A Study on the Effects of Using Mastery Learning Methodology on Academic Achievement, Academic Self-Concept, and Achievement Motivation in Female Middle School Students in Bandar Abbas City

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Abstract: This study aims to investigate the effects of mastery learning on academic achievement, academic self-concept and progress motivation in female middle school students in Bandar Abbas city. This study is semi-experimental, using test-pre-test and a control group. In order to do this, a sample of 25 students studying in District 2 of Bandar Abbas was selected using the control group and study group, using accessibility sampling. The tastes filled out academic achievement test, Delavar's educational self-concept, and Hermens achievement motivation questionnaire. After doing the test on both groups, the study group underwent mastery learning and control group went through the traditional method of education. Then, the re-test was conducted. Data was analyzed using descriptive and inferential statistics. Descriptive statistics was used to calculate mean, standard deviation, and variance. Inferential statistics was used with regard to single and multiple factor co-variance analysis based on the hypotheses of the study. Results indicated that mastery learning leads to students' academic achievement and it improves their positive academic self-concept, and achievement motivation .
Keywords: Mastery Learning, Academic Achievement, Academic Self-Concept, Achievement Motivation

INTRODUCTION

The reality is that education of human beings, which is the main responsibility of education and training, requires order and proper, wise, and exact administration of educational programs. Paying attention to proper and principled training of teachers and investing on their attitudes, knowledge, and skills is one significant factor contributing to better and faster accomplishment of this goal. One of the most vivid natural phenomena in all human societies is the existence of differences. A healthy, humane, and efficient system of education perceives and comprehends such differences in capabilities and abilities. Existence of individual differences among students, with regard to their intelligence, personality, academic achievement, skills, socio-economic status, and learning ability is among the significant issues that teachers face in their classrooms.

Based on experience, teachers have realized that in dealing with different students, having one single methodology of teaching could not be similarly beneficial to all students. Group education, no matter how carefully it is designed and administered, has certain problems. The main issue for group education is rooted in this wrong perception that a methodology that a teacher uses for a 30 to 40-student classroom could be used by each and every student. Since there are personal differences between students, no teaching methodology could be found that has the same effectiveness for all students. Therefore, whatever methodology a teacher uses with a group of students would be beneficial for some and unbeneficial for some others. The best teaching methodology is thus one that is designed and administered based on personal characteristics of learners, and this could only be found in single student education. For different reasons, teaching one single student by a teacher is not practical. The only practical approach is to modify group education in a way that current problems of group education are minimized while students enjoy the benefits of personal education. Mastery learning teaching methodology has these features. In this method, which is done in groups, personal differences and unique features of learners is taken into consideration and while providing instructions, teachers are given the opportunity to take care of each and every student and help to solve their problems. [1]

Based on Carool's theory, learners' learning and academic achievement is extensively correlated with learning time. Thus, the main index of students' academic skill is time. In mastery learning, if teaching methodology is of high standards, less amount of time would be required and skill of each individual plays a significant role in this method. Bloom and other proponents of mastery learning are of the conviction that teachers could administer this pattern by changing the common methods of teaching group classrooms and they could be confident that some students, who are in need of more time based on the results of supplementary evaluations, will receive more proper type of personal education .[2]

Studies conducted on effectiveness of mastery learning have demonstrated that it leaves positive effects on academic achievement of students, particularly the weaker students. The most recent investigations and also modification of previous studies on mastery learning was done by Slavin and Kulik, both indicating that this methodology is successful.[3]

Studies show that this methodology leaves positive effects on motivation and interests of students towards the subject. In addition, Spenser notes that the study by Kim and her colleague Lee showed the superiority of mastery learning to the traditional methods. In these studies, mastery learning was used on a group in a ratio of 70 learners to 1 teacher. In order to do this, Kim and Lee turned the system of most primary and middle schools in Korea to mastery learning. In the introductory studies that were conducted on 272 students in Year 7 in geometry, Kim found out that 75 percent of the students in the mastery learning group achieved a correct score of 80%. In contrast, 40% of those in the traditional (non-mastery learning) had achieved the same level. Based on this experiment, Kim expanded the study to 5800 students. He studied math and English language in an eight-week period. In English, 75 percent of students in the mastery learning group achieved the 80% correct answer. In contrast, 28% of the students in the non-mastery learning group achieved the same score. In math, 67% of mastery learning

students achieved the set criteria while 39% of students in the non-mastery group achieved the same level .[4]

Researchers of different areas like psychology have attempted to understand the series of factors determining and effecting academic achievement. Among these factors, academic self-concept and achievement motivation are among those that have attracted numerous studies .[5]

