Junior Secondary in mathematics, found out that pupils' poor performance in numeracy in Junior Secondary School examination was high: male pupils performed better than female; pupils from rural schools performed better than pupils from urban schools in numeracy; and pupils from private schools performed better than pupils from public schools. Oginni (2009) asserted that male pupils performed better than their female counterparts in numeracy laboratory lessons.

Musa and Hartley (2015) documented a notable correlation between trichotomous achievement goals and the academic performance of students in English as well as their overall academic achievement in Borno State. In English Language and overall academic performance, males demonstrated significantly higher performance compared to females; however, there was no discernible gender difference in numeracy performance. Additionally, there exists a substantial impact of gender on students' learning goal orientation, favoring males. Conversely, no gender effects were observed on performance approach and performance-avoidance goal orientations among students (Musa, Dauda & Umar, 2016).

School type should not be overemphasized, as the name implies, Public and private schools are institutions owned by government and private. The public schools in Nigeria own by the Federal, State, and Local Governments as their proprietors while the private schools are owned by individuals, associations or private organizations. According to Berkeley Parent Network (2009) found that private schools exhibit significant difference, and the degree of parental involvement differs among private schools.

Statement of the Problem

Numeracy plays a tremendous role in this age of science and technology of which enables us to have knowledge of how to solve problem on daily basis, yet, pupils are not performing well in the subject. Studies have shown that pupils have poor academic performance in numeracy. During the researcher's teaching practice in the year 2016, most pupils found it difficult to answer some of the numeracy questions. A Report from Kwara State Ministry of Education showed that more than 60 percent of pupils who took the Junior Secondary School Common Entrance Examination in the year 2020 scored less than 50 percent. According to WAEC results from 2016-2020, secondary school students' performance in core subjects (mathematics inclusive) is on the decline. In the 2016, only 41.01% had five credits and above including mathematics and in 2017, only 40.04% had five credits, in 2018, the percentage of students with five credits was 32.47% in mathematics, the percentage of students with five credits including mathematics 2019 was 59.15% and only 43.50% had five credits and above in the year 2020 including mathematics. This is necessary because the foundation of teaching and learning starts from the primary school level of education. It shows that pupils have negative attitude towards learning numeracy which could be as a result of principle and practice being used by numeracy teachers. The poor academic performance of pupils in numeracy at this level is a source of concern to all educational stakeholders since its one of the major subjects at the primary school level. More so, it is the bedrock of technological advancement of any nation.

Based on the above, the researcher examined the effect of buzz group strategy (BGS) on primary school pupils' academic performance.

Research Hypotheses

The under listed hypotheses were formulated and tested at 0.05 level of significance in this study.

H01: There is no significant main effects of treatments on pupils' academic performance in numeracy.

H02: There is no significant main effect of gender on pupils' academic performance in numeracy.

H03: There is no significant main effect of school-type on pupils' academic performance in numeracy.

H04: There is no significant interaction effects of treatments and gender on pupils’ numeracy academic performance

H05: There is no significant interaction effect of treatment and school-type on pupils’ numeracy academic performance

H06: There is no significant interaction effects of gender and school-type on pupils’ numeracy academic performance

H07: There is no significant interaction effect of treatment, gender and school-type on pupils’ numeracy academic performance

METHODOLOGY

The researcher adopted pre-test, post-test, nonequivalent control group quasi-experimental research design .A factorial design of 2X2X2 was adopted. The population of this study comprises all primary three pupils (three private and three public schools).

The stratified sampling technique was adopted for the study and simple random sampling and purposive sampling technique was also used Test on pupils’ Numeracy Academic Performance (TPNAP) and Instructional Guide on Conventional (Traditional) Teaching Method (IGCTM). Data obtained were analysed through the use of frequency, percentage and Analysis of Co-variance (ANCOVA) at 0.05 level of significance.

