

## **IMPACT OF PROGRAMMED INSTRUCTION IN LEARNING MATHEMATICS**

Dr. R. Sambasivarao\*, Assistant Professor, University College of Education, Adikavi Nannaya University, Rajamahendravaram-533296, E.G. Dist, Andhra Pradesh. Mobile: 9440451141, email : rssr.edu@aknu.edu.in

### **Abstract**

The Teachers has work hard continually to enhance the effectiveness and efficiency of their teaching by identifying and comparing alternative methods of teaching and learning. In present scenario integration of ICT plays a vital role in the learning process. Programmed Instruction is one such ICT tool which brings great achievements in education where as the learner can learn concepts on their own pace of learning. This study attempts to find the impact of Programmed Instruction on academic achievement in mathematics. This study reveals that use of Programmed Instruction strategy improves the achievement in learning mathematics in turn helps to provide quality education.

**Key Words: Teaching Mathematics, Quality Education, ICT, Programmed Instruction**

### **Introduction**

Mathematics is the highest abstraction attained from the human brain. Mathematics plays an important role in human life and for successful living in the society needs a sound mathematical knowledge. In this context a mathematics Teacher should have scientific bent of mind. This does not mean that he should have the knowledge of Science but he should be systematic and orderly in his method of teaching.

The process of learning mathematics differs in learner to learner as a result of various individual, physical and biological differences in them. To some students, mathematics can be very difficult, since it requires a lot of intellectual powers from them. So, the students of such categories require a lot of motivation to go through with the subject. Hence it is the responsibility of mathematics teachers to produce various instructional approaches and strategies that are interesting and stimulating .To

motivates the students towards mathematics learning, teacher should integrate ICT in his teaching. To make all the children to learn mathematics easily the teacher has to use innovative ICT integrated strategies in his teaching.

Programmed instruction is a teaching technique which developed as a result of the application of the scientific method to the teaching learning process. It is a method which uses highly structural materials which take the place of a teacher for the learner. The materials are designed carefully and are thoroughly evaluated for effectiveness. Programmed Instruction represents one of the effective innovations in the teaching-learning process which is introduced by B.F Skinner of Harvard University in 1954. As a highly individualized and systematic instructional strategy, it has been found quite useful for classroom instruction as well as self-learning or auto instruction.

Programmed Instruction occupies a unique place in teaching-learning as there is a provision of active students' participation, content presentation in small steps, immediate feedback & reinforcement and individualized learning. In this strategy all students work through the same sequence. According to Smith and Moore, Programmed Instruction is the process of arranging the material to be learned into a series of sequential steps, usually it moves the students from a familiar background into a complex and new set of concepts, principles and understanding.

Programmed instruction can be used to give information to learners in Linear and branched forms according to the nature of the students and subject also.

- **Leaner program:** In the Leaner Program instructional material is arranged in a order in to a number of meaningful small steps, named as frames. These frames are presented to the learner in the arranged sequence, one by one, one at a time. The learner has to respond actively at each frame. Immediately after responding, the learner is given information about the correctness of his response. It reinforces his behavior and he may be motivated to learn the next frame in the arranged sequence. If the learner does not respond correctly to a particular frame, he may be required either to repeat the frame or be acquainted with the correct response. By proceeding from one step to another, the learner may be able to acquire the desired learning experiences

- **Branched program:** It is similar to linear programming, but in case of wrong answer the learner will be directed to go through one or more remedial frames which explain the matter afresh, ask him questions to elicit the correct answer and reveal his previous mistakes, and then return him to the original frame. This cycle goes on till the learner passes through the whole instructional material at his own pace. Also, branching is used with the idea that slow learners can be presented with additional information if they cannot respond well enough to a sequence of frames and that more advanced students can be exposed to more challenging materials.
- **Objectives of the study**
  1. To find the effectiveness of Programmed Instruction on the Mathematics achievement among VIII standard students.
  2. To compare mathematics achievement of boys and girls who were taught through Programmed Instruction.

#### **Hypothesis of the study**

1. There will be no significant difference between the pretest scores of experimental group and controlled group.
2. The achievement of the students taught through Programmed Instruction is greater than the achievement of the students taught through conventional approach.
3. There will be no significant difference between boys and girls taught through Programmed Instruction.

#### **Methodology**

The study is quasi-experimental in nature. It tries to compare the effectiveness of Programmed Instruction in teaching mathematics to VIII class students studying in GBR English Medium School, Anaparthi, Andhra Pradesh. The software designed by **Educom.in** is used in the study to arrange programmed instruction.

#### **Sample**

As it is difficult to get two groups with same abilities for any study, a sample of 60 students from two sections A & B of VIII standard from GBR English

Medium School, Anaparthi was taken for the study by adopting Purposive sampling technique.

### **Intervention**

The chapter on "Factorization" was selected for the study. Two sections of class VIII were matched based on their attitude towards computer.' Section A' was considered as the experimental group and' section B' as the control group. Pre test was conducted for both the groups to ascertain their knowledge on the topic "Factorization ". Then the chapter "Factorization " was taught using programmed Instruction designed by **Educom.in** for the students of the experimental group. This software contains Branched programming with animations, interactive activities and self-assessment frames. Students of the controlled group were exposed to conventional learning where they learnt the concept through the demonstration by the teacher and practiced solving sums using paper and pen. The two groups were taught for 6 days by the investigator with duration of 40 minutes every day.

