A STUDY OF EFFECT OF COMPUTER ASSISTED TEACHING PROGRAMME ON ACHIEVEMENT OF STUDENTS OF STANDARD IX IN MATHEMATICS

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Abstract

The question why we teach mathematics is important from more than one point of view. The answer to this question depends on what we should teach in the subject and how we should teach it. It is known that the 'WHAT' and 'HOW' have always been governed by the 'WHY'. 'WHAT' concerns with the curriculum. 'HOW' concerns with the objectives and the processes of thinking. An application of the Educational Technology in the field of education now a day's seems at the bottom level, trend of using computer in the schools is increasing, but still it is not at the satisfactory level. The present study is concerned with the construction and implementation of computer assisted teaching programme on the achievement of students of standard IX in mathematics. This paper points out the effect of computer teaching programme on the achievement of the students of standard IX in mathematics of Baroda. Experimental design used for this study. Researcher selected 250 students for this study and making analysis with the help of ANOVA analysis.

***Key Words :** CATP, Achievement, Effect, Standard-IX, Mathematics*

Introduction : The question why we teach mathematics is important from more than one point of view. The answer to this question depends on what we should teach in the subject and how we should teach it. It is known that the 'WHAT' and 'HOW' have always been governed by the 'WHY'. 'WHAT' concerns with the curriculum. 'HOW' concerns with the objectives and the processes of thinking. Human brain is used for thinking. The ability to think and reason is the most precious possession of the human brain. Therefore, one should develop the capacity to think, reason and understand. Technology has entered the portals of our life in a big way and will continue to stay for times to come in modified packages. When technology is impacting each and every domain of life education has also been largely influenced by technology. Educational Technology, in its wide sense as understood today, includes "The development, application and evaluation of system, techniques and aids in the field of learning". Technology is very much essential in the field of education. It is thoughtful ideas regarding the usage new scientific inventions in the field of education.

In today's world teachers need to be equipped not only with subject-specific expertise and effective teaching methodology, but with the capacity to assist students to meet the demands of the emerging knowledge-based society. Teachers therefore require familiarity with new forms of information and communication technology and need to have the ability to use that technology to enhance the quality of teaching and learning. Educational Technology involves applying ideas from various resources to create the best learning environments possible for students.

Educational Technology helps teacher to perform his task in effective and efficient manner. It helps the teacher to find and develop new systems, processes and strategies to achieve educational objectives to its maximum level in effective and efficient manner. Educational Technology enables the teacher to male sensible and systematic use of computer, over head projector, LCD projector, slide projector etc. Educational Technology provides the scope of using principles and theories of psychology, the application of the technology and knowledge of other disciplines to enrich the teacher in the process of attainment of set goals. It helps the teacher in the development of cognitive, affective and Psycho-motor abilities of the learners.

The latest and biggest contribution of technology to the field of education is computers. Computers are the new teachers that communicate messages worldwide through image and sound. The use of computers in education has grown from computer-aided instruction systems and then to micro worlds.

The computer can be used as a tool in extending our mental capabilities. In this sense, it is different from the other tools but basically, its purpose is to make life simpler, easier and generally give up the freedom to use our time in activities of our choice. Further, it can be used in normal as well as handicapped and learning disabled classes Computers can never replace teachers. A teacher always plays a very important role in the teaching-learning process and computers will have to be used as teaching aids. Using quality educational software packages, good learning environments can be created in schools. Control free software packages, like a power point presentation, a data base programme, word processing programme, etc., will find extensive applications in the whole curricular area of schools. The above mentioned software packages can be used as tools by teachers and students. Teaching by computer has been known by many names: Computer-Based Instruction (CBI), Computer-Assisted Instruction (CAI), Computer-Assisted Teaching (CAT) etc.

An application of the Educational Technology in the field of education now a day's seems at the bottom level, trend of using computer in the schools is increasing, but still it is not at the satisfactory level. The present study is concerned with

the construction and implementation of computer assisted teaching programme on the achievement of students of standard IX in mathematics.

