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Cell : 9595 359 435, Ph No: 02172372010 Email: ayisrj@yahoo.in Website: www.oldror.lbp.world

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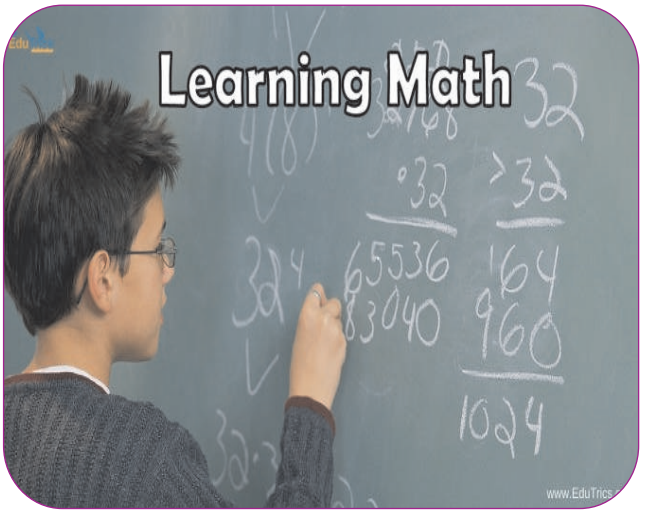
CONCEPTUAL CHANGE APPROACH IN ENHANCING LEARNING MATHEMATICS AMONG SIXTH STANDARD STUDENTS BY SELECTED VARIABLES



R. Prabhu[1] and Dr. G. Subramonian[2]
[1]Assistant Professor, Sri Ramakrishna Mission Vidyalaya College of Education (Autonomous), Coimbatore, Tamil Nadu.
[2]Associate Professor, Sri Ramakrishna Mission Vidyalaya College of Education (Autonomous), Coimbatore, Tamil Nadu.

ABSTRACT: -

This article deals with Conceptual Change Approach in enhancing learning Mathematics among sixth standard students by selected variables. The research article is based on experimental design. Post-test score is used for the study. The variables selected for the study are gender, locality of the students and parental education. The study revealed that there is a significant difference between the groups with respect to their Post test score.

KEYWORDS: *Learning Mathematics , Sixth Standard Students , learning strategies .*

INTRODUCTION

Research on conceptual change investigates how concepts change with learning and development in different subject matter areas with a focus on explaining students' difficulties in learning the more advanced and counterintuitive concepts in these areas. When conceptual change is a form of learning, it is important to differentiate it from other types of learning because it requires fundamental changes in the content and organization of existing knowledge as well as the development of new' learning strategies for deliberate knowledge restructuring and the acquisition of new concepts.

In learning mathematics the main phenomenon involved is not only accepting new concepts, but new logic as well. This new logic more or less contradicts the prior fundamental logic of Mathematics. Therefore, misconceptions and learning difficulties are possible at every enlargement. To understand the problems, students have in the conceptual change pertaining to the enlargement of various concepts in Mathematics.

Many mathematics educators have noticed that prior knowledge can hinder the acquisition of some mathematical concepts. Fischbein (1987) was one of the first to notice that intuitive beliefs may be an important contributor to students' systematic errors in mathematics, a fact also noted by Vergnaud (1989) and Sfard (1987). The importance of the conceptual change approach is that it can provide a basis from which such widespread findings can be systematized and explored for the purpose of designing more effective curricula and instruction (Vosniadou & Verschaffel, 2004). It can be used as a guide to identify concepts in mathematics that are going to cause students great difficulty, to predict and explain students' systematic errors and misconceptions, to provide student-centered explanations of counterintuitive math concepts, to alert students against the use of additive mechanisms in these cases, to find the appropriate bridging analogies, etc. In a more general fashion, it highlights the importance of developing learning environments that foster intentional learning and the development of

metacognitive skills required to overcome the barriers imposed by prior knowledge (Schoenfeld, 1987; Vosniadou, 2003).

Mathematics educators have become increasingly aware that our understanding of conceptual change is at least as important as the analysis of the concepts themselves. In fact, a plethora of research has established that concepts are mental structures of intellectual relationships, not simply a subject matter. The research indicates that the mental structures of intellectual relationships that make up mental concepts organize human experiences and human memory (Bartsch, 1998). Therefore, conceptual changes represent structural cognitive changes, not simply additive changes. Based on the research in cognitive psychology, the attention of research in education has been shifting from the content (e.g., mathematical concepts) to the mental predicates, language, and preconcert. Despite the research, many teachers continue to approach new concepts as if they were simply add-ons to their students' existing knowledge - a subject of memorization and recall. This practice may well be one of the causes of misconceptions in mathematics.

OBJECTIVES OF THE STUDY

- To study the misconceptions prevalent among sixth standard students related to the Mathematical concepts of their school syllabus.
- To construct diagnostic test to logically identify misconceptions in learning mathematics based on the syllabus of sixth standard students.
- Remedial measures to overcome the misconceptions in mathematics among the students.
- To study the effectiveness of conceptual change approach in overcoming misconceptions in learning Mathematics among sixth standard students by selected variables such as Gender, Locality and Parental Education.

HYPOTHESES

1. There is no significant difference between Boys and Girls in the Post test scores of Experimental Group by CCA.
2. There is no significant difference between Rural and Urban students in the Post test scores of Experimental Group by CCA.
3. There is no significant difference between Rural Boys and Rural Girls in the Post test scores of experimental group by CCA.
4. There is no significant difference between Urban Boys and Urban Girls in the Post test scores of Experimental Group by CCA.
5. There is no significant difference between Parental Education as Non Graduate and Graduate in the Post test scores of Experimental Group by CCA.

