

The Effectiveness of Self-regulation in Students' Academic Achievement Motivation

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ABSTRACT

Objective: This research was conducted to study the effectiveness of self-regulation training among female students' academic achievement motivation in Birjand City, Iran.

Methods: In this interventional comparative study (pretest-posttest design with control group), 84 eighth grade students (from public intermediate schools) in Birjand were selected through multi-stage cluster sampling. They were placed in two groups: experiment and control with randomization. The academic achievement motivation test and science test were administered as pre- and post-tests, respectively. The experimental group was taught self-regulation skills in 8 sessions. Data were analyzed using the mixed-design factorial analysis of variance model.

Results: The results showed significant differences in the experiment group's achievement motivation test ($p < 0.05$), but no signs of change in the science test.

Conclusion: We can provide students with effective and useful tips to improve their academic achievement and performance by teaching them self-regulation skills.

1. Introduction

Motivation often refers to the reasons why human beings behave differently under different circumstances. Simply put, motivation is defined as the direction and intensity of one's efforts. 'Direction of effort' refers to the goals one wants to achieve, and 'intensity of effort' refers to the extent that person tries to achieve those goals (Ahmadi, Namazizadeh, Abdoli, & Seyedalinejad, 2009; Paul & Elder, 2013).

Motivation is an innate phenomenon that is affected by four factors including: situation (environmental and outer stimulants), temper (inner state of organism), aim

(aim of behavior, purpose and tendency), and tool (tools applied to achieve goals). To achieve their goals, human beings first need to acquire the necessary incentives. For example, academic achievement motivation is very important to scholars (Firouznia, Yousefi, & Ghassemi, 2009).

Academic achievement motivation refers to behaviors related to learning and progress in school (Ames, 1984). Battle believes that academic achievement motivation can be defined as a comprehensive orientation towards self-performance evaluation – keeping in mind the best criteria, pursuing successful performance and enjoying it (Battle, 1966). With this motivation, individuals can finish assignments successfully and achieve their goals

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with a certain degree of competency till they become successful in learning and academic achievement (Firouznia, et al., 2009).

Motivation plays a very significant role in academic competence. The more motivation students have, the more interest they have in learning. In fact, motivation is the stimulant of one's activities and defines one's direction. However, it is not only a stimulant of one's behavior, but also has a great role in learning. Actually, motivation is a prerequisite for learning among students and its impact on education and learning has been confirmed (Pooeslami & Shirazi, 2001). If students are not interested in lessons (i.e. have a low level of motivation), they will ignore the teacher's explanations and trifle their homework. Thus, they will make no progress. However, if they are interested in their lessons (i.e. have a high level of motivation), they will pay attention to their teacher's explanations and also take their homework seriously (Seif, 2008).

Husén considers academic achievement motivation unique in the sense that it can be called as the student's 'inner motivation'. Through this, the student believes s/he has the necessary competence and self-control. Therefore, it is essential to identify the factors related to academic achievement motivation and academic performance (Husén, 1967). One such variable is self-regulated learning. Self-regulation is a factor which was introduced by Bandura in the 1967's. Preliminary studies on self-regulation were conducted at different personal, familial, and social levels. Bandura describes self-regulation as the ability to begin and give up necessary activities, social and educational opportunities, and the ability to postpone achieving task or a desired goal (Bandura, 1988, 1991; Hasanpour, 2008). One theorist who had a great impact on the expansion of self-regulation was Zimmerman. Zimmerman describes self-regulation as self-regulation of thoughts, emotions and self-generated actions, which are planned and acquired periodically to achieve personal goals (Garner, 2009; Zimmerman, 2008; Zimmerman, Bonner, & Kovach, 1996).

Based on literature, individuals have two systems of self-regulation: promotion self-regulatory focus and prevention self-regulatory focus. In promotion focus, the subject is sensitive to positive results, whereas in prevention focus the subject is sensitive to the absence of losses. Results of examinations have shown that through transformational leadership, promotion relies considerably on job satisfaction. Nowadays, the significance of self-regulation has been emphasized in all psychological

aspects of Human behavior, not only in the emotional aspect (Tseng & Kang, 2009).

