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Exploring Effectiveness of Transacting Mathematics through Cultural Visualization Intervention Program

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Introduction

Knowledge is imperative for the human survival. Human with its survival instinct and proactive & precocious attitude is always in an attitude to build upon the existing system so as to spread its wing and ensure acquisition of power and spread of popular culture. This has invariably lead to the introduction of teaching learning system which was considered as the easiest tool available at the doorstep for the transfer of the traditionally acquired skills and spread of the popular culture.

The schools are considered important for transferring knowledge to the upcoming generation. The importance of the education system and the continuous change in the needs and demands of the society has initiated the quest for the innovative methods and techniques for transacting the curriculum. The continuously innovating classrooms with the latest technology and the google generation students which have the information at the back of their hands are questioning and interrogating teachers for the need of their presence and the necessity of the face ot face interaction in the era of virtual classrooms.

In such a scenario it is challenging for the teachers to satisfy the students creativity and inquisitiveness at the same time. Further the changing social roles have resulted in the rapid degeneration of the cultural values and the relevance of the cultural knowledge among the learners. Thus there is a dire need of bringing to the forefront not only the need for face to face teaching but also to innovate in the classroom with the inclusion and integration of the knowledge that has been preserved and disseminated and transferred since ages together.

This paper realizes this problem and also one of the major notion i.e. that maths is an abstract subject with the concepts taught having very less social relevance. It approaches the teaching of mathematics in a very novel aspect and involves the integration and inclusion of not only the conceptual facts but also the cultural artefacts and the epithets which have been the epitome of human civilization since the time immemorial.

Review of Literature

The curriculum should be such that promotes richness, recursions, relationships and rigor. (Doll, 1993). Bruner says that education is a bridge from culture to mind. Thus any curriculum is an inherent display of culture and language. The visual art makes up most of the visual culture and includes triable arts, popular films, folk arts and anything that may be depicted in the curriculum as visual representation of the culture. People can be manipulated through the images that are often antithetical to the individual nature. (Baudrillard, 1983).

Thus there is a need of continuously innovating in terms of teaching learning approaches. The use of visual methods gives young people the opportunity to narrate their stories in their own voice. (Allen, 2009; Pink, 2001). Concept cartoons were viewed as one of the possible strategies for promoting argumentation (Feasey, 1998; Keogh and Naylor, 1999; Naylor, Downing and Keogh, 2001; Osborne, Erduran and Simon, 2004; Wellington and Osborne, 2001). There is a discontent with the existing (traditional) algebra and there is a distinction between algebraic thinking and learning formal bits of algebra and gave examples from research in what has been called 'early algebra'. (Stacey, 2004). Arvind Gupta proposes teaching basic concepts in mathematics using simple diagrams so the mathematical ideas can be 'seen'. Krishnamurthi Ramasubramanian, IIT Bombay,

describes the art of blending of mathematics with poetry seems to have its origin in India at least from the time of Aryabhata as evidenced from his seminal work Aryabhataiya (499 CE). This trend had been successfully taken forward by the later mathematicians like Mahaviracarya, Sridhara, Lalla and a host of others, and it reached its pinnacle by 12th century with the compositions of Bhaskaracarya (b.1114), whose 900th anniversary celebrations are on for paying tributes to his immortal compositions.

An educational study of 35,000 pre - schoolers revealed the importance of early math skills is fundamental. Students who enter kindergarten with elementary math skills are able to build on those abilities are much more likely to experience subsequent academic success, regardless of whether or not they are dealing with social or emotional problems. (Greg Duncan). Mathematics is deeply rooted in our culture and its origin can be traced back to Pre-dynastic Egyptians and Sumerians. They represented geometric designs on their artefacts as early as the 5th millennium BCE, as did some megalithic societies in northern Europe in the 3rd millennium BCE or before. In India, mantras from the early Vedic period (before 1000 BCE) invoke powers of ten from a hundred all the way up to a trillion and provide evidence of the use of arithmetic operations such as addition, subtraction, multiplication, fractions, squares, cubes and roots. In the 4th Century, CE Sanskrit text reports Buddha enumerating numbers up to 1053, as well as describing six more numbering systems over and above these, leading to a number equivalent to 10421. Given that there are an estimated 1080 atoms in the whole universe, this is as close to infinity as any in the ancient world came.

Thus there is ample evidence of using different art forms in the teaching learning experiences and there still remains ample scope in innovating in this area.

