Effect of Self-Believe of Students on Educational Progress of Mathematics

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Abstract
In educational system of Iran, the students entered to high school after passing elementary school and junior high school by selecting their interested field of study. Among them, the students with weak performance in mathematics continue their studies in the field of human sciences, the students with average performance in mathematics continue their studies in the field of experimental sciences and student with high performance in mathematics continue their studies in the field of mathematics. It seems that there may be a hypothesis telling students with weak performance in mathematics have low self-believe. Therefore, their performance in mathematics may be improved by promoting their self-believe. The purpose of the present research is analysis the factor of self-believe on progress and performance in mathematics. The sample of this study contains 85 girl students of third grade of high school in Karaj City. The method of this research is correlation and the tools of this research include: self-believe test prepared by the researcher for measurement and test of mathematics as index for performance of students in mathematics in three fields of human sciences, experimental sciences and mathematics. The data gained with Pearson correlation coefficient statistical method shows that there is a direct meaningful relationship between self-believe and performance of students in mathematics. Moreover, it is shown that there is a different meaningfulness between the students of experimental sciences and human sciences from viewpoint of self-believe and according to the mean of self-believe it can be concluded that the students in the field of experimental sciences have the most self-believe. Therefore, it seems that the teachers and instructors can promote and establish efficient strategies for promotion of self-believe among students in school and educational institutes and this needs more studies and researches in this regard.

Keywords: Mathematics, self-Believe, educational progress, self-concept, learning, performance.
1 Introduction

Most researchers believe that self-believe has a multidimensional structure, because a one-dimensional structure does not present a complete and wide description from behavior. According to Scheirer & Kraut, self-believe is a multidimensional structure and this term should not be considered a simple and one-dimensional term. They believe that self-believe must not be imagined as a simple and unit aspect, even though as a complex structure it has various descriptive, evaluation, relative and effective aspects and there may be some differences between them. Marsh and Showlson also considered self-believe as a multidimensional structure. They say that they doubted that self-believe shall not be increased generally by promoting special aspects of self-believe because these aspects only analyze the physical aspects. If self-believe is considered as a one-dimensional structure, no relationship can be considered between it and one other structure. Most scientists separate scientific self-believe such as reading, mathematics and general concepts of training from its non-scientific fields such as social intrepidity, physical ability, physical attractiveness, relationship with friend and family communications (Marsh & Onil, 1984) [2]. Increasing development of science and technology, importance of learning and problem solving and complex problems of technology era led to more attention to teaching various sciences especially teaching mathematics to students as learners and multilateral diagnosis of psychological abilities plays an important role. Among this, the factors resulted to personal success in educational aspects, are studied and taken into consideration more than before. It is worth mentioning that despite of and common and old believe among people, the talent does not play an important role in educational success of people by itself. The observations and studies show that more people with talent higher than average are not very successful in education and or even people with equal talents differs from each other in learning mathematics. This resulted to asking this question: "What effective factors are distinguishing along with talent?". The perception of a person about her/himself plans an important role in determining his/her relations with other persons. When a child grows, s/he achieves more experiences and develops his personal images on him/herself as a person. Therefore, studying the concept of self or self-believe is considered as an important topic in psychology knowledge. Structure and organization of thinking and mind of each person, is resulted from his/her plan, program, role, technique, and strategy selected by him/her about him/herself or a subject. Therefore, logical development of such mental structures is important and fundamental in an educational system. Among all curriculum, mathematics is more effective tool in development of logical structural and mental processes due to its abstract nature in mind. In fact, because of the essential nature of this science, development of mental processes in a complete logic system is possible in in mathematical processes as well as achieving new communication channels between the existing concepts, due to strong and effective logic governing mathematical concepts and principles [7]. Self-believe is valuable in most psychological and educational opportunities as one of the effective consequences and often it is considered as an intermediate variable besides motivation for achieving desirable results in mathematical performance and learning. Self-believe is one of factors effecting on students’ educational performance. Self-concept is defined as "personal perceptions of a person about him/herself" (Marsh, 1993). In general, self-concept is a complex system of learnt believes, attitudes and believes of any persons about self [1, 4]. Mathematics progress in each society can prepare a bed for development of other scientific and industrial fields and development of mathematics is considered as criteria for evaluation of the amount of growth and technology. For development of mathematics, educational performance of students in mathematics is very important. Various studies and researches on psychology and educational sciences paid more attention to ability of determination and definition of a problem, creation and performance of various effective solutions, and motivation for using the maximum power for facing the problems for development of students’ performance on mathematics. Self-believe is valuable as an effective consequence in most educational and psychological conditions and it is recognized as intermediate variable beside the
motivation for gaining more desirable results in mathematical performance and learning. This research analyzes the relationship of self-believe and mathematical performance of students.

