

EFFECTS OF GENDER ON STUDENTS' ACADEMIC ACHIEVEMENT AND RETENTION IN ECONOMICS USING POLYA'S PROBLEM SOLVING INSTRUCTIONAL STRATEGY

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Abstract

Controversial reports on gender and academic achievement of students necessitated this study which determined the effect of gender on students' academic achievement and retention in Economics in secondary schools in Imo State. Quasi-experimental design of pretest, posttest non-randomized control group was adopted for the study. Population comprised 31,630 Senior Secondary School two (SSII) Economics students in the 299 public secondary schools in the six Education zones of Imo State. A sample of 192 secondary school (SSII) students that offered Economics was drawn from four public secondary schools in Owerri Education zone 1 of Imo State using purposive sampling technique. The study was made up of 98 students in the experimental group (47 male and 51 female) and 94 students in the control group (55 male and 39 female). Data were collected using a 40-item Multiple Choice Economics Achievement Test (MCEAT) rearranged into Pretest, Post-Test, Retention test. The instrument was validated by five experts with a reliability coefficient of 0.82. Four research questions and hypotheses respectively guided the study. Mean and standard deviation were used to answer the research questions while analysis of covariance (ANCOVA) was used to

test the null hypotheses at 0.05 level of significance. Findings among others revealed that gender was not a significant factor on students' achievement and retention in Economics when exposed to Polya's problem –solving instructional strategy. Based on the findings, it was recommended among others that Polya's problem –solving instructional strategy is gender friendly and its use should be encouraged during teaching and learning of Economics particularly in co-educational schools since it enhanced male and female students' academic achievement and retention.

Keywords: Polya's problem-solving instructional strategy, Gender, Academic Achievement, Retention, Economics.

Introduction

Educational opportunities for both male and female students are supposed to be equally distributed. According to the requirements of the Millennium Development Goals (MDGs), countries were supposed to ensure that by 2015, gender disparity in education was eliminated especially at the primary and secondary levels. Unfortunately, in some developing countries like Nigeria, this objective is yet to be achieved. In Nigeria, 2006 census figures indicated that females outnumbered males in the country (NPC, 2006). As such, all concerted efforts have to be made to encourage females to acquire more knowledge as their male counterparts. It is for this view that Fennema in Adetula (1988) stressed the need to continue researches and document the status of gender differences as they exist in various subject areas.

Gender as a concept relates to cultural attributes of both males and females (Akpochafo, 2009). Unlike sex, which is concerned with only the distinction between male and female based on biological characteristics, gender encompasses other personality attributes as roles, orientation and identity based on individual's conceptualization of self. Nwaubani, Machebe and Nwaubani (2018) drew a clear distinction between gender and sex. According to them, gender refers to a learned, socially and culturally constructed characteristic assigned to male and female while sex is an inborn physiological condition that makes one a male or female. Similarly, gender as defined by Idika, Onuoha, Nji and Eze (2018) involves the psychological and socio-cultural dimensions of being a male or a female. Gender role is a set of expectations that prescribes how females or males should think, act or feel. In our society, males are assigned to such attributes as bold, aggressive, tactful and so on while females are assigned the opposite attributes such as fearful, timid, gentle and so on.

Numerous studies on sex differences in cognitive performance can be found. Intrinsically, Okoye in Nnamani and Oyibe (2016) asserted that there is practically no

significant difference in the intelligence between male and female that can be traceable to gender difference. He argued that, the fact that men are regarded as the dominant and even superior sex does not mean that they are artistically better than women. Similarly, Aransi (2017) found no significant difference in the academic achievement of students in two compulsory subjects of Mathematics and English Language at High School Level on the basis of gender. Jacob and Linus (2017) on the other hand, reported significant improvement in the academic achievement of female students in Geography compared to their male counterparts. While Iji, Emiaku, & Utubaku (2015) identified gender as one of the factors that affect students' academic achievement, Olaoye and Adu (2015) reported that no significant difference exists in academic achievement of students as a result of gender. Also, other separate studies conducted by Nnamani and Oyibe (2016) and Oriakhi and Igbudu (2015) revealed no significant difference in the academic achievement of students in Social Studies and Government respectively based on gender.

