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Effectiveness of Computer Based Concept Mapping Strategy on Self Regulation at Secondary School Level

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Abstract: *The study investigates the effectiveness of Computer based Concept Mapping strategy on self regulation of secondary school students. The method employed was Experimental method and the Design selected was Pretest Posttest non equivalent groups design. The study made use of Lesson transcripts, computer based concept map and scale on self regulation for Experimental and Control treatment. The sample included 68 students in the Experimental group and 68 students in Control group. The statistical method adopted was the test of significance of difference between means and ANCOVA. 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 for enhancing self regulation of Students at Secondary school level.*

Key words: *computer based concept mapping strategy, self regulation, teaching biology*

I. Introduction

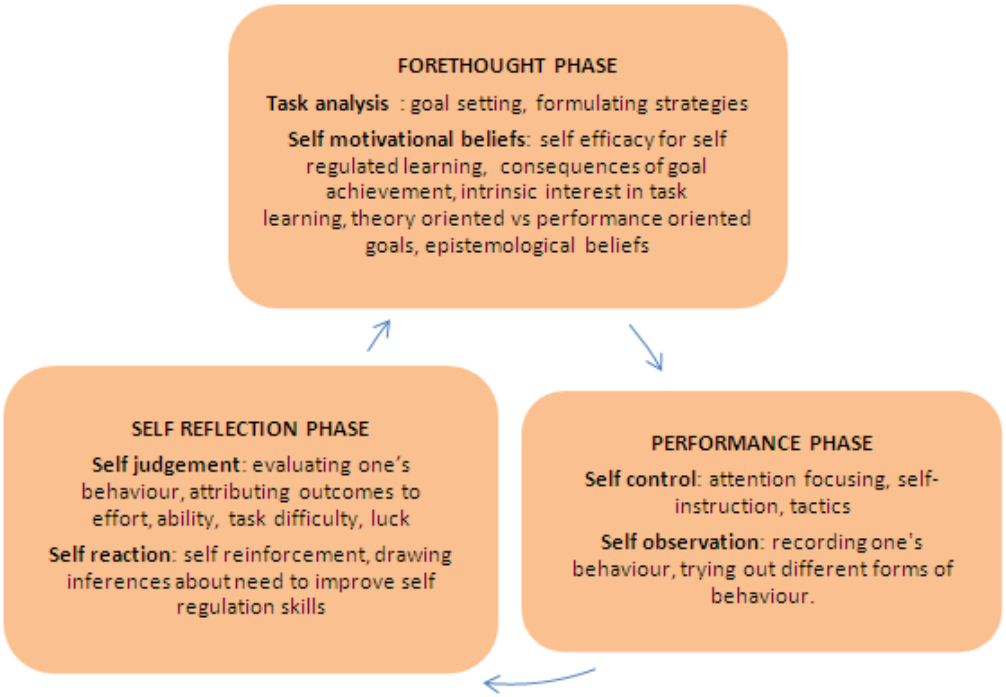
Today society and social needs have become very complex. Newer and newer inventions and discoveries have taught us to have more and more control over nature. Self regulation involves the consistent and appropriate application of self control skills to new situations. Self regulating individuals set their own performance standard, evaluate the quality of their performances and reinforces themselves when their performances meets or exceeds their internal standards. (Zimmerman, 1990, 2000; Zimmerman and Kitsantas, 2005). Self regulation is a critically important capability of students to acquire for at least three reasons:

- as students get older and especially when they get into the middle school and high school grades they are expected to assume greater possibility for their learning than was the case in earlier grades, thus they receive less prompting and guidance from teachers and parents.
- Students move through the primary, elementary, middle school and high school grades they have to learn more complex materials. With less parental and teacher supervision the temptation to put off studying or to do it superficially increases.
- Because of the rapid pace of change in today's world, individuals increasingly need to be self- directed, autonomous learners not just during the school years but over their lifetimes. Self regulation is important because students are expected to become increasingly independent learner as they progress through schools.

Computer based concept mapping strategy is an open ended approach which is enough for rich and detailed responses from students and also it is convenient for teachers to administer in the class room. Concept maps are a graphic organizing technique designed to help learners to explore their knowledge or understanding of topics that are highly exclusive and mystifying (Novak and Gowin 1984). Concept maps are different from other mapping techniques as they have a strong theoretical foundation. Ausubel (1963) published the theory of cognitive learning and this became the psychological foundation for Novak and his research group's work on the concept map tool. De Simone, Schmid and Mc Ewen (2001) combined the use of electronic concept mapping and online collaborative learning where concept mapping aids in externalizing the thinking of individuals or of the group as a whole.

