

The Effect of Metacognitive Strategy Training on Social Skills and Problem - Solving Performance

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Abstract

Background: The purpose of this study was to assess the effect of Metacognitive strategy training on Problem-solving Performance and social skills in high school girls.

Material and methods: The population of this experimental study consisted of all high school girls in Yazd city in Iran. Sample size in this study, 80 subjects was selected from the population (random clustering). Subjects completed the Wales' Metacognition Questionnaire, The Teenage Inventory of Social Skills and Problem- solving Inventory and then randomly. Then were divided two groups of 40. Six sessions (1.5 hour per week) curriculum-based on Metacognitive strategies and problem-solving methods and various types of social skills was performed on the experimental group. One week after last session, the same Questionnaires were taken from both groups. Data analyzed with covariance.

Results: In the post-test stage, the average scores of the positive style scale of Problem-solving in the experimental group was estimated 21.7, but in the control group 17.32. The average scores of the negative style scale of Problem-solving in experimental group was estimated 16.47, but in the control group 21.77.

Conclusion: The results indicated that students in the Metacognitive treatment group significantly improved in both social skills and problem-solving performance.

Keywords: Metacognition; Problem-solving performance; Social skills

Introduction

Modern man has been faced with a world of information, technologies and challenges being dramatically changing. These changes have occurred so quickly that they have influenced all aspects of human life. Since they happen so rapidly and continuously, new and flexible responses are required to meet demands [1]. Meanwhile, knowledge acquisition will be realized through education and learning. Learning plays an important role in man's social progress, yet learning process is a complicated and multidimensional process. Psychologists and those involved in education have developed various methods of learning and teaching with regards to their own intellectual systems and proportional to the educational changes. Application of such methods (cognitive and Metacognitive) will improve learning process [2]. New psychological theories consider cognitive and Metacognitive factors as the basic learning factors playing more important role than intelligence and inherent talent. Now, learning specialists believe that it is possible to teach the students many Metacognitive skills effective on learning and its transference [2]. Result of Özsoy and Ataman [3] study showed that students in the Metacognitive treatment, significantly improved in both mathematical problem solving achievement and Metacognitive skills. Maleki [4] showed that Training cognitive strategies to enhance learning and retention of learners in lessons has considerable influence. Therefore, teachers must teach Metacognitive strategies to students, especially poor people. The more the students apply accurate strategies of learning, the more they learn. Normally, those students who have high academic achievements apply studying strategies better than unsuccessful ones [5].

Today, Metacognition is considered the most determining factor in the students' educational achievements [6]. A psychologist called Flavel [7] first introduced this term, who defined that as cognition about cognition or awareness about awareness [8]. Also Swanson [9], have

defined Metacognition as an individual's knowledge and control on his thoughts and learning activities. Metacognition is defined as a person's knowledge about cognition and mental processes, and also his ability to regulate those processes, yet it is called as the process of applying cognitive processes in order to improve thinking skills or the quality of learning and thinking. Anderson [10] believes that Metacognition includes issues related to human reasoning and is triggered while facing complex problems.

In this century, Metacognition is regarded as a field of psychology, fascinated by all involved in; it is also regarded as an index of trained mind or trained thought and has to be included in the students' curriculum, so that the concept of thought would be emphasized as an undeniable fact. Metacognitive education is mentioned as an active turn toward education in which the importance of applying such strategies and processes are discussed. Upon further reflection, we find out that Metacognitive thinking controls and guides the person's ideas for solving a problem, inferring a meaning and choosing an appropriate strategy [11]. Problem-solving ability is known as the climax of the human abilities [12]. Successful problem-solving capability plays an important role in the person's social compatibility and academic performance; and this ability is dependent on his/her coping skills, independence, self - discipline and success in doing the assignment, and it also prevents facing problems caused by the lack of social

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skills. Zare et al. [13] revealed that the people suffering from learning disorders showed different performances in problem – solving skills compared to normal students; yet they showed similar performances in terms of cognitive skills, i.e. these two groups of students performed differently in terms of Metacognitive skills. Therefore, it is probable that Metacognition, as a high – level mental process, is associated with problem-solving skills. Accordingly, many programs have been provided to improve the students' capabilities and Metacognitive strategies. If the Metacognitive skills are well – developed to the learners and they are taught when and how to apply such skills, they will be able to maintain them and solve their own problems. The evidences suggest that the Metacognitive strategies applied in solving problems can be transferred to new problematic situations too. This is undoubtedly a significant educational goal leading to the improvement and reformation of all Metacognitive strategies. Having gained knowledge about the nature and the course of thought, the students will be able to reveal whatever comes to their minds. This, totally, indicates that Metacognition originates in learners.