Objectives of the study : Every work is base on certain objectives because without objective one can not get idea to plan his work. The purpose of this study was to investigate the effects of CATP on the achievement of students in mathematics. This study was undertaken with the following objectives:

1. To construct the computer assisted teaching programme in mathematics of standard IX.
2. To implement the computer assisted teaching programme and to study its effects on student's achievement in mathematics.
3. To study the main effect of factors like sex, intelligence and social economical status on the achievement.
4. To study the interaction effect of treatment, sex, intelligence and social economical status on achievement of students in mathematics.

Hypotheses : In present study, the hypotheses are formulated on the bases of objectives and variables. They are as mentioned below.

H_{01}: There is no significant difference between the achievement of control group and experimental group.

H_{02}: There is no significant difference between the achievement of boys and girls.

H_{03}: There is no significant difference between the achievement of students of low I.Q group and high I.Q group.

H_{04}: There is no significant difference between the achievement of students of low S.E.S group and high S.E.S group.

Methodology

Method : Experimental method have been used for this study.

Development of Achievement Test : The Achievement Test was prepared by the researcher according to the syllabus based on the content of software package in mathematics on the 10 units. All the points taught with the help of CATP were included in the achievement test. The suggestions of subject teacher were taken into consideration in developing the final form of the test. It was of 50 marks, 90 minutes was given to complete it. The students had written down the answers in the question paper. Different types of exercise were asked in this achievement test.

Tools for the present study : In the previous section the researcher gave the importance of tools of the research. The topic of the research was – "A study of the effect of Computer Assisted Teaching programme on the achievement of the students of standard IX in mathematics." Keeping mind in the topic the researcher decided to use the following tools: (i) Computer Assisted Teaching Programme developed by the investigator., (ii) Achievement Test in mathematics developed by the investigator., (iii) I.Q. test developed by K.G. Desai., (iv) SES test developed by R.S.Patel.

Computer Assisted Teaching Programme:
This computer assisted teaching programme is developed by the investigator. It has ten programmes covering the at most all content of mathematics of standard IX of Gujarat state. This computer assisted teaching programme was described in detail in chapter III.

The aim of this programme is to be improved achievement of students toward mathematics. Each programme is developed in such a way that the subject becomes functional and meaningful to learner. The researcher analyzed the content of each selected chapters and made small frames along with the animations and figures whenever required.

Achievement test in mathematics:
This achievement test is developed by the investigator. It has three questions. Question I, consist of objective type questions. In this question there are three sub questions. 1(A), 1(B) and 1(C) consists fill in blank, true-false and multiple optional type questions respectively. Question 2 consist short type questions. Question 3 consist long type questions. The content of this achievement test covers the all topics of CATP. With the help of this tool investigator wanted to measured the achievement scores in mathematics. The reliability of this test has been established by test-retest method. The test-retest interval was about two weeks. The test retest reliability was found 0.85. This indicates that the test is reliable.

I.Q. test:
To find out the level of intelligence of students and for the group formation, a reliable and valid measure of intelligence was needed. Keeping in view the criteria for selection, the I.Q. test for std. VIII, IX, X, XI, XII and college developed and standardized by Dr.K.G.Desai was selected for finding I.Q. of the students for present study. This I.Q. test was developed in 1992. It contained four verbal and four non verbal sub tests. This test could be given to 8th ,9th ,10th ,11th ,and 12th standard student moreover it could be given college training institute as well as higher degree students. In this test answer sheet and questionnaire are separated. This is omnibus test. Eight illustrations are given for each of eight sub tests. Organizer of the test has to explain these illustrations before the exam start. Students have to give answer of eighty questions in forty minutes as many as possible. This test is easy to conduct, normal school teacher also able to conduct this test. All instruction which is printed on the answer sheet must be follow strictly; casualness in regarding to these instructions may be spoiling the result. The norms of this test were fixed after conducting this test on large number of sample. This sample was consisting of 1437 boy and 1308 girls. Average score according to age is given in table. Maximum score can be possible is 80.

Population and Sample Selection : For every perfect research work the researcher have to define the word population. Generally, the population is decided before carrying out the research work.