Achievement test on gender results conducted by Onekutu in Nnamani and Oyibe (2016) have shown that boys and girls in the early ages perform equally in all subjects including English Language and as they grow to higher classes, the girls begin to get more interested in language Arts, while the boys take more to sciences and social sciences. This has resulted in a situation where there are more boys than girls offering social sciences. In line with the above finding, Sweeney in Nnamani and Oyibe (2016) also noted that female students are lower in Mathematics and spatial ability, as males were superior to females on problem-solving tasks and on specific abilities related to problem-solving.

In relation to Economics, the study conducted by Aransi (2018) revealed significant difference in the academic achievement of students in Economics on the basis of gender characteristics but in favour of female students. This was in consonance with the study done by Bitrus, Domiya & Hannatu (2016) in which female students were reported of having higher percentage grade scores of distinction and credit in Economics than their male counterparts in High School Examination conducted by National Examination Council between 2006/2007 and 2007/2008 academic sessions respectively in Maiduguri metropolis of Borno State, Nigeria. On the contrary, the findings of the study by Glawala, Ali and Durkwa (2016) showed consistent significant gender difference in the academic achievement of students in Economics in favour of male students while 2006/2007 session showed no significant gender difference in the academic achievement of students in SSCE, WAEC and NECO in Economics. Supporting the latter part of the above findings, Ede and Oleabhie, (2020) found gender to be an insignificant determinant of students' achievements in graph-related-concepts in Economics. Research findings have identified gender as one of the factors that affect students 'academic achievement and retention in secondary school subjects including Economics.

Economics is a science, concerned with how individuals, businessmen and government make use of limited resources at their disposal (Chudi, 2013). Yusuf (2013) observed that Economics is concerned with human behaviour such as how people earn their living and make a choice between alternatives to satisfy their wants. It focuses on the study of individual firms and the government whose activities are geared to the production of goods and services for the satisfaction of human wants. According to Yusuf, Economics is a social science, and like any science subject, the general pattern of procedure in Economics is scientific, its analysis is systematic, and the validity of its various theories can be tested.

An attempt has been made to integrate the theoretical foundations of the subject with their practical applications. Anyanwocha (2010) affirmed that Economics is an exciting and intellectual based subject that inspires young people to expand the frontiers of their knowledge about how best to use limited resources with minimal wastes. The subject therefore provides a rational guide to individuals, firms and governments in the allocation of scarce resources. Furthermore, Akunya (2021) opined that Economics is concerned with the efficient management of scarce resources by individuals, firms and governments for the purpose of attaining maximum satisfaction of human wants.

Academic achievement of students represents performance outcomes that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in school, college, and university (Steinmayr, Meibner, Weidinger & Wirthwein 2015). Academic achievement, according to Ajobeje in Glawala, et al (2016), refers to an expression used to represent students scholastic standing while Eze, Ezenwafor and Obidile, (2016) saw academic achievement as the outcome of students' effort in examinations. Retention is the ability to keep or retain what is learnt and be able to recall it when it is required (Safo, Ezenwa & Wushishi, 2013). Hornby (2013) defined retention as the fact of keeping something in one's memory. Retention is the ability to possess, use or keep information and ability to reproduce past experiences or previously familiar materials (Okoro, 2013). Retention according to Ngwoke (2010) is the process by which a child stores information in his memory for use at a later period. Retention occurs when facts or experiences are stored in the long term memory. A student may be able to memorize facts in the short term, but may not retain those facts over the long term memory. In the context of this study retention is the ability to recall or remember what has been taught after a given time as a measure of students' progress. Knowledge retention of Economics concepts could lead to high academic achievement in the subject. Some studies other (Klegeris and Hurren, 2011; Okoro, 2013; and Hoidn and Karkkainen, 2014) found that retention of learning were more with one method of teaching than the other while Wynn, Mosholder, and Larsen (2014) found in his own study that there was no significant difference in students' knowledge retention using different methods of

teaching except after a longtime. These conflicting views have equally added to the necessity of the present study. The search for a good instructional delivery process that could balance the gender inequality in Economics cannot, therefore, be over-emphasized. The study therefore determined if Polya's problem-solving strategy was capable of closing the gap in students' academic achievement and retention in Economics based on gender.

Though many studies have been conducted to ascertain the effect of gender on academic achievement and retention of students in many subject areas using different teaching methods, but not much has been done in the area of Economics in secondary schools, especially using Polya's problems-solving instructional strategy. Hence, the imperative to carry out this study.