Academic self-concept is one of the factors affecting academic achievement and means the general attitude of an individual towards their capabilities in academic learning. The positive perception of individuals about themselves not only could leave a positive effect on education, but could also help to achieve the desirable level of perfection in education. In contrast, students who do not have good feeling about their capabilities, regardless of their ethnicity and color of skin, are rarely successful in their academic activities .[6]

Achievement motivation is another significant factor in academic achievement. There is numerous evidence around its effectiveness on class performance.[7] In order to achieve their objectives, needs, and nature, human beings require having the necessary motivation. With regard to those who seek knowledge, i.e. students, academic achievement motivation is of great importance. This motivation gives individuals the required stimuli to successfully complete their learning and achieve academic progress. [8]

As a result, those who enjoy a high level of motivation and willingness to progress show a high level of perseverance in all areas and particularly in their education. When confronting problems, instead of being affected by negative emotions and thoughts, they employ the best solutions.[9, 10]

MATERIALS AND METHODS

This study is semi-experimental. In other words, a study group and a control group are used and they are used to control the differences among the tastes. This project was administered as follows :

O 1*   Ó 1   X Study group

Ó 2   X   O 2 control group

Where Ó is test, X8 is test, X is control, and O is re-testing.

Population, Sample, and Sampling Methodology

In this study, statistical population includes students studying at grade 3 of middle schools in Bandar Abbas city in Hormozgan Province in 2012 academic year. Sampling method is accessibility sampling. First list of all female high schools in District 2 of Education and Training in Bandar Abbas was collected and one high school was selected. Then, 2 classes at that high school were selected as the study group and the control group. Therefore, the sample under study includes 25 students in third grade of middle school .

Data Collection Instrument

In this study, academic achievement test, Delavar's educational self-concept, and Hermens achievement motivation questionnaire are three tools for collecting data .

1. Academic Achievement Test

In this study, in order to measure the performance of students at different levels of learning in science subject, academic achievement test is used. This test is designed by the researcher and is used as a test-retest before and after the experiment. The questions in this test are taken from the science textbook at third grade, the sixth chapter .

2. Academic Self-Concept Questionnaire

This questionnaire is designed by Delavar and includes 28 statements. The tastes need to indicate their opinions about each statement. Some questions are negatively scored and some are positively scored. Then the total score is calculated as the sum of these scores. The range of changes is between 70 to 140. A high score in this questionnaire is indicative of high academic self-concept. Reliability of this questionnaire was obtained to be 78% in the study performed by Delavar. Reliability was obtained using Chronbach Alpha to be 81%, 83%, and 84% respectively, which is an acceptable reliability coefficient .

3. Achievement Motivation Questionnaire

This questionnaire is designed by Hermens. It includes 29 unfinished statements, which are followed by a number of options. In order to have the same value for all questions, 4 options were written for each statement. Then the options were scored based on achievement motivation of high to low and low to high. Some questions are positive and some are negative. The range of changes in scores is between 29 and 116 .

In order to measure the validity of the test, Hermens used content validity, the foundation of which in previous studies was achievement motivation. In addition, he measured correlation coefficient of two questionnaires using forward-looking behaviors and obtained a high validity of r=0.88. In order to calculate the reliability, two methods of Chronbach Alpha and re-test were used after 3 weeks, and the reliability was 0.82 and 0.85 respectively. Reliability of the questionnaire was obtained 0.87, using Chronbach Alpha, in this study.

RESULTS

In order to investigate the effectiveness of mastery learning on academic achievement of female middle school students in Bandar Abbas City, first the mean and standard deviation were calculated. Results could be seen in Table 1 .

Table 1. Descriptive features of scores of academic achievement in pretest-posttest

Test	Group	N	Mean	SD
Pretest	Experimental	25	4.28	2.42
	Control	25	4.60	2.65
Post test	Experimental	25	17.38	2.52
	Control	25	4.76	2.55

The table above shows descriptive features (number, mean, and standard deviation) of the variable of academic achievement. There is no difference in the pretest between the groups. However, as the table shows, while there is no change in the mean of scores of the control group in the post-test, the score mean of the study group has increased as much as 17.38 .

Table 2. Descriptive features of scores of self-concept in students in pretest - post test

Test	Group	N	Mean	SD
Pretest	Experimental	25	57.32	18.67
	Control	25	56	16.73
Post test	Experimental	25	99.52	23.18
	Control	25	57	18.05

As it could be seen in the table, changes in the pretest scores and posttest scores in the two groups of control and study are shows with regard to the dependent variable of self-concept. There is no significant difference seen between the groups in the test. However, while score mean of control group has not changed in the re-test, the score mean of the study group has increased as much as 99.52 .

