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Impact of Programmed Learning on Science Achievement of 8th Class Students

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Abstract:

It is time's demand that science education should be provided to all kind of students of the country and no student should be deprived from the benefits of it. New methods and techniques in education are having an increasing effect on the traditional approach to teaching and learning. Among the new approaches and innovations that have gained great acceptance in recent years is Programmed Learning. The purpose of programmed learning is to manage human learning under controlled conditions. According to research studies and related literature, it has been found that with the help of the programmed learning, learning and understanding of science increased significantly. The main objectives of the study were to see the Impact of Programmed Learning on Science Achievement of 8th class students and to study the difference in Science Achievement of students taught through Programmed Learning and traditional Method. For this purpose a self constructed Achievement test for pre and post test is prepared and administered to 50 students from a Private School. The findings revealed that instructional material based on programmed learning has positive impact on students learning and there is significant difference in Science Achievement of students taught through Programmed Learning and traditional Method.

1. Introduction

Man is greatly dependent on science and technology. This is because the future hope for a better scientifically and technologically developed country lies in science education not only for attainment of paper qualification but to aid them adjust to such technological devices as may affect their daily lives. It is time's demand that science education should be provided to all kind of students of the country and no student should be deprived from the benefits of it. In this context, many steps and efforts have been taken to improve the educational system and class room teaching. New methods and techniques in education are having an increasing effect on the traditional approach to teaching and learning. Among the new approaches and innovations that have gained great acceptance in recent years is Programmed Learning. It is highly individualized instructional strategy for the modification of behavior. Programmed Learning or Programmed Instruction is a learning methodology or technique first proposed by the behaviorist B. F. Skinner in 1958. According to Skinner, the purpose of programmed learning is to "manage human learning under controlled conditions". Programmed learning has three elements: (1) it delivers information in small bites, (2) it is self-paced by the learner, and (3) it provides immediate feedback, both positive and negative, to the learners. It was intended to free teachers from burdensome drills and repetitive problem-solving inherent in teaching basic academic subjects like spelling, arithmetic, and reading. Skinner based his ideas on the principle of operant conditioning, which theorized that learning takes place when a reinforcing stimulus is presented to reward a correct response.

2. Types of Programmed Learning

- Linear Programming
- Branched Programming
- Mathematics

3. Linear Programming

This was developed by B.F. Skinner and his associates. In this method the subject material will be divided into very small steps each of which is called as frame. In each frame, the students have to do something. After giving the response the students immediately can check whether his answer is correct or wrong.

F1 → F2 → F3 → F4 → F5 → F6

4. Branching Programming

This was developed by Norman A. Crowder (1960) and it was called as intrinsic programme. In this method the subject should select the answer for the question (Objective Type). If subject's answer is correct he will lead to the next frame. If subject's answer is wrong he will lead to the remedial frame. After the remedial frame he will directed to the main frame.

5. Mathetics

Thomas F. Gilbert developed the mathetics style. In this style a consistent pattern of trios – demonstration phase, prompted phase and release phase. In the first exercise, the learner is demonstrated the response. In the second exercise, the learner is required to emit the response with help of prompts and in the third exercise responses came without prompts.

According to research studies and related literature, it has been found that with the help of the programmed learning, learning and understanding of science increased significantly. Sharma (1986) constructed the Programmed Learning in Physics of std. XI. The data was analyzed through t – test. The study concluded that the programmed learning method was found more effective than the traditional method. Patel (1980) constructed the Programmed Learning material on 'Waves of Science' for std. IX. The data was analyzed through mean and ANOVA. The study concluded that students scored higher on post – test than pre – test. Programmed Learning material was found effective.

The education is a process to develop cognitive, affective and psychomotor skills whose aim is to mould the learner towards a total contribution to the development of community and self (Durosaro, 2002). In achieving this, there is a need to improve the instructional methods in the teaching – learning process especially in teaching science subjects.

6. Objectives of the Study

- To develop a Programme based on Linear Programming.
- To find out the impact of Programmed Learning on Science Achievement of students.
- To study the difference in Science Achievement of students taught through Programmed Learning and traditional Method.

7. Design and Sample of the Study

The study was experimental in nature. It was carried out on the students of 8th standard. The researcher randomly selected the 50 students from a Private School of Ladwa town distt. Kurukshetra, Haryana. School was purposively selected by the researcher. Students were further divided into Experimental and Control groups (25each), which were equated on the basis of Intelligence test prepared by S. S. Jalota. The design was followed by three operational stages viz. pre test, treatment program and post test.

8. Tools used in the Study

- Intelligence test by S. S. Jalota.
- A self constructed Achievement Test for pre and post test to assess the Science Achievement.
- A self developed Instructional Material based on linear programming on topics "Cell" and "States of Matter" of 8th standard.

