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A study of the efficacy of meta cognitive strategies on creativity and self confidence and approaching problem solving among the third grade junior school students of the city of Rey

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ABSTRACT

The main aim of this research was investigating the effect of met cognitive strategies training on problem solving methods of students in guidance school level. Research method was experimental with pretest – posttest design with control group. The method of sampling was accessible sampling. Sample groups were consisted of 2 classes totally with 56 members, each class 28 students. One of the classes selected randomly as an experimental group and another as a control group. Both groups were tested by Problem Solving Scale Inventory as a pretest. Then experimental group received met cognitive strategies training through 8 sessions of 50 minutes, whereas control group did not receive any intervention. As training course finished, the post test was conducted on both groups. Received data was analyzed by using Covariance analysis. Findings showed that training of met cognitive strategies has significant effect on increasing creativity, self-confidence and tendency to close to problem solving.

Keywords: met cognitive strategies training, met cognition, problem solving, cognition.

INTRODUCTION

During the history of education, increasing the productivity level of the learners and increasing their ability and aptitude in learning and solving problems have been a matter of concern for teachers and educational practitioners. For so many years, people and various schools of thought have been striving to increase productivity, inventing various approaches and testing them .Meantime, it looks knowledge of Meta cognitive strategies could be a tool or an effective aptitude. This concept was applicable in psychology even before it took the name. Harry Harlo, applied for the first time the concept of learning in a range of trials with monkeys [1]. However, the term meta cognition was for the first time introduced by Flavell, Flavell had already raised the term meta memory and stated this term based on that [2]. In Flavell's view , meta cognition consists of two classes: Experience of meta cognition and meta cognition knowledge. Meta cognitive experience is an emotional or cognitive experience that relates to a psychological affair. The content of meta cognitive experience could be long, summarized, complicated or simple and occurs before or after the cognitive activity. The knowledge of Meta cognition refers to the acquisition of knowledge of cognitive processes and of the way cognitive control processes are used (westwood, quoted by Leving Stone). In other words, Meta cognitive knowledge is part of our knowledge about our setting that is concerned with cognitive subjects. On the other hand, there are many problems in life that need efforts to be solved. Life has no meaning without problems and in fact that which is experienced in a form of difficulty or life issues, is the true or rational life visage. Problems are life natural .the art if life embodies in the ability and skill in solving problems and getting along with them. Some people become worried and feel upset when they're confronted with the most trifle

problems and thus, are unable to find solutions to them .There are also, some other people who face tricky crises , but have the proficiency to successfully pass behind them . Of reasons that these people are able to solve the problems and are successful to go through the crises , is that they utilize appropriate ways to solve issues and this is what distinguishes them. Based on the theory of meta cognition and productivity, the meta cognitive knowledge is thought to be one of the major factors in then learning processes and overcoming numerous life problems. This research seeks to reveal if training meta cognitive strategies could be helpful in dealing with problem solving obstacles. According to the above matters and done research m hypotheses were formulated and tested like the following:

1. Training the meta cognitive strategies (increasing meta cognitive knowledge) will increase the creativity of the subjects in problem solving.
2. Training the meta cognitive strategies (increasing meta cognitive knowledge) will increase the subjects' self confidence in problem solving.
3. Training the meta cognitive strategies (increasing meta cognitive knowledge) will increase the subjects' approaching problem solving.

MATERIALS AND METHODS

The research scheme used is the scheme of present and posttest with the control group and the population under study includes the third grade junior school students in Rey. Sampling was conducted using the sample available and the sample size was 56 people. The sample size was organized in two classes and one of these classes was randomly considered as the experimental group and the other was labeled as the control group. First by using a measuring tool, a pretest was given to both groups and the independent variable having been applied , the posttest was administered. To describe data obtained, the descriptive statistics (average, standard deviation) was applied and to extract the inferential results , the covariance statistical method (ANOVA) was utilized .

Measurement tools

The tool used to collect data was the scale of Cassidy and Long 's problem solving styles . This tool was designed by Cassidy and Long (1996)during two studies[3]. The tool measures 6 problem solving styles. These styles are:

1. Insolvency or helplessness style
2. Control or inhibition of problem solving style
3. Creativity style
4. Self confidence in problem solving style
5. Avoidance style
6. Dealing or approaching style

This scale includes 24 items and each of the styles involves 4 items. The scale of problem solving style was translated and examined by Mohamadi. In a study by Abdi, the alpha coefficient for the subscales were 0/65, 0/61,0/61,0/71,0/70 and 0/55. The reliability of this test in another study by Mazaheri and Ghashang, was reported 0/89 through a retest after a week . Three styles mentioned in this test were applied in this research[4]. The other tool used to apply the independent variable in the preset research is a research –made package that includes the meta cognitive strategies that taught subjects of the experimental group. Result was analyzed using the SPSS 19 statistical software.

RESULTS

Upon examining the data obtained from testing the hypotheses, the following results were found that are included distinctly in the relevant tables.

Table 1. Descriptive data related to the variable of “creativity in problem solving" in both experimental and control groups in the pretest and posttest

Groups	Pretest	Posttest
Average	4.7500	6.0174
Experimental Number	28	28
Standard deviation	1.83838	1.53788
Average	4.9643	5.0000
Control Number	28	28
Standard deviation	1.83550	1.76383
Average	4.8571	5.537
Total Number	56	56
Standard deviation	1.82337	1.72642

Information of the table indicate that the average score of the variable" sense of control and inhibition in problem solving" in the control group in the pretest and posttest are 3.3.and 3.7 respectively. Also, the average score of the variable " sense of creativity in the group" under experiment were 3.82 and 2.75 respectively.

