THE IMPACT OF INSTRUCTING SELF - REGULATION LEARNING STRATEGIES ON FEMALE HIGH SCHOOL STUDENTS' TEST ANXIETY, SELF-ESTEEM, AND LEARNING OF MATH AND BIOLOGY IN BOJNORD, IRAN

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ABSTRACT: *The purpose of the present research is to investigate the impact of instructing self - regulation learning strategies on high-school students' test anxiety, self-esteem, and learning of math and biology. The population of this study are two thousand female, first-year, high-school students in Bojnord in 2012-2013 academic year. Fifty students were selected through stratified random sampling and were randomly assigned to two groups. The instruments used in this study include Abdolghasemi test anxiety test (TAT), Koper Smith self- esteem questionnaire, and pre-tests and post-tests related to math and biology. The methodology of this study is experimental and its design is pre-test and post-test by means of experimental and control groups. Independent T-test and ANOVA were used to analyse the data. The findings indicated that instructing self - regulation learning strategies leads to the decrease of test anxiety and increase of self-confidence. It will also boost mathematics and biology learning.*

Key words: learning, self-regulatory, self-esteem, test anxiety

INTRODUCTION

Enforcing educational programs in schools calls for paying attention to students' psychological conditions. Due to the special features of adolescence, higher anxiety and lower self- esteem and self- confidence are observed in this period. Therefore, tackling anxiety and boosting self- confidence and self- esteem should be top priorities for educational authorities [1].

Test anxiety is one of the factors threatening students' psychological well-being and affecting their efficacy, potentials, and social personality and identity [2]. Test anxiety is one of the factors affecting academic achievement affecting millions of students all over the world. Anxiety is an undesirable emotional reaction to lack of success in evaluation. It is concomitant with a sense of tension and the activation of the automatic nervous system. Anxiety menaces student's psychological well-being and negatively impacts their efficacy, potentials, and social personality and identity. It is a wide-spread phenomenon having a negative influence on students' academic achievement [3]. Johnson believed that students suffering from test anxiety have to devote more time to study, cannot rely on their abilities, have a sense of inefficacy, and feel that they are prone to failure [4]. Tobias (1985) held that there is a linear relationship between study skills, test anxiety, and self-belief. Inadequate and inappropriate study habits lead to test anxiety and this construct is one of the factors causing students to have negative self-belief [4].

One of the most evaluation indexes in the education system is learning, which is used to improve students' cognitive, emotional, and personality traits [5]. The advances of the new era have illustrated the importance of learning, which calls for the importance of learning strategies (cognitive and meta-cognitive strategies). Conducting research on high school students, experts have come to the conclusion that many learners need instruction with regard to self-regulation, self-control, and identifying ones' problems [6].

Atkinson has considered academic achievement as the ability to be learned in the subjects taught or the ability leaned in the instructional subjects, which is measured in different ways. The importance of investigating academic achievement lies in the fact that academic achievement dominates learning. Teachers should enhance the learning conditions in order to boost students' motivation to learn different. They should also improve the quality of instruction to subjects so that students reach success and gain confidence in their ability to learn [7]. Self-esteem is a construct that is under the influence of the educational environment. This construct is important in all stages of life. A wide range of psychological investigations indicated that if self-esteem does not exist, needs such as to create and to gain success are not satisfied [8]. Koper Smith considered self-esteem as one's evaluation of himself gained by paying attention to himself. It indicates the degree to which an individual is confident in his abilities, success, and value. Self- esteem is related to learning. Kernis et al. found that one's self-esteem is related to one's image of his abilities [9]. Koper Smith asserted that low self-esteem leads to low perseverance, self-confidence, and academic achievement, and forces individuals to change the situation or to compromise [8].

There are many factors affecting learning, one of which is self-regulation. This issue has been investigated by many experts. Self - regulation is an active and organized process during which individuals set some goals for their learning. Then, they try to regulate, control, and monitor their cognition, motivation, and behaviour [7].

Self- regulation is a construct first introduced by Bandura. The pioneering studies in this regard had a general approach to self-regulation dealing with individual, family, and social domains. Since 1980's, this concept has been examined in the educational context. The role of self-regulation in learning, particularly in academic achievement and professional success, has led behavioural, cognitive, structural, and particularly social cognition theories [10].