Purpose of the Study

The study investigated the effect of gender on students' academic achievement and retention in Economics using Polya's problems-solving instructional strategy. Specifically, the study:

1. found out the mean achievement scores of male and female students taught Economics using Polya's problem-solving instructional strategy and those taught with conventional instructional strategy.
2. determined the interaction effect of gender and instructional strategy on students' academic achievement in Economics.
3. found out the mean retention scores of male and female students taught Economics using Polya's problem-solving instructional strategy and those taught with conventional instructional strategy.
4. determined the interaction effect of gender and instructional strategy on students' retention in Economics.

Research Questions

The following research questions guided the study;

1. What are the mean achievement scores of male and female students taught Economics using Polya's problem-solving instructional strategy and those taught with conventional instructional strategy?
2. What is the interaction effect of gender and instructional strategy on students' academic achievement in Economics?
3. What are the mean retention scores of male and female students taught Economics using Polya's problem-solving instructional strategy and those taught with conventional strategy?

4. What is the interaction effect of gender and instructional strategy on students' retention in Economics?

Hypotheses

The following null hypotheses were formulated and tested at 0.05 level of significance:

HO₁ There is no significant difference between the mean achievement scores of male and female students taught Economics using Polya's problem-solving instructional strategy and those taught with conventional instructional strategy.

HO₂ There is no significant interaction effect of gender and instructional strategy on students' academic achievement in Economics.

HO₃ There is no significant difference between the mean retention scores of male and female students taught Economics using Polya's problem-solving instructional strategy and those taught with conventional strategy.

HO₄ There is no significant interaction effect of gender and instruction strategy on students' retention in Economics.

Methodology

The study adopted a quasi-experimental design. The sample of the study consisted of 192 SS II Economics students which comprised 98 in the experimental group (47 male and 51 female) and 94 in the control group (55 male and 39 female) drawn from a population of 31,630 Senior Secondary School Two (SS II) Economics students in the 299 public secondary schools in the six Education zones of Imo state. The sample was drawn from four public co-educational secondary schools in Owerri Education zone I using a two-staged sampling procedure. In the first stage, purposive sampling was used to select the Owerri education zone I from the six education zones in the state as well as the four schools within the selected zone. Furthermore, simple random sampling was used to assign the four sampled schools into experimental and control groups. Instrument used for data collection was Multiple Choice Economics Achievement Test (MCEAT) which was developed by the researchers. Two experts in measurement and evaluation carried out content validation of the instrument while three experts in Economics education carried out face validation of the same instrument. MCEAT was also trial-tested and the result obtained was calculated using Kuder-Richardson's formula 20 (K-R₂₀) which yielded the reliability coefficient of 0.82. Also, two instructional packages were developed by the researchers for the instructional delivery which included one that was based on the Polya's problem-solving instructional strategy, and the other based on the conventional instructional

method. Mean and standard deviation were used to answer the four research questions while Analysis of Covariance (ANCOVA) was used to test the four null hypotheses that guided the study at 0.05 level of significance.

Results

Research question 1

What are the mean achievement scores of male and female students taught Economics using

Polya's problem-solving instructional strategy and those taught with conventional instructional strategy?

The data for answering research question 1 were analyzed with mean and standard deviation and results presented in the Table 1

Table 1 Pretest and Posttest mean achievement scores of male and female students taught Economics using Polya's problem-solving instructional strategy

Gender	N	Pretest		Post test		Mean gain scores
		\bar{X}	SD	\bar{X}	SD	
Male	47	46.36	10.13	49.17	10.76	2.81
Female	51	45.94	10.07	47.37	10.55	1.43
Effect						1.38

Table 1 reveals that male students taught with Polya's problem-solving instructional strategy had Pretest mean score of 46.36 with standard deviation of 10.13 while the female had a pretest mean score of 45.94 with standard deviation of 10.07. In the same vein, the posttest mean scores of male and female students were 49.17 and 47.37 respectively with standard deviations of 10.76 and 10.55. This implies that the male students had higher mean gain of 2.81 than their female counterparts with mean gain of 1.43 indicating that Polya's problem-solving instructional strategy had more increasing effect of 1.38 on the male students' academic achievements in Economics than on the female students.

A corresponding hypothesis that addressed the above research question is:

Hypothesis 1

There is no significant difference between the mean achievement scores of male and female students taught Economics using Polya's problem-solving instructional strategy and those taught with conventional instructional strategy.

