INFLUENCE OF THINK PAIR SHARE INSTRUCTIONAL STRATEGY ON SENIOR SECONDARY SCHOOL STUDENTS' ACADEMIC PERFORMANCE AND RETENTION IN SCIENCE SUBJECT IN AKWA IBOM NORTH EAST SENATORIAL DISTRICT, NIGERIA

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ABSTRACT

This research is out to investigate the influence of think pair share instructional strategy on Senior Secondary School Students Academic Performance and Retention in Science Subject in Akwa Ibom North East Senatorial District. The study adopted a Quasi Experimental Design. Six research question and six hypotheses were formulated to guide the study and eleven thousand, seven hundred (11,700) SSII students in Akwa Ibom State. Chemistry Achievement Test (CAT) and chemistry retention test (CRT) were developed by the researcher and used for data collection. Data collected were analyzed using mean, standard deviation and analysis of covariance (ANCOVA). The findings of the study were that there was a significant difference between the mean achievement scores of chemistry students taught in the class using think pair strategy and those taught using lecture method and there was no significant interacting effect of gender and teaching methods on students mean Achievement in science subject. It was recommended among others that science educators should incorporate think pair share as an innovative strategy in teaching and learning science subjects.

KEYWORDS: Think Pair Share Strategy, Academic Performance, Retention, Science Subject, Matter.

INTRODUCTION

Chemistry is a branch of science which deals with the properties, composition, formation and product of matter, Brain (2023).

Majekodummi (2007) observed that chemistry has contributed to the development and growth of Nigeria and the world at large. Brain (2023) opined that the following subjects make up what is known today as rocket science today in the sense that more than 80% of what life depends on the foundation and existence of the following subjects which include Mathematics, Chemistry, Physics, Biology, Agricultural Science, Integrated Science, hence chemistry for instance is applied in medical field, Biology, Physics, Pharmacy, Food, Nutrition, Engineering among other sciences for better knowledge in chemistry before undertaking courses in any of the fields mentioned. It is a co-operative strategy that encourages student's interest which could be used in the following ways.

- **Think**

In this step, teachers instruct their students to be actively engaged in solving questions independently.

- **Pair**

Students in each group are given topics for deliberations.

- **Share**

Students discuss their ideas with their partner, thereafter one person presents the answer to whole class (Presley as cited in Goodman, 2010). The question now is can think pair share instructional strategy yield the same effect on achievement and retention on male and female students in science subject.

STATEMENT OF THE PROBLEM

Available statistical data reveals that populated secondary school student perform poorly in science subjects in various topics like Titrations, Algebra, photosynthesis, research method, light etc. Some of these topics should be taught with appropriate method of instruction in other to enhance better understanding of another difficult concept.

According to WAEC Chief Examiner reports 2014-2018 concern have been raised why student have poor academic performance in science subject's and the problem has been attributed to poor teaching and learning methods which lead to the research title Influence of Think Pair share Instructional Strategy on Senior Secondary School Students Performance and Retention in Science Subjects which has to be investigated.

OBJECTIVES OF THE STUDY

The purpose of this study is to investigate the influence of think pair share instructional strategy on students' performance and retention in science subject. Specifically, the study sought to determine.

- Student mean achievement scores in matter when taught using Think Pair Share Instructional Strategy and Lecture Method respectively.
- Influence of gender on students mean achievement scores in matter when taught using Think Pair Share Instructional Strategy.
- Influence of gender on students mean achievement scores in matter when taught using Think Pair Share Instructional Strategy.
- Influence of gender on students mean retention scores in matter when taught using Think Pair Share Instructional Strategy.
- Interaction influences on gender and teaching methods on students mean achievement scores in analysis.
- Interaction influences on gender and teacher method on students mean retention scores in matter.

RESEARCH QUESTIONS

The following research question guided the study.

- What is the mean achievement score of students in matter when taught using Think Pair Share Instructional Strategy and Lecture Method?
- What is the mean retention score of students in matter when taught using Think Pair Share Instructional Strategy and Lecture Method?
- What is the influence of gender on students' mean achievement scores in matter when taught using Think Pair Share Instructional Strategy?
- What is the influence of gender on students' mean retention scores in matter when taught using Think Pair Share Instructional Strategy?
- What is the interaction influence on gender and teaching methods on students' mean achievement scores in matter?
- What is the interaction influence on gender and teaching methods on students' mean retention scores in matter?