The present research was meant for the students of Gujarati medium schools of standard IX studying the syllabus of Gujarat State Board of School Textbooks, Gandhinagar. Therefore, for the present research, the population was all the students of standard IX of Gujarati medium schools of Gujarat state. Practically, due to the limitation of time, money and energy it is not possible to carry out the research on the whole population. Thus sampling is indispensable. The target population for the field tryout of the CAT programme was restricted to the students from Gujarati medium schools of Baroda district.

On the basis of I.Q. score two equal group formed from two sections of IX standard of selected school. These equal group made by making equal pair from I.Q. score. From these two groups one group was randomly selected as treatment group and other as control group. Total number of pupils was 250.

Procedure of analysis : The analysis of the data was done in the following orders.

1. Mean and variance of 24 factorial design was calculated.
2. The test of homogeneity of variance was given prior to ANOVA to the data.
3. Orthogonal contrast matrix was constructed to partition the sum of squares.
4. To check effects of treatment (CATP) on achievement of different group, t-score was calculated.

Table 1
(Achievement)
Sums, Sums of Squares, Means & Variances of 2^4 Factorial Design

sex	I.Q.	SES		Experimental group	Control group	Grand mean		
B	H	H	ΣX	314	265	41.36	40.07	32.71
			ΣX^2	14128	10193			
			MEAN	44.86	37.86			
			VAR.	6.12	22.98			
		L	ΣX	291	252	38.79		
			ΣX^2	12193	9186			
			MEAN	41.57	36			
			VAR.	13.67	16.29			
	L	H	ΣX	187	168	25.36	25.36	
			ΣX^2	5123	4174			
			MEAN	26.71	24			
			VAR.	18.20	20.29			
		L	ΣX	193	162	25.36		
			ΣX^2	5609	4046			
			MEAN	27.57	23.14			
			VAR.	41.10	42.41			
G	H	H	ΣX	307	257	40.29	39.89	31.50
			ΣX^2	13511	9503			
			MEAN	43.86	36.71			
			VAR.	6.69	9.63			
		L	ΣX	291	262	39.50		
			ΣX^2	12143	9864			
			MEAN	41.57	37.42			
			VAR.	6.53	8.24			
	L	H	ΣX	182	155	24.07	23.11	
			ΣX^2	4840	3617			
			MEAN	26	22.14			
			VAR.	15.43	26.41			
		L	ΣX	166	144	22.14		
			ΣX^2	4022	2998			
			MEAN	23.71	20.57			
			VAR.	12.20	5.10			
Grand mean				34.48	29.73			

The analysis of variance result into a partitioning of the total sum of squares and the degree of freedom into two parts. One part was associated with the differences among sixteen groups means and was based on k-1 = 15 degree of freedom. The other part was associated with the variation within each of the 16 groups and has k (n-1) = 96 degree of freedom. This analysis is shown in table 2

Table 2
Primary ANOVA 2 x 2 x 2 x 2 factorial design
for achievement

Source of variance	Sum of squares	Df	Mean square	F
SS_B	7569.348	15	504.6232	
SSw	1953.429	96	20.3482	24.799
Total	9522.777	111		

Table 3
ANOVA Summary Achievement

Source	df	SS	MSS	F
A	1	1002.0089	1002.0089	49.24308
B	1	35.4375	35.4375	1.741553
C	1	6405.4375	6405.4375	314.7911
D	1	13.580357	13.580357	0.667397

Ho 1 : There is no significant difference between the achievement of control group and experimental group.

From table 3, the F value for treatment was found to be 49.2431. This is greater than the table value 6.91. It is significant at 0.01 level. Hence, the null hypothesis is rejected. There could be two alternate hypotheses, namely MA1 > MA2 or MA1 < MA2. it can be seen that MA1 = 34.48 and MA2 = 29.73. Thus MA1 > MA2 holds.

It can be concluded that laboratory teaching programme has improved the achievement of the students in mathematics.

Ho 2 : There is no significant difference between the achievement of boys and girls.

From table 3, it can be seen that the value of F for sex is 1.741553. This is less than the table value 3.94. It is not significant at both the levels. Hence, the null hypothesis is accepted. Therefore, it may be concluded that there is no significant difference between the achievement of boys and girl in mathematics.

