Creation of Various Devices or Aids and Their Effectiveness in the Teaching of Measurement Units (Area – Volume) of Mathematics of Standard Seven

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Abstract:
As the entire situation is being transformed with time, the teacher will have to develop the efficiency of creating teaching aids, using audiovisual devices in teaching as well as making use of more than one aid of teaching. As mathematics, among all subjects is abstract and dull, it becomes difficult on the part of the teacher to inculcate certain mathematical concepts in children. It becomes easy on the teacher's part to make students understand certain difficult mathematical concepts, if the teacher makes use technological teaching aids also in mathematics, as in other subjects, such as T.V., Computer, film projector, overhead projector, tape recorder, V.C.D., V.C.R. and telecommunication. The lively and humble nature of the child is active. Thus, if brightens up on getting an opportunity to learn through activity and experiment. The child gains confidence if it gets an opportunity to learn through activity in mathematics. The belief that mathematics is only a subject of counting will no longer remain and the child will no more have a dislike or prejudice towards mathematics. Today, as there is a reality of teaching aids in mathematics in primary schools the quality of teaching has declined. The present research paper is presented with the purpose that in such a situation, the quality of teaching can be improved by making use of various devices or aids of teaching up to an extent.

Keywords: *Aids, Effectiveness, Mathematics, Measurement*

1. Introduction

Today, when the entire world has entered the twenty first century, ended effort has been made during the last fifty years to bring about an improvement in teaching. The two special words, namely, 'learning' and 'teaching', with their traditional definitions are getting ready for the subtle twenty first century. As time has come for the entire teaching world to take up the challenge if you do not accept change. You will perish; the present system of teaching will have to take utmost advantage of the progress in science and technology of the first half of the twentieth century. Perhaps, the roles of teacher and student will have changed from their roots. The method of distant teaching is taking shape worldwide in the place of the present formal method of teaching. In this situation, the world will have to come out of the present. Teacher centered teaching method as room as possible and accept the student centered method of teaching. Classrooms will have to be made student centered with the attitude of letting students learn by themselves with the help of science and technology.

2. Objectives of the study

The objectives of the present study are as follows:
1. To create a test based on the geometrical units 'area' and 'volume' in the subject of mathematics standard 7, primary school.

2. To create various devices or teaching aids for geometrical units 'area' and 'volume' of mathematics, stand 7, primary school.
3. To examine the effectiveness of various teaching aids for the geometrical units 'area' and 'volume' in mathematics, standard 7, primary school.

3. Inference of the study

The average teaching success grade of the test of students belonging to the experimental group of standard 7 who learn by various aids and that of students belonging to a controlled group learning through the traditional method are perhaps not much different.

Table 1 Variables and their relation
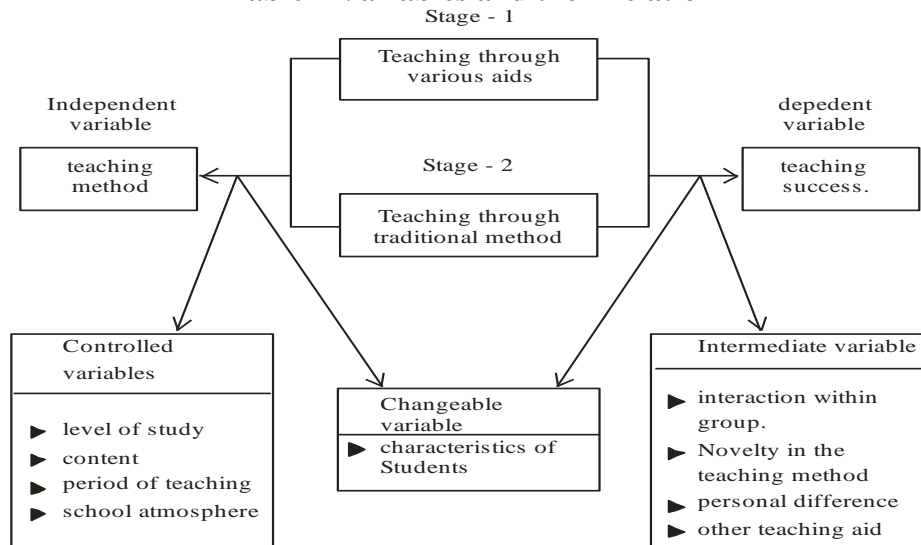
4. Importance of the study