The data for testing hypothesis 1 were analyzed with ANCOVA and the results presented in Table 2

Table 2 Analysis of Covariance (ANCOVA) of mean achievement scores of male and female students taught Economics using Polya's problem-solving instructional strategy

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	13449.739 ^a	3	4483.246	18.248	.000
Intercept	2420.089	1	2420.089	9.850	.000
Pretest	43.145	1	43.145	0.176	.000
Method*Gender	1303.126	2	651.563	2.652	.091
Error	2339.918	95	245.683		
Total	153325.118	98			
Corrected Total	3542.134	97			

The data in Table 2 reveal that a significant P-value of .091 was obtained. Since the P-value of .091 is greater than 0.05 level of significance, the null hypothesis was not rejected. Therefore, Polya's problem-solving instructional strategy has no significant effect on male and female students' academic achievements in Economics.

Research question 2

What is the interaction effect of gender and strategies on students' academic achievements in Economics?

The data for answering research question 2 were analyzed with mean and standard deviation and results presented in Table 3

Table 3: Interaction effect of gender and strategies on students' academic achievements in Economics

Groups	Gender	N	Pretest		Post test		Mean gain
			\bar{X}	SD	\bar{X}	SD	
PPSIS	Male	47	46.36	10.13	49.17	10.76	2.81
	Female	51	45.94	10.07	47.37	10.55	1.43
	Differences		0.42	0.06	1.80	0.21	1.38
lecture	Male	55	45.98	10.11	46.83	10.63	0.85
	Female	39	45.76	9.68	46.31	10.59	0.55
	Differences		0.22	0.43	0.52	0.04	0.30

Table 3 shows that the mean achievement gain scores for male and female students in the treatment group stood at 2.81 and 1.43 respectively while their mean achievement gain scores were in the control group were 0.85 and 0.55 for male and female students respectively. This showed that both male and the female students taught using the Polya's problem-solving instructional strategy (treatment group) recorded higher posttest mean achievement scores than their counterparts in the lecture (control group) method. The Table further showed that the male students recorded higher posttest mean achievement scores than the females in both the treatment and the control groups. This implies that irrespective of the teaching strategies used the male students achieved higher than the female students, hence there is no interaction effect of gender and strategies in the achievements of students in Economics. In other words, the observed increase in students' posttest scores is not really due to gender combination with the learning strategy but is entirely due to the learning strategy (PPSIS) used in the study. A corresponding hypothesis that addressed the above research question is:

Hypothesis 2

There is no significant interaction effect of gender and strategies on students' achievements in Economics.

The data for testing hypothesis 2 were analyzed with ANCOVA and the results presented in Table 4

Table 4 Analysis of Covariance (ANCOVA) of Interaction Effect of Strategies and Gender on Students' Academic Achievements in Economics

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	26806.914 ^a	4	6701.73	69.09	.000
Intercept	4261.373	1	4261.373	43.94	.000
Pretest	5591.525	1	5591.525	57.65	.000
Group	12006.630	3	4002.21	41.26	.000
Gender	26.730	1	26.730	.276	.342
Methods * Gender	71.971	3	23.990	.247	.509
Error	7565.111	95	96.99		
Total	327119.000	98			
Corrected Total	34372.024	97			

From Table 4, it could be observed that Probability-value of .509 was obtained. Since this P-value is greater than 0.05 level of significance, the null hypothesis was upheld. Hence, there is no significant interaction effect of gender and strategies on students' academic achievements in Economics. This implied that the gender of the students' did not actually combine with the strategies to influence their posttest scores (achievement) in Economics. The observable increase in the students' achievement (posttest scores) is not connected with the gender of the students but linked to the learning strategies used.

Research question 3

What are the mean retention scores of male and female students taught Economics using Polya's problem-solving instructional strategy and those taught with conventional strategy?