Self-regulation is a skill that individuals employ to change their thoughts, feelings, desires, and daily activities to attain higher goals. In fact, self-regulation includes strategies, which individuals use to regulate and control their cognition. Pintrich (2000) says self-regulation is an active and constructive process that learners verify, regulate, and motivate to control their cognition and behavior (Pintrich, 2000).

Students who are self-regulated have certain features distinguishing them from students who are not. These features include 1) using cognitive strategies, 2) controlling and trying to arrange time, 3) programming and controlling mind processes to reach personal goals, 4) creating appropriate learning environments, 5) putting in adequate effort to control and regulate academic assignments and the class environment (Montalvo & Torres, 2004).

There are different models for teaching self-regulation. These models emphasize the active role of learners in the learning process. The aim of each self-regulation model is to state how to form and expand self-regulation capacities and independent skills to affect academic and personal success (Zibazadeh, 2007; Zimmerman, 1989). These models include Borkowski (process-oriented model of metacognition), Boekaerts (consistent framework with learning), Pintrich (general framework for self-regulation), Winn (four stages of self-regulation training), and Zimmerman (Social cognition of self-regulation) (Puustinen & Pulkkinen, 2001).

The Zimmerman model was chosen in this study because of its novelty and for having a full teaching methodology. In this model, students' self-regulation skills are described as management skills; time management; note taking; anticipation; and preparation for a test, writing, understanding, and summarizing from the text. To develop each of these skills, a repetitive cycle is completed, which includes 'self-evaluation and monitoring, goal-setting and program-planning, implementation strategies, outcome monitoring and remediation strategies' (Zimmerman, 1989).

Earlier studies have shown that self-regulation learning (SRL) is associated with academic achievement (Heikkilä & Lonka, 2006; Mard-ali & Kooshki, 2008; Nota, Soresi, & Zimmerman, 2004; Samadi, 2007; Sobhaninejad & Abedi, 2006). Moreover, a large number of studies have shown that there is a relationship between

self-regulation and achievement motivation (Jabbari, Khodapanahi, & Heydari, 2003; Mousavinejad, 1997; Pintrich & De Groot, 1990; Shih, Chang, Chen, & Wang, 2005). Elsewhere, the effect of self-regulation skills in teenagers' was examined. This impact caused the ability to control and manage feelings, thoughts, behavior and recognition. Besides, teenagers evaluate and supervise their own behavior through reflecting upon and judging themselves and observing their own reactions. Hence, a better and more positive perspective of the future can be achieved by improving one's capabilities to achieve higher levels of efficiency (John Biggs, 1993; J Biggs, 2001; Boekaerts & Niemivirta, 2000). According to Zimmerman and Boekaerts' studies, subjects with self-regulation skills illustrate increased motivation, self-control, and satisfaction (Boekaerts & Niemivirta, 2000; Zimmerman, 1989, 2008; Zimmerman, et al., 1996).

Kuyper investigated the relationship between motivation, metacognition, and self-regulation as predictors of long-term academic success. The results showed that motivated students who used metacognition strategies and self-regulation in their academic course made better progress (Kuyper, Van der Werf, & Lubbers, 2000). Montagu (2007) investigated the impact of SRL in mathematics; students with learning disabilities who had received self-regulation training could understand new concepts and succeeded in self-efficacy and contingent responses (Montague, 2007).

Zimmerman et al., examined the relationship between self-regulation, academic achievement and flexibility. The results showed that students who used self-regulation strategies were more successful in learning and academic achievement than other students (Nota, et al., 2004; Zimmerman, 1989). Britton investigated the relationship between academic achievement and time management and realized that individuals with academic targets and timing who acted in a specified time frame and had a specific attitude towards time had higher academic achievements (Britton & Tesser, 1991). Ravari et al., (2008) investigated how students managed their time in the University of Medical Sciences. The results showed significant differences between the field of study and duration of study in a day (Ravari, Alhani, Anoosheh, & Mirzaie-Khalilabadi, 2008).

