The effectiveness of metacognitive strategy teaching on the junior high school grade 2 male students’ general self-efficacy

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Abstract

The present study has been done to analyze the effectiveness of metacognitive strategy teaching on the junior school grade 2 male students’ general self-efficacy in Shiraz, Iran. This study is of kind of experimental with presenting pre-test and post-test which has been done with an experimental and a control group. The target population of the research were all male secondary school grade 2 students in 2009-2010. The instrument of research was Sherer self-efficacy questionnaire. The number of samples is 60 students of secondary school grade 2 students who were selected by multiphase sampling. In the pretest phase, both groups were equal in metacognitive strategies and self-efficacy. The results of the study show the difference between two groups but this difference is not meaningful statistically.

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Keywords: metacognitive strategies, teaching of metacognitive skills, self-efficacy, the students’ self-efficacy.

1. Introduction

The effort to discover the human beings’ cognitive processes and finding ways to support and improve these abilities were always the interest of educational philosophers, educational experts and psychologists (Marzano, 1988). Human beings liked to know how they think, how mind works and how students learn. It is important to determine how learning takes place and which learning strategies are necessary for effective educational achievements (Downing, Kwong, Chan, Lam & Downing, 2009). At first it was supposed that metacognition is just a characteristic of human beings, while the recent researcher indicate dolphins and monkeys also show metacognitive abilities well (Ding, 2007). From the late seventeenth century in educational literature a lot of attention was given to metacognition (Car, 2010; Kramarski, 2004). Metacognition is the information which the person has about his/her cognitive system (Fevell, 1976). Metacognition is a multidimensional concept which includes knowledge, belief, processing and strategies which have the responsibility for assessment, supervision or control of cognition. A lot of researches have been done
about the role of metacognition in improving the learning process in schools and the total findings indicate training of metacognitive skills makes the students dominate on the learning processes. Studies about metacognition (Marzano, 1988; Anderson, 2002), metacognitive beliefs (Cotterall, 1999; Graham, 2003) and metacognitive strategies (Tseng, Dornyei, Schmitt, 2006) mostly are related to how these influence learning. Exploiting metacognitive skills makes the general learning performance rise (Anderson, 2002). Training the students mental and tools is one of the goals of education (Schunk, 1990). The best definition for metacognition is “thinking about thinking”, but this definition should be more detailed because metacognition consists of the knowledge of analysis and reflection of thinking, how to conclude from this analysis and how to utilize this learned things in practice (Downing, Kwong, Chan & Downing, 2009). Metacognition consists of knowledge about how to analyze thought, how to induce the results from analysis and how change the learned things into practice. In order to solve the problems effectively, the students must understand how their minds work. In other words, they need to understand how important cognitive assignments such as memorization, learning and problem solving are done. It was observed that the recent researches discuss metacognition under two categories: metacognitive knowledge and metacognition control (Sungur, 2007).

Metacognition means the person’s awareness about his/her thought and that his/her abilities are in the control of these processes (Jager, Jansen & Reezigt, 2005).

Self-efficacy is the person’s assessment of his/her abilities in doing an assignment (Kadivar, 2005). (Bandura, 1997) defines self-efficacy as a person’s beliefs about his/her abilities in order to organize and implementing the assignments in order to obtain the special goals (Panourea, 2007). Self-efficacy was described as the ability to satisfy the current needs with regard to the current motivation and cognitive resources. The growth of self-efficacy makes an increase in learning (Roberts, 2011). (Zimmerman, 2000) believes self-efficacy is one of the key variables in self-regulation and one of the main resources for motivation. In self-regulation the students must have the necessary tools to control their cognitive process. (Paris, 1990) indicates that the students must know all the kinds of useful processes which guide them for learning and success before they have the ability to implement. Those students who feel responsibility and motivation will be successful people. These people are responsible for a deeper learning and assess what they know and evaluate themselves all the time. As regards the researchers have indicated that self-efficacy beliefs as one of the most decisive factors for each person’s motivation, emotions, thought and action and according to the relationship between self-efficacy and educational progress, the necessity to enhance the students’ self-efficacy is felt (Bandura & Martinez, 1992).

