

Effect of Mind Map as a Note-Taking Approach on Students' Achievements' in Economics

Madu, B.C. and Metu Ifeoma C.

Department of Science Education,
University of Nigeria Nsukka Nigeria.

Corresponding Authors: Madu, B.C

Abstract

This study investigated the effects of mind-map as note taking approach on the students' achievement in Economics. The significance of this study was that it would stimulate creativity, discovery and enquiry oriented in students since at the end of each lesson, the student may fashion their notes according to their ability to facilitate their retention. The study was carried out in two selected co-educational schools in Aguata Local government Area of Anambra State, South East of Nigeria. A sample size of 195 Senior Secondary school students was used for the study. The two selected schools were assumed to possess similar characteristics. A pretest post-test non-equivalent control group design was adopted for the study. The treatments were assigned to the two coeducational schools respectively. Economics achievement test was used as an instrument for data collection. The instrument was validated and trial-tested and the responses from this exercise were used to determine the internal consistency of the items of the instrument using Kuder-Richardson formula 20. The reliability was found to be 0.79. The two groups (experimental and control groups) were pre-tested before the treatment. After the treatment, the posttest was administered to the two groups. Data obtained from this exercise were analyzed for answering the research question and testing the hypothesis at .05 level of significance. The analysis of the data indicates that mind-map as note taking approach enhanced students achievement in Economics. On the basis of the results it was recommended that students should be encouraged by the teachers to represent the topics they are taught by using symbols and connections that will make lessons more permanent in their memory.

Keywords: mind-map, note taking, achievement test, economics, co-educational schools

INTRODUCTION

It is apparent that one of the most prevalent sets for attempting to enhance the recall of the content of a lesson is to take a written transcription of the materials presented. This aptitude for abstracting meaningful information from typical lessons depends on complicated linguistic abilities. Adejumo and Ehindero (2000) gave such abilities as skills to identify the major ideas and relationship in a presentation, understand the medium of communication, skills of decoding the intended meaning and skills for formulating and encoding the information in one's own words. In a country like Nigeria where English language is a second language, the average secondary school student typically thinks first in his mother tongue (for instance Igbo, Yoruba, Hausa etc.) and then translates his/her thought directly into English. There may be inaccuracies in translation which may inhibit the ability to abstract meaningful information that will eventually lead to learning. According to Banjo (1999) for a student to take down meaningful note in a lesson, all four basic languages and communication skills need to be required. The skills are listening, speaking, reading and writing.

Therefore, one of the ways to improve learning at secondary school level in an area where English language is a second language is to encourage a note-taking approach that poses fewest problems associated with linguistic abilities and provides students with opportunity to participate actively in the instructional process. One of the forms of note-taking in the instructional process is a type of concept map called the mind-map. A mind-map is a diagram used to represent words, ideas, tasks or other items linked to and arranged radially around a central keyword or idea and as an aid in study, organization, problem solving, decision making and writing (Wikipedo, 2007). Buzan (2000) described mind-map as an image-centred diagram that represents semantics or other conceptions between portions of information. By presenting these connections in radial and non-linear graphical manner it encourages a brain storming approach to any given organizational task, eliminating the hurdle of initially establishing appropriate or relevant conceptual framework to work with. According to Buzan a mind map consists of a central word or concept. Around the central word, 5 to 10 main ideas that relate to that word can be drawn. Brickman (2003) gave some rules for making mind-map. The rules are as follows

- Use a large sheet of paper, place the topic of the map at the centre.
- From the topic draw a main branch for each of the main ideas linked to the topic
- Write keywords relating to the main ideas directly as the lines
- Starting from the main branches draw further lines (sub branches) for secondary ideas (sub topics) and so on.
- The order follows the principle-from the abstract to the concrete, from the general to the specific.
- Use colours when drawing a mind map
- Add sketches, symbols such as little arrows, geometric figures, exclamation marks or question marks, as well as self defined symbols.