On the other hand, Rezvan et al., (2006) found that teaching cognitive skills (which themselves are part of self-regulation skills) to 'students on probation' resulted in their academic progress and made them happier (Rezvan, Ahmadi, & Abedi, 2006). In a case-control study, Fooladchang (2003) taught self-regulation to high school

students in 6 sessions, and observed better performance in the experiment group (Fooladchang, 2003). Upon examining the self-regulation theory as a key step in rehabilitation, Siergret et al., (2004) concluded that using self-regulation and goal-setting skills could help reduce depression and anxiety and prove useful in rehabilitation programs, as they regulate thoughts, feelings, and emotions (Siergret, McPherson, & Taylor, 2004).

In recent years, certain changes have taken place in the education system, and are currently underway too. The titles and contents of school books are also changing. The interest of the students to new contents of school books and learning them is not clear. Taking into account these changes and the possibility that the results of earlier studies may no longer apply to the new system and books, the current study was designed to test the following hypotheses:

Teaching management and time management skills through the self-regulation model has a positive effect on students' academic achievement motivation. Teaching management and time management skills through the self-regulation model has a positive effect on students' academic performance in science studies.

2. Methods

A semi-experimental and interventional-comparative study of pretest-posttest design was conducted.

Female students were selected through multi-stage cluster sampling from some Birjand public intermediate schools during the 2012-2013 academic year. Inclusion criteria were eight grader female students from an exemplary public school. Exclusion criteria were unwillingness to cooperate, and having been diagnosed with a specific psychological disorder.

In the first stage, upon collaboration with Birjand Department of Education, its public (girls only) intermediate schools were identified. Then, educational experts who had in-depth information about the aforementioned schools were asked to choose schools which were known as ordinary schools. Usually, children from middle class families attend these schools.

In the second stage, two schools were chosen at random from the list of selected schools. In the third stage, one school was chosen for the experiment and the other for the control. In the fourth stage, one eight grade class was chosen at random for the experiment and another was chosen as the control from the schools selected. The

second control group was chosen from another school. Then, the academic achievement motivation and academic performance tests were applied among the eight graders and 79 out of those who had scored below average were randomly selected. Since the study was of experimental nature, 25 & 29 students were randomly assigned to the control groups and 25 were assigned to the test group. The subjects received 8 sixty-minute sessions of self-regulation training once a week.

The study was conducted through four phases: 1) preliminary application of the test and selection of research samples, 2) pre-test, 3) academic self-regulation training, 4) post-test. A follow-up test was not performed because the research team considered both variables (i.e. academic achievement motivation and academic performance) as a whole.

After selecting the sample group, the time management questionnaire, the academic achievement motivation scale and the academic performance test (experiment group, control 1 and control 2) were given to all participants. During the pre-test, the participants' questions were addressed and they were acknowledged for their presence. The experiment group was invited to participate in the classes (held in 8 sessions). Zimmerman theory (1996) was used to design the time management training sessions, and the remaining sessions were designed on the basis of programs carried out by Schunk (1991) and Conrad's (2005) study results (Conrad & Sireli, 2005; Schunk, 1991; Zimmerman, et al., 1996)

In the first session, the trainer introduced himself and stated the purpose of the course. Then he talked about the importance of self-regulation and time management. In the second session, the researcher asked students for their opinion about the first session. Then the first stage of training i.e. monitoring evaluation was held by giving the time management forms to students. In this step, based on the content that was supposed to be taught, important reading material and a series of questions from the lesson content were defined for the next session and given to the students. In the self-evaluation form, the students were asked about their method of study and were also asked to evaluate and manage their method of achieving their goals.