Besides, in recent years much attention has been paid to the issue of social interaction, since many studies show that the lack of social skills negatively affects the students' academic performance, exacerbates learning difficulties, prevents a child's progress and eventually leads to several educational consequences [14].

It is reported that about 29% of high school students in the United States are in need of social skills training (Alksyn, 2003). As Hartup [15] says, the most important feature of childhood leading to adulthood improvement is neither cognitive intelligence, nor school grades and not even school behaviors, but it is the quality of a child's relationship with other children. Hartup recommends that social skills, concerning their impact on adulthood, be taught to the children either formally or informally from early educations. Therefore, it is necessary to study the methods the teachers must develop to reinforce the students' social – emotional learning capacities [16]. This research is aimed at studying the effectiveness of Metacognition on the problem-solving performances and the social skills of the vocational school students in Yazd.

Method of Research

In this experimental study, was used from the pre-test and post- test with the control group. The population included the whole students of technical and vocational schools (15-18 years old) in Yazd city in Iran. With the random clustering method, 40 persons were selected (in each group).

Instruments

The Teenage Inventory of Social Skills (TISS): Inderbitzen and Foster [17] designed the inventory that has 40 sentences and Cronbach's α of positive section in Doran study [18] was 0.9 and negative section 0.72.

Wales' Metacognition Questionnaire (MCQ-30): This questionnaire is a self-report scale that measures thinking about their beliefs and designed based on Wells and Matthews self-regulation model [19]. Wells and Matthews reported Cronbach's α from 0.93 to 0.76 for questionnaire and these components [19]. Cronbach's α of this questionnaire and their components calculated 0.84 to 0.54 in Hashemi and Khaier [20].

Problem-solving Inventory: Revised Short Form of problem-solving ability Questionnaire is a self-report scale to measure problem-

solving skills. This short form has 25 questions and 5 subscales [21].

Then, the subjects were randomly divided two groups of 40. The intended training course for the experimental group included 6 weekly sessions, each held for one hour and a half and in a group workshop. The palincsar and Brown method [22] and teaching based on Bendura social learning theory used [23] this methods included a process which began by giving necessary explanations and showing patterns to the subjects; then each strategy was discussed in groups of up to five members, the assignments related to each strategy was implemented, and eventually the students themselves did the assignments assigned for each strategy. The control group received no training. The training sessions included:

Session 1: The examiner gave some descriptions about the importance of this study and its efficiency, the necessity of strategizing this study and the application of various studying methods, then provided a discussion about the subject.

As general discussions were going on, training sessions began, in which the examiners discussed about cognition and Metacognition, their strategies and also some strategies about studying; then they gave some assignments to the students to do and bring back the next session, in order to resolve potential problems.

Session 2: The importance and the definition of planning were explained in this session. By description, the elements of a good plan include determining the goals, the means and methods, the way of implementation, and the way of evaluation. They gave some descriptions about each element and finally, the role and the method of planning were introduced. Then, the examiner provided a model for daily planning. During this session, they described comments for a daily and weekly plan and asked the students to prepare their weekly plan for the next session.

Session 3: In this session, the examiners discussed about monitoring the strategies and about the features of the person who would be eligible to observe us. The subjects were supposed to fulfill their weekly plan, and the researcher promised to randomly call 5 of the students each night and remind them their problems by phone or in person the next session they come together.

Session 4: During this session, the examiners gave the subjects some information about evaluation and then gave them some questions to answer:

- How do we know that we have achieved our goals?
- How do we manage difficult texts or unclear points?
- How do we diagnose inefficient strategies and how do we improve them?

Session 5: In this session, the examiners defined what problem means and which steps to take to solve a problem, and pointed out that the students had to answer the questions by planning and in a systematic manner to gain control over the plan and prevent waste of time.

Session 6: During this session, the subjects were asked to suggest their solutions for the social problems presented in the book of teenagers' behavioral problems written by Bigge et al. [24] and, translated by Jamalfar [25], and prioritize them about the three strategies taught and the problem-solving steps. Then the solutions were implemented and their effects were reviewed, until they could find the real solution.

