

Effects of Concept Mapping Instructional Strategy on Junior Secondary School Student's Retention of Social Studies Education Concepts

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Abstract: This study investigated the effects of concept mapping instructional strategy on the retention of JSS students in social studies education concepts. Four research questions and three hypotheses were formulated and tested. Social Studies Concept Test (SSCT) was used to collect data. The study is a quasi-experimental study of a non-equivalent control group design. A multi-stage sampling technique was used to draw a sample of 664 JSS 2 students from the six schools used for the study in Nsukka educational zone in Enugu State. Six regular teachers from the schools used formed the research assistants. The data collected were analysed using a two-way Analysis of Covariance (ANCOVA). The findings showed that concept mapping instructional strategy enhances the mean retention scores of students in social studies education concepts. It also, bridges the gap between male and female student's retention. The researcher among others recommended that teachers in social studies should make use of concept mapping in the teaching of social studies concepts.

Key words: Instructional, design, educational, assistants, strategy

INTRODUCTION

Meaningful learning aids retention. Knowledge does not become internalised and is not transferred to real social situations if learning is not meaningful. In other words, retention involves the ability of the long term memory to hold information stored in it. In fact retention refers to the ability to hold on to things experienced or learned. Ezeudu (1995) shows that concept mapping enhances student's retention of Chemistry concepts. Since mapping promotes meaningful learning rather than rote learning, the information will likely be retained longer (Rafferty and Fleschner, 1993). Though studies in student's retention of social studies concepts are scanty, the present study intended to find out the effectiveness of concept mapping in enhancing the retention of social studies concepts.

Concept mapping is a kind of teaching and learning strategy which was propounded by Novak and Canas (2008) his master's students in Cornell University in early 1970s. The theoretical assumption of the theory was based on Ausubel (1968)'s Acquiring Cognitive Learning Theory (ACLT). The primary objective of their research effort was to develop a model for overcoming the problem of student's rote learning of concepts (Novak, 1977). The learning style that Ausubel defined as meaningful learning

is forming a new conceptual frame in a learner's mind with the interaction of the new and previous concepts (Ausubel, 1968).

Meaningful learning involves the assimilation of new concepts and propositions into existing cognitive structures (Novak *et al.*, 1983). In other words, meaningful learning achieves a deep understanding of complex ideas that are relevant to student's lives. It also, assumes that students already have some knowledge that is relevant to the new experiences they encounter and that students are willing to do the mental work necessary to create connections. When the learner is trying to learn a new item, she/he is trying to relate this concept with the previous concepts in his or her mind (Hamachek, 1986). According to Roth and Roychoudury (1993) concept maps help to make clear to both students and teachers the key ideas they must focus on for any specific learning. He argues that it helps to foster creativity and co-operation between students and teachers and thereby enhances student's retention of learned concepts.

In recent past, researches in education have tried to analyse student's retention of learned concept in relation to male and female (gender) performances though inconclusive. Such research findings include Okeke (1996), Jahun and Momoh (2001), Haycock (2001) and so on. However, literature is silent on gender-related

differences in the area of social studies student's retention tests. Therefore, the researcher saw the need for a teaching strategy that will improve the retention of both male and female students in social studies. This is important because any instructional strategy that does not give room for equal performance of both male and female students will not be a good instructional strategy in the teaching of social studies concepts. Social studies involves human interaction which does not require instructional biasness.

This study was conceived on the observed poor performances of JSS students in their Junior Secondary School Certificate Examinations (JSCE) in Nigeria. For instance, between 2000 and 2008, only 1.76% of those who sat for junior secondary school certificate examination in nsukka educational zone of enugu state in social studies passed while 98.24% failed. Also, Kanu (1996) reported that 38.47, 42.91, 49.46 and 34.84% of the students who sat for junior secondary school certificate examination in social studies in 1987, 1988, 1989 and 1990, respectively in selected seven schools in Zaria educational zone failed. The low performance of students in social studies has been traced to teacher's inability to use instructional strategies that make for meaningful learning. Students may perform well on the spot test immediately after a teaching/learning class but may forget if the concepts learned are not properly stored. Hence, the present study sought to find the effects of concept mapping instructional strategy on JSS student's retention on social studies education concepts. It attempts to find out specifically:

- The effect of concept mapping instructional strategy on student's retention of social studies concepts
- The influence of gender on the retention of students taught with concept mapping instructional strategy of social studies concepts

Literature review: Many studies have been carried out to investigate the effectiveness of concept mapping instructional strategy on student's retention in many subjects. Such studies include Ezeudu (1995) who carried out a study to ascertain if the use of concept mapping could be found significantly effective in accelerating student's performance and retention in organic chemistry. She also, ascertained the effect of gender on performance and retention. She used non equivalent control group design and a sample size of 411 Senior Secondary (SSIII) students in Nsukka educational zone. The findings of the study reveal that concept mapping had a significant effect on student overall

retention in selected organic chemistry concepts more than the conventional method. Also, her findings reveal that both males and females retained their knowledge in organic chemistry. She recommends that chemistry teachers should adopt concept maps in teaching since it is more effective and promotes gender equality. Similar studies were conducted by Esiobu and Soyinbo (1995) in ecology and genetics with significant results.

