

Effect of Think-Pair-Share on Academic Performance of Pupils in Numeracy in Ekiti Local Government Area of Kwara State

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Abstract: *The numeracy performance of the pupils is declining. Thus, the researcher investigated the effect of think-pair-share on the academic performance of pupils in Numeracy in Ekiti Local Government Area of Kwara State. The study adopted the pretest-posttest Quasi-experimental research design. Pupils' Numeracy Performance Test (PNPT) was used to obtain pretest and posttest scores. The Numeracy teachers validated the instrument. Pearson Product Moment Correlation (PPMC) was used to establish the reliability coefficient of the instrument at .74. Data collected were analysed using Analysis of Covariance (ANCOVA). Hypotheses were tested at a 0.05 level of significance. It was found, among others, that There was a significant effect of think-pair-share on pupils' numeracy academic performance ($F_{(1; 51)} = 8.691, P < 0.05$). Also, it could be revealed that the think-pair-share strategy enhances and facilitate the better performance of pupils in numeracy than the traditional method of teaching and learning*

Keywords: Academic performance, Numeracy, Think-pair-share, Gender and School type

Introduction

The rationale behind classroom teaching and learning activities are to bring about a desirable change in learners' behaviour. This change is determined by the extent of the pupils' performance on a learning task or subject. Performance is an academic perspective of a learner's exhibited intellectual capability on an assigned test. Constantly, the outcome of a pupil's academic performance judged a particular nation's educational quality (Nwokocha&Amadike 2005). Ebebuwa-Okoh (2010) described the academic performance as participants' examination grades (Grade Point Average) at the concluding part of a particular term, semester or programme. Ayo (2000) submitted that academic performance is an upshot of pupil assessment through comprehensive, systematic, cumulative, diagnostic, formative and summative evaluation of what they have learnt in various subjects, including numeracy.

Numeracy is the ability to reason by applying simple numerical concepts. The basic numeracy skills encompass understanding fundamental arithmetic like addition, subtraction, multiplication, and division. For example, if one can comprehend simple Mathematical equations such as $2 + 2 = 4$, one would be deemed to possess at least a basic numeric understanding. Substantial aspects of numeracy include number sense, operation sense, computation, measurement, probability and statistics. A numerically literate person can deal with and respond to the request of life mathematically (Brooks, 2010).

Numeracy belongs to Mathematics, just as literacy is to language. Various writers have advocated numerous essential features of numeracy in recent times, whose fundamental themes revolve around numeracy being the understanding and applying mathematical rules to resolve life's challenges (Best, 2008). Numeracy covers knowledge, calculating, manipulating, interpreting results, and communicating mathematical information. In the adult setting, numeracy denotes practical mathematics (Awofala&Anyikwa, 2014)

Numeracy is the competence and skills needed by pupils to get by everyday life and understand the information presented mathematically in an academic environment and beyond. According to O'Donoghue (2002), numeracy is more about sense-making, application and decision-making with numbers. He also submitted that numeracy affects pupils across-the-age groups in their education and life beyond formal education. Pupils with a good impression of numbers do not think of numbers only; they can also plan their own incomparable mental computation methods through their numeracy skills like understanding the place value and making appraisals across numbers, fractions and decimals. If appropriately connected to a child's world, numeracy in the early years is more than getting ready for school or accelerating them into elementary arithmetic. Several studies have displayed that pupils' achievement in numeracy depends on the context and measurement. Some years back, the pupils' numeracy performance was relatively poor (Aremu, 2003).

The poor academic performance in numeracy was also evident during the inter-school quiz competition in Ekiti Local Government Area of Kwara State. Pupils found it difficult to answer some of the numeracy questions in the last two years' common entrance examination (2020 and 2021). 40% of the pupils scored 50 marks and above while 60% scored below 50. According to Aremu (2003), poor pupils' numeracy performance is one that examiners adjudge as falling below an expected standard. Poor numeracy performance was observed among primary school pupils. It is the inability of the pupils to learn, unlearn, and re-learn and the inadequacies in parental efforts to make pupils read at their various homes to master and discover new things about themselves different from what they have been taught and exposed to in school. As one may be aware, the teacher is an influential primary agent with principles and practices considered in teaching and learning processes in the classroom, where both teaching and learning depend on the abilities of the teacher to drive home lessons with the appropriate use of strategies like think-pair-share

The think-Pair-Share strategy is a cooperative learning strategy that requires pupils to interact with peers by sharing individual understanding in solutions after a period of particular think time. The Think-Pair-Share approach is contrived to differentiate direction by giving pupils the time and a model for thinking by providing worksheets, allowing them to devise unique ideas and share them with another (Kagan, 1998).