2 Literature of Study

Mahdavi (2008) studied research literature and studies related to the relationship between teaching music and self-believe in his research. This research includes five chapters:
1) The concept of self-believe, models and methods,
2) Music ability self-believe,
3) The relationship between general self-believe and music teaching,
4) The contents of the existing research,
5) Suggestions for the next researches.

The results showed that the interference methods designed for increasing the children assurance about their abilities in special fields, can be resulted to their development in case of achieving the prerequisite skills [2]. Franz (1992) selected 996 male students and 1325 female students for proving the relationship between self-believe and educational progress and after the necessary studies, he showed that there is a strong and positive relationship between educational progress and self-believe. The students with more positive self-believe show more educational progress in comparison with students with less self-believe and vice versa, students with more negative self-believe show lower educational progress [8]. Wigfield and Karpathian (1991) studied the relationship between self-believe and educational motivation. The results of their research showed that there is a positive relationship between self-believe and educational motivation [3]. Tersesa's research (1999) was about the relationship between self-believe, level of hopefulness, and educational progress among 40 male students and 49 female students. According to the results of this research, the students with positive self-believe and higher level of hopefulness, was searching the information more, showed more educational progress and tried hard to maximize their desirable results and avoided from undesirable results [5]. Tarkhan (2001) tried in his research to analyze the relationship between three important personality variables: self-esteem, self-believe and their control and analysis and their role in educational development in mathematics. The results showed that students having high grades in mathematics, showed more self-esteem, more positive self-believe and their control is more internal [6]. There were few studies in the field of self-believe and its relationship with mathematics. Therefore, this research is very important in this regard.

3 Strategies for Development of Self-Believe in Learning Mathematics

Here we can present strategies for improvement of self-believe among students through a model. The teachers must create movement motivations among students. Human is not a one-dimension creature that can be prosperous only based on his physiological factors. Man is a creature with various motivational, cognitive. Emotional and sentimental aspects that any neglect from one aspect changes him to an one-dimension and unable person. Educational methods should be changed for gaining self-believe. Whereas mathematics is a concrete and conceptual subject, from view point of self-believe most students are not able to learn mathematical concepts. Therefore, in the following model, it is tried to create fundamental strategies for strengthening self-believe among students that can held the mathematics teachers:
4 Hypothesis of Research

1st Hypothesis) There is a meaningful relationship between self-believe and mathematics performance of students.
2nd Hypothesis) There are minimum two fields that the amount of students’ self-believe is different in.

5 Method of Research

The present research is a descriptive-correlative research. In such researches the researcher is searching the probable relationship and amount of correlation between the mentioned variables. Therefore, the purpose of this research is not discovering the cause relationship, but it is determining a relationship for its meaningful connection. In general various events and factors can be related to self-believe, but the present research is going to analyze the probable relationship between self-believe and educational progress of female students in high school.

5.1. Subjects and Tools of Research

According to the subject of research, sample of this research is all high schools students in Dist. 3 of Karaj city in academic year 2013-2014. For determination of sample volume, multi-stage sub-cluster sampling method was used and one high school was selected among girl high school in Dist. 3-Karaj, and among various classes of this high school, three classes from three different field of study was selected randomly and they were analyzed statistically. It is worth mentioning that there are 3 classes in the third grade of experimental sciences, 2 classes in the third grade of human sciences and 2 classes in the third grade of mathematics in this high school and 25 to 29 students exist in each class. In this research, self-believe questionnaire (researcher-designed) was used for gathering information. These questionnaires were analyzed from viewpoint of reliability and validity while introducing them. As there is no access to a questionnaire analyzing self-believe from viewpoint of psychiatry and appropriate with the characteristics

Figure 1: Model of strategies for strengthening self-believe in mathematics
of researching society, a researcher-designed questionnaire is used. For this purpose, first some aspects of definitions of self-believe such as 'self-satisfaction', 'Self-respect', 'Competence', 'Efficiency', 'Self-Believe and Trust', and 'Self-Abilities' and … were extracted from the existing definition of self-believe. Then the questions related to the extracted concepts were selected among three questionnaires of 'Self-Efficiency' Sherz et al. and “Self-respect” of Smith and “Self-Satisfaction” of Ganji and the first questionnaire was compiled in this method. In this questionnaire, 38 questions were designed and prepared. The questions of this questionnaire ware placed in questionnaire in random order and the questionnaire was executed on 85 students in various fields (mathematics, experimental sciences and human sciences) and for determination of conceptual problems, all students were interviewed individually and based on this, some questions were placed in the questionnaire in an easier expression. For grading these items, two answers –‘yes’ and ‘no’- were used. The stability of the questionnaire was 74% based on Cronbach's Alpha Coefficient and the said questionnaire was observed by a number of professors in psychology and they confirmed its reliability. Moreover, mathematics tests were used as second tool for research in three fields of human sciences, experimental sciences and mathematics. These tests are designed by Ministry of Education of Iran and totally include 20 points.

