EFFECT OF CONTEXTUAL TEACHING- LEARNING APPROACH IN ACHIEVEMENT IN MATHEMATICS AT SECONDARY LEVEL

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ABSTRACT

Mathematics has always held a key position in the school curriculum, because it has been considered knowledge indispensible to every human being. Clarity of thought and pursuing assumptions to logical conclusions is central to mathematical enterprise. Most of the mathematical concepts which have been included in our school curriculum have their origin from daily life situations and happenings in the surrounding world. So, the new techniques or strategies are essential for teaching the subject of mathematics to makes it interesting and relating it with real world experience. Contextual teaching learning is one such instructional strategy which can aid to better understanding of mathematical concepts. The present investigation attempts to study the effect of contextual teaching and learning on achievement in mathematics at secondary level for district Ludhiana. A purposeful sample of 50 pupils of eleventh grade was taken from Guru Gobind Singh Senior Secondary School, Bassian, Distt. Ludhiana and divided into two groups i.e. A and B comprising 25 students each. Group A was taught concepts of mathematics with the help of traditional method and Group B was taught with contextual teaching and learning approach. While comparing these strategies, it was found that Group "B" achieved more than Group "A". It means that contextual teaching learning approach was more effective than traditional method in the teaching of Mathematical concepts. Further, the study revealed that both males and females improved through contextual teaching learning approach as well as traditional method.

Key Words: Mathematics, Contextual teaching and learning, Achievement

Education has always been an instrument to bring about social change. It is the key that opens the door of life. It plays a pivotal role in social change by bringing perfection in human life besides an upward mobility in social status. It brings a radical transformation in outlook and perception. Our society has entrusted the responsibility of imparting education to schools. The functioning of a school is depicted through the results obtained by its inmates. No matter how much our educational system has changed but the age old concept of achievement of students in school subjects is still held important. In fact better achievement of students is an indicator of the quality of the education being provided in the school.

Achievement signifies accomplishment or gain in performance carried out successfully. It also means the extent to which learner is profiting from instructions in a given area of learning or progress in school. It is outcome of general and specific learning experience. In formal education given in schools, the achievement of the learner in any subject is assessed through marks or grades achieved by them in that particular subject.

Mathematics has always held a key position in the school curriculum, because it has been considered knowledge indispensible to every human being. According to National Curriculum Framework (2005), the main role of mathematics education in schools is the "Mathematisation of the child's thought process". Clarity of thought and pursuing assumptions to logical conclusions is central to mathematical enterprise. Mathematics reveals hidden patterns that help to understand the

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world around us. It empowers us to understand the information loaded world in which we live, in a systematic and organized level. Most of the mathematical concepts which have been included in our school curriculum have their origin from daily life situations and happenings in the surrounding world. Since, experience has shown that majority of students are unable to make connections between what they have learnt in mathematics and how that knowledge will be used in their daily life. This is because the way they process information and their motivation for learning are not touched by the traditional method of classroom teaching. So, new techniques or strategies are essential for teaching the subject of mathematics to make it interesting and relating it with real world experience.

The philosophy of contextual teaching learning has rooted from progressivisms of John Dewey (2009). John Dewey, an expert of classical education proposed the theory of curriculum and teaching methodology, related to the student's experience and interest. He was of the view that the students will learn effectively if they can make a connection between what they are learning with the experience they had, and also if they are actively involved in learning process in the classroom.

The contextual approach recognizes that learning is complex and multi faceted process that goes far beyond drill-oriented, stimulus and response methodologies. According to contextual theory, learning occurs only when students process new information or knowledge in such a way that it makes sense to them in their own frames of references. According to Berns and Erikson (2001) remark that contextual teaching and learning (CTL) helps students to connect the content they are learning to the life context in which that content could be used, students then find meanings in the learning process. As they strive to attain learning goals, they draw upon their previous experiences and build upon existing knowledge. They are able to use the acquired knowledge and skills in an applicable context by learning subjects in an integrated, multidisciplinary manner and in appropriate contexts. Various approaches to implement CTL strategy are:

1. Problem-based learning (Moffitt, 2001)
2. Cooperative learning (Holubec, 2001)
3. Project-based learning (Buck Institute for Education, 2001)
4. Service learning (McPherson, 2001)
5. Work-based learning (Smith, 2001)

Kamaruddin, et al. (2012) observed that the treated group which had gone through the contextual lab activity scored higher than the non contextual. The contextual lab activity is able to help the engineering statistics students in their learning process. Emilia (2011) revealed that contextual teaching and learning in teaching writing program was successful to improve students' recount writing skill. Specially, they showed some improvement on schematic structure, grammar roles, and graphic features. Mudhofar (2005) highlighted the view that contextual learning has a purpose to give students the skills connecting mathematics with daily life and apply them in the questions. The use of CTL model needs to be given by teachers in teaching and learning, in order to achieve better learning results. Johnson (2002) supported the view that CTL promotes brain compatible system that generates meaning by linking academic content with the context of a student's daily life. Frazee (2001) concluded that questioning techniques used during CTL enhance student learning and the development of problem solving and other higher order thinking. US Department of Education (2001) explained Contextual teaching and learning approach as an educational process that aims to help students see meaning in the academic material they are studying by connecting academic subject with the context of their daily lives, that is, with the context of their personal, social and cultural circumstances. A careful review of the above literature revealed that contextual teaching and learning definitely improved achievement and imparted clarity to various subjects. Hence, the present investigation attempted to study the effect of contextual teaching and learning on achievement in mathematics at secondary level for district Ludhiana.