Results

Research Hypothesis One: There is no significant main effect of treatment on pupils’ academic performance in Numeracy

Table 1: Summary of Analysis of Covariance showing the main effects of treatment on pupils’ academic performance in Numeracy

Source	Type III Sum of Squares	df	Mean	F	Sig.
Corrected Model	52.638 ^a	8	6.580	1.889	.089
Intercept	185.131	1	185.131	53.137	.000
Pretest	6.304	1	6.304	1.809	.186
Treatment	21.547	1	21.547	6.184	.017
Gender	.030	1	.030	.009	.927
School type	2.728	1	2.728	.783	.382
Treatment * Gender	.227	1	.227	.065	.800
Treatment * School type	1.552	1	1.552	.446	.508
Gender * School type	1.929	1	1.929	.554	.461
Treatment * Gender * School type	2.870	1	2.870	.824	.370
Error	139.362	40	3.484		
Total	6916.000	49			
Corrected Total	192.000	48			

Table 1 shows the main effect of treatment on pupils’ academic performance in. There was significant main effect of treatment on pupils’ academic performance in Numeracy in Moro Local Government Area of Kwara State, Nigeria ($F_{(1; 40)} = 6.184; P < 0.05$). The hypothesis is therefore rejected in the light of findings since the significant value (.000) is less than 0.05. This revealed that buzz group strategy had significant effect on pupils’ academic performance in Numeracy. Table 2 revealed that the sources of the difference in pupils’ academic performance in Numeracy.

Table 2: Summary of Bonferroni’s Post Hoc pairwise Comparison of the scores within the three Groups

Treatment	Mean	Experimental 1	Control Group
Buzz Group Strategy	12.41		*

Conventional Method	10.42	*
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Table 2 revealed that the significant main effect as shown in the table 1 is as a result of the significant difference between:

- i. Buzz Group Strategy
- ii. Conventional method

This implies that those exposed to Buzz Group Strategy (Mean = 12.41) performed significantly better than those exposed to conventional method (Mean = 10.42).

Research Hypothesis Two: There is no significant main effect of gender on pupils' academic performance in numeracy.

Table 1 revealed that main effect of gender on pupils' academic performance in numeracy. There was no significant main effect of gender on pupils' academic performance in numeracy ($F_{(1;40)} = .009$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the findings since the significant value (.927) is greater than 0.05. This shows that gender had no significant effect on pupils' academic performance in numeracy.

Research Hypothesis Three: There is no significant main effect of school type on pupils' academic performance.

Table 1 also revealed the main effect of school type on pupils' academic performance in numeracy. There was no significant main effect of school type on pupils' academic performance in numeracy ($F_{(1;40)} = .783$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.382) is greater than 0.05. This implies that school type had no significant effect on pupils' academic performance in numeracy.

Research Hypothesis Four: There is no significant interaction effect of treatment and gender on pupils' numeracy academic performance.

Table 1 also revealed the interaction effect of treatment and gender on pupils' numeracy academic performance. There was no significant interaction effect of treatment and gender on pupils' numeracy academic performance ($F_{(1;40)} = .065$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.800) is greater than 0.05. This implies that the interaction of treatment and gender had no significant effect on pupils' numeracy academic performance.

Research Hypothesis Five: There is no significant interaction effect of treatment and school type on pupils' numeracy academic performance.

Table 1 also revealed the interaction effect of treatment and school type on pupils' numeracy academic performance. There was no significant interaction effect of treatment and school type on pupils' numeracy academic performance ($F_{(1;40)} = .446$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.508) is greater than 0.05. This implies that the interaction of treatment and school type had no significant effect on pupils' numeracy academic performance.

Research Hypothesis Six: There is no significant interaction effect of gender and school type on pupils' numeracy academic performance.

Table 1 also revealed the interaction effect of gender and school type on pupils' numeracy academic performance. There was no significant interaction effect of gender and school type on pupils' numeracy academic performance in Moro Local Government Area of Kwara State ($F_{(1;40)} = .554$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.461) is greater than 0.05. This implies that the interaction of gender and school type had no significant effect on pupils' numeracy academic performance.

Research Hypothesis Seven: There is no significant interaction effect of treatment, gender and school type on pupils' numeracy academic performance.

Table 1 also revealed the interaction effect of treatment, gender and school type on pupils' numeracy academic performance. There was no significant interaction effect of treatment, gender and school type on pupils' numeracy academic performance ($F_{(1;40)} = .824$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.370) is greater than 0.05. This implies that the interaction of treatment, gender and school-type had no significant effect on pupils' numeracy academic performance.

Discussion of findings

This study examined the impact of the buzz group strategy on the academic performance of pupils in Moro Local Government Area, Kwara State. The findings of this research are sequentially discussed in this section.

