

EFFECT OF CONCEPT MAPPING ON GENDER AND RETENTION OF SECONDARY SCHOOL STUDENTS IN BUSINESS STUDIES

¹Prof A. U. Okeke & ²Ebere M. Ethel-Echedo

au.okeke@unizik.edu.ng

^{1,2}Department of Technology and Vocational Education, Faculty of Education, Nnamdi
Azikiwe University, Awka, Anambra State

Abstract

This study investigated the effect of concept mapping on gender and retention of junior secondary school students in business studies in South-East, Nigeria. This study adopted a non-equivalence pre-test, post-test, post-post-test quasi-experimental design. The population for the study was 10, 882 second year junior secondary school (JSSII) students in public secondary schools in Orumba South Local Government Area, Anambra State. The sample size of the study was 115 year two junior secondary school students from two intact classes (comprising 52 in control group and 63 in experimental group; 29 female and 23 male students in the control group; and 36 female 27 male students in the experimental group). The instrument used for data collection was 50-objective item Business Studies Achievement Test (BUSAT). BUSAT was validated by experts from the Department of Technology and Vocational Education and Measurement and Evaluation, Nnamdi Azikiwe University, Awka. The reliability of the study was tested using split-half method on Pearson Product Moment Correlation Coefficient which yielded a coefficient index of 0.96. Experimental procedures were observed in the study. The mean and standard deviation were used to answer the research questions while the hypotheses were tested with t-test statistic using the SPSS version 23. The study found among others, that students taught business studies using concept mapping strategy had higher retention scores (8.92 > 16.25) than students in the control group. The mean retention score of the male students taught business studies using concept mapping strategy was higher than the that of the female students (59.67 > 58.0). The study however, found non-significant differences in the mean retention scores of male and female students taught business studies using concept mapping strategy. The study recommended among others, that business studies teachers should adopt the concept mapping strategy in the teaching of business studies in junior secondary schools in order to improve students' learning outcome. Adequate fund and opportunity also should be provided by government for the training of business studies teachers in the art and principle of concept mapping so that they can employ the strategy effectively in the schools.

Key Words: Concept mapping, gender, retention, Business studies, secondary school

Introduction

Secondary education in Nigeria is designed to cater for the diverse interests of students aged 12 to 18 years (Federal Republic of Nigeria, 2013). This level of education which lasts six years, is divided into two- the junior and the senior secondary education. More specifically, the junior secondary curriculum provides for both the academic and pre-vocational subjects, the aim of which is to: “offer diversified curriculum to cater for the differences in talents, opportunities and future roles; to provide trained manpower in the applied sciences, technology and commerce at sub-professional grades, and to provide technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development” (FRN, 2013).

Business studies is one of the subjects of study at the junior secondary school level. Business studies is taught to enable students acquire further skills which are common and fundamental to all personal and occupational activities (Inyang, 2018). It is unfortunate however, that students have been found wanting in the learning of business studies in junior secondary schools. Reports of results of Basic Education Certificate Examination (BECE) in business studies over the years have shown that most students who have taken the business studies examinations failed the subject (Imeokparia, 2018).

One of the reasons attributed to this failure is the teacher-centred methods and strategies used by teachers in teaching students. Some writers (Imeokparia, 2018; Emeasoba, 2018) contended that the teaching strategy employed by teachers play significant role in students’ achievement in a subject. Teaching strategy refers to a tactic or unique way around a particular problem so as to achieve a goal or success (Moemeka, 2016). It is a plan and action taken by teachers to enable learners access knowledge, information and skills being taught. Teachers’ choice of strategy can make or mar the intended learning outcome (Onyeme, 2019). Teacher-centred strategies have been seen to be the cause of massive failure of students in public examinations as these strategies merely make the students passive learners instead of active learners. As a result, students fail to retain knowledge.

Students’ achievement is a function of retention, which is the ability to retain knowledge or skills acquired over time. Thus, Muhammad (2011) defined retention as the ability to remember learned concepts or information over some period of time. This time period is called retention interval. Retention is the ability of the learner to recollect/remember the concept which was learned after a given period has passed (Blair and Simon, 2018). Retention of basic business studies concepts and facts entails the ability to recall the facts and concepts taught after a given time lapse. It is this ability to retain information acquired that enables students to make appreciable achievement in a subject including business studies. Although it is not yet agreed on the amount of time lapse to be considered before knowledge could be said to have been retained, Uche (2019) contended that an interval of one to two weeks is enough to test for retention. Other education experts (Onyeme, 2019; Amadi, 2020) agreed with one week interregnum. Retention in the light of this study therefore, is the successful transfer of the items of the memory from short term to long term which is usually measured by a test conducted after a period of one week the item is acquired. Retention is usually determined after a period of one to two weeks after exposure to knowledge, skills and attitude (Onyeme, 2019).