Also, Anakebah (1986) investigated on the effect of graphic organizers on learning and retention of school certificate biology specifically on reproduction. He presented reproduction in various organisms while the control group received none. The sample was composed of 230 students from class five. After the presentation of the non verbal organization, he taught the topic to both groups. The instrument was made up of 25 test items which he used to test for leaning performance and retention. The findings showed that advance organizer group scored higher than the control group on both performance and retention test. This confirms Novak and Canas (2008) that concept maps are graphical tools for organizing and representing knowledge and can also, be used as advance organizers (Willerman and Harg, 1991).

Similarly, James (2000) investigated the effects of combining reflective writing with concept mapping and lecture method on pre service NCE teacher's attitude and performance in biology. The study used all NCE I Biology students of the Federal College of Education, Zaria (1997/98 session) as sample for the study. The study also, used a pre-test, post-test experimental control group design. The subjects were randomly classified into four groups (3 experimental and I control group. The first experimental group was taught using a combination of concept mapping and reflective writing strategy. The second experimental group was taught using a combination of lecture and reflective writing strategy while the third experimental group was taught using concept mapping alone. The control group was taught using lecture techniques of teaching. The treatment lasted for a period of 8 weeks including the 2 weeks of pre instructional training. The data collected were analysed using ANCOVA. The findings indicated that concept mapping showed significant difference in attitudinal change.

Jegede and Okebukola (1989) used concept mapping to carry out a study on student's anxiety toward perception of difficulty of some biological concepts and found out that concept mapping instructional strategy is a useful way of reducing the anxiety level of students and thus improved retention. Also, Novak (1990) analyzing the effect of concept mapping and Vee diagram (two meta cognitive tools) concluded that concept mapping strategy

can better improve the students understanding and retention of concepts than Vee diagram. He also, concluded that concept mapping changes student's attitude positively than Vee diagram. This study in fact deals with a major aspect of the objectives of social studies which is transformation of attitudes and behaviour of students positively towards societal acceptable behaviours.

However, despite these significant results recorded in other subjects, evidence shows that not much had been done in the use of concept mapping as a teaching strategy in social studies. Hence, this study investigated the effect of concept mapping instructional strategy on the retention of junior secondary school student's on some social studies concepts.

MATERIALS AND METHODS

Quasi-experimental study of a non-equivalent control group design was used. The target population of the study consist of 5097 and a sample size of 664 JSS 2 students in Nsukka educational zone selected using multi-stage sampling technique. JSS II students were used because the units taught are contained in JSS II curriculum. Social Studies Concept Test (SSCT) was used to determine/assess the student's prior knowledge and subsequent understanding of the social studies concepts after treatment as well as their retention. The post test was taken after the 4 weeks of treatment while the post-post-test (retention test) was taken after 2 weeks of the post-test. Face and content validity of the instrument was determined before it was administered to both the experimental and control groups. Also, a pilot study was done using forty JSS II students from a school located in the same environment but was not used for the study. The results of the pilot study were used to modify the draft of the instrument and also to estimate the reliability. Internal consistence of 0.84 was established using Kuder-Richardson (K-R) since the items are dichotomously scored (only one answer is correct and others are wrong as in objective test). Similarly, an estimate of 0.73 temporal stability was established using the test-retest method at an interval of 2 weeks.

Before the experiment, both groups (experimental and control groups) were pre-tested to ascertain the student's initial knowledge. After the pre-test, the trained assistants commenced the experiment following all the steps prescribed in the lesson plan. Both groups met for 35 min 3 times every week for 4 weeks. Only 4 weeks were used because that is what the curriculum recommends. At the end of the experiment, the students were tested and

re-tested after an interval of 2 weeks. The student's regular teachers assisted the researcher to do the teaching after training. A two way Analysis of Co-Variance (ANCOVA) was used to test the hypotheses for this study. The ANCOVA served as a controller for the initial differences across groups as well as increasing the precision due to the extraneous variables thus reducing the error variance (Ezeudu, 1995). Similarly, mean, standard deviation and percentage were used to answer the research questions.