OBJECTIVES OF THE STUDY

1. To use contextual teaching and learning approach in teaching mathematical concepts to class IX students.

2. To compare achievement in mathematics of students taught with contextual teaching and learning approach and Traditional Method.
3. To compare the effectiveness of contextual teaching and learning approach on achievement of boys and girls in mathematics.
4. To compare the effectiveness of Traditional Method on achievement of boys and girls in mathematics.

METHOD

Experimental method of research was applied and pre-test post-test matched two group design was used to study the present problem

Sample

A purposeful sample of 50 pupils of eleventh grade was taken from Guru Gobind Singh Senior Secondary School, Bassian, Distt. Ludhiana and divided into two groups i.e. A and B comprising 25 students each after matching in terms of intelligence, achievement in mathematics and socio economic status. Group A was taught concepts of mathematics with the help of traditional method and Group B was taught with contextual teaching and learning approach (CTL). Group 'A' had 15 male and 10 female students, Group 'B' had 16 male and 09 female students, respectively.

Measures

The following tools and tests were used for the experimental study.

1. A pre-test and post test prepared by the investigator.
2. Lesson plans prepared by the investigator with the help of expert teacher.
3. Ravens Progressive Matrices developed by Ravens, J. C.
4. Contextual teaching and learning approach developed by Crawford to make the content easily understandable to pupils.

RESULT AND DISCUSSION

The data collected during the investigation was analysed using various statistical tools. The pre-test scores, i.e. achievement test scores of the sample were normalized by using mean, median, mode, skewness and kurtosis.

Table 1. Pre test scores of Group 'A' and Group 'B'

Group	N	Pre test scores		t -value
		Mean	SD	
A	25	7.34	2.42	0.44^{NS}
B	25	7.06	1.99	

NS – Non significant

On the basis of pre-test scores of achievement test, intelligence test, socioeconomic status, two matching groups were formed i.e Group 'A' and 'B'. A teacher made mathematical achievement test was administered to both the groups and their mean score were calculated. Group 'A' achieved a mean pre-test score of 7.34 and Group 'B' attained a mean pre-test score of 7.06, respectively (Table 1). The t-ratio indicated that the difference between means was non-significant thereby implying that both the Groups were equal in terms of achievement in mathematics before the treatment. After which the two groups were subjected to two teaching approaches. Control Group 'A' was taught through traditional method and experimental Group 'B' was taught through contextual teaching learning approach.

The perusal of data shows that the mean of post-test score of Group “B” was 12.40 which was significantly higher than the mean of post-test score of 8.16 for Group “B” (Table 2).

Table 2: Post test scores of both the groups

Group	N	Mean	SD	t -value
A	25	8.16	2.44	6.9*
B	25	12.40	1.79	

* t-value significant at 0.05.

This clearly implies that the students achieve more if they are taught concepts of mathematics through contextual teaching learning approach rather than the traditional method (Table 2). This finding is a great indicator for teachers, curriculum makers and text book writers that the best of schools and best of teacher cannot effectively deliver education till the method and techniques of teaching are not moulded to suit the cognitive structure of students mind.

Especially for complex concept based subjects like mathematics, it is essential that knowledge is presented in the same fashion as it can be assimilated by students mind.

Hence contextual teaching learning approach is a useful tool for the deliverers of education as it would ensure significantly effective learning than the same old traditional method.

Further, analysis of data also shows that mean of post-test mathematical achievement scores of males (8.26) and females (8.00) of Group "A" did not vary significantly. The "t" value (0.25) was found to be non-significant at both 0.05 and 0.01 levels (Table 3). It was clear from the data that both the genders benefited equally in terms of achievement after teaching through traditional method.

Table 3. Post test scores of males and females of Group "A" and "B"

Group	N	Males		Females		t -value
		Mean	SD	Mean	SD	
A	25	8.26	2.10	8.00	2.88	0.25^{NS}
B	25	12.59	1.68	12.06	1.90	0.69^{NS}

NS – Non significant

Similarly, the mean scores of post-test of males (12.59) and females (12.04) of Group "B" did not differ significantly indicating that teaching through contextual teaching learning approach was equally effective for both the genders. The "t" value (0.69) was found to be non-significant at both 0.05 and 0.01 levels (Table 3).

CONCLUSIONS AND IMPLICATIONS

The results and the conclusions obtained in the present study can be used to generate useful implications for teachers' administrators and curriculum makers. It is clear that contextual teaching learning approach is far better than traditional method to enhance the achievement of students in mathematics. This approach can be used in variety of topics of mathematics thus, helping the students to develop deeper understanding of the topic. Therefore, teachers teaching mathematics should experiment with this strategy to improve achievement of their students. Based on the principle of correlation and utility, this technique becomes psychologically sound and thus, effective to be adopted by the teachers without reluctance. Such techniques prove useful not only to raise the level of achievement but also to make curriculum of concept based subject like mathematics more useful in daily life practices of the students.

The present experimental study has brought the following facts into light:

1. While comparing these strategies, it was found that Group "B" achieved more than Group "A". It means that contextual teaching learning approach was more effective than traditional method in the teaching of

Mathematical concepts.

2. The study revealed that both males and females improved through contextual teaching learning approach as well as traditional method.

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