

Strengthening Memory Engrams Through Computer Based Concept Mapping

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Abstract:

Long term retention is facilitated by the method of encoding process. Computer based concept mapping is an effective encoding strategy that can enhance retention among students. The study investigates the effectiveness of Computer based Concept Mapping strategy on Retention in Biology of secondary school students. The method employed was the Experimental method and the Design selected was Pretest Posttest equivalent groups design. The study made use of Lesson transcripts, Retention test and other standardized tools for Experimental and Control treatment. The sample included 30 students in the Experimental group and 30 students in Control group. The statistical method adopted was the test of significance of difference between means. The findings revealed that Computer based Concept Mapping strategy used as Experimental treatment is more effective than Constructivist teaching strategy which is used as Control group treatment on Retention in Biology of Students at Secondary school level. The concepts encoded to our brain in the form of concept maps are very similar in structure with engrams in the brain that made long term retention of the learned material.

Science is a systematic study of knowledge which may be verified at anytime by any number of individuals under a given set of conditions. Learning is the process of acquiring things done by our brain very naturally. It is the process by which we acquire and store information and skill. When we are actively learning, the making of new connections outweighs the breaking of old ones. The best way to learn things and retain in memory is by: Focus attention, engage working memory and then a bit later, actively trying to recall it.

One of the most important features of our brain is the ability to absorb pieces of information and make connections between them. Knowledge obviously relies on memory in particular the type of memory that stores general information about objects, plans, facts and people known as semantic memory, Human memory capacity is fascinating and it involves more than taking information in and storing it in any of the mental compartment, in a general view point, memory can be classified into short term memory, inter mediate memory and long term memory. The amount of information that can accurately be stored, retained and recalled whenever needed depends upon the way by which information is encoded. Encoding is the process that involves forming a memory code. Encoding needs 'attention' which involves effective way of registering the incoming stimuli.

According to Greek and Tulving (1975) semantic encoding is the best way of encoding. Semantic encoding is the process of organizing information to be remembered by means of categories and hierarchical relationships. Conceptual hierarchical classification in which the concepts with similar characteristics are grouped together that can enhance retaining more into our memory. Concept mapping follows the theory of David Asubel in which progressive differentiation and integrative reconciliation is followed.

When new information is registered into our memory it is stored in the form of 'engrams'. 'Engrams' are the hierarchical network patterns of information in human brain.

Concept maps are the hierarchical graphical representation of knowledge of a domain (Novak). Theory suggests that deep processing of information involves greater elaboration of memories during encoding phase. Elaboration is the process of creating association between new memory and existing memory. This supports the integrative reconciliation theory by David Asubel which forms the back bone of computer based concept mapping.

Long term retention is facilitated by the method of encoding process. We need to experiment newer and interesting teaching learning strategies to enhance the capacity of encoding process. In the present study computer based concept mapping strategy is used as an effective encoding strategy to enhance retention ability among secondary school students.

I. STATEMENT OF THE PROBLEM

In the present study Computer based concept mapping strategy is used as a strategy for enhancing retention in Biology using Cmap Tools which is a free software programme that allows the user to add many types of resources to concepts and linking words including notes, pictures, videos, annotations, web links, word documents, audio and video files. The study checks the effectiveness of instruction based on computer- based concept mapping Strategy on retention in Biology of secondary school students. So the study is entitled as "**Strengthening memory Engrams through Computer based Concept Mapping**".

II. VARIABLES OF THE STUDY

Computer based Concept Mapping Strategy and Constructivist Teaching Strategy are the independent variables; Retention in Biology is the dependent variable; Intelligence, Socio- economic status and previous knowledge are the control variables of the study.

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III. OBJECTIVE OF THE STUDY

To study the effectiveness of Computer based Concept Mapping strategy on total Retention in Biology of students at Secondary School level.

IV. HYPOTHESIS OF THE STUDY

There will be significant difference in the mean scores of Retention in Biology between Experimental and Control group.