RESULTS AND DISCUSSION

Table 1 shows significant difference in the mean retention scores of students taught using concept mapping instructional strategy and those taught using conventional instructional strategy (Table 1). Since, experimental group had higher retention score than the control group, it implied that concept mapping instructional strategy influenced retention in social studies concepts significantly. The results revealed no significant difference in the mean retention scores of male and female students taught using concept mapping instructional strategy at 0.05 level of significance.

This study showed significant difference between the mean retention scores of students taught using concept mapping instructional strategy and those taught using conventional instructional strategy. Since, experimental group had higher retention mean (41.03) than the control group (12.85), it therefore means that concept mapping instructional strategy influenced retention in social studies concepts significantly ($F_{cal} = 271.386$ and $p = 0.000$). The results in Table 1 showed that concept mapping had a significant effect on the student's retention of social studies concepts. This finding agrees with Anakebah (1986), Roth and Roychoudhury (1993), Egbugara (1998) and Madu (2004) that students taught using concept mapping strategy retain more than those taught using conventional strategy. It also, supports Novak and Canas (2008) that information learned meaningfully stays a long time in the long term memory. The improved retention may be due to the fact that the concept mapping strategy enabled students to have concepts organized and summarized in such a way that they were easily remembered at a later time, it could also, be that concept mapping makes knowledge of concepts clear and meaningful to students. Thus, the researcher believes with Novak and Canas (2008) that one of the reasons concept mapping is so powerful for the facilitation of meaningful learning is that it serves as kind

Table 1: Analysis of Covariance (ANCOVA) of student's retention (dependent variable: retention scores)

Sources	Type I sum of squares	df	Mean square	F-values	Sig.
Corrected model	11271.7802 ^a	8	14089.725	108.261	0.000 S
Intercept	404644.018	1	404644.018	3.109E3	0.000 S
Posttest	75184.496	1	75184.496	577.692	0.000 S
Gender	341.583	1	341.583	2.625	0.106 NS
Method	35319.826	1	35319.826	271.386	0.000 S
Gender*method	893.577	1	893.577	6.866	0.009 S
Error	55312.180	425	130.146		
Total	572674.000	434			
Corrected total	168029.982	433			

R² = 0.671 (Adjusted R² = 0.665); ^aComputed using $\alpha = 0.05$; S = Significant; NS = Not Significant

of template or scaffold to help to organize knowledge and to structure it, even though the structure must be built up piece by piece with small units of interacting concept and propositional frameworks.

The results showed that female students had higher mean retention scores than their male counterparts. This agrees with Pishkin (1972), Ezeudu (1995) and Nworgu (1990) that female students retain more than the males. However, the difference in the retention score in favour of the females is not significant. In other words, gender does not affect student's retention of social studies concepts when taught with concept mapping instructional strategy. This finding agrees with Obodo (1990) and Ezeudu (1995) that male and female students retained equally. The difference so identified in favour of the females might be as a result of chance.

Nevertheless, the interaction between gender and method is significant indicating that male and female students taught using concept mapping instructional strategy retained more than their counterparts taught using conventional strategy. This is because concept mapping makes knowledge of concepts clear and meaningful to both males and females and also has the ability of organizing and summarizing learning experiences in such a way that aids retention. It is obvious from the findings that concept mapping helps students to overcome psychological factors such as problems associated with retrieval, forgetting, lack of motivation and so on that affect student's retention of concepts.

Summary of major findings: The following are the major findings of this study: concept mapping instructional strategy enhances student's retention of up to 98.95% of social studies concepts. The mean POST-SSCT score is 41.90 while the mean POST-POST SSCT (retention) score is 41.03 indicating a mean performance loss of 0.87. The difference in the mean retention scores of post-test and post-post-test shows that students tend to forget faster when taught using conventional teaching strategy. Students forgot 10.89% of the social studies concept acquired after 2 weeks of teaching. On the average, a student taught with concept mapping instructional

strategy will retain 9.84% of the concept more than a student taught with conventional instructional strategy. Gender influences student's retention in social studies concepts when taught with conventional strategy. But does not influence retention when taught with concept mapping. Males retain more than their female counterparts in social studies concepts when taught using conventional instructional strategy with a mean difference of 4.48. Concept mapping instructional strategy positively influenced retention in social studies concepts significantly.