It is believed that a teaching strategy that is more involving of learners could be more retentive of learning and improve achievement. Nwanekesi and Emereonye (2016) averred that learner-centred teaching strategies are more effective than teacher-centred teaching strategies in retaining and achieving learning objectives. One of the teaching strategies that could improve the teaching and learning of business studies is concept mapping. Concept maps are graphical tools for organizing and representing knowledge. They include concepts, usually enclosed in circles or boxes of some type, and relationships between concepts indicated by a connecting line linking two concepts (Novak and Canas, 2008). Words on the line, referred to as linking words or linking phrases, specify the relationship between the two concepts. Novak and Canas (2008) conceived concept as “a perceived regularity in events or objects, or records of events or objects, designated by a label”.

Concept mapping strategy has been employed by teachers in several remedial contexts to improve students’ retention and achievement. These include improving achievement and retention in Mathematics (Awofala, 2011), English (Khajavi and Ketabi, 2012; Kalhor, Mehranb and Shakibaei, 2012; Shakoori, Kadivar and Sarami, 2017), and Chemistry (Singh and Moono, 2015). Unfortunately, the efficacy of concept mapping on retention in business studies has not been determined.

Moreover, gender difference in retention when concept mapping is employed as a strategy has not been explored thus leaving gaps in the body of knowledge. Abduraheem (2012) stated that one of the most topical issues in education is that of gender differences. Gender is the social and constructed differences in women’s and men’s roles and responsibilities, which are learned, vary from culture to culture and change over time (United Nations Girl Education Initiative (UNGEI), 2012). While sex is biological, gender is a product of human construction that is said to affect all spheres of male and female interactions. Dania (2014) found non-significant gender difference in students’ academic achievement in secondary school Social Studies. In Adigun, Onihunwa, Irunokhai, Sade and Adesina (2015), it was found that even though the male students had slightly better performance compared to the female students in Mathematics, the difference was not significant. Although the two studies examined achievement rather than retention, it is settled that academic achievement is a function of learning retention (Onyeme, 2019).

Whether gender will have moderating effect on the efficacy of concept mapping strategy in teaching business studies among junior secondary school students holds equal attraction to this study. The study therefore sought to determine the effect of concept mapping on students’ gender and retention in business studies in junior secondary schools in South East, Nigeria.

Statement of the Problem

It has been observed that students have continued to record underachievement in business studies at the Basic Certificate Examinations. This underachievement is an indication that the students have not been able to retain information acquired in course of learning the subject. This poor retention has been attributed to weakness in certain teaching strategies employed by teachers in teaching business studies. Considering the need to improve students’ retention

in business studies, it becomes necessary to explore alternative strategy for teaching the subject. It is assumed that if a more effective strategy is employed, students' achievement and retention capacity could improve. In recent times, no attempt has been made to establish the effect, if any, of concept mapping on students' retention as well as the possibility of the moderating influence of gender in business studies. At the moment, it will remain a costly assumption to conclude that concept mapping can improve students' retention in business studies or that gender could influence such effect. As such, the problem of this study posed as a question is, what will be the effect of concept mapping on students' gender and retention in business studies in junior secondary schools?

Purpose of the Study

The main purpose of the study was to investigate the effect of concept mapping on students' gender and retention in business studies in junior secondary schools in South East, Nigeria. The specific objectives of the study were to determine:

1. Mean difference in the retention scores of junior secondary school students taught Business studies using conventional teaching strategy and concept mapping.
2. Mean difference between retention scores of male and female junior secondary school students taught Business Studies using concept mapping.
3. Mean difference between retention scores of male and female junior secondary school students taught Business Studies using concept mapping and conventional teaching strategy.