9. Data Collection

For assessing the Science Achievement a self constructed Achievement test was administered to both the groups as pre-test. Students of Control group were taught with Traditional Method and students of Experimental Group were taught with instructional material based on Linear Programming. After the treatment, post test was administered to both the groups for assessing the Science Achievement.

The data obtained was analyzed by calculating mean, SD and t-ratio of both the groups.

10. Interpretation and Discussion

Experimental Group Control Group					Experimental Group Control Group				
Pre - test			Pre - test		Post – test			Post - test	
Mean	S D	Mean	S D	t-ratio	Mean	S D	Mean	S D	t – ratio
10.25	4.25	12.60	3.56	2.35*	17.40	2.64	14.42	2.58	5.15**

Table 1: Mean, SD and t – ratio for Pre – test scores of Experimental & Control groups and Post - test Scores of Experimental and Control Group of "Cell"
 ** Significant at .01 level
 * Significant at .05 level

Experimental Group					Control Group				
Pre - test		Post - test			Pre - test		Post - test		
Mean	S D	Mean	S D	t-ratio	Mean	S D	Mean	S D	t - ratio
10.25	4.25	17.40	2.64	7.15**	12.60	3.56	14.42	2.58	2.06*

Table 2: Mean, SD and t - ratio for Pre – tests and Post - tests Scores of Experimental and Control Groups of “Cell”
 ** Significant at .01 level
 * Significant at .05 level

Experimental Group		Control Group			Experimental Group		Control Group		
Pre - test		Pre - test			Post – test		Post - test		
Mean	S D	Mean	S D	t-ratio	Mean	S D	Mean	S D	t - ratio
13.78	3.73	13.52	1.57	0.34*	17.16	2.69	14.89	3.23	4.16**

Table 3: Mean, SD and t – ratio for Pre – test scores of Experimental & Control groups
 And Post - test Scores of Experimental and Control Group of “State of Matter”
 ** Significant at .01 level
 * Not Significant at .05 level

Experimental Group					Control Group				
Pre - test		Post - test			Pre – test		Post - test		
Mean	S D	Mean	S D	t-ratio	Mean	S D	Mean	S D	t - ratio
13.78	3.73	17.16	2.69	5.2**	13.52	1.57	14.89	3.23	2.74**

Table 4: Mean, SD and t - ratio for Pre – tests and Post - tests Scores of Experimental and Control Groups of “States of Matter”
 ** Significant at .01 level

11. Main Findings and Discussion

Results of the study showed that instructional material based on programmed learning has positive impact on students learning. It was indicated through the obtained t - ratio for the difference between pre and post tests scores of Experimental group, that students of this group performed better when compared to the Control group on the Achievement test of both topics. It may be inferred from Table - I that t - ratio 2.35 is not significant at .01 level but significant at .05 level means there is slightly difference between the scores of pre - tests of both the groups but there is significant difference between the post – tests scores of Experimental and Control group as t-ratio is 5.15 for the topic Cell. Table - II clearly indicated that there is significant difference between the scores of pre and post - tests of Experiment and Control groups as t – ratios are 7.15 and 2.06 which are significant at 0.01 and .05 level respectively for the topic Cell. The present results showed that the teaching through Programmed Learning had a good impact on Science Achievement of 8th class students in comparison to Traditional Method. Table – III indicated that t - ratio 0.34 is not significant at .05 level means for the topic States of Matter there is no difference between the scores of pre - tests of both the groups. But there is significant difference between the post – tests scores of Experimental and Control groups as t-ratio is 4.16, which is significant at .01 level for the topic The States of Matter. Table - IV clearly indicated that there is significant difference between the scores of pre and post - tests of Experimental and Control groups as t – ratios are 5.2 and 2.74 which are significant at 0.01 level for the topic States of Matter. The above results showed that the teaching through Programmed Learning had a good impact on Science Achievement of 8th class students in comparison to Traditional Method for both the topics. The results may be explained through the experiment conducted by the Dadhaniya (1999) on the effectiveness of the programmed learning method in teaching on English Grammar. The subjects were divided into two groups. One group was taught through the programmed learning method and the other group was taught through the traditional method. The collected data was analyzed through the t – test. The findings of the study revealed that the programmed learning method was better than the traditional method to teach the English Grammar. The results may be further mirrored through

the study of Lavadiya (1995) who constructed the Linear and Branching Programmed Learning material on 'Energy and its sources' in science for class X. The results showed that the Linear Programmed Learning material was more effective than the Branching Programmed Learning material.

12. Implications

The findings of the paper suggested that substantially self-paced Programmed Learning is a better technique than the Traditional Method in the science subject. Another important aspect is that Programmed Learning forces student active participation in the teaching – learning process. It shifts the responsibility for learning back to students, where it should be, because it provides for a self-paced, logical sequence of small steps and immediate confirmation or correction, it helps to overcome the wide spread of abilities and interest among university chemistry students (Powel, 1963).

13. References

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