UNIJERPS
Unizik Journal of Educational Research and Policy Studies VOL.16 (5);
https://unijerps.org
2023 Impact Factor:* 6.834;** 2022 ***Impact Factor*:** 5.156; ***2021 Impact Factor: 5.641; 2020 Impact Factor: 5.355.
Indexing and Impact Factor URL: http://sjifactor.com/passport.php?id=21363
July-December, 2023

GENDER AND ACADEMIC RETENTION OF SECONDARY SCHOOL STUDENTS TAUGHT RADIOACTIVITY WITH COMPUTER ANIMATED INSTRUCTIONAL PACKAGE IN OGIDI EDUCATION ZONE

Dr. Pius Promise Obinna, Dr. Nnoli Juliana Nkiru, Onuigwe Blessing Ukamaka
promisepius850@gmail.com; jn.nnoli@unizik.edu.ng; bu.onuigwe@unizik.edu,ng
Department of Science Education, Nnanmdi Azikiwe University Awka, Anambra State.

ABSTRACT

A lot of Researchers and Educationist had investigated on how multi-media and other teaching strategies can be used to improve understanding of some difficult concept in Chemistry yet, not many have investigated on gender differences in secondary schools students' learning retention through the use of multi-media. This paper determined the gender differences and academic retention of secondary school students taught Radioactivity using computer animated package (CAIP) in Ogidi Education Zone of Anambra State, Nigeria. One research question guided the study and two hypotheses were tested at 0.05 level of significance. Quasi experimental nonequivalent control group design was adopted for the study. Population was 3,438 senior secondary three (SS3) students from Government owned co-educational secondary schools in the area. A sample of 68 SS3 from Idemili North and South Local Government Areas was selected through multistage sampling. The students were exposed to CAIP produced by the researcher which is based on the content of SS3 Chemistry Scheme of work. Instrument for data collection was Radiation Radioactive Element Achievement Retention Test (RREART) validated by three expert with reliability index of 0.89 using KR-20 formula. Mean and Analysis of covariance were used for data analysis. Findings revealed that gender had no significant influence on students' retention in radioactivity when taught with CAIP; there was no significant interaction effect of treatment and gender on academic retention. Based on the findings, it was recommended among others that since computer animated package enhances retention in Chemistry, teachers should make use of it while teaching in classroom.

Keywords: Gender, Retention, Radioactivity, Computer assisted instruction

Introduction

The passion to learn more and importance of education across all nations irrespective of the gender has led to the intensified research on the performance of both male and female students in their academic activities in addition, the need to ensure equal and consistent academic performance of both genders on every subjects area like; sciences, social sciences, vocational and art. It has also called for the need to identify the factors leading to the differences in their academic performance where there is any. A number of factors has been adduced for the poor performance in chemistry. One factor according to Alabi (2023) is that Nigerian did not only find science subject very difficult but uninteresting and that few student that enroll in science sometimes perform poorly

exemplified in their consistent poor performance in school examinations. The problem of poor achievement in chemistry can be traced again to such factors as: poor method used in teaching chemistry (Udoh 2008), background problems, and students' lack of interest and/or negative attitude towards Chemistry. Other factors are teachers related, such as poor teacher preparation, inadequate qualified chemistry teacher and inadequate instructional materials (Usman & Memeh 2007).

However, Adigun et al (2015) identified that gender is strong influencing factor in the retention and academic performance of students in science subject and their understanding of difficult science concept. According to the authors, a student's gender comprises the physical, mental, biological features of an individual the behaviours that make the male and the female population distinct. The need for the study of the effect of gender on the students' academic retention is underpinned by the socio-cultural dissimilarities between both genders. For instance, some science/ technological profession such as carpentry, engineering, craft, welding, plumbing and wiring are classified as men's professions while some professions such as catering, nursing, and home economics are classified as a female course based on socio-cultural perspective of the individual.