Research Questions

Based on the objectives of the study, the following research questions guided the study:

1. What is the mean difference between retention scores of junior secondary students taught business studies using conventional teaching strategy and concept mapping?
2. What is the mean difference between the retention scores of male and female junior secondary students taught business studies using concept mapping strategy?
3. What is the mean difference between the retention scores of male and female junior secondary students taught business studies using concept mapping strategy and conventional teaching strategy?

Hypotheses

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

HO₁: There is no significant difference in the posttest mean retention scores of students taught business studies using concept mapping strategy and those taught using conventional strategy.

HO₂: There is no significant difference in the mean retention scores of male and female students taught business studies using concept mapping strategy.

Methods

This study adopted a non-equivalence pre-test, post-test, post-post-test quasi-experimental design. . The experimental group (CM-G) were exposed to topics in business studies using concept mapping technique. The control group (Lec-G) were taught the same topics in business studies using the conventional method. After an interval of one week, another test (post post-test) were administered on participants to determine retention. The area for the

study was South-East, Nigeria. The area is one of the six geopolitical zones of Nigeria and comprises five states of Abia, Anambra, Ebonyi, Enugu and Imo. The target population of this study is 310, 882 second year junior secondary school (JSSII) students in public secondary schools in South-East, Nigeria. The sample size of the study was 115 year two junior secondary school students from two intact classes (comprising 52 in control group and 63 in experimental group; 29 female and 23 male students in the control group; and 36 female 27 male students in the experimental group). The instrument used for the study was Business Studies Achievement Test (BUSAT) constructed from the business studies scheme of work for first term junior secondary school three (JSSIII). The content and construct validities of the instrument was estimated using experts in business studies and measurement and evaluation. Reliability test conducted on BUSAT yielded a coefficient index of 0.96. Experiments lasted four weeks of treatment and pre-test, post-test and post-post-test exercises. Mean and standard deviation were used to analyse data related to the research questions, while t-test was used to test the hypotheses at 0.05 level of significance. The t-test was considered appropriate because it is used to determine the difference between two independent means. For the research questions, a percentage of 50 was deemed as acceptable pass mark. The decision on hypotheses was that where the p-value was less than the level of significance (.05), the null hypothesis was rejected and where the p-value was greater than the level of significance, the null hypothesis was accepted. The analysis was carried out using SPSS version 23.

Results

Research Question 1: What is the mean difference between retention scores of junior secondary students taught business studies using conventional teaching strategy and concept mapping?

Table 1:

Mean Difference between Retention Scores of Students Taught Business Studies Using Conventional and Concept Mapping Strategies

	Descriptive Statistics					
	N Statistic	Min. Statistic	Max. Statistic	Mean Statistic	Std. Dev. Std. Error	Mean Gain
Conv. Grp. (Posttest)	52	28.00	50.00	35.3846	.70879	5.11113
Conv. Grp. (Post posttest)	52	12.00	28.00	19.1346	.47962	3.45860 -16.25
Conc. Map Grp. (Posttest)	63	37.00	64.00	49.7937	.58797	4.66683
Conc. Map Grp. (Post posttest)	63	41.00	71.00	58.7143	.89128	7.07433 8.92

Table 1 shows the mean difference in the retention scores of junior secondary students taught business studies using the conventional and concept mapping strategies. Students taught with conventional teaching method recorded a negative retention score of -16.25 (post posttest score minus posttest score). Students in taught business studies using the concept mapping strategy recorded a retention score of 8.92 (post posttest score minus posttest score). In other words, while students in the concept mapping group gained, students in the conventional group lost.

Research Question 2: What is the mean difference between the retention scores of male and female junior secondary students taught business studies using concept mapping strategy?

Table 2:
Mean Difference between the Retention Scores of Male and Female Students Taught Business Studies Using Concept Mapping Strategy

	Descriptive Statistics						
	N	Minimum	Maximum	Mean	Std. Deviation		
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Mean Diff.
Male Students	27	41.00	71.00	59.6667	1.30526	6.78233	
Female Students	36	41.00	71.00	58.0000	1.21629	7.29775	1.67

Table 2 shows the mean retention scores of male and female junior secondary students taught business studies using concept mapping strategy. The male and female students recorded mean retention scores of 59.67 and 58.0 respectively. This leaves a mean retention difference of 1.67 in favour of the male secondary school students.

Research Question 3: What is the difference in the mean retention scores of junior secondary students taught business studies using the conventional strategy and those taught using the concept mapping strategy?