In a mind map keywords are extracted and arranged hierarchically according to the degree of importance. They will also be represented in the form of images. Main points are given superior places while supporting points occupy less important positions. Economy of words is maintained; only essential words, clauses and phrases are used. Concepts and conceptual relationship is stressed. Mind map makes note resemble a programme of instruction such as seen in a computer flowchart. In addition, it makes the note a combination of images and few words. Several uses of mind map are in brainstorming (generation of ideas), note-taking and communication enhancement and as a learning tool. Mind map approach to note-taking has its base on the principle of learning as an active process. The principle of active participation of the learner in the learning process instructs teachers to conceive learning as what the learner does and not what the teacher would do to the learner.

However, research on note taking has generated debates which centered on whether note-taking resulted in improved students performance on the tests. For instance, Simbo (1988) carried out a study to examine the relative effects of three note-taking approaches and discovered that students who formed their own notes achieved better than those who make their own notes based on teacher's chalkboard summary as well as students who copied notes fully developed by the teachers. Fisher (1978) in his study revealed that the quality of notes made by students correlated positively with free recall and multiple-choice. Bretzing and Kuhary (1994) compared note taking that indicated semantic processing (encoding) with verbatim notes and found that students who took verbatim notes scored low on comprehension test than those who processed information at a higher level while they took notes. The above findings indicate that notes are the main link with which students have with the topics taught. They also emphasize the importance of note for review and recall as well as aid retention when the need arises.

In his own contribution, Simbo (1986) revealed that students who participate actively in note taking process performed better than those who copied notes already prepared by their teachers. The above studies have shown the importance of note taking by the students in their academic pursuit but have failed to indicate how this note taking is being approached. Also in the South-East of Nigeria, the medium of communication is the mother tongue (Igbo) language. During lessons in the schools, students are expected to take down notes in English. Thus, their poor background in English language becomes an inhibiting factor. Floyd (1984) and Oyenokan (1984) observed that students notes have been found to be verbose, non-economical, unorganized, substance less and incomprehensible. According to Floyd, some students do not have notes at all and this is reflected in the disjointed, pointless and weird answers given to the assessment questions. It is therefore very ironical that notes which are what students keep after each lesson and use to revise for examination could not be relevant. Hence in this study the researchers tried to determine how mind map as an approach to note taking facilitated students' achievement using Economics as a base subject. This is necessary because note taking during an instructional process is supposed to be a rich and brief summary of the lesson containing all items and necessary ingredients for effective and qualitative utilization.

Research Question. What are the mean achievement scores of the two groups of Senior Secondary two (SS11) students that used mind- map and ordinary method of note taking in the Economics?

Hypothesis. There is no significant difference in the mean scores of the two groups of SS11 students who took down notes in Economics lesson using mind-map and ordinary method ithe EAT.

METHOD

The sample size of this study was made of 195 Senior Secondary School two students from two selected coeducational schools from Aguata local government area in Anambra State of Nigeria. The two selected schools were assumed to possess similar characteristics such as location, organizational and instructional programme. The two sampled schools were used as an experimental group as well as for control. In the experimental group, there were 97 students while the control group had 98 students. The treatments were randomly assigned to two intact classes of each school and all the students doing Economics were used for the study. Economics as a school subject is not compulsory but almost all the students select Economics as a school subject. That is, in each coeducational school sampled, one intact class of SSII was used for experimental while the other class was used as control. Once a treatment was randomly assigned to an intact class, all the students

in that class automatically fall under the same research condition. The instrument for data collection was Economics Achievement Test (EAT) which consisted of 40 multiple-choice test items with four options A-D. The items were drawn from the following topics namely Theory of Demand and Supply and Price System/Determination. The items were subjected to face and content validation to ensure the appropriateness and adequacy of the items in addressing the purpose and problems of the study. Later, the instrument was trial tested by administering it to senior secondary two students who were not part of the study but share the same environmental conditions with the subjects for the study. The responses obtained from this exercise were used to determine the reliability coefficient of the test items using Kuder Richardson formula 20 and was found to be 0.79.