Based on this fact, it becomes necessary for teachers to apply innovative teaching method and strategies that will aid students to acquire and retain any knowledge gained in Chemistry in most efficient way, also to enable students' understanding of the teaching and learning processes especially in most difficult and abstract concept such as Radioactivity. Computer technology is applied to facilitate students' understanding. Radioactivity is a concept in Chemistry which studied radiation and radioactive elements. The realization that this aspect of Chemistry is among those that is treated as a difficult and abstract concept with little practical implications has over time dampened interest of the learner hence retarding their retention of the concept which equally affects their performance in Chemistry. Yusuf Afolobi (2010) noted that computer animated instructional package (CAIP) arouses the interest of the student thereby enhancing retention and serves as motivation to the irrespective to their gender. Through the CAIP lesson are provided for the better student irrespective for their gender. Through the CAIP lesson are provided for better understanding through animation, games, drill and practice visual imagery and tutorial (Mayor, 2009; scot, 2004) student's ease in understanding a lesson serve as drive for their sustained attention and retention in the subject and subsequent and adoption for the subject as a career because of the simple method the lesson are presented through the CAIP.

Several studies has been carried to ascertain the effect of gender on the understanding, retention of the student in some science subject such as; mathematics, Chemistry, physics, computer, using computer-animated instruction package. Yusuf and Afolabi (2010) identified that there has not been success recorded as the link between instructional model and performance of either male or female gender, but the author believed that attitude to the model, access, the computer used, and its carrier choice is not the same across gender. This has called for the concern of parent of the importance and advanced technology,

because of its future position in human such as teaching and learning. Scholars such as Danmole (1998) and Stephen (2010) were the view that male student outperform female student in science subject such as chemistry while other subject carried out by Atadoga, Zaria, Mari, and Danjima (2016) made while a contrary revelation stating that female students perform better than their male counterparts.

On the use of the CAIP, Collazos, Guerrero, Llana and Qetzel (2020) identified that computer-animated instructional method improves collaborative learning and abstract concept such as we have Radioactivity in Chemistry subject, the author identified that a greater number of female in collaborative learning group have higher index of collaboration when compared with a group with few numbers of women. Research cross gender failed to establish the gender-difference across on the retention of male and female students. Authors such as Kirkpatrick and Cuban (1998) and Yusuf and Afolebi (2010) stated that findings have revealed a similar record across genders when male and female students are exposed to the same level of impact is recorded in student's subject retention across gender.

Purpose of the study

The main purpose of the study is to investigate on the influence of gender on the academic retention of secondary school students taught Radioactivity with computer Animated Instructional Package (CAIP) specifically, the study sought to ascertain the:

1. The difference in difference in mean retention scores of male and female students taught Radioactivity using CAIP.
2. Interactive effect on the package and gender on students' retention in Radioactivity

Research Questions

1. What is the difference in mean and retention scores of male and female students taught Radioactivity using CAIP package?

Hypotheses

The following hypotheses were tested at 0.05 level of significance

1. There is no significant difference between the mean retention scores of male and female students taught Radioactivity.
2. There is no significant interaction effect of package and gender on students' retention in electrostatics.

Research Method

Quasi-experimental design was used for the study, specifically nonequivalent control group design. The study was carried out in Ogidi Education Zone of Anambra State. Populations of the study comprised of 3,438 SS3 students of Government owned co-education secondary schools in the area. Co-education zone was chosen to examine male and female students sharing the same facility in the same learning environment while SS3 students was chosen because the topic "Radioactivity" is found in the SS3 scheme of work and they are the most senior students that will soon sit for external examination. The sample was made of 68 (37 males 31 female) SS3 students. This was selected through multistage sampling. 30 items of multiple choice questions (MCQ) on Radiation and Radioactive elements were used as data collecting tool. Prior to the