HYPOTHESES

The following hypotheses were formulated to guide the study and were tested at 0.05 level of significance.

H_{o1}: There is no significant difference between the mean achievement scores of students taught using Think Pair Share and those taught using lecture method.

H_{o2}: There is no significant difference between the mean retention scores of science student's taught using matter using Think Pair Share and those taught using lecture method.

H_{o3}: There is no significant difference between achievement mean scores of male and female students in matter when taught using Think Pair Share instructional strategy.

H_{o4}: There is no significant different between the mean retention scores of male and female students in matter when taught using Think Pair Share Instructional Strategy.

H_{o5}: There is no significant interaction influence of gender and teaching methods on students' mean achievement scores in matter.

H_{o6}: There is no significant interaction influence of gender and teaching methods on students' mean retention scores in matter.

SIGNIFICANCE OF THE STUDY

At the end of this research, the findings of this research will be beneficiary to the research World, Nation, Student's Science Teachers, Curriculum Developers etc.

It is hoped that when the findings of this study are presented in seminars, workshops, conferences and when implemented the following may be achieved. It may enhance students' achievement and retention in science subject and increase the number of students that will go in to study professional science courses like Engineering, Pharmacy, Medicine, Architecture, Estate Management, Chemistry etc. It is believed that it will enhance male and female achievement and retention scores in science subject.

SCOPE OF THE STUDY

The scope of the study is delimited to senior secondary II students in Uyo Educational Zone in Akwa Ibom State. The content scope for the study includes; Type of matter, Physical properties of matter, chemical properties of matter etc.

REVIEW OF RELATED LITERATURE

The literature related to this work reviewed under the following headings; Conceptual framework, Theoretical framework, Empirical studies and Summary of the Literature review.

Conceptual Framework

This covers the concept of matter, teaching and learning of matter, difficulties students undergo in understanding matter, teaching method, lecture method, concept of think pair share instructional strategy, retention as a factor in learning students' achievement in any of the science-oriented courses.

Matter

According to Okeke (2011) define matter as anything that has mass and occupies space. Mass is a measure of quantity of matter. Matter exists in three physical states which are gas, liquid and solid. Owoyemi (2007) state that the chemical properties of matter are those that describe the chemical changes (chemical reactions) that matter undergoes. For example, rusting iron, properties that are not characteristics of any particular type of matter such as mass, length and temperature are known as extrinsic properties.

Teaching Methods

According to Aniaku (2013), the method of teaching could be recorded as a vehicle through which message is delivered. Teaching is a process of communicating information that involves the learner.

Lecture Methods

Lecture method is simply the way that leads to easy completion of the curriculum and information are easily disseminated through teaching.

Think Pair Instructional Strategy

Rowe as cited in Sampsel (2013) described Think Pair as a high intensity talk arena due to the engaged directly in speaking and listening

Benefits of Think Pair Share

- Initiates individual involvement about a particular topic.
- Helps the students to be focused by comprehending the reading materials.
- Engages the entire class and allows quiet students to answer questions without having to stand out from their classroom.

THEORETICAL FRAMEWORK

This deals with theories that are related to this study. These theories are Vygostsky's theory of social cognitive development and Jerome Brunners.

METHOD

This study adopted Quasi experimental design. Quasi experimental design involved the pretest, post-test non-equivalent control group design. This study was conducted in Uyo Local Government Area of Akwa Ibom State and the population for the study consisted of all the senior secondary II chemistry study in Akwa Ibom State and there are eleven thousand seven hundred and forty (11,740) students in the two hundred and fifty-four public secondary schools in Akwa Ibom State.