The data for answering research question 3 were analyzed with mean and standard deviation and results presented in Table 5

Table 5: Posttest and Retention mean scores of Male and Female Students taught Economics using Polya's problem-solving instructional strategy

Gender	N	Posttest		Retention		Retention Mean gain scores
		\bar{X}	SD	\bar{X}	SD	
Male	47	49.17	10.76	50.89	10.83	1.72
Female	51	47.37	10.55	49.13	10.78	1.76
Effect						0.04

Data in Table 5 show that male and female students taught Economics concepts using Polya's problem-solving instructional strategy had Posttest mean scores of 49.17 and 47.37 respectively with standard deviation of 10.76 and 10.55 while their retention scores stood at 50.89 and 50.03 for male and female respectively with standard deviation of 10.83 and 10.78. This indicates that the retention mean gain scores of male and female students were 1.72 and 1.76 respectively. This showed that the female students had slight higher retention mean gain of 0.04 than their male counterparts. This further revealed that Polya's problem-solving instructional strategy had more increasing effect on the female students' retention in Economics than the male students. A corresponding hypothesis that addressed the above research question is:

Hypothesis 3

There is no significant difference between the mean retention scores of male and female students taught Economics using Polya's problem-solving instructional strategy and those taught with conventional strategy.

The data for testing hypothesis 3 were analyzed with ANCOVA and the results presented in Table 6

Table 6: Analysis of Covariance (ANCOVA) of the mean retention scores of male and female students taught Economics using Polya's problem-solving instructional strategy

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	3213.623 ^a	3	1071.207	82.021	.000
Intercept	12433.260	1	12433.260	1030.95	.000
Pretest	3247.424	1	3247.424	248.654	.000
Gender	56.634	2	28.317	2.168	.135
Error	1227.647	94	13.060		
Total	151371.115	98			
Corrected Total	3612.213	97			

The data in Table 6 reveal a Probability-value of .135 which is greater than 0.05 level of significance. This however means that the null hypothesis stated was accepted. Therefore, Polya's problem-solving instructional strategy has no significant effect on male and female students' retention in Economics.

Research question 4

What is the interaction effect of gender and strategies on students' retention in Economics?

The data for answering research question 4 were analyzed with mean and standard deviation and results presented in Table 7.

Table 7 Mean interaction effect of gender and strategies on students' retention in Economics

Groups	Gender	N	Posttest		Retention		Mean gain
			\bar{X}	SD	\bar{X}	SD	
PPSIS	Male	47	49.17	10.76	50.89	10.83	1.72
	Female	51	47.37	10.55	49.13	10.78	1.75
	Differences		1.80	0.21	1.86	0.05	0.04
lecture	Male	55	46.83	10.63	47.61	10.74	0.78
	Female	39	46.31	10.59	47.50	10.67	0.75
	Differences		0.52	0.04	0.11	0.07	0.03

Table 7 reveals that the mean retention gain scores for male and female students in the treatment group stood at 1.72 and 1.75 respectively while the mean retention gain scores their counterparts (male and female students) in the control group were 0.78 and 0.75 respectively. This showed that both male and the female students taught using the Polya's problem-solving instructional strategy (treatment group) recorded higher mean retention scores than their counterparts in the lecture (control group) method. The Table further showed that the female students recorded higher mean retention scores than the males in both the treatment but the reverse in the control group. This implies that there is no interaction effect of gender and strategies in the mean retention of students in Economics. In other words, the observed increase in students' retention scores is not

really due to their gender but entirely due to the learning strategy (PPSIS) used in the study

Hypothesis 4

There is no significant interaction effect of gender and strategies on students' mean retentions in Economics

Table 8 Analysis of Covariance (ANCOVA) of interaction effect of gender and strategies on students' retention in Economics

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	8349.498 ^a	3	2783.166	176.944	.000
Intercept	62.234	1	62.234	3.966	.000
Posttest	1712.485	1	1712.485	25.719	.000
Gender	1.294	1	1.294	.082	.581
Method	2188.223	2	1094.112	69.560*	.000
Gender * method	2.806	2	1.403	.891	.718
Error	1494.324	95	15.729		
Total	159988.000	98			
Corrected Total	9843.822	97			

The result in Table 8 indicates a Probability-value of .718. Since this value is greater than 0.05 level of significance, the hypothesis of no significant interaction effect was upheld. Therefore, there is no significant interaction effect of gender and strategies on students' retention in Economics. This means that gender of the students did not really combine with the strategies to influence their retentions in Economics. In other words, the students' retention is not connected with their gender but linked to the learning strategies employed in the study.