Experimental Procedure

During this period, the research assistants (teachers) were trained for two weeks by the researcher who explained to them in detail what the research was all about and what they were required to do. The teachers conducted practice sessions using lesson notes. Necessary corrections were pointed out until each teacher had acquired the necessary skill for mind map note taking for easy transfer of the knowledge to the students in the experimental group. The lesson notes contain students' and teachers' activities. Delivering the lesson using the lesson note was extensively discussed with the cooperating teachers (research assistants) during the training. All the topics for the study were treated in details. The researchers used the opportunity to detect individual problems of the teachers that may introduce error to the study. After the training of the cooperating teachers, pre-test was administered to both the experimental and control groups before the treatment commenced.

The treatment involved teaching the three topics to both groups by the trained teachers. During the treatment, the same lesson note on the three topics was used for both experimental and control group. The only difference is in that of instructional approach. The experimental group was given guidelines for developing mind maps by the teachers, and foolscap sheets were distributed to the students for mind mapping. As the lesson progressed, the teacher developed mind map of the topic gradually, and the students were also requested to develop their own mind map for the topics using their own imagination that will help them remember the content of the lesson. For the control group the research assistants (teachers) taught the students using their usual method of teaching. At the end of the treatment, that is, after four weeks of the treatment, achievement test was given to both the experimental group and

control group. The scripts were scored by the researchers and the two research assistants.

RESULTS

The data collected from EAT were analyzed using mean, standard deviation for the research questions and analysis of covariance for testing the hypotheses. The responses were scored on maximum of 40 marks and minimum mark of zero. The data for answering research question are presented in table 1.

Table 1: Mean And Standard Deviation of Test Scores of Experimental and Control Group

Group	N	Pretest		Posttest	
		Mean	SD	Mean	SD
Use of mind Map (E)	97	20.82	2.98	33.05	2.72
Control (C)	98	20.92	3.23	25.42	2.11

The table 1 above shows that in the pretest the experimental group obtained a mean score of 20.82 and standard deviation of 2.98, while the control group got a mean score of 20.92 and standard deviation of 3.23. In the case of test after the treatment, those in the experimental group got a mean score of 33.05 and standard deviation of 2.72, while those in the control group obtained a mean score of 25.42 and standard deviation of 2.11. The range of standard deviation for those of experimental and control groups indicate that the subjects for the study were homogeneous in their responses. To test the hypothesis, the summary table of ANCOVA is presented in table 2.

Table 2: Summary Table of Ancova for the Mean Achievement Scores By Treatment

Source of Variation	Sum of Squares	DF	Mean Square	F	Sign
Corrected model	11211.606	2	5605.803	92.508	.000
Intercept	14277.526	1	14277.526	235.840	.000
Pretest	0.720	1	0.720	0.012	.914
Method	8317.105	1	8317.105	137.384	.000
Error	11623.431	192	60.539		
Total	34218.782	195			

The data in the above table 2 revealed that the exact probability level (.000) associated with significant effect due to mind map was less than .05 level of significance. This indicates that there was significant difference in the mean score of the students who used mind map and those that were exposed to conventional method. Further analysis of the students' notes was done and presented in tables 3 and 4.

Table 3: Summary of Responses of the Students

Activity	Percentages
Took down everything the teacher has said	20.0%
Copied interesting word and phrases	15.5%
Copied all examples and illustrations	15.0%
Underlined their important concepts	11.7%
Demonstrated lack of use of mind-map	6.0%
Took down important points properly	21.7%
Produce disjointed notes	10.0%

DISCUSSION

The findings of this study revealed that the mind map method of note taking had significant effects on students' achievement in Economics. The experimental group had a higher mean achievement score of 33.05 while the control group had 25.42. This shows that those in the experimental group had better understanding and presentation of concepts and principle taught than those used for control group. Further analysis with ANCOVA revealed that there is a significant difference in the mean achievement scores of the experimental and control group due to the treatment using mind-map method of note taking.