Meta-cognitive strategies have an important role in self - regulation by means of self-monitoring and self-evaluation.

The interaction between these strategies, cognitive elements, and motivational beliefs increases individuals' capabilities. Having a better understanding of self-regulated learning enables students to enhance their learning. Therefore, becoming familiar with self-regulated learning skills can play a salient role in this regard. There are many students who suffer from academic failure and frustration because they are not equipped with study skills and strategies, which are an instrument to solve academic problems and develop the skills need in one's education. Identifying and developing these skills enable students to reach full academic achievement [11]. If students want to succeed, they should have self-regulation motivational beliefs and learning strategies. Learning these strategies is related to motivational beliefs, adaptive orientation patterns, and higher levels of self-efficacy, goal orientation, and internal motivation [12].

Research has shown that students have encounter tension-provoking factors such as fear, anxiety, frustration, conflict, marriage, shyness, depression, anger, and jealousy. If they are not able to cope with these factors, they will be prone to physical, mental and social damage [13].

Young [14] considered learning strategies as a powerful tool to illustrate the way the learning process is developed. Young believed that these strategies improve self-learning and independence in learning and facilitates the process of learning. Therefore, due to the important role of self-regulation and its related strategies in the process of learning and the impact they have on students' anxiety, self-esteem, and learning, this research project is defined. It aims at testing the following hypotheses:

* Instructing self-regulated strategies causes high - school female students' test anxiety to decrease.
* Instructing self-regulated strategies causes high - school female students' self-esteem to increase.
* Instructing self-regulated strategies has a positive influence on high-school female students' learning of math.
* Instructing self-regulated strategies has a positive influence on high-school female students' learning of biology.

METHODOLOGY
The methodology of this study is semi-experimental with pre-test - post-testdesign. The population of this study is all first-year high school students in Bojnord, Iran. One region of the city was selected through random sampling. One high school was randomly selected in this region. This school had two first-year classes, one of which was randomly assigned as the experimental group and the other assigned as the control group. Each group had 25 students. First, the two groups were given pretests for test anxiety, self-esteem, math, and biology. The experimental group received instruction with regard to self-regulation learning strategies. The instruction took two sessions a week. There were 8 sessions, each 90 minutes. The control group received no instruction. Post-tests with regard to the four variables were given to the two groups.

Table 1: The semi-experimental design with experimental and control groups

R	T1	X	T2
R	T1	-	T1

The following instruments are used in this study:
A. Abdolghasemi test anxiety questionnaire
This questionnaire has 25 items with a four -point Liker scale (from 0 to 3). It has a score range of 0 to 75'. The higher score indicates a higher level of test anxiety. The reliability and validity of this instrument has been examined by Abdolghasemi and colleagues in a sample of third-year students in Ahwaz, Iran. Moreover, the test-retest reliability coefficient and Cronbak coefficient of this questionnaire has been 0.77 and 0.94 respectively [15]. The content validity of this questionnaire for third-year junior high school students has been approved by experts. The Cronbaoh alpha reliability of this instrument has been 0.77.
Koper Smith self-esteem questionnaire.
This instrument was designed in 1968 and consists of 58 items. Fifty items measure self-esteem and eight ones test the truth of the answers. The items of this instrument are yes-no questions, scored by 1 and 0 respectively. Individuals scoring 25 or higher are considered to have high self-esteem and those who score below 25 are deemedto have a low level of self-esteem. The split-half, Cronbach alpha, and Gatman reliability of this questionnaire are 0.85, 0.87, and 0.80 respectively. The validity of this instrument for this study has been approved by experts in the field of psychology, and its reliability is 0.72 by means of Cronbach alpha.
Mathematics pre-test and post-test