Table 3:
Mean Difference between Mean Retention Scores of Students Taught Business Studies Using Conventional and Concept Mapping Strategies

	Descriptive Statistics						
	N	Minimum	Maximum	Mean	Std. Dev.		
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Mean Diff.
Students in Conv. Group	52	12.00	28.00	19.1346	.47962	3.45860	
Students in Concept Map Group	63	41.00	71.00	58.7143	.89128	7.07433	39.58

Table 3 shows the mean retention scores of junior secondary students taught business studies using conventional and concept mapping strategies. The mean retention scores of the groups were 19.13 and 58.71 for students in conventional and concept mapping groups respectively. This leaves a mean retention difference of 39.58.

HO₁: There is no significant difference in the mean retention scores of students taught business studies using concept mapping and those taught using conventional strategy.

Table 4:
t-test of significant difference between the mean retention scores of junior secondary school students taught business studies using conventional method and those taught with concept mapping strategies.

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Conventional Group	11.818	51	.000	14.16000	11.6871	16.6329
Concept. Mapping Group	57.816	62	.000	33.56000	32.3620	34.7580

Table 4 shows the t-test of significant difference between the mean retention scores of junior secondary school students taught business studies with conventional method and those taught with concept mapping strategy. The p-value of .0 is less than the alpha value of 0.05. Since the p-value is less than the alpha value, the null hypothesis is therefore rejected. This indicates that there is significant difference between the mean retention scores of junior secondary school students taught business studies with conventional method and those taught with concept mapping strategy.

HO₂: There is no significant difference in the mean retention scores of male and female students taught business studies using concept mapping strategy.

Table 5:

t-test of significant difference between the mean retention scores of male and female junior secondary school students taught business studies using concept mapping strategy

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Male Students	45.712	26	.000	59.66667	56.9837	62.3497
Female Students	47.686	35	.000	58.00000	55.5308	60.4692

Table 5 shows the t-test of significant difference between the mean retention scores of male and female junior secondary school students taught business studies using the concept mapping strategy. The p-value of .0 is less than the alpha value of 0.05. Since the p-value is less than the alpha value, the null hypothesis is therefore rejected. This indicates that there is significant difference between the mean retention scores of male and female students taught business studies using concept mapping strategy.

Discussion

The findings of the study are discussed in this section. The discussion has been arranged under the following themes in line with the research questions and hypotheses.

Business studies retention of students using conventional and concept mapping strategies

The finding of the study established the mean difference in the retention scores of junior secondary students taught business studies using the conventional and concept mapping strategies. Students taught with conventional teaching method recorded a negative retention score (post posttest mean score minus posttest mean score). Students taught business studies using the concept mapping strategy however, recorded a retention score (post posttest mean score minus posttest mean score). In other words, while students in the concept mapping group gained, students in the conventional group lost. It may be inferred from the finding that students tend to retain knowledge better when taught with concept mapping strategy than the conventional methods. The finding agreed with Tumen and Taspina (2012) that the use of

concept mapping could retain knowledge better than the traditional teaching method like lecture and storytelling.

The corresponding hypothesis that there is no significant difference between the mean retention score of students taught using conventional method and those taught using concept mapping strategy was also rejected as the difference in mean retention was found to be statistically different. In other words, with concept mapping as teaching strategy, students are likely to retain business studies knowledge better than when taught with the conventional method. The finding is consistent with Tumen and Taspina (2012) who compared concept mapping with the traditional instructional method in consideration of students' achievements in English course and found that there was significant difference in students' retention of English course when taught with concept mapping than the conventional method.

Business studies retention scores of male and female students using concept mapping strategy

The study also examined the difference in the retention scores of male and female students taught business studies using conventional method and those taught using the concept mapping strategy. The results show the retention score of male students is higher than the retention score of the female students when taught with the concept mapping strategy. The corresponding hypothesis shows that the difference in the mean retention scores of male and female is statistically significant. Retention is important in learning as it is the ability to retain that enables students to recall information during the examinations and record appreciable achievement at much later period.

The findings on gender differences in retention among students have recorded different results. The finding of this study however, is inconsistent with earlier studies. Abdu-Raheem (2012) examined gender differences in retention of students in social studies in Ekiti State and found that there was no statistical difference in the mean retention scores of male and female students in social studies. Similarly, Ajai and Imoko (2015) found no significant difference in the retention scores of male and female students in Mathematics. Perhaps, the difference in subjects involved among the studies could have accounted for the differences in findings.