Certain important aspects of the present study can be severally as follows

1. Computerized audio-visual CD based on a PowerPoint slide show of the computer, model, as well as colored self created transparency will be available to teachers of mathematics in order to enable them to teach easily and effectively in the mother tongue with the help of computer technology.
2. The present study will be useful to research workers and teachers wishing to teach mathematics in Gujarati through various devices.
3. Teachers will be able to bring novelty in day to day teaching by making use of teaching technology in the teaching learning process. The teaching – learning process will be made interesting.
4. 'Area' and 'volume' are such aspects of geometry in mathematics, that are difficult from the point of view of thematic constitution. Visual teaching aids for this purpose are not easily available. The idea of the above mentioned units of each and every standard can be clarified effectively.

5. Limitations of the study

1. The present research was limited only up to Gujarati medium schools of Mansa Taluka.
2. The present presentation was limited only up to primary students of standard seven.
3. From among various aids only three, namely CD, transparency and model were included.
4. Group teaching was done in the present study. Thus, the result obtained, may not be like that obtained by experiments conducted through individual study.
5. In the present study, a purposeful implementation of an experimental plan was made on small group selected from schools.

6 The test was created by oneself. The help and guidance of experienced teachers and knowledgeable people was taken during the creation of the test.

6. Selection of the Sample
The aggregate of the present study was limited to Gujarati Medium Students studying in the primary school of Mansa Taluka. As an experimental research plan was to be used in the present study, a selection of two primary schools was made randomly from the entire world area. The marks of mathematics test-1 of the respected schools of students of seventh standard of two primary schools were obtained. Two groups of the same level were formed on preparing recurrence distribution of each, according to the marks obtained in the first test, and finding out the average, proportional variation, proportional error, proceeding ratio as well as level of significance. Then, students of one school were named experimental group' and those of the other were named as 'controlled group' There were 60 students in the experimental group and 60 in the controlled group. There were a total number of 120 students in the sample of the present study.

7. Experimental Plan
In order to maintain the correctness of the experiment, variables other than independent variables effecting dependent variables were controlled. The study-level theme and teaching period were controlled in the present study. The effects of two levels of the independent variable on the dependent variable were to be compared. Due to these reasons and also to obtain an unadulterated result, a complete experimental plan was used. Two name level group pre and post test plans of a complete experimental plan were selected in the present study. There were two levels of independent variable teaching method and the learning achievement of students as dependant variable in the present study. Two same level groups were created for the experiment, keeping this aspect in mind.

8. Creation of Unit
The effect of teaching methods on educational aptitude was to be examined in the present experimental research. The effectiveness was to be examined in the contact of the educational aptitude of students. The aptitude test (Pretest – post test) was created for measuring educational aptitude. The pretest was created keeping in mind the objectiveness of learning teaching of 'area' and 'volume' units in standard seven. The unit aptitude test consisted of objective questions, match the following, and answer in one word and questions regarding drawing diagrams. The test was of fifty marks. The time limit was one hour. The post test was created on the basis of question according to the objectives form of the test, views of experts and also by authenticating the test.

9. Definition
 "A collection of various devices and methods through various ways at one place and time for the purpose of teaching the components of the syllabus is multimedia.

The experimenter had made a self-created CD, transparency and models in a computer based Power point presentation, selecting it from among various means. Various devices were created for the teaching of the units 'area' and 'volume'. Their various stages are as follows.