Objective

1. To develop Cultural Visualization Intervention Program for teaching the selected concepts of mathematics.
2. To compare the effectiveness of intervention program on the achievement of the students.

Hypothesis

Ho₁ There shall be no significant difference in the post-test achievement scores of the students of experimental and control group.

Materials And Methods

The present study was an experimental study and was carried out on the students of standard seven in Mumbai. The sample was selected through random sampling technique. The study assessed whether the use of cultural visualization effectiveness program is effective in developing a conceptual understanding of the mathematical concepts among the students. It also observed whether the students were able to imbibe some information related to the structural descriptions of their cultural artifacts and monuments or not. The content selected for the study was a simple topic from mathematics involving concepts like area, perimeter and symmetry. The data was analyzed using descriptive statistics and t test.

Cultural Visualisation Intervention Program

The intervention program developed embedded the components of culture and mathematical concepts in the conceptual explanations. The program was developed using several references and consulting several experts in the field of mathematics and sociology. The images were carefully selected so as to ensure not only their relation with the concept to be taught but also in relation to the importance attached to the monument, artifact or the dance form. The relation of the cenotaph and the artifacts with the concept of perimeter, symmetry or area was carefully developed. Care was taken not to confuse the students. The achievement of the learners was assessed pre and post intervention. The representations of monuments, artefacts like carpets, dance forms like square dance were used to transact concepts like area, perimeter and symmetry.

Data Analysis

Figure 1 shows the mean score of the experimental and control group and Table 1 shows the t value for the same.

Fig. 1 : Mean Post test scores of Students in Achievement Test of Mathematics for Experimental and Control Group

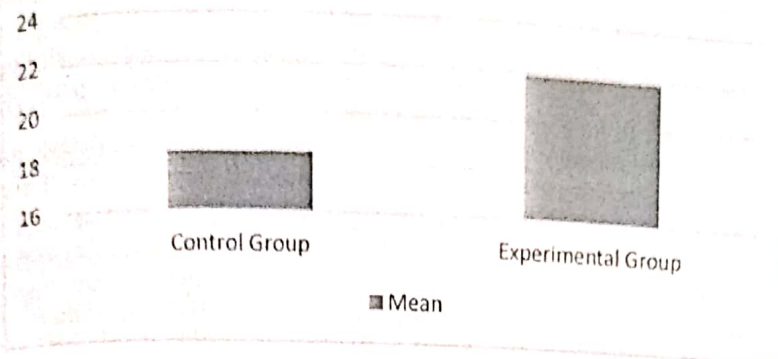


Table 1 t value of Post test scores of Students in Achievement Test of Mathematics for Experimental and Control Group

Group	Sample (N)	Mean	SD	S.E _m	Df	t value	Significance
Control	30	18.52	5.96	1.09	55	2.21	S* (Significant at 0.05)
Experimental	30	21.82	5.27	0.96			

The obtained value of 't' for pre and post-test achievement scores of experimental group in mathematics is 2.21, which is more than the table value of 2.00 at 0.05 level of significance and less than table value of 2.66 at 0.01 level of significance.

Thus it can be inferred Ho₁ is rejected and there is significant difference between the pretest and post test scores of the experimental group

Results

There is significant difference in pretest-posttest score of experimental group in achievement in mathematics. The mean of the experimental group is more than that of the control group so it can be inferred that the significant difference may be due to the intervention.

Discussion

The question of what is right knowledge that is fit for dissemination and what is the right process of dissemination have always been the big questions that destabilize the curricular culture and innovations. Students have changed over the last twenty years, perhaps as a result of a technology rich upbringing; they appear to have different needs, goals and learning preferences than students in the past.

The teachers need to better understand them and determine how to best engage them in learning. The teachers need to be better equipped with skills and strategies to generate right attitude and aptitude among students and effective training can play an important role in this area. In Indian current scenario there is a lack of usage of different teaching style in the teaching of mathematics. There is a need to implement new teaching style while teaching mathematics in schools. Rather emphasis on rote learning teacher can give importance to understanding and application. Children should be allowed to explore the innovative process by themselves.

Conclusion

The study reveals that the well thought curriculum with planning to ensure effective transaction has the power to control the curricular outcomes. The use of artefacts and monuments, exemplars and notations which are some form of cultural representations can be integrated and included in the content in order to ensure not only the effective achievement of the objective but also to help students realize that these concepts are present since ages and have the practical implications too.

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