The instruments used for data collection were Chemistry Achievement Test (CAT) and Chemistry Retention Test (CRT). These instruments were developed by the researcher for the data collection. The instruction was validated by 3 validators from the Department of Integrated Science, Akwa Ibom State College of Education, Afaha Nsit. The CAT and CRT were administered to forty students in the sampled schools outside the study area in order to obtain the reliability of the test items, the reliability estimate of CAT was calculated to be 0.77 mean and standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at 0.05 level of the significance.

RESULT AND DISCUSSION

What is the mean achievement score of students in matter when taught using Think Pair Share Instructional Strategy and Lecture Method?

Table 1: Mean Achievement Scores of Students Taught Using Think Pair Share Strategy and Lecture Method.

Teaching Method	N	Pretest Mean	SD	Mean	Post-test SD	Gain Score
Think-Pair Share	100	24.18	5.28	33.16	4.57	10.98
Lecture	100	21.00	5.66	25.62	4,75	3.63
Mean Difference				7.54		

Table 1 show that students taught matter and its properties using Think Pair Share recorded a mean achievement score 24.18 and standard deviation of 5.28 in a pretest and recorded a mean and standard deviation score of 33.16 and 4.57 respectively in a post-test. The data showed that students taught with lecture method had a mean achievement score of 23.99 with standard deviation of 5.66 in a pretest and as well recorded mean achievement of score of 26.5 with standard deviation of 3.6 in a post-test.

Think Pair Share had the mean of 7.54 higher than those taught using lecture method.

HYPOTHESIS ONE

There is no significant difference between the mean achievement scores of chemistry students taught matter using Think Pair Share and those taught using lecture method.

Table 2: Analysis of Covariance of Chemistry Student's Achievement Using Think Pair Share and Lecture Method.

Source	Type III Sum of Squares	df	Mean Square	f	Sig.
Corrected Model	21.616	2	11.258	1.202	303
Intercept	2386.682	1	2386.682	267917	00
Pretest	20.536	1	20536	2.289	132
Group	436	1	436	2.81	021
Error	1681.404	197	8535		
Total	197996.000	200			
Corrected Total	1701.920	199			

The f- calculated value of 2.51 and significant p-value 0.021 since the significant p-value is less than 0.05 level of significant, the null hypothesis stated is rejected.

Research Question Two

What are the students mean retention scores in matter when taught using Think Pair Share Strategy and Lecture Method?

Table 3:

Method	N	Post-test Mean	SD	Retention Mean	SD
Think-Pair Share	100	32.16	3.57	34.58	3.01
Lecture		25.65	3.57	25.96	2.85
Mean Difference	100	6.51		8.62	

The above table shows that students taught with Think Pair Share had a mean retention of 34.58 with standard deviation of 3.01 while those taught with lecture method had a mean of 25.96 with standard deviation of 2.85.

Research Question Three

What is the influence of gender on students' mean achievement score in matter when taught using Think Pair Share Strategy?

Influence of gender on students' mean achievement score in matter when taught using Think Pair Share Strategy is shown in the table below.

Table 4: Mean Achievement Score of Male and Female Students Taught Using Think Pair Share Strategy

		Pretest		Post-test	
	N	**Mean**	**SD**	**Mean**	**SD**
Male	69	24.96	4.22	30.23	3.59
Female	31	25.08	4.46	29.21	3.59

Data in Table 4 shows that male students taught using Think Pair Share had a pretest mean score and standard deviation of 24.96 and 4.22 respectively and post-test mean and standard deviation scores of 30.23 and 3.59 respectively. The table also showed that the female students had a pretest mean and standard deviation scores of 25.68 and 4.46 respectively and 29.21 and 3.59 for their posttest mean achievement and standard deviation respectively. This implies that males recorded a slightly higher posttest mean achievement scores than their female counter parts.

Hypothesis Three

There is no significant difference between the mean achievement scores of male and female students in matter when taught using Think Pair Share Strategy.

Table 5: Analysis of Covariance on the Mean Achievement Scores of Male and Female Chemistry Students Taught Using Think Pair Share.