Concept mapping is a process for representing concepts and their relationships in graphical form, providing both teachers and students with a visually rich way to organize and communicate what they know. Concept maps can be associated with other ways of graphical representation like mind maps, semantic webs, storyboards and flowcharts. Concept maps are hierarchical representations of concepts and propositions that reflect both the content and the structure of a person's knowledge in a given domain. Knowledge representation tools such as concept maps can help teachers and students externalize their understanding of a concept and its relationship to other concepts. Concept mapping with a computer has greatly enhanced teachers' and students' willingness to use concept mapping for instructional purposes, because electronic maps transcend page size, are easy to create, and are dramatically faster to revise than their paper-andpencil counterparts.

Theory suggests that instruction in concept mapping may foster self-regulation. Instruction in strategy use is an effective means of promoting self-regulation (Corno & Mandinach, 1983; Schunk, 1986). Concept mapping help students attend to tasks, focus on important features, organize material, and maintain a productive psychological climate for learning. Consequently (Zimmerman 2000; Zimmerman &Kitsantas, 2005) refers to these three processes as occurring in phases as follows



II. Statement Of The Problem

In the present study Computer based concept mapping strategy is used as a strategy for enhancing self regulation. So the study is entitled as **"Effectiveness of Computer Based Concept Mapping Strategy on self regulation of students at Secondary School Level".**

Variables Of The Study

Computer based Concept Mapping Strategy and Constructivist Teaching Strategy are the two levels of independent variable; Self regulation is the dependent variable of the study.

Objectives Of The Study

- To develop Computer based concept maps in the selected units in Biology for secondary school students.
- To study the effectiveness of Computer based Concept Mapping strategy on self regulation of students at Secondary School level.

Hypotheses Of The Study

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

III. Methodology

Design

The present study uses the quasi 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 transcripts based on Computer based Concept Mapping Strategy
- Lesson Transcripts based on Constructivist Teaching Strategy

- Scale on Self regulation
- Computer based Concept maps

Statistical Technique
- Test of significance of difference between means.
- ANCOVA

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. A scale on self regulation was administered before and after the experimentation. The preliminary statistical analysis was conducted and the values maintained normality. The test of significance of difference between means and ANCOVA were used to compare the relevant variable between the experimental and control group. The data and results are consolidated and presented in Table 1&2.

IV. Analysis And Interpretation Of Data

Table 1: Comparison of Experimental and Control groups on Self regulation using t-Test

Variable	Groups	No. of students	Mean	S.D	t value	Level of significance
Self regulation (before experiment)	**Experimental**	68	195.35	23.70	0.78	P>0.01
	Control	68	192.21	23.07		
Self regulation (after experiment)	**Experimental**	68	215.35	22.14	5.13	P<0.01
	Control	68	195.87	22.11		

As per the data given in Table 1, the 't' value obtained for self regulation (before experimentation) is 0.78, which is not significant at 0.01 level. It can be noted that there is no significant difference in the mean scores of self regulation of students in experimental and control group before experimentation. This indicates that the two groups are almost equal with regard to self regulation. The't' value obtained for self regulation after experimentation is 5.13, which is significant at 0.01 level. It can be noted that there is a significant difference in the mean scores of self regulation after experimentation of students in experimental and control group.

Table 2: Summary of analysis of Co variance for the scores of Self regulation before and after experiment of pupils in the experimental and control groups

Source of variance	Sum of squares	df	Mean squares	F	Level of significance
between	12747.508	1	12747.508	26.441	0.01
within	64120.455	133	482.109		
total	5838756.00	136			

As per table 2 the obtained F (26.441) for the effectiveness of computer based concept mapping strategy is found beyond the table value for 0.01 level of significance. The results of the F- test supports that the effectiveness of computer based concept mapping strategy of secondary school students after controlling pretest scores, $F(1, 133) = 26.441$, $P< 0.01$. The result therefore suggest that the variation in the posttest scores of computer based concept mapping strategy cannot be attributed to the influence of pretest scores of computer based concept mapping strategy. Hence the results of ANCOVA suggest that when the linear adjustment is made for the effect of variation due to the difference in the pretest scores of the subjects on computer based concept mapping strategy, there exists statistically significant difference between the 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 Self regulation when compared to control group which is taught using constructivist teaching strategy, and the hypothesis is accepted.

V. Conclusion

Computer based concept mapping enables teachers and students to draw and redraw their concept maps in an electronic environment, thus making changes to a map's content and structure relatively easy. Concept mapping with a computer has greatly enhanced teachers' and students' willingness to use concept mapping for instructional purposes, because electronic maps transcend page size, are easy to create, and are dramatically faster to revise than their paper-and pencil counterparts. Concept of Self- regulation can be directly applied to learning academic material in and out of class rooms. The study revealed that computer based concept mapping

strategy is beneficial in enhancing self regulation among secondary school students. As the students in the experimental group are now self regulated they can set goals, create plans to achieve goals, focus on tasks, process information meaningfully and also self monitor their own achievement. Self regulated learners can evaluate their performance, make appropriate attributions for success and failure and reinforce themselves.

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