Table 3. Descriptive characteristics of scores of academic achievement of student in pretest-post test

Test	Group	N	Mean	SD
Pretest	Experimental	25	66.68	11.44
	Control	25	67	12.08
Post test	Experimental	25	91.04	7.82
	Control	25	67.16	11.82

Table 3 demonstrates the changes in test and retest scores for both study and control groups with regard to the dependent variable of achievement motivation. As it could be seen, there is no significant difference between the two groups in the test. However, while score mean of control group has not changed in the re-test, the score mean of the study group has increased as much as 91.04. Covariance analysis test was used to analyses the study's hypotheses. Mastery learning increases students' academic achievement .

Table 4. Results of covariance analysis in the variable of academic achievement

Dependent Variable	SS	DF	MS	F	P	ETA
Academic Achievement	945.56	1	945.56	522.13	0.01	0.63
	552.87	48	11.51	-----	------	----
	1098.92	1	1098.92	790.32	0.01	0.94
	66.74	48	1.39	-----	-----	----
	1048.52	1	1048.52	752.64	0.01	0.97

Table above indicates the results obtained from covariance analysis test in the variable of students' academic achievement. Intra-group factor with the f value of 522.13 is significant at the alpha level of 0.01. In addition, in-group factor with the f value of 790.32 is significant at the alpha level of 0.01. The interaction between two situations (test and re-test) and groups (study group and control group) with the f-value of 752.64 is significant at the alpha level of 0.01. On the whole, results indicate that the increase in score mean in the test was significant for the study group. Hence, it could be said that mastery learning significantly increases the mean of academic achievement scores for students .

Table 5. Results of covariance analysis in the variable of self-concept

Dependent Variable	SS	DF	MS	F	P	ETA
Self-concept	12012.16	1	12012.16	16.67	0.01	0.25
	34581.68	48	750.47	-----	------	----
	11664	1	11664	455.92	0.01	0.90
	1228	48	25.58	-----	------	----
	10609	1	10609	414.68	0.01	0.89

Table above shows the results obtained from covariance analysis test in the variable of students' self-concept. Intra-group factor with the f-value of 16.67is significant at the alpha level of 0.01. In addition, in-group factor with the f-value of 455.92 is significant at the alpha level of 0.01. The interaction between two situations (test and re-test) and groups (study group and control group) with the f-value of 414.68 is significant at the alpha level of 0.01. On the whole, results indicate that the increase in score mean in the test was significant for the study group. Hence, it could be said that mastery learning significantly increases the mean of self-concept scores for students. Mastery Learning increases student's achievement motivation .

Table 6. Results of covariance analysis in the variable of achievement motivation

Dependent Variable	SS	DF	MS	F	P	ETA
Self-concept	3469.21	1	3469.21	15.92	0.01	0.24
	10901.20	48	227.10	-----	----	----
	3751.69	1	3751.69	313.92	0.01	0.86
	574.56	48	11.97	-----	----	----
	3660.25	1	3660.25	305.78	0.01	0.86

Table above shows the results obtained from covariance analysis test in the variable of achievement motivation. Intra-group factor with the f-value of 15.92 is significant at the alpha level of 0.01. In addition, in-group factor with the f-value of 313.92 is significant at the alpha level of 0.01. The interaction between two situations (test and re-test) and groups (study group and control group) with the f-value of 305.78 is significant at the alpha level of 0.01. On the whole, results indicate that the increase in score mean in the test was significant for the study group. Hence, it could be said that mastery learning significantly increases the mean of achievement motivation scores for students.

DISCUSSION

Bloom believes that one main hypothesis in mastery learning is if proper conditions are provided and if enough time is available; all learners could acquire all the academic objectives of a lesson. Results obtained in this study indicate that there is significant difference between scores of academic achievement for the control and study groups. In other words, academic achievement in students who undergo mastery learning methodology is different from the students who undergo traditional methodologies. Therefore, it could be claimed that mastery learning translated into academic achievement for students. In addition, it confirms the results obtained by the studies done by Shekari and Kashani [8], Khalkhali [4], and Moradi [10] on effectiveness of mastery

learning, which all indicate that it leaves positive effects on students' academic achievement .

Findings indicate that mastery learning translated into improvement of self-concept in students. Results demonstrate that there is a significant difference between scores of academic self-concept for the control and study groups. In other words, academic self-concept in students who undergo mastery learning methodology is better than the students who undergo traditional methodologies of teaching .

Results of this study obtained in this study demonstrate that mastery learning increases achievement motivation in students. Results demonstrate that there is a significant difference between scores of achievement motivation for the control and study groups. In other words, achievement motivation in students who undergo mastery learning methodology is higher than the students who undergo traditional methodologies of teaching. This finding confirms the results obtained by Pazhooheshbal Shekari Kashani[8].

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