Source	Type III Sum of Squares	df	Mean Square	f	Sig.
Corrected Model	13.131[a]	2	6.565	.487	.615
Intercept	5357.392	1	5357.392	397.599	.000
Pretest	.063	1	.063	.005	.946
Gender	13.125	1	13.125	.974	.325
Error	2654.449	197	13.474		
Total	181350.000	200			
Corrected Total	2667.580	199			

a. R Squared = .005 (Adjusted R Squared = -.005)

Data in Table 5 shows the F-calculated value of 0.97 and significant p-value of 0.33. Since the significant p-value of 0.33 is greater than 0.05 level of significance, the null hypothesis is accepted. Therefore, there is no significant difference in the mean achievement scores of male and female students taught matter using Think Pair Share.

Research Question Four

What is the influence of gender on students' mean retention scores in matter when taught using Think Pair Share Strategy?

Influence of gender on students' mean retention scores in matter when taught using Think Pair Share is shown in the table below.

Table 6: Mean Retention Scores of Male and Female Students Taught Using Think Pair Share

Gender	N	Posttest Mean	SD	Retention Mean	SD
Male	69	30.23	3.59	34.59	2.98
Female	31	29.21	3.59	33.58	3.11

Table 6 shows that male students exposed to Think Pair Share had a mean retention score of 34.59 and standard deviation of 2.98 while their female counter parts had mean retention score of 33.58 and standard deviation of 3.11. This implies that male students exposed to Think Pair Share had slightly mean retention scores than the females.

Hypothesis Four

There is no significant difference between the mean retention scores of male and female students in matter when taught using Think Pair Share.

Table 7: Analysis of Covariance on the Mean Retention Scores of Male and Female Chemistry Students Taught Using Think Pair Share.

Source	Type III Sum of Squares	df	Mean Square	f	Sig.
Corrected Model	20.648[a]	2	10.324	1.120	.300
Intercept	2288.296	1	2288.296	268.127	.000
Pretest	20.456	1	20.456	2.397	.123
Gender	.568	1	.568	.067	.797
Error	1681.272	197	8.534		
Total	1879996.000	200			
Corrected Total	1701.920	199			

a. R Squared = 0.12 (Adjusted R Squared = .002)

The data in Table 4.7 shows an F-calculated value of 0.07 and significant p-value of 0.80. Since the significant p-value of 0.80 is greater than 0.05 level of significant, the hypothesis above is accepted. Therefore, there is no significant difference between the mean retention scores of male and female students in matter when taught using Think Pair Share.

Research Question Five

What is the interaction on the influence of gender and teaching methods on students' mean achievement scores in matter?

Table 8: Mean Interaction influence of Gender and Teaching Methods on Students' Mean Achievement Scores in Matter

Group	Gender	N	Mean
Experimental	Male	69	32.23
	Female	31	30.00
Control	Male	56	26.91
	Female	44	25.25

Summary of results presented in table 4.8 reveals that there is no interaction between gender and method on students' achievement scores in matter. This is because the mean achievement scores of male and female are higher with Think Pair Share strategy than with the lecture method. This indicates that Think Pair Share is superior to the lecture method at two level of gender (male and female).

Hypothesis Five

There is no significant interaction on the influence of gender and teaching methods on students' mean achievement scores in matter.

Table 9: Analysis of Covariance for Test of Significant of Interaction on the Influence on Gender and Teaching Methods on Students' Mean Achievements.

Source	Type III Sum of Squares	df	Mean Square	f	Sig.
Corrected Model	26.501[a]	4	6.625	.489	.744
Intercept	5364.681	1	5364.681	396.093	.000
Pretest	.014	1	.014	.001	.974
Group	13.094	1	13.094	.967	.327
Gender	9.136	1	9.136	.675	.412
Group * Gender	2.096	1	2.096	.155	.614
Error	2641.079	195	13.544		
Total	181350.000	200			
Corrected Total	2667.580	199			

a. R Squared = 0.10 (Adjusted R Squared = .0.10)

The result presented in Table 9 shows the F-calculated value of 0.155 and significant p-value of 0.614. Since the significant p-value of 0.614 is greater than 0.05 level of significant, the null hypothesis stated is accepted. Therefore, there is no significant interaction on the influence of gender and teaching method on students' mean achievement scores in matter.

Research Question Six

What is the interaction on the influence of gender and teaching methods on students' mean retention scores in matter.