6 Results

In this part, two parts of descriptive and inferential statistics were used. First the mathematics grades of students shall be explained in descriptive statistics. Then, their relationship with self-believe shall be analyzed through statistical exams in a meaningful level of 0.05.

Table 1: Descriptive statistics for mathematics grades of students

<table>
<thead>
<tr>
<th>Statistical Indexes</th>
<th>N</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics Grades of Answerers</td>
<td>85</td>
<td>20</td>
<td>2.25</td>
<td>12.38</td>
<td>4.77</td>
</tr>
</tbody>
</table>

As it's observed in Table 1, minimum mathematics grades of students analyzed in this research is 2.25 and maximum grade of them is 20 and the mean of mathematics grades of all answerers in three fields of mathematics, experimental sciences and human sciences is 12.38. Normal test survey was used for analyzing its normality. The results of tests showed that P-value of the existing amount is higher than 0.05 (0.41>0.05), therefore, the grades are normal. Then, the parametric tests were used. In this part, for analysis and testing the hypothesis, the various analyses are used for comparison of various fields in order to analyze the difference and for analysis the relationship between variables and analysis of differences, Pearson's correlative coefficient is used.

6.1. The Results of The First Hypothesis

For analyzing whether there is a meaningful relationship between self-believe and mathematics performance of students, Pearson's Correlation Coefficient was used and the results are mentioned in Table 2.
As you see in Table 2, P-value is less than 0.05 (0.000<0.05), therefore the hypothesis saying there is a meaningful relationship between students' self-believe and their performance in mathematics is confirmed. Whereas the gained Pearson's Correlation Coefficient is a number close to +1 ($r = 0.77$), there is a direct and strong relationship between self-believe and students' performance in mathematics.

6.2. The Results of The Second Hypothesis

Variance Analysis was used for analyzing the differences between students' self-believe in three fields of Mathematics, Experimental Sciences and Human Sciences.

HO: The amount of self-believe among the students of three fields (mathematics, experimental sciences and human sciences) is equal.

H1: There are minimum two fields in which the amount of students' self-believe is not equal.

Variance analysis is used for analyzing the differences of students' self-believe among three fields (mathematics, experimental sciences and human sciences) and the results are mentioned in Table 3.

As see in Table 3, P-value is less than 0.05 (0.04<0.05), therefore the HO saying the amount of self-believe among students of three fields is equal, is rejected in meaningful level 0.05. In continue, by using Scheffe Test binary students' self believe in various fields are analyzed and the results are mentioned in Table 4.

Based on the gained P-value, there is no meaningful difference between students' self believe in the fields of mathematics, experimental sciences as well as mathematics and human sciences, but there is a meaningful difference between the students of experimental sciences and human sciences and based on the average of self-believes, it can be resulted that the students of experimental sciences have the most self-believe.
7 Conclusion

Mathematics is one of the most important courses of high school whose importance due to its nature in mental processes development and it has an increasing importance and value as the basis for most of the fields. A lot of factors are involved in teaching and learning mathematics that can have positive and negative effect on teaching-learning approach. One of the most important factors in students’ performance in mathematics is self-believe. Self-believe means a desirable mental and spiritual status, resulting to persons’ merit and efficiency feeling and prepare him for using his merits and abilities in life and then perform his duties and stand against the living problems and obstacles. In other word, self believe is a belief on talents, abilities and internal potentials, resulting in the person’s life experiences, communications and interpretations and relying on it, the person can gain his goals in the life and in the highest level of self-believe all potential talents shall be flourished. In the present research, the results of the first hypothesis showed that there is a direct and meaningful relationship between self-believe and students performance in mathematics and as the Pearson’s coefficient is close to 1, showed that there is a strong relationship between self believe and performance in mathematics and in 95% accuracy it can be said that the performance of the students shall be increased in mathematics by increasing the student’s self-believe. Therefore, it can be concluded that one of the effective factors on students' performance in mathematics is self-believe and by increasing the students’ self-believe, there can be a positive step in increasing their performance in mathematics. In the second hypothesis, the amount of self-believe among the students of three fields (mathematics, experimental sciences and human sciences) is not equal. There is a meaningful difference in self-believe between the students of experimental sciences and human sciences. The students of experimental sciences have a high self-believe because the students can select experimental sciences whose grade is more than 12 in three courses of biology, chemistry, and physics but one of these courses can be less than 10. Now the students who cannot select experimental sciences, selects field of mathematics for avoiding from enrolment in the field of human sciences and work and knowledge, although they may have no interest to mathematics. Some of them cannot pass mathematics, even. According to the importance of self-believe variable in performance of mathematics, it is suggested that it must be tried to prevent them from gaining negative educational experiences because their successful experiences can prepare positive feedbacks and this resulted to formation of valuable feelings and self-believe. The teachers must be aware of the ways which is important in the students’ educational behavior. This awareness shall be resulted to their decision making and it can increase the students’ educational motivation. This research is done on girl students and it is suggested this research shall be performed on boy students, too.

References


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