At the beginning of the third session, students expressed their opinions about the second session. The researcher addressed the students' questions about the time management forms. Then the researcher reviewed the students' work and addressed their questions. The researcher stated the targets of the third session and taught

the self-efficiency chart. During each step of training, exercises, and examples were given to students to solve. In the Fourth session, the researcher reviewed and evaluated the students' forms. Then, after explaining the goals of the session, he taught the next step of self-regulation which was goal-defining. For this purpose the researcher gave the students a goal-defining form. Then, he taught some management and time management skills. The researcher and students practiced with some exercises. He then asked students to set a few goals for the next session - with the help of their teacher- and to observe how they achieve those goals on the basis of the first step (self-evaluation form).

In the fifth session the researcher reviewed the previous session and reviewed the goals and strategies selected by the students. Then, the researcher taught the third step, which was implementation of strategies and observation. One of the characteristics of this stage is that a student executes and evaluates her plan. With the help of the teacher, the researcher defined a series of assignments for the students' next session. Students were asked to choose the goal and strategies for achieving that goal and to control the way they did so.

In the sixth session outcome monitoring and correction of strategies was taught. Then, the researcher gave students the outcome monitoring form and asked students to write all the steps they had gone through for the next session. Exercises for this step were done by the researcher. In the seventh session, the researcher reviewed the students' work and compared their selected goals and strategies. Then, students were asked for their opinions about the selected goals and strategies used in the previous step. The researcher asked students to define new goals and strategies if their goals had not been achieved, and to evaluate and observe their way of achieving those goals. Finally in the last session, the researcher evaluated the students' work. Students wanted to write their opinions about the educational course in the survey form. At the end of the course, all forms were collected.

After completion of the training course, all members of the sample group (experiment group, control group 1 and control group 2) were invited and acknowledged again. They were asked to complete the academic achievement motivation scale for the second time. Students' grades in science were recorded in the final exam.

The data of this study was obtained by completing the academic achievement motivation scale and the academic performance test (in science) by both experiment

and control groups before and after the implementation of the independent variable.

Academic achievement motivation test, which has 49 items and is based on a Likert scale. It assesses 11 factors of academic achievement motivation (goal-oriented, competitiveness, inclination to work and homework, inclination to progress, social ties, social assistance, fame seeking, financial rewards, domineering, self-esteem and self-reliance) (Vallerand et al., 1992).

The validity and reliability of this scale has been reviewed and approved by McInerney and Sinclair (McInerney & Sinclair, 1992). In Iran, Mahmood Bohrani (Bohrani, 1993) has reported the reliability of this scale at 70%. Bahrami and Rezvan (Bahrami & Rezvan, 2006) have reported the reliability of this scale at 80% using the retest method. In this research the reliability of this scale was estimated at 75% using Cronbach A.

Second, the students' academic performance test comprised a) the score obtained in the science teacher-made pre-test b) the score obtained in the science post-test. Regarding Ethical consideration, informed consent was obtained from participants and were assured their information will remain confidential.

3. Results

In this research three groups were studied. These groups included one experiment group and two control groups. Each of these groups was measured on two occasions (pretest and posttest) with the academic achievement motivation test and science test. Based on the results, the effectiveness of the training was judged.

There was no significant difference between groups in basic variables and demographic indicators such as: age, economic and social situation, and academic performance in the last year.

Factorial analysis of variance (mixed-design model) was used to analyze the data. Before performing the variance analysis, we first confirmed the randomness of data, the homogeneity of variances, and independence of data.

As illustrated in table 1, the average score of the experiment and control groups was not significantly different in the pretest for the academic achievement motivation test (174.80 versus 179.72 and 185.56). However, there was a significant difference in the average posttest scores (180.76 versus 176.89 and 183.92), which was in favor of the experiment group. The average scores of both experiment and control groups had increased compared to the pretest results (12.59, 12.54, 12.80) in the academic performance test.

To test the difference between the groups in pretest and posttest, analysis of variance was used. The results are presented in table 2.

According to table 2, the amount of F among subjects was 0.164, which shows the difference between the two experiment and control groups in academic achievement motivation, which was not significant at a $P=0.687$. According to the Table, the experiment group's score in the academic achievement motivation test was higher than that of the control group.