Ho 3 : There is no significant difference between the achievement of low I.Q group and high I.Q group.

From table 3, it can be seen that the value of F for I.Q is 314.7911. This value is greater than the table value 6.91. It is significant at 0.01 level. Therefore the null hypothesis is

rejected. There could be two alternative hypotheses, namely MC1 > MC2 or MC1 < MC2 . According to table 5.7, the mean for I.Q are MC1 = 39.98 and MC2 = 24.24. Hence, MC1 > MC2. Therefore, it can be concluded that the achievement of high I.Q group is better than the achievement of low I.Q group.

Ho 4 : There is no significant difference between the achievement of low SES group and high SES group.

From table 3, it can be seen that the value of F for SES is 0.667398. This value is less than the table value 3.94. It is not significant at both the levels. Hence, the null hypothesis is accepted. Therefore, it may be concluded that there is no significant difference between the achievement of low SES group and high SES group.

Ho 1 : Treatment v/s Achievement

Observation : F value for treatment is found to be 49.2431. This is greater than the table value 6.91. It is significant at 0.01 level. Also MA1 = 34.48 and MA2 = 29.73 thus MA1 > MA2 holds.

Conclusion : The substantive hypothesis is accepted. The mean shows that achievement of experimental group is better than the control group. The computer assisted teaching programme had improved the achievement of students in mathematics.

Ho 2 : Sex v/s Achievement

Observation : F value for sex is found to be 1.741553. This is not significant at both levels.

Conclusion : There is no significant difference between the achievement of boys and girls in mathematics.

Ho 3 : Intelligence v/s Achievement

Observation : F value for intelligence is found to be 314.7911. This is greater than the table value 6.91. It is significant at 0.01 level. Also MC1 = 39.98 and MC2 = 24.24 thus MC1 > MC2 holds.

Conclusion : The substantive hypothesis is accepted. The mean shows that achievement of high I.Q. group is better than the low I.Q. group.

Ho 4: SES v/s Achievement

Observation : F value for SES is found to be 0.667398. This Value is less than the table value 3.94. It is not significant at both the levels. Also MD1 = 25.75 and MD2 = 23.415 thus MD1 > MD2 holds.

Conclusion : There is no significant interaction effect of SES on achievement.

References :

Agarwal Y.P., *Statistical Methods.* New Delhi: Sterling Publishers Private Ltd.,1998

Best John W. and Kahn James V., *Research in Education.* New Delhi: Prentice Hall of India Private Ltd.,1989

Bloom Benjamin S., *Taxonomy of Educational Objectives Book-1, Cognitive Domain.* London : Longman Group Ltd.,1979

Borg Walter B., (1963) *Educational Research* London: Logmans, Green and Co.Ltd.

Buch M.B., (1983-88) *Fourth Survey of Educational Research.* New Delhi: NCERT.

Buch M.B., (1988-92) *Fifth Survey of Educational Research* New Delhi: NCERT

Desai H.G. and Desai K.G., *Sanshodhan Paddhatio ane Pravidhio* Ahmedabad: University Granthnirman Board,1997

Dewal O.S. et.al.(1999), *Hand Book on Education research.* New Delhi: NCTE

Doctor I.H.,et.al., (1996) *Ganit Adhyapan – Paddhati* Ahmedabad: Anada

Fox D.J.,(1969) *Research Process in Education.* New York: Halt, Rinehart and Winston Inc.

Edward Allen.L., (1968) *Experimental Design in Psychological Research* (3rd Ed.) New York: Holt, Rinehart and Winston Inc.

Garrett H.E.,(1981) *Statistics in Psychology and Education.* Bombay: Vakils, Fefer and Simons Pvt. Ltd.

Gilford J.P., (1967) *A Curriculum for Creativity* New York: John wiley and sons

Good C.V. et.al., (1973) *Dictionary of Education* (3rd Edi). New York: Mc Graw Hills Book Co.

Johnson P.C., (1950) *Statistical Methods in Research* New York: Prentice Hall, Inc.

Kerlinger F.N., (1978) *Foundations of Behaviour research* Delhi: Surjeet Publications

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