At the end of the course, both groups, simultaneously and equally,

attended the posttest related to the problem – solving skill and social skills questionnaire. The data were collected, coded and studied by the SPSS software version 16. With regards to the type of data collected, they were processed by descriptive and inferential statistics, in a way that the mean and the standard deviation were applied to describe data; and considering

1) Research hypothesis, 2) distance quality of the covariance variable, and 3) linear relationship with the dependent variable, the univariable and multivariable covariance analysis were applied in inferential statistics.

Results

The number of samples was 80; the mean age was 16 years old with standard deviation 10.5. The average score for the cognitive skills in the experimental group before the training was 74.56 and this average was 75.12 in the control group.

In the posttest stage, the average scores of the positive style scale of Problem- solving in the experimental group was estimated 21.7, but in the control group the average scores of the positive style scores of Problem- solving was estimated 17.32. According to the Kolmogorov-Smirnov test, the normal distribution of scores in pretest and posttest was confirmed. Also, in the posttest stage, the average scores of the negative style scale of Problem- solving in experimental group was estimated 16.47, but the average scores of the negative style scale of Problem- solving in the control group was estimated 21.77. In posttest stage, the average scores of the logical style scale of Problem- solving in experimental group was estimated 23.50, but the average scores of logical style scores of Problem-solving in the control group was estimated 18.62.

Discussion

The emergence of Metacognition as an important concept in psychological education and cognitive sciences led to many researches in this field. The results of various studies [5,26] showed that the difference between people in general and between the students specifically does not always lie in their different cognition, but, there are also other factors causing their different performances, one of which is Metacognition. The basic hypothesis of this research is the effect of Metacognition training on the problem-solving performances and social skills of the female students of vocational schools. The results of this research, accomplished by repeated measures of multivariate covariance (pre-test and post-test) on a training group and a control group, revealed that the average posttest scores of the experimental group in both skills compared to the pretest scores had increased significantly, and the posttest in the control group showed a slight increase compared to the pretest. The difference between the present research and previous ones goes to the content of the training program and the training method. The content of the Metacognitive training course applied here, is intended to include basic strategies involved in a cognitive action from beginning to the end. These strategies included determining the goal, planning, supervision, evaluation and mistake diagnosis. These strategies were taught in the same order having been implemented on a cognitive action, i.e. the initial strategies including goal determining and planning as the first and the most basic Metacognitive strategies in every cognitive action and then other strategies were taught in the mentioned order. The main purpose of this training course and the method applied in, was to train an independent learner who is aware of his/her own learning process and is able to guide and observe those processes. The results of this study showed that the average score of

positive style scale of the experimental group in posttest stage showed significant increase compared to the pretest, and this is in line with the studies of Slavin [27] and Peterson [28]. The average scores of negative style scale of Problem- solving in experimental group and in the posttest stage had decreased compared to the pretest stage.

Zare and Mohammadi [29] observed that Metacognitive processing can positively affect learning of problem – solving and transfer of learning. The average scores of logical style scale of Problem- solving in posttest stage of experimental group had increased compared to the pretest stage, which was in line with the results of the researches accomplished by Rahimpour [30]. The average scores of the avoidant style scale of Problem- solving in the posttest stage of the experimental group had slightly increased compared to the pretest stage, since they had not been yet taught to the students. The results of the studies carried out by Trainin and Swanson [31] revealed that Metacognition has a positive correlation with the students` performance. These results emphasized and confirmed the results of theory of Costa [32], which indicates that Metacognition includes the person`s capability of identifying personal known and unknown and this knowledge helps him in his problem – solving and decision making process. Al Costa emphasized that if the teachers do pay attention to “thinking about thinking”, then the students will learn the process of perception, understanding and the link between mental processes. Golestan et al. [33], in his studies in Iran about the effect of Metacognitive strategies in academic achievements reported that the researches on the effectiveness of strategies are the most studied areas among all other research areas. According to the results, the changes should be in the educational system. Some teachers neglect to teach thinking skills to students. Apparently, they think that logical thinking automatically grows in students. However, this is not true. Thinking and problem- solving skills are basic skills for any learning. Therefore, it is necessary to learning. We propose similar studies in both gender and different courses of students. We proposed that which components of Metacognitive strategies have more effect on social skills and Problem- solving performance too.

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