The effect of interaction on the experimental procedure (time management training) with F was equal to 4.95, which was significant at 0.009, meaning the interaction between implementation of the two-step test and training intervention could cause significant changes in academic achievement motivation. So, the first research hypothesis about the effect of time management training on academic achievement motivation was confirmed.

Table 3 shows descriptive indicators, numbers, means, and standard deviation for the experiment, control 1 and control 2 groups in the pretest and posttest. According to table 3, the amount of F among subjects was 53.424. It shows that the difference between the two experiment

Table 1. Descriptive indicators of academic achievement motivation and academic performance (pre-test and post-test)

Group	Academic performance						Academic achievement motivation					
	Post-test			Pre-test			Post-test			Pre-test		
	n	SD	M	n	SD	M	n	SD	M	n	SD	M
Experiment	25	4.18	14.07	25	3.26	12.59	25	15.144	180.76	25	14.80	174.80
Control 1	29	3.64	15.28	29	3.18	12.54	29	12.54	176.89	29	10.92	179.72
Control 2	25	3.08	15.24	25	3.30	12.80	25	15	183.92	25	12.61	185.56

Table 2. The summary of combined analysis of variance to assess the effect of time management training on academic achievement motivation

Source of variation		Eta-squared (η^2)	P	F	Mean square	df	Sum of squares
Intra rater	Experimental procedure	0.002	0.687	0.164	9.72	1	9.72
	Experimental procedure × Group	0.115	0.009	4.95	294.64	2	589.29
	Error	-	-	-	59.45	76	4518.42
Inter rater	Group	0.062	0.088	2.512	765.212	2	1530.42
	Error				304.61	76	23150.61

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and control groups on academic performance was significant at $P < 0.001$. According to the table, the scores of posttest are generally higher than those of pretest.

The effect of interaction on the experimental procedure (time management training) with F was equal to 1.602, which was not significant at 0.208, meaning the interaction between implementation of the two-step test and training intervention did not cause significant changes in academic achievement motivation.

One of the constructs that explain motivation is academic achievement motivation. One of the variables related to academic achievement motivation and academic performance is self-regulation training. Psychologists believe that SRL includes several processes and components. The main processes and components were expressed by Bandura & Zimmerman et al., (Bandura, 1988, 1998; Zimmerman, 1989). Bandura believed that learning comprises three processes: a) watch yourself, b) assess yourself, and c) react to yourself (Bandura, 1998;

Table 3. The summary of combined analysis of variance to assess the effect of time management training on academic performance

Source of variation		Sum of squares	df	Mean square	F	P	Eta-squared (η^2)
Intra rater	Experimental procedure	199.211	1	199.211	53.424	0.00	0.407
	Experimental procedure × Group	11.95	2	5.975	1.602	0.208	0.039
	Error	290.85	78	3.72			
Inter rater	Group	11.95	2	5.975	1.602	0.208	0.039
	Error	290.85	78	3.72			

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4. Discussion

Our results showed significant differences in the motivation test for the academic achievement in the experiment group's achievement motivation test, but no signs of change in the results of science test. Motivation is a prerequisite for students' learning and its effect is apparent on training and learning (Pooreslami & Shirazi, 2001). Psychologists emphasize the need for paying attention to motivation in education, because there is a significant association between motivation in education and learning new skills, strategies, and behaviors (Pintrich & Schunk, 2007).

Miller & Brickman, 2004). Zimmerman et al., are of the opinion that the self-regulation process consists of several interaction steps: foresight (forethought), performance control (arbitrary), self-reflection (Garner, 2009; Zimmerman, 1989). Self-regulation is the most important point of effective functioning in areas of momentum control, time management and coping with stress. Based on Zimmerman's belief, one component of self-regulation skills is the management and time planning skill. Time management means self-management, it also means taking time and your work in your own hands and not allowing things and events take control of you (Zimmerman, et al., 1996).

Based on our research results, the intervention had a positive effect on academic achievement motivation, as a significant difference between the experiment, control 1 and control 2 groups was observed after the intervention. These results were similar to the results of other studies that had assessed the relationship between self-regulation strategies and motivated beliefs.