CONCLUSION

Students taught using concept mapping strategy retained more than their counterparts taught using conventional strategy in social studies. Therefore, concept mapping instructional strategy has shown to be viable in enhancing meaningful learning in social studies. Based on the findings of this study, the following recommendations are made:

- Teachers in social studies should make use of concept mapping in the teaching of social studies concepts
- Universal Basic Education Commission (UBEC) should organise workshops/seminars on the effective use of concept mapping for in-service teachers
- In like manner, teacher training institutions should include concept mapping strategy in their social studies special methods content. This will enhance the training of pre-service social studies teachers on the use of concept mapping strategy

REFERENCES

- Anakebah, M.N., 1986. The effects of advance organizers on measures of achievement and retention of secondary school biology students in Onitsha urban. M.Ed Thesis, University of Nigeria, Nsukka, Nigeria.

- Ausubel, D.P., 1968. Educational Psychology: A Cognitive View. Holt, Rinehart and Winston, New York, ISBN-13: 978-0030696404.
- Egbugara, U.O., 1988. The retentive effects of three advance organizers. *Inst. J. Stud. Educ.*, 1: 112-118.
- Esiobu, G.O. and K. Soyibo, 1995. Effects of concept and vee mappings under three learning modes on students cognitive achievement in ecology and genetics. *J. Res. Sci. Teach.*, 32: 971-995.
- Ezeudu, E.E., 1995. Effect of concept mapping on students achievement, interest and retention in Chemistry. Ph.D Thesis, University of Nigeria, Nsukka, Nigeria.
- Haycock, K., 2001. Closing the achievement gap. *Educ. Leadersh.*, 58: 6-11.
- Jahun, I.U. and J.S. Momoh, 2001. The effects of sex and environment on the mathematics achievement of JSS III students in Kwara State. *Abacus J. Math. Assoc. Nigeria*, 26: 53-58.
- James, T., 2000. Effects of combining reflective writing with concept mapping and lecture method on pre-service N. C. E. Teachers attitude and achievement in biology. Ph.D Thesis, Ahmadu Bello University, Zaria, Nigeria.
- Jegede, O.J. and P.A. Okebukola, 1989. Some socio-cultural factors militating against drift towards science and technology in secondary schools. *Res. Sci. Technol. Educ.*, 7: 141-151.
- Kanu, G.E., 1996. Factor affecting the academic performance in social studies junior secondary school examination in Zaria educational Zone of Kaduna State. Ph.D Thesis, Ahmadu Bello University, Zaria, Nigeria.
- Madu, B.C., 2004. Effects of a construtivist-based instructional model on students conceptual change and retention in Physics. Ph.D Thesis, University of Nigeria, Nsukka, Nigeria.
- Novak, J.D. and A.J. Canas, 2008. The theory underlying concept maps and how to construct and use them. Florida Institute for Human and Machine Cognition, Ocala, Florida. <http://eprint.ihmc.us/5/2/TheoryUnderlyingConceptMaps.pdf>.
- Novak, J.D., 1977. A Theory of Education. Cornell University Press, Ithaca, New York, USA., ISBN:9780801411045, Pages: 295.
- Novak, J.D., 1990. Concept maps and Vee diagrams: Two metacognitive tools to facilitate meaningful learning. *Instructional Sci.*, 19: 29-52.
- Novak, J.D., D.B. Gowin and G.T. Johansen, 1983. The use of concept mapping and knowledge Vee mapping with Junior High School science students. *Sci. Educ.*, 67: 625-645.
- Nworgu, B.G., 1990. Evaluating the effects of relevance material types relative to students cognitive achievement, retention and interest in integrated science. Ph.D Thesis, University of Nigeria, Nsukka, Nigeria.
- Obodo, G.C., 1990. The differential effects of three teaching models on performance of junior Secondary School students on some algebraic concepts. Ph.D Thesis, University of Nigeria, Nsukka, Nigeria.
- Okeke, B.A., 1996. Effect of two instructional approaches and gender on the academic achievement of the academically retarded pupils. Ph.D Thesis, University of Nigeria, Nsukka, Nigeria.
- Pishkin, V., 1972. Concept identification with mnemonic cues as a function of children's sex and age. *J. Educ. Psychol.*, 63: 93-98.
- Rafferty, C.D. and L.K. Fleschner, 1993. Concept mapping: A viable alternative to objective and essay exams. *Literacy Res. Instruction*, 32: 25-34.
- Roth, W.M. and A. Roychoudhury, 1993. The concept map as a tool for the collaborative construction of knowledge: A microanalysis of high school physics students. *J. Res. Sci. Teach.*, 30: 503-534.
- Willerman, M. and M.R.A. Harg, 1991. The concept map as an advance organizer. *J. Res. Sci. Teach.*, 28: 705-711.