This learning strategy stimulates classroom interaction by encouraging pupils' responses, rather than using a traditional approach in which a teacher asks a question and one pupil response. Besides, this method allows all pupils to share their thinking. In this method, the teacher asks the question, pupils have time to think about it individually, and then they work in pairs to solve the problem and share their ideas with other pupils (Baumeister, 1992). McTighe and Lyman (1988) viewed the Think-Pair-Share strategy as a multi-mode give and take cycle grouped into three stages: (1) 'Think': Pupils are allowed time to think individually after a question; (2) 'Pair': students discuss the views with each other within a paired context to give a final answer; and finally (3) 'Share': Each pair shares their new, improved answer with another.

Similarly, Ruiz-Primo (2011) used a strategy similar to the think-pair-share, referred to as peer instruction. They grouped an undergraduate practical exercise physiology class into group A and group B., Each group, was made up of three presentations. After each class, the students took a short quiz about the presentation. Students in group A could talk about the questions with a group of 2 to 3 other students, and students in group B completed the quiz independently. Later in the course, the quiz questions included novel situations. Students had to integrate the new understanding of the presentation and their existing knowledge to solve these problems. Besides the quiz, students also took a study about their experiences. The performance on both quiz types was significantly more outstanding for those who interacted with peers. Also, students averred that interaction with peers eases their learning. Besides, students submitted that they enjoyed peering instruction as it helped them evolve positive intermarriage between students and the faculty and among other students. Cortright, Collins, and Dicarolo (2005) therefore concluded that the cooperative learning strategy of peer instruction led to the transfer of knowledge, enabling students to apply what they acquired in two new settings. Thus, this collaborative learning of the think-pair-share method led to an ideal understanding of the subject matter of both male and female

Their findings showed many differences in Mathematics connected to gender over the past decades. According to Fauto and Friedman (2005), there was no significant difference between male and female cognitive ability. Okoye (2008) advocated that sex differences may have little or no impact on academic performance. He also accepted that the eventual implementation of learners is dictated by personal attempt than sex variable. Sada and Adesina (2015) found that boys do better than girls. However, male students' performance diverges more around average than female students.

Yusuf and Adigun (2010) investigated the influence of school type, sex and location on students' academic performance in Ekiti State secondary schools. Results revealed that students' academic performance was low. It was also showed that school type, sex and location had no significance on students' academic performance. Onekutu (2002) perused the difference in students' academic achievement in both private and public secondary schools in Akwa Ibom State. It found that students in private secondary schools performed better in Social Studies than in public schools. Contrary to this background, the researcher examined the effect of think-pair-share on the pupils' academic performance in Numeracy in Ekiti Local Government Area of Kwara State

Statement of the Problem

Numeracy is a technique developed across the primary three curricula. It has to do with reason logically, problem-solving skills and having the confidence and competence to use numbers and measures in various settings. It is one of the major subjects offered at the primary school level. Poor performance in numeracy at this level of education might result from the teachers' inadequacies and inappropriate use of classroom practices. Poor academic performance has been a focus for all stakeholders in education, especially since numeracy is a significant subject in schools. The poor academic performance in numeracy was also evident during the inter-school quiz competition, where pupils could not answer numeracy questions in the last two years' standard entrance examination (2020 and 2021), where 40% of the pupils scored 50 marks and above, while 60% scored below 50 marks. For this reason, the researcher investigated the effect of think-pair-share on the academic performance of pupils in Numeracy in Ekiti Local Government Area of Kwara State.