The result of this study is also in consonance with the findings of Buzan (1995) and Halt and Smith (1994) who observed that method of note taking has influence on the achievement of secondary school students. This study tends to suggest that mind map approach to note taking has its base on the principle of learning as an active process. That is, learning proceeds more economically and effectively when the learner participates actively in the process. Participating actively in the lesson requires students to find out main ideas in the presentation, select significant detail, listen to interpret correctly, listen to evaluate critically and listen to summarize. These activities could only be achieved through the use of mind map in note taking. Perhaps those in the experimental group may have adopted these activities that enable them to perform better than those in control group. However, the findings revealed that some students did not prepare well for note taking during the lessons and this made them to have problems in taking down notes the way they had wanted to. Further analysis of the students' notes shows that in the experimental group, 20.0% took down everything the teacher has said, 15.5% copied interesting words and phrases, while 15% copied all examples and illustrations. Also 11.7% underlined their important points while 6% demonstrated lack of proper use of mind map. Further inspecting of the notes indicates that 21.7% of the students were able to take down the important points properly so as to maintain the meanings while 10% produce disjointed notes. This means that those with disjointed notes found it difficult to isolate necessary concepts in the contents of the lesson and therefore could not maintain continuity in their notes. The implication of this study is that students have not been seeking for various models to make these notes. Every student's note is supposed to be unique so as to stimulate creativity in them, since at the end of each lesson the students fashion their notes in the way that it will be meaningful.

CONCLUSION

Research on note taking has generated debates and this debate is centered on whether the use of mind map as note taking resulted in improved students'

performance in any tests. This study examined the relative effects of mind map as a note taking approach on students' achievement in Economics and it was found that mind map helped the students to encode the impact data well and served as an external memory device. This indicates that the use of mind map has the potentials to enable students engage in reflective thinking. This means that mind mapping supports the natural thinking process, which goes on randomly and in a non-linear way. As mind maps have an open structure, every produced idea may be integrated in the mind map by relating it to already recorded ideas and this is done with virtually no mental effort.

RECOMMENDATION

Results of this study revealed how mind map as a note taking approach is related to achievement and therefore teachers should adopt mind map as instructional approach for their lesson delivery and also encourage the students to use mind map approach as a study tool.

REFERENCES

- Adejumo, J.A & Ehindero, O.J (2000). Facilitating Science Oriented Textual Material in a Developing country. *Science Education*, 78 (3), 397-403.
- Banjo, A (1999). The Students and Roles of English language. *Journal of Nigerian English Studies Association*, 9 (3), 74-78.
- Bretzing, B.H. & Kulhary, R.W. (1997). Note-Taking by Junior High School Students. *Journal of Educational Research* 80 (6), 359-362.
- Brinkman; A (2003). Graphical knowledge Display-Mind map as Efficient tool in Mathematics Education. *Mathematics Education Review: The Journal of Association of Mathematics Education Teachers*, 16, 39-48.
- Buzan, T. (2000). *Use your Head*. London: BBC Consumer Publishing
- Fisher, J.L (1978). Effect of Note-Taking and Review on Recall. *Journal of Educational Psychology*, (65, (3), 321-326.
- Flohd, J.(1984). *Study Skills for Higher Education*. Harlow: Longman Press Ltd.
- Halt, R and Smith, M. (1994). Different Effects of Note Taking Ability and Lecture Encoding Structure of Students' Learning. Paper presented at the Annual Meeting of the Eastern Educational Research Association.

Oyenokan, S.B.(1984).A Critical Assessment of Note-taking Strategies of Students of Polytechnic Ibadan in R. Freeman and M.Jubril (Eds). English Language Studies in Nigerian Higher Education

Simbo, F.K (1986). The Effect of Note-taking Approach on students Achievement in Secondary School Geography. Journal of Educational Research, 81(6), 377.

Wikipedia (2007) Computer Dictionary <http://www.Webopedia.wrn/term!m/map.html> retrieved Dec. 2011.