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Research Paper

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Development of Mastery Learning Based Resource Material in Science for Class Iv: A Study

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ABSTRACT

Mastery learning proposes that all children can learn when provided with the appropriate learning conditions in class-room. Learning of Mastery or mastery learning are terms coined by Benzamine Bloom in 1968 and 1971 respectively. Bloom hypothesized that a classroom with a mastery learning focus as opposed to the traditional form of instruction would reduce the achievement gaps between varying groups of students. In this study mastery learning based resource material was developed for class IV in the subject science. The content of resource material was 'force', 'work' and 'energy'. The material was divided into units ranging from simple to complex. Students of class IV were taught step by step and after completion of one unit they were appeared in a test to find out what they have learned. The test scores was considered as achievement scores of the students. Pre-Post experimental design was adopted for the study. The findings of the study showed that through mastery learning students achieved better than traditional method of teaching.

Mastery learning is a process whereby students achieve the same level of content mastery but at different time intervals. Evaluation of these programs revealed that students in mastery learning classes consistently learn better, achieve higher level of learning and greater confidence in their ability to learn as learner. Benjamin S. Bloom believed that it could be a powerful supplement to any teacher's instructional procedures. Bloom hypothesized that a classroom with a mastery learning focus as opposed to the traditional form of instruction would reduce the achievement gap between varying group of students. The concept of mastery learning attributed to the behaviourism principles of operant conditioning. According to this theory learning occurs when an association is formed between a stimulus and response (Skinner, 1984). In mastery learning first material to be learned is divided into units ranging from simple to complex. Learners proceed through the learning material step by step and after each step they take a test designed to find out what they have learned. If they have not mastered any given unit, they can repeat it, unless and until they have mastered the material. Considering the difficulties of school students researcher has prepared content in science subject for class IV. The content was developed following the principles of content development like principles of utility, relevance, balance and other psychological characteristics (age, sex, intelligence level and socio-economic background).

Review of Literature

Following studies may be written as the evidence of effectiveness of mastery learning:

Wentling (1973) compared mastery learning and non-mastery learning as to how feedback relates achievement and found that high ability students spent more time than the low ability students. Okey (1974, 77) examined the materials necessary in order to teach mastery learning teachers and students' attitudes towards learning and students' achievements. Significant positive effects were discovered in all areas. Arlin and Webster (1984) found that the group taught through mastery learning exhibited a significantly higher achievement in mathematics than the other group. Patadia (1987) found that the mastery learning strategy was liked by the students and was feasible in the real classroom. Verma (1991) conducted a study on the effects of personalized system of instruction (PSI) and mastery learning (ML) on achievements of average students and found both techniques were better than conventional teaching. Thomas (1995) conducted a study on mastery learning in regular classroom and found that mastery learning offers a way for teachers to offer individualization instruction to students. Thaukam (1997) revealed that the mastery learning approach is more effective than the traditional method in enhancing mathematics interest of ninth standard pupil. Mathur (1998) found that mastery learning as effective strategy in terms of achievement, self-concept and attitudes towards statistics for both undergraduate and post-graduate students. Patrician and others (2007) showed that mastery learning approach resulted in higher achievement but gender had no significant effect on their achievement.

Objectives:

Following were the main objectives of this study:

1. To compare the achievement of boys taught through mastery learning and traditional method of teaching.
2. To compare the achievement of girls taught through mastery learning and traditional method of teaching.

Hypotheses :

1. There is significant difference in academic achievement of boys taught through mastery learning and traditional method of teaching in the subject science.
2. There is significant difference in academic achievement of girls taught through mastery learning and traditional method of teaching in the subject science.

Null Hypotheses :

To verify the research hypotheses following null hypotheses were framed:

1. There is no significant difference in academic achievement of boys taught through mastery learning and traditional method of teaching in the subject science.
2. There is no significant difference in academic achievement of girls taught through mastery learning and traditional method of teaching in the subject science.

Sample of the Study :

30 boys and 30 girls students of class IV were selected for the study.

Content covered :

'Force', 'work' and 'Energy' were the units considered for the mastery learning resource material.

Procedure of the Study :

tPre-post experimental design was used for the study. In first phase the students were taught through traditional method of teaching. They were evaluated through objective type test exercises. In second phase, the same class was taught through mastery learning method. They were further evaluated through objectives type test exercises. The achievement scores of pre and post group was compared. Self prepared objective tests were used as tools of the study.