Later on, both the groups were given post test and the duration of the test was 45 minutes. The post test was a paper pencil test for 25marks having 10 objective type Questions, 5short answer type questions and1 essay question. The researcher conducted tests for both the groups simultaneously.

### **Data Analysis**

Data were analyzed using SPSS software. Mean, Standard Deviation and Paired t-test was applied to compare the achievements of the experimental and control groups.

### **Attitude towards Computer**

Attitude towards computer has impact on learning through Programmed Instruction. So both the groups were analyzed for their attitude towards computers and its usage through a questionnaire. The Mean and t- value are listed inTable-1. As seen from table 1, no difference in both the groups in the attitude towards computers and its usage. Based on this score both the groups were

matched.

Table -1: Attitude towards Computer

Group	N	Mean	SD	't' value	Tabulated 't' value	Level of Significance
VIII A	30	18.41	9.61	0.64	1.96	Not significant at 0.05 level
VIII B	30	18.55	6.78			

## Testing of Hypothesis

### Hypothesis I

There will be no significant difference between the pre test scores of experimental group and controlled groups.

Table -2: Comparison of Pretest Scores

Group	N	Mean	SD	't' value	Tabulated 't' value	Level of Significance
Controlled Group	30	6.14	6.45	0.32	1.96	Not significant at 0.05 level
Experimental Group	30	5.47	4.65			

Since the calculated values seen from table 2 are less than the tabulated value, the hypothesis is accepted. Therefore there is no difference between the pre test scores of controlled group and experimental groups in achievement of the students.

### Hypothesis II

The achievement of the students taught through Programmed Instruction is greater than the achievement of the students taught through conventional approach.

Table -3: Comparison of Posttest Scores

Group	N	Mean	SD	't' value	Tabulated 't' value	Level of Significance
Controlled Group	30	50.94	14.33	4.92	1.69	significant at 0.05 level
Experimental Group	30	75.34	15.27			

Table 3 shows that the controlled group has secured a Mean of 50.94 and the experimental group has secured a Mean of 75.34 in mathematics achievement. The calculated 't' value is 4.92; the table value to be significant at 0.05 level is 1.69. The achievement of the students taught through Programmed Instruction is greater than the achievement of the students taught through conventional approach.

Table -4: Comparison of Gain in Scores

Group	N	Mean	SD	't' value	Tabulated 't' value	Level of Significance
Controlled Group	30	44.79	12.039	3.97	1.68	significant at 0.05 level
Experimental Group	30	69.88	13.78			

The gain score of the experimental group as seen from table 4 is greater than the gain scores of the controlled group. This shows that Programmed Instruction is more effective for learning mathematics than the conventional approach.

### Hypothesis III

There will be no significant difference between backward and average students taught through Programmed Instruction.

Table -5: Comparison of posttest scores of backward and average students

Group	N	Mean	SD	't' value	Level of Significance
Average Students	19	75.78	14.45	0.22	significant at 0.05 level
Backward Students	11	74.56	15.72		

As seen from table5, Average Students and Backward Students do not differ in mathematics achievement when they are taught through Programmed Instruction. This shows that Programmed Instruction can be used in teaching and learning Mathematics irrespective level of students and its suits all the students of the class for equal achievement.

### Findings

The results of the study are as follows:

- The achievement of the students taught through Programmed Instruction is greater than the achievement of the students taught through conventional approach.
- There is no difference between boys and girls taught through Programmed Instruction in achievement of mathematics

### Educational Implications

- The potential of Programmed Instruction should be utilized to enhance quality of education at school level.
- Teacher education institutions should train the student teachers in integrating ICT in teaching learning for better achievement in mathematics.
- Students should be motivated in utilizing the technology and various

educational software for better achievement in mathematics and other school subjects also.

- Teachers should use programmed instruction approach to teach mathematics in order to overrule the backwardness in mathematics.
- Teachers should use programmed instruction approach to teach mathematics to clever and gifted students in order make them to learn mathematics on their pace of learning.

### **Conclusion**

This study reveals that Programmed Instruction can be used in teaching learning mathematics effectively to achieve the aims of teaching mathematics. It will help the student to get immediate feedback and it recalls the previous knowledge which helps the students to understand the learning concept through its branched programming. In the present scenario also the programmed instruction strategy is also useful in teaching-learning to achieve educational goals.

### **References**

1. Aggarwal J.C., (1996). Educational Research: An Introduction, Arya Book Depot, New Delhi
2. Best J.W., (1978). Research in Education. New Delhi: Prentice Hall of India Ltd.
3. Blishen Edward (Ed) (1969). Encyclopedia of Education, London: Blond Educational Ltd
4. R. Sambasivarao, Methods of Teaching Mathematics, Discovery Publishing House, New Delhi.
5. European Journal of Educational Research, 1(3), online journal, page 117
6. Dr.G.Viswanathappa, Associate Professor: ICT Mediation in Learning Mathematics, Edutracks, Vol 13(2), Oct 2013.