Chang (1991) conducted a research investigating the relationship between students' academic performance, cognitive style, metacognition and motivational components and SRL strategies. The results showed a significant correlation between motivational components (self-efficiency, inner values) and SRL strategies and academic performance (Chang, 1991). In another research, Pintrich and De Groot (1990) studied the correlation between motivational situations and SRL in academic performance in class, and showed that SRL can enhance achievement and facilitate learning (Pintrich & De Groot, 1990). Miller and Brickman (2004) showed that students who were self-regulated had more motivation to achieve their goals in the future. Highly motivated students attended class on time and spent more time on studying (Miller & Brickman, 2004). However, the results of our combined analysis of variance on academic performance did not confirm the effect of our intervention and showed no significant difference between the experiment, control 1, and control 2 groups in terms of academic performance.

In studies assessing the relationship between time management in academic performance, different results were reported. These researches can be divided into two groups: a) studies reporting positive significant associations between time management and achievement, b) studies that did not find any association between time management and academic performance.

In relation to the first category of the aforementioned research, the results of Jahanseyr et al., (2007) showed a significant relationship between time management and academic achievement (Jahanseyr, Salehzadeh, Vasaghi, & Mousavifard, 2007). There was also a significant difference in time management between students of different ages; the results of statistical analyses showed higher average scores of time management in older students. So the ability to manage time improves in older people (Jahanseyr, et al., 2007). Experience and passage of time help individuals manage their time properly. In another research, McMullen (2007) investigated the association between the time spent on doing homework and its impact on academic performance. The results showed that spending much time on homework could positively af-

fect students' academic performance (McMullen, 2009). So if students with low academic performance spend more time on their homework, they can improve their academic performance significantly.

With regard to the second category, Kember (1995) studied the association between the learning approach and spending time on studying and academic performance. The results showed no significant association between the time spent on studying and academic performance. Moreover, the result showed that time management was not the only predictor variable of academic achievement, and that the student's motivation and quality of studying affected time management and academic performance too. The students who had high motivation to get a good score showed more effort and managed their time better and performed better. Furthermore, students who studied more seriously showed better performance compared to those who studied carelessly (Kember, Jamieson, Pomfret, & Wong, 1995).

Lincoln et al., (2004) investigated the role of teaching time skills to students in organizational management. According to the results, time management is not enough for increasing academic performance, but other factors like motivation for success, learning problem-solving, and methods of self-directed learning can be effective in increasing academic performance (Lincoln, Adamson, & Covic, 2004). In summary, it can be concluded that time management is not the only predictor variable of progress in academic achievement, and other factors can be effective in academic performance too. Some of these factors are as follows: age (the older the individuals, the higher their ability to manage their time), motivation (the more motivated the individuals, the better time management and performance they have), the quality of studying (which means the students study better and do not study carelessly and try various solutions) (Lincoln, et al., 2004).

Another social reason for the insignificance of time management training in academic performance in our study was that time management training was done in class time; perhaps the students lacked adequate concentration to solve academic problems. So if the time management training had to be done in another time instead of class time, the results might have been more precise. There was also the possibility that if students had made more efforts to complete the educational steps and had worked on optional assignments, the results would have been more reliable. To improve academic performance, time planning and management skills are not sufficient,

and other skills and factors can affect performance (Lincoln, et al., 2004).

The most important overall finding of this research is the consistency of its results with previous studies regarding the new education system and textbooks. According to our research findings, it can be stated that teaching time management skills through self-regulation training can positively affect students' academic achievement motivation. However, time management training is not enough for students' progress in academic performance.

Based on our results, we propose the following recommendations:

1. Informing teachers, parents and students that students' academic achievement does not solely depend on their cognitive abilities, but also on their attitudes and specifically their motivation.
2. In order to help students develop self-regulation skills, teachers should be trained themselves first.
3. Teaching management skills and time management to students

Conflict of Interests

The authors had no conflict of interests.

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