Research Hypotheses

The following research hypotheses were formulated to guide the study

H₀₁: There is no significant main effect of think-pair-share on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

H₀₂: There is no significant main effect of gender on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

H₀₃: There is no significant main effect of school type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

H₀₄: There is no significant interaction effect of think-pair-share and gender on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

H₀₅: There is no significant interaction effect of think-pair-share and school-type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

H₀₆: There is no significant interaction effect of gender and school type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

H₀₇: There is no significant interaction effect of think-pair-share, gender and school-type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Methodology

This study adopted the pretest-posttest Quasi-experimental research design. A stratified random sampling technique selected four schools, two public and two private. Pupils' Numeracy Performance Test (PNPT) was used to obtain pretest and posttest scores. The instrument was used as a pretest before the actual exercise. It was given to experimental and control groups based on topics selected from the curriculum to which pupils were exposed. The instrument was validated by the Numeracy teachers of the selected schools. Items therein were established using the test-retest method within two weeks. Therefore, the researcher and the research assistants carried out the Pearson Product Moment Correlation (PPMC) to establish the reliability coefficient of the instruments at .74. The researcher and the research assistants carried out the exercise. The procedure adopted was to develop the pretest based on the topics chosen by the pupils before the practice began. After this, those in the experimental group were taught the selected topics using think-pair-share, and the control group was prepared using a conventional method. After the teaching and learning exercises, the two groups administered the test again. Data collected were analysed using Analysis of Covariance (ANCOVA). All the hypotheses were tested at a 0.05 level of significance

Results

Research Hypothesis One: There is no significant effect of think-pair-share on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Table 1: Summary of ANCOVA analysis showing the effect of think-pair-share on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Source	Type III Sum of Squares	DF	Mean Square	F	Sig.
Corrected Model	2301.266 ^a	11	209.206	2.308	.022
Intercept	21925.671	1	21925.671	241.862	.000
Pretest	125.167	1	125.167	1.381	.245
Think-pair-share	1575.781	1	787.891	8.691	.001
Gender	64.092	1	64.092	.707	.404
School-type	227.561	1	227.561	2.510	.119
Think-pair-share * Gender	205.875	1	102.937	1.136	.329
Think-pair-share * School-type	76.491	1	38.246	.422	.658
Gender * School-type	29.238	1	29.238	.323	.573
Think-pair-share * Gender * School-type	157.896	1	157.896	1.742	.193
Error	4623.337	51	90.654		
Total	403750.000	63			
Corrected Total	6924.603	62			

Table 4 shows the effect of think-pair-share on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State. There was a significant effect of think-pair-share on pupils' numeracy academic performance ($F_{(1; 51)} = 8.691, P < 0.05$). The hypothesis was therefore rejected in the light of the result since the significant value (.001) is less than 0.05. This implies that think-pair-share substantially affected pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Table 2: Summary of Bonferroni's Post Hoc pairwise Comparison of the scores within the two Groups

Think-pair-share	Mean Score	Experimental	Control Group
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Think-pair-share Strategy	76.325	*	
Conventional Method	69.766		*

Table 2 reveals the significant main effect exposed by table 1 results from the substantial difference between The think-pair-share strategy and the Conventional Method. Think-pair-share strategy refers to an experimental group, while the conventional method is known as the control group. It implies that those taught with the Think-pair-share strategy outperformed significantly over those acquainted with the traditional method.

Research Hypothesis Two: There is no significant effect of gender on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Table 1 also reveals the effect of gender on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State. There was no significant effect of gender on pupils' numeracy academic performance ($F_{(1, 51)} = .707$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.404) is greater than 0.05. It implies that gender did not significantly affect pupils' numeracy and academic performance in Ekiti Local Government Area of Kwara State.

Research Hypothesis Three: School type has no significant effect on pupils' numeracy and academic performance in Ekiti Local Government Area of Kwara State.