classroom exercise, teachers who acted as research assistance has been adequately briefed and demonstrated competence in the successful implementation of the instructions pretest was applied on groups week before the actual teaching of Radiation and Radioactive elements. Experimental group were taught using CAIP. Conventional lecture method was used for which are known as the control group were administered to both group one week after the treatment. In analyses of data, descriptive and inferential statistics were used. ANCOVA were used for testing the hypothesis. In that case, post-test score serve as covariate measures. In this study, step below were observed with control and experimental group in 5 weeks of process. At the end of the pretest subject of Radiation, types of radiation, natural radiation and artificial (induced) radiation, radioactive elements and their interactions, uses and bombardment were taught to both groups by their class teachers who served as their research assistance in line with the lesson plan prepared by the researchers. Control groups were exposed to the Chemistry concept using conventional method. Experimental groups were taught using CAIP produced by the researcher from the same field with the lesson plan. The package adopted the tutorial modes of Computer Assisted Instructions (CAI). After treatment has been, the same instruments was reshuffled and used as delayed Post-test.

Presentation of Results

Table 1: Mean and Standard Deviation Scores of Students' Retention Scores by Gender.

		Post test		Test for Retention		
Gender	**N**	**Mean**	**SD**	**Mean**	**SD**	**Gain in mean**
Male	37	73.00	10.21	74.92	8.54	1.92
Female	31	70.10	10.87	75.23	12.56	5.13
Mean Difference		2.90		-0.31		-3.21

Table 1 present the mean retention scores of male and female student that is exposed to CAIP in Radiation. Male student has mean retention score of 74.92 while their female counterpart has 75.23.From the table1it is obvious that female student with mean gain of 5.13 retain more than male student with gain of 9.12 student by gender.

Table 2: ANCOVA test of significant Difference between the Mean Retention Score

Source	Type 111sum of squares	df	Mean square	F	Sig	Decision
Corrected	1590.331[a]	2	795.165	8.962	.000	
Intercept	2424.523	1	2424.52	27.325	.000	
Post-test	1588.742	1	1588.742	17.905	.000	S
Gender	45.690	1	45.690	.515	.476	NS
Treatment*Gender	351.790	1	3.51.790	3.019	.084	NS
Error	5767.434	65	88.730			
Total	390458.000	68				
Corrected Total	7357.765	67				

Significant at 0.05 probability level NS= Significant at 0.05 probability

Table 2 reveals the value of significant of F (0.515) on the mean retention score of student based on gender (treatment gender) is 0.476 which is greater than the alpha level of $p<0.05$. The null hypothesis is that there is no significant differences between the mean retention scores of male and female student taught Radiation through CAIP is therefore up held. This implies that the effect of CAIP in student retention does in no way influenced whether the student is a male or female.

From table 2 it can be observed that the significant of F (3.019) for the interaction (treatment gender) is 0.084 against $p<0.05$. Facts emerging from the table show that there is no significant interaction effect between method of instruction and gender on student retention. Thus the null hypothesis 2 is upheld. That means the male and female students are the same level when exposed to CAIP.

Discussion

The finding of this study revealed that is no variance in the delay post RREART scores of male female student exposed in CAIP. This is an indication that male and female benefited. Table 2 also confirms that gender is not significant factors in student's retention in physic concept taught. This is in agreement with the earlier findings of Animu (2015) Stephen (2010) which revealed no significant difference in the academic retention of male and female to animated–media strategy. The present study further reveal that CAIP used in the course of this study could be used to improve student retention in Chemistry irrespective of gender.

Hypothesis two predicted that there would be no significant interaction effect of package and gender on student academic retention in electrostatics. But the result of the analysis of covariance of retention on table 2 showed that the significant of F in two way interaction is higher than the significant level of alpha set up at $p<0.05$.It implies that is no significant interaction effect on method of instruction and gender student retention in Chemistry concept (Radiotion). This means that the group difference is not sensitive of gender.

From the findings of this study, CAIP has proved to be useful in teaching and learning of Chemistry in Awka Education zone, Anambra state. Nigeria just as developed country of the world like; USA, UK and so on. The realization that Chemistry is treated as a difficult and abstract subject with little practical implications has over times damped the interest in learning there by hampering student's retention in Chemistry. However with the emergence of ICT as an important tool in teaching and learning science with Chemistry is one of the science subject, teaching and learning of difficult and so to say abstract subject like Chemistry has proven not to be inherently boring. Looking at it from another angle, it can be said that the problem lies in the fact that teachers are usually not equipped with the skill set and tools to make teaching and learning in Chemistry more interesting. This concur the expression of Aina (3013) that the proliferation of educational software aimed at explaining the complex aspect of Chemistry has served to trigger interest in the subject. With the student interest aroused in any educational environment, there retention will automatically be enhanced. Hence with use of computer software (CAIP, CAD, CAI, among others) in classroom activities

teaching and learning of not only Chemistry but other difficult subject's concept will become interesting, simplify and meaningful thereby enhancing the retention of learners.