V. METHODOLOGY

Design

The present study uses the True experimental method of research using Pretest- Posttest Non Equivalent Groups Design.

Sample

The sample selected consists of 68 students in the experimental group and 68 students in control group.

Tools

- Lesson transcript based on Computer based Concept Mapping Strategy
- Lesson Transcript based on Constructivist Teaching Strategy
- Achievement test in Biology.
- Computer based concept maps

Statistical Technique

- Test of significance of difference between means.

Procedure

For the present study the investigator randomly selected three divisions with a total of 136 students. 68 students were given experimental treatment and 68 were given control treatment. The experimental group was taught using Computer- based Concept Mapping Strategy and the control group using Constructivist Teaching Strategy. Pretest (before experimentation), posttest(immediately after experimentation), gain scores, delayed posttest(one month after experimentation), retention test(three months after experimentation) were conducted. . The test of significance of difference between means was used to compare the relevant variable between the experimental and control groups. The data and results are consolidated and presented in Table 1

VI. ANALYSIS AND INTERPRETATION OF DATA

Table 1

Comparison of mean scores of Experimental and Control groups based on Pretest, Posttest and Retention test scores in Biology Achievement

Test	Groups	No. of students	Mean	S.D	t	Level of significance
Pretest	Experimental	68	5.29	1.34	0.21	P>0.01
	Control	68	5.34	1.35		
Posttest	Experimental	68	23.09	2.62	23.02	P<0.01
	Control	68	14.04	1.91		
Gain score	Experimental	68	17.62	3.12	18.54	P<0.01
	Control	68	8.56	2.55		
Delayed posttest	Experimental	68	22.85	2.67	23.66	P<0.01
	Control	68	13.26	2.01		
Retention test	Experimental	68	22.85	2.67	26.03	P<0.01
	Control	68	12.34	1.99		

As per the data given in Table 1, the 't' value obtained for the pretest is 0.21, which is not significant at 0.01 level. It can be noted that there is no significant difference in the mean scores of achievement in Biology of students in experimental and control group for pretest. This indicates that the two groups are almost equal with regard to Achievement in Biology. The 't' value obtained for the posttest is 23.02, which is significant at 0.01 level. It can be noted that there is significant difference in the posttest mean scores of achievement in Biology of students in experimental and control group. Value obtained for the gain scores is 18.54, which is significant at 0.01 level. It can be noted that there is significant difference in the mean gain scores of achievement in Biology of Students in the experimental and control group. This indicates that the experimental group is in an advantageous position in Achievement in Biology as a result of using computer-based Concept Mapping Strategy. The 't' value obtained for the delayed posttest test is 23.66, which is significant at 0.01 level. It is revealed that there is significant difference in the mean scores of delayed posttest in Biology of students in experimental and control group. The 't' value obtained for the retention test is 26.03, which is significant at 0.01 level. It is revealed that there is significant difference in the mean scores of retention in Biology of students in experimental and control group.

The above findings shows that the experimental group taught using computer based concept mapping Strategy is in an advantageous position in retention when compared to control group which is taught using constructivist teaching strategy, and the hypothesis is accepted.

VII. CONCLUSION

Concept map becomes an artifact through which the students demonstrate changes in their understanding of a concept.

Computer based concept mapping strategy can be implemented in our classroom by different ways. They all require the learner to take the initiative for his or her own learning actively engaging the process of abstracting the ideas, finding the relationships and structuring them coherently. The results of the study lead to the following recommendations for implementing Computer based concept mapping strategy.

- Instruct learners to pay careful attention to labeling links
- Emphasis the relevance of planning the mapping process and controlling the improvement of a concept map.
- Guide the learners to shift their attention from the pure technical design to the learning content as much as possible.

It is suggested that incorporating Computer based concept mapping strategy with our present educational system would definitely give an additional benefit for both teachers and learners.

VIII. REFERENCE

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