The validity of this test has been approved by the supervisor and the advisor and three experienced math teachers. Its reliability has been 0.40 by means of Cronbach alpha.
Biology pre-test and post-test
The validity of this test has been approved by the supervisor and the advisor and three experienced biology teachers. Its reliability has been 0.30 by means of Cronbach alpha.
A summary of the self-regulation learning strategies instruction program is as follows:
The first session was devoted to introducing the therapeutist and the participants, the rules and goals of the program, and the method of instruction. Moreover, strategies related to goals setting, time management, and tackling hesitation were instructed.
Second session
Issues related to information processing and memorization, recall, and comprehension strategies, including topics such as sensory memory, working memory, and short term memory were discussed.
Third session
Studying and learning strategies (cognition) were introduced and some exercises were given to students (strategies such as reviewing basic points and meaning expansion).
Fourth session
Students' homework was examined and studying and learning strategies for complex issues and also expansion strategies for such issues were introduced. Material organization and mind mapping were also discussed.
Fifth session
After evaluating students' homework, studying and learning strategies (meta-cognitive strategies), cooperative studying,

and skills to inspire motivation in learners were discussed. Then, team work was dealt with.

Sixth session

Problem solving, the process of problem solving, and skills to improve learners' ability in this regard were discussed.

Seventh session

Preparing for exams, ways to reach concentration and comfort for exams, and learning strategies were dealt with.

Eighth session

Ways to gain concentration in learning and reduce test anxiety, effective therapeutic methods for test anxiety, and methods to tackle distracting factors were discussed.

RESULT

This study was carried in two 25-member groups. Table 2 shows descriptive statistics for test anxiety for the two groups after the effect of pre-test was excluded.**Table 2: Descriptive statistics for test anxiety for**

The two groups after the effect of pre-test was excluded

Group	Mean	No.	SD
Control	8/75	25	15.57
Experimental	25/55	25	9.21

Table 2 indicates that the mean score of test anxiety for both groups has decreased, but the decrease is more significant for the experimental group.

Table 3 shows descriptive statistics for self-esteem for the two groups after the effect of pre-test was excluded.

Table 3: Descriptive statistics for self-esteem for the

Two groups after the effect of pre-test was excluded

Group	Mean	No.	SD
Control	0.30	25	7.29
Experimental	5.48-	25	10.01

Table 3 indicates that the mean score of self-esteem for the experimental group has increased after the effect of the pre-test was excluded, while that of the control group has decreased.

Table 4 shows descriptive statistics for math and biology mean scores for the two groups after the effect of pre-test was excluded.

Table 4: Descriptive statistics for math and biology mean

Scores for the two groups after the effect of pre-test was excluded

	Group	No.	Mean	SD
Math learning	Control	25	2.28	1.72
	Experimental	25	4.16	2.39
Biology learning	Control	25	2.24	2.05
	Experimental	25	5.08	2.08

Table 4 illustrates that after excluding the effect of the pre-test mean scores of math and biology learning in the experimental group has risen.

In order to analyze the date related to test anxiety and self-esteem, Independent t-test was used to examine the difference between pre-test and post-test results. For using t-test, the assumptions of normal distribution were tested by Galmagroph-Spernoph test, and the homogeneity of variances were checked by Levin test. The results of t-test are shown in Table 5.

Table 5: The results of inferential statistics using independent t-test (after the effect of the pre-test is excluded)

Variable	Mean difference	Standard mean of difference	T	df	Sig.
Test anxiety	16.98	3.48	4.89	53	0.001
Self-esteem	5.51	2.35	2.34	53	0.0023

Table 5 indicates that the difference between the two groups is significant (t=4.89). Therefore, with 95 percent certainty, the null hypothesis is rejected. In other words, teaching students to use self-regulation strategies helps them reduce their test anxiety. In addition, the difference is statistically significant (t=2.34). Therefore, with 95 percent certainty, the null hypothesis is rejected. In other words, teaching students to use self-regulation strategies helps them increase their self-esteem. In order to analyze the date related to math and biology learning, MANOVA was run to examine the difference between pre-test and post-test results.

Table 6 compares the pre-test and post-test scores related to math and biology learning. In order to compare the pairs, the column related to the intervening effect is considered. If we consider the results of the dependent variables separately, using the moderated BinFroni alpha (0.012), both variables have reached the significance level. In other words, after excluding the effect of the pre-test, the instruction of self-regulation strategies had a positive impact on students' learning of math and biology.

DISCUSSION and CONCLUSION

Investigating the first hypothesis revealed that teaching self-regulation learning strategies significantly reduced students' test anxiety score. This is in line with Khaksar [16], Bornes [17], Farokhi [18], Kaviani et al. [19] and Haman et al. [20].