The interaction on the influence of gender and teaching method on students' mean retention scores in matter.

Table 10: Mean Interaction on the influence of Gender and Teaching Methods on Students' Mean Retention Scores in Matter

Group	Gender	N	Mean
Experimental	Male	69	34.59
	Female	31	33.58
Control	Male	56	27.38
	Female	44	26.54

Summary of results presented in table 4.10 reveals that there is no interaction between gender and method on students' retention scores in matter. This is because the mean retention scores of both males and females are higher with Think Pair Share strategy than with the lecture method. This indicates that Think Pair Share is superior to the lecture method at two level of gender (male and female).

Hypothesis Six

There is no significant interaction on the influence of gender and teaching methods on students' mean retention scores in matter.

Table 11: Analysis of Covariance for Test of Significant of Interaction on the Influence on Gender and Teaching Methods on Students' Mean Retention Scores.

Source	Type III Sum of Squares	df	Mean Square	f	Sig.
Corrected Model	2.833[a]	4	.708	.081	.988
Intercept	5472.497	1	5472.497	628.065	.000
Pretest	1.133	1	1.133	.130	.719
Group	.680	1	.680	.078	.780
Gender	.225	1	.225	.026	.873
Group * Gender	.421	1	.421	1.28	.106
Error	1699.087	196	8.713		
Total	187996.000	200			
Corrected Total	1701.920	199			

a. R Squared = .002 (Adjusted R Squared = .019)

The data in Table 11 reveals the F-calculated. Value of 1.28 and significant p-value of 0.106. Since the significant p-value of 0.105 is greater than 0.05 level of significant, the null hypothesis stated is accepted. Therefore, there is no significant interaction on the influence of gender and teaching method on students' mean retention scores in matter. Mean retention scores of male and female students in matter when taught using Think Pair Share at 0.05 level.

DISCUSSION OF FINDINGS

The results of the study showed that students taught matter using Think Pair share recorded higher mean achievement scores than others taught using Lecture Method. The findings from the study showed that the mean retention scores of students taught matter using Think Pair Share was higher than those who were taught using lecture method, hence the academic achievement of chemistry students taught matter had a good academic performance than student taught with lecture method.

CONCLUSION

The findings revealed that: Students taught matter using Think Pair Share had higher mean achievement scores than those taught with Lecture Method. Also, there was a significant difference between the mean achievement scores of chemistry students taught matter using Think Pair Share and those taught using Lecture Method at 0.05 level of significance in favour of experimental group. Educators Think Pair Share strategy which involve students in the learning process and also allow learners to retain the concepts learnt during the teaching and learning process.

RECOMMENDATION

Based on the findings of the study, the following recommendation was made.

- Since Think Pair Share Strategy was found to be an effective strategy for improving students' mean achievement scores and mean retention scores in matter, chemistry teachers should adopt it as a teaching strategy in chemistry teaching.

REFERENCES

Aniaku, O. L. (2013). Effect of guided and unguided inquiry methods of teaching on secondary school students' achievement and interest in biology. Master's Thesis University of Nigeria, Nsukka.

Brain, E. S. (2023). Impact of Teaching and Learning of Chemistry in Tertiary Institutions in Akwa Ibom State. Unpublished Ph.D Work.

Goodman, J. (2010). Active research on active learning strategies. *International Journal of Education Psychology,* 2 (11) 22.

Majekodummi, O. F. (2007). An address presented at 30th Annual Conference of the Chemical, Society of Nigeria held at Abuja Nigeria. (pp. 30-35).

Okeke, O. J. (2011). Effect of mind mapping teaching strategy on students' achievement, interest and retention in senior secondary school chemistry. Ph.D Thesis. Department of Science Education, University of Nigeria, Nsukka.

Owoyemi, J. E. (2007). Mathematics and chemistry senior school certificate results; gender and attitude as predictors of achievement in a physical chemistry course. *African Journal of Educational Research,* 11 (1&2) 27-34.

Sampsel, A. (2013). Finding the effect of think pair share on students' confident and participation. *Journals of Science Education* 3 (12).