Table 2. Results of the covariance analysis for the variable of creativity in problem solving

Source	Square sum	Freedom degree	Square average	F	P	Effect size
Independent variable	19	1	19	9	0.000	0.146
Error	111.4	53	2.1	-	-	-
Total	1880	-	-	-	-	-

Information of the table indicate that the F estimated is 11.9which is greater than the F of the table with the freedom degree of 1.53 and significance level of 0.01. Hence, the null hypothesis based on lack of difference is rejected and the contrary (opposite) hypothesis is supported. Thus, with 0/99 confidence, it can be said that training meta cognitive strategies will increase creativity in problem solving among the subjects.

Table 3. Descriptive data related to the variable of " sense of self confidence in problem solving" in both groups of control and experiment in the pretest and posttest

Groups	Pretest	Posttest
Average	3.7500	5.0357
Experimental Number	28	28
Standard deviation	1.35058	1.10494
Average	3.9643	4.3214
Control Number	28	28
Standard deviation	1.42678	1.33487
Average	3.871	4.6786
Total Number	56	56
Standard deviation	1.38076	1.26645

Information of the table indicate that the average score of the variable" sense of insolvency and helplessness in problem solving" in the control group in the pretest and posttest are 3.07.and 3.07respectively. Also, the average score of the variable " sense of self confidence in problem solving" in the group under experiment were 3.7and 2.64 respectively.

Table 4. Results of the covariance analysis for the variable of sense of self confidence in problem solving"

Source	Square sum	Freedom degree	Square average	F	P	Effect size
Independent variable	8.8	1	8.8	7	0.01	0.118
Error	66.04	53	1.24	-	-	-
Total	1314	56	-	-	-	-

Information of the table indicate that the F estimated is 20.48 which is greater than the F of the table with the freedom degree of 1.53 and significance level of 0.01. Hence, the null hypothesis based on lack of difference is rejected and the contrary (opposite) hypothesis is supported . Thus, with 0/99 confidence , it can be said that training meta cognitive strategies will increase self confidence in problem solving among the subjects. The results of the table that compares the averages indicate that the average score of the variable of "sense of self confidence" will substantially increase after the application of the independent variable (5.03) compared to the prior application of the same variable (3.75).

Table 5. Descriptive data related to the variable of " approaching problem solving" in both groups of control and experiment in the pretest and posttest

Groups	Pretest	Posttest
Average	4.6786	6.5000
Experimental Number	28	28
Standard deviation	1.51666	1.03638
Average	5.2143	5.2143
Control Number	28	28
Standard deviation	1.37051	1.66349
Average	4.94464	5.8571
Total Number	56	56
Standard deviation	1.45752	1.51871

Information of the table indicate that the average score of the variable" sense of avoiding problem solving" in the control group in the pretest and posttest are 3.07.and 3.07respectively. Also, the average score of the variable " approaching problem solving" in the group under experiment were 3.7and 2.64 respectively.

Table 6. Results of the covariance analysis for the variable of approaching problem solving"

Source	Square sum	Freedom degree	Square average	F	P	Effect size
Independent variable	25.45	1	2.45	13.38	0.001	0.02
Error	100.7	53	1.9	-	-	-
Total	2048	56	-	-	-	-

Information of the table indicates that the F estimated is 20.48 which are greater than the F of the table with the freedom degree of 1.53 and significance level of 0.01. Hence, the null hypothesis based on lack of difference is rejected and the contrary (opposite) hypothesis is supported. Thus, with 0/99 confidence, it can be said that training Meta cognitive strategies will increase approaching problem solving among the subjects. The results of the table that compares the averages indicate that the average score of the variable of "sense of approaching problem solving" will substantially increase after the application of the independent variable (6.5) compared to the prior application of the same variable (4.67).

DISCUSSION AND CONCLUSION

Results obtained from the present research are indicative of the substantial effect of training meta cognitive strategies on the variables effective in improving the process of problem solving. Testing the hypotheses and the findings obtained are going to be discussed for each of the hypotheses . Hypothesis 1: 1. Training the Meta cognitive strategies (increasing Meta cognitive knowledge) will increase the creativity of the subjects in problem solving. Results of the first hypothesis at the significance level of (P<0/01) are indicative of the considerable increase of creativity in t5he experimental group. These results are in line with those of Matinnejad et al (2010) [5], Mirzaee et al, (2012) [6]. Hypothesis 2. Training the Meta cognitive strategies (increasing meta cognitive knowledge) will increase the subjects' self confidence in problem solving. Results of the first hypothesis at the significance level of (P<0/01) are indicative of the considerable increase of creativity in t5he experimental group . These results are in line with those of Babapour et al,(2002) [7].

Hypothesis 3. Training the Meta cognitive strategies (increasing Meta cognitive knowledge) will increase the subjects' approaching problem solving. Results of the first hypothesis at the significance level of (P<0/01) are indicative of the considerable increase of creativity in t5he experimental group. Thinking and utilizing Meta cognitive knowledge is effective in the processes of learning in addition to the process of problem solving. Learners with meta cognitive thinking are more successful compared to the learners of mathematics and have more accurate planning [8, 9]. According to the results obtained as well as the rich literature in the area of Meta cognition, it looks more attention to training and increasing the Meta cognitive knowledge among the learners is undeniable. Of imitations of this research is that executing the research was confined to the city of Rey. Hence, in generalization of the results, one has to take care f the other educational grades and communities among male and female students.

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