Table 1 also shows the effect of school type on pupils' numeracy and academic performance in Ekiti Local Government Area of Kwara State. There was no significant effect of school type on pupils' numeracy academic performance ($F_{(1, 51)} = 2.510$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.119) is greater than 0.05. It implies that school type had no significant effect on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Research Hypothesis Four: There is no significant interaction effect of think-pair-share and gender on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Table 1 also shows the interaction effect of think-pair-share and gender on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State. There was no significant interaction effect of think-pair-share and gender on pupils' numeracy academic performance ($F_{(1, 51)} = 1.136$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.329) is greater than 0.05. It implies that think-pair-share and gender had no significant effect on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Research Hypothesis Five: There is no significant interaction effect of think-pair-share and school-type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Table 1 also shows the interaction effect of think-pair-share and school-type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State. There was no significant interaction effect of think-pair-share and school-type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State ($F_{(1, 51)} = .422$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.658) is greater than 0.05. It implies that think-pair-share and school-type had no significant effect on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Research Hypothesis Six: There is no significant interaction effect of gender and school type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Table 1 also shows the interaction effect of gender and school type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State. There was no significant interaction effect of gender and school type on pupils' numeracy academic performance ($F_{(1, 51)} = .323$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.573) is greater than 0.05. It implies that gender and school type had no significant effect on pupils' numeracy and academic performance in Ekiti Local Government Area of Kwara State.

Research Hypothesis Seven: There is no significant interaction effect of think-pair-share, gender and school-type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Table 1 also shows the interaction effect of think-pair-share, gender and school-type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State. There was no significant interaction effect of think-pair-share, gender and school-type on pupils' numeracy academic ($F_{(1, 51)} = 1.742$; $P > 0.05$). The hypothesis is therefore not rejected in the light of the result since the significant value (.193) is greater than 0.05. It implies that think-pair-share, gender and school-type had no significant effect on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State.

Discussion of Findings

One of the results originated from this study revealed that there was a significant effect of think-pair-share on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara state ($F_{(1; 51)} = 8.691, P < 0.05$). It signifies that think-pair-share gave room for that because they are a child-centred approach that allows pupils to learn quickly, especially among their peers. This was agreed with the findings of Ruiz-Primo (2011), who grouped undergraduate practical exercise physiology. Each group was made up of three presentations. After each class, the students were given a short quiz about the presentation. Students in group A could talk about the questions with a group of 2 to 3 other students, and students in group B completed the quiz independently. It found that performance on both quiz types was significantly more outstanding for those who interacted with peers. Also, students averred that interaction with peers eases their learning. Besides, students submitted that they enjoyed peering instruction as it helped them to evolve positive intermarriage between students and the faculty and among other students. Also, Cortright, Collins, and Dicarolo (2005) maintained that the cooperative learning strategy of peer instruction led to the transfer of knowledge, enabling students to apply what they acquired in two new settings

Another finding of this study stated that there was no significant effect of gender on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State ($F_{(1; 51)} = .707; P > 0.05$). It was in a relationship with the submission of Fauto and Friedman (2005), who found no significant difference between male and female cognitive ability. On the contrary, Sada and Adesina (2015) investigated the effects of gender on academic performance in Computer Studies in secondary schools in New Bussa, Borgu Local Government of Niger State. The results showed that boys do better than the girl. However, male students' performance diverges more around average than female students.

Another finding stated that there was no significant effect of school type on pupils' numeracy academic performance in Ekiti Local Government Area of Kwara State ($F_{(1; 51)} = .2510; P > 0.05$). It was in tandem with Yusuf and Adigun (2010), who investigated the influence of school type, sex and location on students' academic performance in Ekiti State secondary schools. It was shown that school type, sex and place had no significance on students' academic performance. Against this result, Onekutu (2002) perused the difference in students' academic achievement in both private and public secondary schools in Akwa Ibom State. Private secondary school students outperformed better in Social Studies than in public schools.

Conclusion

Based on the above discussion, it is explicitly stated that the think-pair-share strategy enhances and facilitates the better performance of pupils in numeracy than the traditional method of teaching and learning

Recommendations

In the light of this conclusion, the following recommendations were made:

1. Numeracy teachers should be enlightened on the effectiveness of the think-pair-share strategy on pupils' academic performance in numeracy
2. Practising teachers should be encouraged to learn the use of the think-pair-share strategy through seminars and workshops.
3. Pupils' academic performance should not be determined based on their gender and school type because the two factors have been discovered not to be decisive factors that hinder pupils' academic performance.

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