Table 2 Teaching process

Sr. No.	Stage	Teaching through various devices	Period
1	Pretest	Aptitude test for teaching mathematics	60 minutes
2	Unit-1 circle - Circumference - Measurement of a semicircular diagram - Practicable Problems related to circumference and measurement of a semicircle. - Area of a circle. - Area of a ring shape - Practicable problems related to the area of a circle.	1. Power point presentation. 2. Transparency. 3. model	75 minutes 50 minutes 50 minutes
3.	Unit-2 Cylinder - Area of the curved surface of a cylinder - Practicable problems related to the area of the surface of a cylinder. - Volume of a cylinder - Practicable problems related to the volume of a cylinder.	1. Power point presentation. 2. Transparency 3. Model	75 minutes 50 minutes 50 minutes
4.	Posttest	Aptitude test for teaching of mathematics.	60 minutes

10. Creation of different device programme

1. Creation of self-made CD based on Power point presentation was made based on the computer's Microsoft power point software keeping in mind units such as area and volume, for the present research. Animation effect, voice effect and various colour backgrounds were used in this presentation. A total of 49 slides along with homework, which were related to the two units of measurement namely area and volume were prepared in the given presentation.
2. Transparency: In order to teach the two units of measurements, namely area and volume in maths teaching, the experimenter had prepared beforehand 14 transparencies with the use of colored marker pens. Transparency is used in order to creat a big picture in the classroom on the screen by an overhead projector in transparency points can be presented to the students in the classroom with greater case and order by drawing diagrams on writing related to the points of the subject-matter.
3. Model: In order to make students get an idea of the radius, diameter and area of a circle, the volume of a cylinder, area of the curved surface of a cylinder as well as area of the total surface of an open and closed cylinder an exact model is more effective than a chart-picture. The teacher had thought the students the limits of the subject-matter by using a model.

The above mentioned various devices were used in order to teach 'area' and 'volume', units of geometry, standard seven.

Table 3 Pre and post test plans of two same level groups

Group	Pretest	Independent variable (level)	Post test	Inference
Experimental (E)	T_1E	Teaching through different devices	T_2E	HO:TE=TC
Controlled (C)	T_1C	Teaching through traditional method	T_2C	

Where T_1E=   Average aptitude marks of experimental group pretest.

T_1C=   Average aptitude marks of controlled group pre-test.

T_2E=   Average aptitude marks of experimental group post-test.

T_2C=   Average aptitude marks of controlled group post-test.

11. Implementation of the experiment

In order to teach through different devices, teaching of the units area and volume in mathematics was carried out for ten days at P.V.H. (Lokniketan) Primary school, Mansa, as an experimental group.

During that period of time, teaching of mathematics was carried out through a traditional method for ten days in standard – 7 as a controlled group in R.B.L.D. Primary school, Mansa. The implementation of the experiment was made by allotting units according to class, from 8-12-05 to 17-12-05. Student of the experimental group were taught through various devices, while those of controlled group were taught through the traditional teaching method. During the experiment, teaching was done keeping in mind matters like organization, observation and control.

12. Classification of information obtained

An experiment was made on 120 students of standard seven in the present study. In both the groups, a T-test was conducted on the basis of marks of the post test, at the end of the experiment. The results of group vise T-test in the post test taken during the experiment of area and volume units are presented in table 4.

Table 4

The average, proportional variable, proportional error, proceeding ratio as well as level of significance of marks obtained by students of controlled and experimental groups in the post – test.

Test	(N)	Average (X)	Preoperational variable (6)	Proportional Error (6D)	Preceding Ratio (C-R	Level of significance
Controlled	60	25.43	8.67	1.34	7.83	0.01
Experimental	60	35.92	5.73			

On Studying table 4, it is evident that the average of marks obtained by 60 students of the experimental group in the post-test taken during the experiment was 35.92 and proportional variable was 5.73, where as the average of marks obtained by 60 students of the controlled group in the post-test was 25.43 and the proportional variable was 8.67. The T-value of the difference between the average marks obtained was 7.83, which was more than 2.58. Thus, the T-value was significant at 0.01 level.

The zero inference of the study was thus. "There may not be any significant difference between the average teaching aptitude score of the post test of students of Standard-7 belonging to the experimental group studying through different devices and that of students of the controlled group studying through the traditional method of teaching." This inference was not being accepted. Thus, the inference made by the alternative was not being accepted. Thus, there was a significant difference between the average teaching aptitude marks of the experimental and controlled group. This was in favour of the experimental group.

There is hope that the aptitude test and teaching method expected for teaching mathematics in different mediums, which was created in the present research paper, will be useful in teaching mathematics to school students. Students will be able of make use of the different devices on their own. It will be possible to develop among students, the skills of using different devices by self teaching.

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