The learning has a high quality in which the students are involved in the learning process. The students should be encouraged in their learning process analysis in order to develop the metacognitive learning strategies, because this factor support the self-efficacy motivational elements (Wang, Spencer & Xing, 2007). The students should know what they think, what they do, what is their status in doing assignments. Those students who are aware of their learning mental processes, schedule their learning processes and revise them if necessary. Studies show those students who use metacognitive strategies while studying are better readers with a higher ability to comprehend (Martinez, 2006) mentions cognition training enhances the students’ reading comprehension. The person’s metacognition is of his/her mental processes and as his/her intentional efforts is done to control and supervise these actions, at the same time this process is accompanied with the analysis process of thought (Warnian, 2005). As regards the researchers show that self-efficacy beliefs as one of the decisive factors in each person’s motivation, emotions, thought and action and because of the relationship between self-efficacy and educational progress, the necessity to enhance the students’ self-efficacy is felt (Bandura & Martinez, 1992). On the other hand, according to the recent researches it is obvious that metacognition has a close relationship with self-efficacy and (Bandura, 1997) pretends training for metacognition skills enhances self-efficacy. Recent studies indicate metacognition has a close relationship with social-emotional variables such as self-efficacy, predication, control resource and motivation (Bahrami, 2005). Those people who are able to assess their knowledge, present more conceptual knowledge in comparison to those who are not able to (Carr, 2010). The results of studies (Pajarez & Schunk, 1996) have shown that the students’ self-efficacy beliefs can help
the prediction for their educational progress, field selection, occupation and... more effectively. Metacognition is a vital element in improving educational system. He indicates if we do not conceive what the student know, what beliefs has about his/her knowledge and more important, what does not know, the effort to grow education will be useless. According to what was said, we can see training for metacognitive skills has a positive effect on enhancing the students’ motivation, learning and educational progress and make the practice on knowledge possible. But a more important question arise: do these strategies need training and the person can acquire these skills individually? To answer this question (Warnian, 2005) points out this is a false expectation that people can learn strategies like metacognition by trial and error and preferably teachers for kids and adults should give them opportunities to learn and utilize metacognition.

According to (Bandura, 1986)’s idea specific self-efficacy is a task and for each task a specific self-efficacy is considered like academic self-efficacy, mathematics self-efficacy and so on. The self-efficacy hypothesis predicts when the students assess themselves correctly, work harder. The feeling that a job is hard is very important for metacognitive experiences. If the person feel that the job is too difficult and feels negatively, he/she would leave the job(Panaoura, 1997). The findings of the researches indicate that using metacognitive and motivational strategies and metacognition produces academic success and progress. Generally speaking metacognitive strategies and self-efficacy play a vital role in the students’ success. One of the basic ways to enhance the students’ success is to teach them metacognitive skills. In fact we can enhance their self-efficacy and make them academically successful by training(schunk, 1990).

It can be said the importance of research is theoretically that by means of enhancing the scientific knowledge in the fields of metacognition and self-efficacy, the ways to learn meaningfully in the classrooms would be paved. This study aims to answer this question: Does teaching of metacognitive strategies has an effect on enhancing the secondary school grade2 students’ self-efficacy beliefs?

2.1. Previous studies
(Combus, 2001) analyzed the effect of metacognition and emotional variables on the university students’ progress. The results show there is a positive relationship between their classroom scores and attitude scores, also between the classroom scores and metacognition. The results of regression analysis indicate high school scores and metacognitive behavior scores are predictive for success in university.

In a study that (Coskun, 2010) has done in Turkey with the title: The effect of training metacognitive strategies on freshmen’s listening performance, he found out the experimental group students changed to more effective listeners because they have received metacognitive strategy training.

In another study (Louca, 2003) has studied the relationship between the excellent students’ metacognitive and motivational factors. The samples were the American students of grade12. Motivational factors consist of self-efficiency, internal motivation, epistemological beliefs (ability, effort, outcome, process), values and progress in learning. In this research the results show that metacognitive variables and motivation have got 20 learning variance and two factors of self-efficiency and epistemological beliefs were the most meaningful predictors of knowledge learning. The analysis of foreign studies indicate metacognitive strategy training has a positive effect on academic progress and attributive, emotional and motivational variables.

The research results of (Schraw, 2001) shows using cognitive, motivational strategies and metacognition can cause success and academic progress. For example successful learners take notes more completely and organized and have higher cognitive and self-efficiency usage (motivation) and have more control and supervision on their assignment doing progress (metacognition strategies).

(Pajares & Schunk, 2002) have done a lot of researches on the relationship between self-efficiency and academic progress and have come to the result that self-efficiency beliefs are positively interrelated to academic progress.

In a study which (Ozsoy & Ataman, 2009) has done with the goal of analysis the effect of metacognitive strategy training on solving math problems, the results showed the experimental group students progressed both in
metacognitive skills and in math problem solving skills. The analysis of the research results indicates metacognitive strategy training had a positive effect on academic progress and attributive, emotional and motivational variables. As regards to what has been analyzed in the previous different researches this research question is presented:

Does metacognitive skill training has an effect on the cognitive self-efficacy in junior high school grade2 students?  