As a part of life, anxiety exists in all individuals. Although some anxiety can be helpful, it can be chronic. In this case it cannot be considered as an organized

Table 6: The results of inferential statistics using MANOVA

(After the effect of the pre-test is excluded)

Variable	dependent variables	Sum of squares	df	Mean of squares	F	Sig
Pre-test	Math	518/42	1	518/42	119/41	0/000
	Biology	/78669	1	669/78	157/29	0/000
Intervening effects	Math	44/18	1	44/18	10/18	0/000
	Biology	100/82	1	100/82	23/68	0/000
Error effects	Math	208/40	48	4/34		
	Biology	204/40	48	4/26		
Total effects	Math	771/00	50			
	Biology	975/00	50			

p<0/05

responses, and canbe a source of failure, posing problems for individuals.

Since the main components of self-regulation are positive attitude, motivation. time management, stress control, information processing, choice of main idea, and self-evaluation, making students aware of self - regulation learning strategies and helping them master these strategies enable them to cope with their anxiety. Students have to encounter tension-provoking factors such as fear, anxiety, frustration, conflict, marriage, shyness, depression, anger, and jealousy. If they are not able to cope with these factors, they will be prone to physical, mental and social damage. Therefore, in order to improve students' mental health, they should be taught to use self-regulation learning strategies. These strategies are very effective in preventing cognitive interference and negative concerns due to short-term memory burden and other distracting factors, resulting in the reduction of test anxiety. It seems that the most important factor in this regard is inappropriate and insufficient studying habits or test-taking skills. Lack of these skills leads to test anxiety.

Examine the second research hypothesis showed that instructing students to use self- regulation learning strategic is effective to boost their self-esteem. This is in line with Zarei et al. [21], Nolen and Morgan and Barkhordarpoor and Sarmad cited in Zarei et al., [21]

Gaining self-regulation strategies improves learning. Since this progress is in line with an individual's goals, it offers a sense of satisfaction with his performance, increasing his self-esteem. The positive enforcement due to applying these skills and strategies and obtaining academic success offers them motivation. Not being fully able to use self-regulation strategies prevents students from benefiting from the positive features of the learning environment and overshadows their physical and mental health and intellectual abilities. On the other hand, these strategies can compensate for the problems of the learning environment and low level of motivation [22].

Koper Smith considered self-esteem as one's evaluation of himself. It is the degree a person believes in his abilities, success, and values. Individuals lacking studying skills cannot reach their desirable goals in spite of making huge efforts. This causes them to have a negative view towards themselves, reducing their self-esteem. A person's self-esteem is a part of his self-concept and derives from the judgement he makes about his value and the feelings about this judgement. Research on self-regulation strategies have indicated that by instructing self-regulation strategies we can enhance students' self- concept and self-esteem. These strategies also help students to be more accepted by their peers, improve their social skills, and reduce the probability of being stigmatised [23].

Foolad Chang suggested that if the education system aims at preparing students who can solve the problems of the society, which has dramatically changed, and take the responsibility of their own learning, it should pay special attention to the instruction of self-rxegulation strategies because these strategies encourage students to have more perseverance and be more responsible [21]. Investigating the third and the fourth hypotheses showed that the instruction of self-regulation strategies had a positive impact on students'

learning of math and biology. Farokhi [24] indicated that the instruction of cognitive and meta-cognitive strategies had a positive impact on students' comprehension and academic achievement. Samadi [25] also had the same finding in female students.

Zimerman et al. [26] believed that self-regulation learning strategies are methods to gain knowledge and skill. These strategies are a new perspective to learning because they are based on how students activate, change, and regulate their learning process.

The most important outcome of cognitive psychology which hasbeen widely researched is the assumption that learning is to be learned and success in academic and social life requires learning how to learn. Iranian students have the capacity to learn these strategies. Researchers have developed a variety of learning methods and have examined the effectiveness of these methods. In our country, inability to learn, lack of motivation and concentration for learning, and not having a clear goal for learning are students' most important problems for learning .All these problems are rooted in the fact that they do not receive instruction on how to learn. Teacher expect students to memories and recall a huge bulk of information but do not show them how to do it.

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