The study's discovery highlighted a significant primary effect of treatment on the academic performance of elementary school students in numeracy within the Moro Local Government Area of Kwara State. This outcome could be attributed to the prior social interaction among pupils. This aligns with the findings of Muchiri and Njenga (2020), who noted that grouping resulted in the highest number of students scoring above 80.

Another finding indicated that there was no significant primary effect of gender on students' academic performance in numeracy within the Moro Local Government Area of Kwara State. This finding supports that of Peteros, Gamboa, Etcuban, Dinauanao, Sito, and Arcadio (2020), revealed that students exhibited a moderate level of self-concept in their approach to learning Mathematics. There was no observed gender disparity in the respondents' self-concept. This opposes the results of Maliki, Ngban, and Ibu (2017), who indicated that male students achieved the highest performance in numeracy in Junior Secondary School examinations in Bayelsa, Nigeria.

In another findings, the outcome similarly indicated that there was no significant primary effect of school-type on pupils' academic performance in numeracy. This outcome corresponds with Salman (2021), who noted the absence of a significant impact of school-type on the academic performance of elementary school students. This finding contrasts with the research conducted by Mijinyawa, Yeldu, Umar, and Hussaini (2017), which identified a significant difference in the performance of students from public and private secondary schools across all three science subjects studied. Notably, students from private schools exhibited notably higher performance compared to their counterparts in public schools.

Furthermore, the finding revealed that there was no significant interaction effects of treatment and gender on pupils' numeracy academic performance. The result is not the same as the result of Nneka, (2019) who revealed that there was significant main effect of treatments on the mean achievement scores of pupils with dyscalculia in numeracy and there was significant influence of gender on the numeracy achievement scores of pupils with dyscalculia. The result is in line with that of Abdulkareem (2021) who found that there was no significant effect of treatment and gender on pupils' academic performance.

Another null hypothesis revealed that there was no significant interaction effect of treatment and school-type on pupils' numeracy academic performance. The result negates the finding of Igbinedion and Epumepu (2011), who both revealed that there was significant difference in the academic performance in business studies between the public and private schools from 2008 to 2011. The percentage performance trend of public schools was higher than those of the private schools among both males and females. The finding is line with the finding of Oni (2020) which revealed that there was no significant effects of treatments and school-type on reading comprehension.

In another finding, there was no significant interaction effects of gender and school-type on pupils' numeracy academic performance. This finding corroborates that of Obafemi (2017) who found that gender and school-type did not have significant effect on pupils' academic performance in social studies. The finding negates that of Aunio, Mononen, Raggot, and Törmänen (2016) the result revealed that there were statistically significant differences in early numeracy skills between the children when they started first grade. The differences were related to the home language of the first graders in the English medium schools, as well as the type of school (public vs. private).

There was no significant interaction effect of treatment, gender and school-type on pupils' numeracy academic performance. The finding corroborates that of Saadu, Obafemi and Yusuf (2020) who found no significant effect of gender and school type. The finding negates the finding of Mburu (2013) who found that the type of school attended affected students' academic performance as majority of the girls who qualified to join tertiary institution were from single-sex schools.

Conclusion

Conclusion was drawn based on the findings of the study. It was concluded that buzz group strategy are effective for teaching numeracy. This implies that these strategy should be adopted for teaching Numeracy to improve academic performance at the primary school level. **Recommendations**

Based on the findings of the study, the following recommendations were made:

1. Since buzz group strategy are effective for teaching numeracy, primary school teachers and administrators in both public and private schools should adopt utilization of buzz group strategy due to its effectiveness.
2. The teachers should enhance their professional development or skills through such as seminars, workshop, conferences, technological training on utilization of buzz group strategies as well as newly discovered teaching methods/strategies.
3. The teachers should make sure that there will be no gender discriminations in schools in order to motivate all pupils during teaching and learning process.
4. The school authorities should provide age appropriate learning environment to enhance appropriate teaching strategy for numeracy.
5. The Government should provide adequate fund and equipment/materials to public and private schools so as to encourage utilization of concrete-representational-abstract and buzz group strategies to improve teaching and learning process.
6. Parent-Teacher Associations, Non-Governmental Organizations and Volunteers should provide self-directed and corrected concrete material or objects to the schools and school administrators in order to encourage teachers or childhood educators to utilize them accordingly.
7. Policy makers and curriculum planners should budget enough fund to the education sector for teachers motivation.

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