Methodology and Sample

The investigator chose experimental design to study the effectiveness of Conceptual Change Approach (CCA) in enhancing learning Mathematics among sixth standard students. One hundred students of sixth standard were split into two equal group namely experimental group and control group based on the IQ level and pretest scores. The Pre test, Post test and Retention test method are used to find the effectiveness. The treatment was given to experimental group where as the control group is given traditional way of teaching methodology.

RESULTS AND DISCUSSIONS

Table 1: Impact of CCA in learning Mathematics among Boys and Girls with respect to the Post-test score of Experimental Group

Experimental Group Post-test Score	N	Mean	SD	't' value	Remark
Boys	26	20.42	2.12	3.25	Significant
Girls	24	22.12	1.50		

Table-1 reveals that the mean of Experimental Group Post test score of Boys is 20.42 and Girls is 22.12. The standard deviation for the same is 2.12 and 1.50 respectively. The calculated t-value is 3.25 and it is significant at 0.05 level. Therefore the formulated null hypothesis, "There is no significant difference between Boys and Girls in the Post test score of Experimental Group in learning Mathematics by CCA" is rejected. It is inferred that the Post test score of Experimental Group of Boys and Girls has yielded much impact on learning Mathematics by CCA.

Table 2: Impact of CCA in learning Mathematics among Rural and Urban students in the Post-test score of Experimental Group

Experimental Group Post-test score	N	Mean	SD	't' value	Remark
Rural	20	20.00	2.15	3.58	Significant
Urban	30	22.17	2.07		

Table-2 depicts that the mean of Experimental Group Post test score of students from Rural is 20.00 and Urban is 22.17. The standard deviation for the same is 2.15 and 2.07 respectively. The calculated t-value is 3.58 and it is significant at 0.05 level. Therefore the formulated null hypothesis, "There is no significant difference between Rural and Urban students in the Post test score of Experimental Group by CCA" is rejected. It is inferred that the Experimental Group Post test score of students from Rural and Urban has yielded much impact on learning Mathematics by CCA.

Table 3: Impact of CCA in learning Mathematics among Rural Boys and Rural Girls in the Post-test score of Experimental Group

Experimental Group Post-test Score	N	Mean	SD	't' value	Remark
Rural Boys	7	15.92	2.67	4.23	Significant
Rural Girls	13	20.14	1.80		

Table-3 shows that the mean of Experimental Group Post test score of Rural Boys is 15.92 and Rural Girls is 20.14. The standard deviation for the same is 2.67 and 1.80 respectively. The calculated t-value is 4.23 and it is significant at 0.05 level. Therefore the formulated null hypothesis, "There is no significant difference between Rural Boys and Rural Girls in the Post test score of Experimental Group in learning Mathematics by CCA" is rejected. It is inferred that the Post test score of Experimental Group of Rural Boys and Rural Girls has yielded much impact on learning Mathematics by CCA.

Table 4: Impact of CCA in learning Mathematics among Urban Boys and Urban Girls in the Post-test score of Experimental Group

Experimental Group Post-test Score	N	Mean	SD	't' value	Remark
Urban Boys	19	18.91	2.17	4.56	Significant
Urban Girls	11	22.53	1.95		

Table-4 indicates that the mean of Experimental Group Post test score of Urban Boys is 18.91 and Urban Girls is 22.53. The standard deviation for the same is 2.17 and 1.95 respectively. The calculated t-value is 4.56 and it is significant at 0.05 level. Therefore the formulated null hypothesis, "There is no significant difference between Urban Boys and Urban Girls in the Post test score of Experimental Group by CCA" is rejected. It is inferred that the Post test score of Experimental Group of students from Urban Boys and Urban Girls has yielded much impact on learning Mathematics by CCA.

Table 5: Impact of CCA in learning Mathematics among students with respect to Parental Education as Non Graduate and Graduate of Experimental Group Post-test score

Experimental Group Post-test Score	N	Mean	SD	't' value	Remark
Non Graduates	20	19.25	2.15	1.98	Not significant
Graduates	30	20.43	1.96		

From Table-5, the mean of Experimental Group Post test score of Parental Education as Non Graduates and Graduates is 19.25 and 20.43 respectively. The standard deviation for the same is 2.15 and 1.96 respectively. The calculated t-value is 1.98 and it is not significant at 0.05 level. Therefore the formulated null hypothesis, "There is no significant difference in the Post test score of Experimental Group with respect to Parental Education as Non Graduate and Graduate by CCA" is accepted. It is inferred that the Post test score of Experimental Group with respect to Parental Education as Non Graduates and Graduates has not yielded much impact on learning mathematics by CCA.

FINDINGS

- Comparing the Post test score of Boys and Girls of the Experimental Group, it is observed that CCA has yielded much impact on learning Mathematics among sixth standard students.
- Comparing the Post test score of Rural and Urban students of the Experimental Group, it is observed that CCA has yielded much impact on learning Mathematics among sixth standard students.
- Comparing the Post test score of Rural Boys and Rural Girls of the Experimental Group, it is observed that CCA has yielded much impact on learning Mathematics among sixth standard students.
- Comparing the Post test score of Urban Boys and Urban Girls of Experimental Group, it is observed that CCA has yielded much impact on learning Mathematics among sixth standard students.
- Comparing the Post test score of Experimental Group with respect to Parental Education as Non Graduate and Graduate, it is observed that CCA has not yielded much impact on learning Mathematics among sixth standard students.

CONCLUSION

The Conceptual Change Approach (CCA) has effectively influenced learning Mathematics. It not only resulted in acquiring knowledge but also for retention of the knowledge since the concepts is very well understood and conceived by the students. The Conceptual Change Approach can be utilized in all other subjects to effectively transform teaching into efficacious learning.

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