Conclusion

The study investigated the effect of concept mapping on students' gender and retention in business studies in secondary schools in South-East, Nigeria. The findings of the study have shown that the concept mapping strategy could be a better alternative in teaching business studies in secondary schools in South-East, Nigeria. The efficacy of the concept mapping strategy in improving retention in business studies as well as being a better alternative to the conventional methods are indicated. Also, there is indication that gender has no significant effect on students' retention in business studies when taught with concept mapping strategy. It may be concluded that the use of concept mapping strategy can be extended to the teaching of business studies in junior secondary schools for better students' retention and academic achievement.

Recommendations

In view of the findings and conclusion of the study, the following are recommended:

1. Government and school authority should provide necessary facilities for the use of concept mapping strategy in the teaching of business studies in junior secondary schools.
2. Students should be encouraged by teachers and other school authorities to compete favourably irrespective of their sexes. In other words, gender should not be a barrier to learning, achievement and retention.
3. Teachers of business studies should adopt the concept mapping strategy to improve students' retention ability in business studies.

References

- Abdu-Raheem, B.O. (2012). Gender differences and students' academic achievement and retention in social studies among junior secondary schools in Ekiti State. *European Journal of Educational Studies* 4(1), 155-161.
- Adigun, J. Onihunwa, J., Irunokhai, E., Sada, Y. and Adesina, O. (2015). Effect of gender on students' academic performance in computer studies in secondary schools in New Bussa, Borgu Local Government of Niger State. *Journal of Education and Practice*, 6(33), 1-7.
- Awofala, A. O. A. (2011). Effect of concept mapping strategy on students' achievement in junior secondary school mathematics. *International Journal of Mathematics Trends and Technology*, 2 (3), 11-16. Available on <http://www.internationaljournalsrsg.org>
- Dania, P. O. (2014). Effect of gender on students' academic achievement in secondary school social studies. *Journal of Education and Practice*, 5(21), 78-84.
- Emeasoba, N. C. (2018). An evaluation of equipment for the teaching and learning of Business Studies in Public Junior Secondary Schools in Enugu State. *International Journal of Vocational and Technical Education*, 10(7), 54-60.
- Federal Republic of Nigeria (2013). *National policy on education* (6th edition). Lagos: NERDC.
- Imeokparia, P. O. (2018). Influence of environmental factors on academic performance of business studies' students in upper basic level in Edo State. *Journal of Education and Practice*, 9(24), 22-28.
- Kalhor, M., Mehranb, G. and Shakibaei, G. (2012). The effect of concept mapping on English language academic achievement and meaningful learning of high school students. *Journal of American Science*, 8(10), 247-253. <http://www.jofamericanscience.org>
- Khajavi, Y. and Ketabi, S. (2012). Influencing EFL learners' reading comprehension and self-efficacy beliefs: the effect of concept mapping strategy. *Porta Linguarum* 17, 9- 27.
- Mohammed, I. A. (2011). The challenges of teaching financial accounting in Nigerian Secondary Schools: A case study of Gombe State. Retrieved from <https://www.researchgate.net/publication/228307957>
- Novak, J. D. and Canas, A. J. (2008). *The theory underlying concept maps and how to construct and use them*. Technical report Institute for human and machine cognition, Cmap tools.
- Nwanekesi, A. U. and Emereonye, R. (2016). Factors that influence the choice of teaching method. In T. N. Kanno, V. A. Obasi and S. A. O. Obih (Eds.). *Contemporary issues in curriculum implementation and methods*. (Pp 190-199).Owerri: Hysab Printers and Publishers.
- Onyeme, A. C. (2019). *Principles and methods of teaching: A simplified version for early teachers*. Awka: Fab Anieh Education Books.
- Singh, I. S. and Moono, K. (2015). The effect of using concept maps on student achievement in selected topics in Chemistry at tertiary level, *Journal of Education and Practice*, 6(15), 106-116. Available on www.iiste.org.
- Tiimen, S. and Taspina, M. (2012). The effects of concept mapping on students' achievements in language teaching. Elazz Gazi University, Turkey.
- UNGEI. (2012). *Gender analysis in education: A conceptual overview*. New York: United Nations Girls Education Initiative.