Discussion

The findings of the study showed that Polya's Problem-solving Instructional Strategy had slightly more increasing effect on male students' academic achievement in Economics than the female students. The result is in line with Abbas and Habu (2014), who reported that male students taught geometry using Polya's Problem-solving Instructional Strategy had higher mean achievements than the female students. The result however disagreed with Okafor (2019) and Olaniyan, Omosewo, and Nwankwo (2015) and Nneji (2013) who reported in their separate studies that female students taught Physics and algebra respectively using Polya's Problem-solving Instructional Strategy recorded slightly higher mean achievements than the male students. The slight superior achievement recorded by the male students over the females could be due to

the fact that the content scope of the study involves calculations and graph-related concepts in Economics which according to Oleabhiele (2011) male students perform better than female students in any classroom instructional activities that involve calculation. The result further indicated that no significant difference exists in male and female students' academic achievements in Economics using Polya's Problem-solving Instructional Strategy. This is equally in agreement with findings of the studies of Olaniyan, et al (2015), Adewumi and Akinnodi (2016) and Nneji (2013) which revealed that there was no significant difference in the performance of male and female students taught Physics and Mathematics respectively due to instructional techniques.

This is an indication that no gender is superior to the other when taught using Polya's Problem-solving Instructional Strategy. The implication is that the instructional strategy is gender friendly and is capable of bridging the gap between male and female students' academic achievements in school subjects especially calculation and graph-related concepts in Economics.

The results from the study revealed that male and female students taught Economics using Polya's Problem-solving Instructional Strategy recorded higher mean achievements than their counterparts in the conventional group. This implies that male and female students in the experimental group had higher mean achievements than those in control group. The result agreed with Olaniyan, et al (2015), Nneji (2013) and Okafor (2019) who in their separate studies found no significant interaction effects of methods and gender on students' achievements in physics and mathematics respectively. This implied that gender was not a factor in the achievements of students but the observed increase in students' achievements was not really due to their gender but was entirely due to the instructional strategy used in the study.

The results from the study showed that Polya's Problem-solving Instructional Strategy had positive effect on male and female students' retention of concepts in Economics. In other words, female students had slightly higher mean retention than their male counterparts. The result further showed that the difference in the mean retention for male and female was not statistically significant. The findings agreed with Abbas and Habu (2014) and Nneji (2013) who in their separate studies found no significant difference in the mean retention scores of male and female students taught Mathematics using Polya's Problem-solving Instructional Strategy. The insignificant difference in the mean retention ability of male and female students taught Economics using Polya's Problem-solving Instructional Strategy might be as a result of the differences in the nature and content of the instruction used (calculations and graph related concepts in Economics) which according to Mbotto and Orgar (2004) are capable of affecting the extent learner retain what was learnt. This implies that both male and female students are capable of achieving high mean retention under Polya's Problem-solving Instructional Strategy. The slight differences in their mean retention could be as a result of any other intervening variables other than gender.

The result from the study revealed that there was no significant interaction effect of gender and methods on students' retention in Economics. This implies that students' gender did not combine with the learning strategies to influence students' retention in Economics. The findings were consistent with the findings of Abbas and Habu (2014) and Nneji (2013) who in their separate studies reported that both male and female students exposed to Polya's Problem-solving Instructional Strategy recorded an enhanced retention of learned materials than their counterparts in the conventional method. The findings of Abbas and Habu (2014) and Nneji (2013) further revealed no significant difference in the mean retention of male and female students in the study. This means that the enhanced mean retention recorded by gender in the instructional strategies was not in any way as a result of the gender of the students but due to the efficacy of the learning strategies used in teaching the students.

Conclusion

Based on the findings of the study, it could be concluded that Polya's Problem-solving Instructional Strategy has no significant positive effect on male and female students' academic achievement and retention in Economics and there was no significant interaction effect of gender and strategies on students' academic achievement and retention in Economics.

Recommendations

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

1. Polya's problem-solving instructional strategy is gender friendly which should be used by teachers during teaching and learning of Economics particularly in co-educational schools since it enhanced male and female students' academic achievement and retention.
2. Government and secondary school administrators should organize training and re-training programme through intensive seminars and workshops on the effective ways of using Polya's Problem-solving Instructional Strategy for in-service Economics teachers.
3. Educators in Teacher Education Institutions should employ the technique in teaching pre-service Economics teachers to enable them learn how to apply same in their respective classrooms.
4. Researchers in Economics education should carry out further studies to find out the effectiveness of Polya's problem-solving instructional strategy on the identified difficult concepts in Economics.

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