Statistical Analysis of the Data

In order to determine the significance of the difference between the means obtained from pre and post testing, following formula was used:

SE_D or $\sigma_D = \sqrt{(\sigma\_(M\_1)^2+\sigma\_(M\_2)^2- 2r\ \sigma\_(M\_1)\ \sigma\_(M\_2))}$

= Standard error of the pre test

= Standard error of the post test

r = Coefficient of correlation between scores on pre and post testing

Z score = $(M\_1- M\_2)/\sigma\_D$

where, M_1=Mean of pre test

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M_2=Mean of post test
σ_D=Standard error of the difference between means

Analysis and Interpretation
Objective No. 1
To compare the achievement of boys taught through mastery learning and traditional method of teaching.

Hypothesis No. 1
There is no significant difference in the academic achievement of boys taught through mastery and traditional method of teaching.

TABLE 1

Groups	N	Mean	S.D.	Z score (calculated)	Critical value of Z		Rejected/ Accepted
					at 5%	at 1%	
Control group (Pre- test)	30	20.33	2.7	2.614	2.58	1.96	Rejected
Experimental group (post-test)	30	30.8	4.8				

Interpretation
Table 1 shows that calculated value of z scores was found higher than tabulated value of z at 5% and 1% level. At 5% level of significance achievement of boys was found better but at 1% level of significance achievement of boys was found slightly better.

Objective No. 2
To compare the achievement of girls taught through mastery learning and traditional method of teaching.

Hypothesis No. 2
There is no significant difference in the achievement of girls taught through mastery and traditional method of teaching.

TABLE 2

Groups	N	Mean	S.D.	Z score (calculated)	Critical value of Z		Rejected/ Accepted
					at 5%	at 1%	
Control group (traditional method)	30	22.1	2.89	9.375	2.58	1.96	Rejected
Experimental group (mastery learning method)	30	30.8	4.8				

Interpretation
Table 2 shows that computed value of z exceeds both at 5% and 1% level of significance. Hence, null hypothesis rejected. Therefore, girls achieved higher when taught through mastery learning.

Findings of the Study
It was found that the students taught through mastery learning achieved higher as compared to those taught through traditional method of teaching. This shows that mastery learning approach had an effect of improving academic performance of class ix students in the subject science. The mean scores of experimental groups of boys and girls were found 30.8 and 34.4 respectively that was found higher than the respective control groups.

Conclusion
Based on the findings of this study it can be concluded that mastery learning method facilitates students' learning in a better way as compared to traditional method of teaching for subject science.

Implication of the study
Mastery learning method can be applied for other school subjects like history, geography mathematics and Environmental sciences.

Students' difficulties can be improved through mastery learning method.

Curriculum developers may find the study helpful in designing appropriate instructional strategies based on mastery learning method which would enhance the achievement of the students.

Teacher educator may also find the study useful in developing programs aimed at producing teachers capable of structuring learning environment that can equalize their interaction with greater participation and satisfaction of the learners.

Suggestions for further Researches
No research is a complete research and it is also true that one problem is solved, another problem springs up we know that no research can be proved true forever as the world is the result of continuous process of change so every area needs more and more continuous efforts. The researcher has conducted this study within a very short time so there is the possibility of being several variables that need to be studied may have been skipped. Therefore further researches may be done in this field such as :

1. Mastery learning and academic difficulties of school students in various academic disciplines.
2. Choice of teaching method by secondary school teachers in relation to their nature of work and school facilities available.
3. Academic difficulties of primary and secondary school students in relation to their school and home environment and its solution by mastery learning method.
4. Success and failure of school students in subject science.
5. Innovative methods of teaching science in secondary and primary schools.

Delimitations of the Study
1. The study included only students of two schools, which were easily accessible.
2. Due to lack of time three units of selected topics were taught.
3. Teacher made tests for evaluation of the students were used.
4. The researcher selected only 30 girls and 30 boys for the study.
5. The study did not consider the age factor on the assumption that all students belong to the age-group 9-10.
6. The researcher excluded the psychological and sociological factors like motivation, intelligence quotient (I.Q.), and socio-economic background and others.

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