Conclusion

Based on the finding of this study the following conclusion where made. The result of this provide empirical evidence that female student exposed to CAIP retained slightly more than male student counterpart, though their men retention scores were not significant.

Recommendations

Based on the findings of this study, the following recommendations were made.

1) Students irrespective of gender should have equal opportunity and the level of motivation to learn.
2) Since the use of computer animated instructional package enhances retention in physics concept (electrostatics), the physics teachers should it's usage in classroom

REFERENCES

1)Abimbade, A. (1997) Principle and Practice of educational technology. Ibadan; international Publishers LTD.

2) Adigun, J., Irunokhai, E., Sada Y. and Adesina, O. (2015). Effect of gender on student's academic performance in computer studies in secondary school in New Bussa, Borgu local government of the Niger State. Journal of education and practice, 6(33) 1-7.

3) Aina J. K. (2013) Effective Teaching and Learning in Science Education through ICT. IOSR – JRME, 2(5), 43-47.

4) Alabi, O. A. (2014), Effect of activity based on teaching strategy on students' achievement of secondary school students in chemistry. *Journal of education and policy review*, 6(2), 119-130.

5) Atadoga, M. M. Zaria, A. B, Maria, J.S and Danjuma A.B (2016). Effect of CIA on academic achievement of Nigerian certificate in education physics student in Niger State, Nigeria. Report and opinion, 8(1), 39-46.

6) Ayodele, C. S. and Adebayo, D. R. (2013) study habit as influence of academic performance of university under graduate in Nigeria. Research journal in organizational, Psychology, and educational studies, 2(3), 72-75.

7) Cesar A. Collazos, C. A., Guerrero, L. A., Llana, M. Oetezel, J.(2020). Gender; an influencing factor in collaborative work process in computer-meditated communication Retrieved from: https://www.researchgate.net/publication/255628731 *Gender An influence factor in the collaborative work process in computer-meditated communication Retrieved.*

8) Danmole,B. T. (1998). The influence of teacher preparation and use of instructional material on primary school pupil performance in integrated science
Ilorin Journal of education, 12, 56-64

9) Kelly, A (1978) *Girls and science*. International association for Evaluation of Educational Achievement Monograph (9) . Stockholm: Almguist and Wilksell.

10) Kirkpatrick, H. & Cuban, L. (1998). Should we be worried? What the research says about Educational Technology, 38(40), 56-60

11) Novak J. D. and Mosunda, D. (1991) A Twelve year longitudinal study of science concept learning. *Americana research journal*, (28), 117-153.

12) Okoro, C. N. (2004) *School Environment and teacher competency variable as correlates of learning outcomes of integrated*

science student with hearing impairment. Unpublished Ph.D. Thesis university of Ibadan, Ibadan

13) S. A. Awoniyi, (2004). Sex differences in academic performance, Nigerian *Journal of Gender Development,* 1 (1&2) 35.

14) Scott, M, Wordsmith tools 4, Oxford: Oxford university press.

15) Usman, K. O. & Memeh , I. M. (2007) Using Scoring Strategy to improve students' achievement in chemistry at secondary school level in Nigeria. *Journal of science*s *teachers association of Nigeria*,42(1&2) , 60-65

16) Wonzencreft. M. (1963). Sex comparism of certain abilities, Journal of education research 57, 21-22

17) Yusuf, M. O. Afolabi. O. A. (2010), Effect of computer instruction (CAI) on secondary school students' performance in biology. Turkish online journal educational technology, 9(1), Retrieved from; *www.tojet.com.*