2.2. Research hypothesis

Metacognitive skill training has a meaningful effect on secondary school grade2 general self-efficacy.

2. Research Methodology

This study is the kind of quasi-experimental and has been implemented in the form of a pretest/posttest plan with a control group. The plan has the capability to control factors like synchronous happenings with the implementation of research and growth, moreover because the groups have been selected randomly; selections, statistical feedbacks and reciprocal action between selection and growth have been controlled.

Experimental group R T1 X T2
Control group R T1 - T2

Population: the research population includes all the secondary school grade2 schools in Shiraz in 2011-2012.

Sample: the sampling method was multiphase cluster random. At first the education area4 in Shiraz was randomly selected among four educational areas and then a junior high school was selected randomly and among all classes two classes have been selected randomly, each class 30 students. So the research sample includes 60 male students which went to two experimental and control groups randomly.

Research tool: The tool for collecting data was Sherer and colleagues (1982)self-efficacy questionnaire which was used to analyze the students’ self-efficacy beliefs. This questionnaire was prepared in 1982 to provide a tool for later researches and determining a tool for different levels of people’s general self-efficacy.

This test consists of 36 items which 13 items have been deleted from the test because of lack of %40 load. From the 23 items remained, 17 items belong to the students’ self-efficacy evaluation. The scoring method of the general self-efficacy questionnaire is as following: from one to five points belongs to each item. From 17 items which evaluate the self-efficacy the points of items 3, 8, 9, 13 and 15 increases from right to left and others from left to right. The highest score is 85 and the lowest is 17 in this questionnaire.

Chronbach alpha has been used for the final evaluation of the self-efficacy test.

Based on the result obtained from the statistical software SPSS, Chronbach alpha coefficient obtained in the self-efficacy test for the experimental group was 0.77 and for the control group 0.95 showing the relatively good capability of reliance in the self-efficacy test.

3. Method

This study has been done in three phases including:

1) Pretest implementation 2) training implementation 3) posttest implementation

During the first phase the students who were selected as experimental and control group completed the general self-efficacy questionnaire. In the second phase the experimental group were exposed to metacognitive strategy training program which was based on Paris and Winogaurd attitude with “the strategy training program” model. This training program has been done in 8 session, each session 1.5 hours, two sessions per week in the form of group guidance. During these sessions, related information and skills were taught. Totally the actions done in each session are as the followings:

1) Presenting complete explanation about metacognitive skills with examples for their deeper learning.
2) Giving opportunity to the students for discussion about the subject of each session and how to utilize the learned materials in different courses and different life conditions.
3) Presenting necessary exercises and assignments to the students which must be done at home or in the classroom. These exercises would be analyzed by the researcher and discussions were made with the students about the effect of the exercises on their learning activities, emotions and thoughts.
4) Successful students in these skills were wanted to talk about their procedures for the other students.
5) After training the self-control skills including control and supervision of commitment, attitude and attention, they were continuously asked to control and supervise these three aspects of control during the class time and doing assignments.
6) Expressing the activities of latent thought and learning superficially.
7) Mental model growth from learning
8) Gradual transfer of control on the learning process
   In posttest implementation, the students were asked to fill Sherer self-efficacy Questionnaire once more in order to measure the probable changes of metacognitive strategies based on Paris and Winoguard’s attitude in control and experimental group.

4. Findings of the Research
For analysis in independent groups t-test has been used and the results were summarized in two tables.

<table>
<thead>
<tr>
<th>Table 1. Statistical description related to the self-efficacy test scores of the experimental group in pretest and posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posttest pretest</td>
</tr>
<tr>
<td>Average of self-efficacy score test 68.36 66.36</td>
</tr>
<tr>
<td>variance 34.99 29.89</td>
</tr>
<tr>
<td>number of observations 30 30</td>
</tr>
</tbody>
</table>

![Comparison between pretest and posttest](image)

Blue: pretest Red: posttest

figur1. Comparison between pretest and posttest of the self-efficacy test in the experimental group
As it can be observed in the table 1 and graph 1, the average of the self-efficacy test scores of the experimental group in pretest 66.36 and in posttest 68.36.

<table>
<thead>
<tr>
<th>Critical t</th>
<th>Meaningfulness level</th>
<th>Freedom degree</th>
<th>Calculation t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.67</td>
<td>0.08</td>
<td>58</td>
<td>1.35</td>
</tr>
</tbody>
</table>

The results of the research hypothesis test is shown in table 2.

In table 2, the results obtained from the research hypothesis has been indicated. As it is obvious in the table, since the amount of the test statistic (1.35) is smaller than the critical amount (1.67) and the amount of meaningfulness level in the test is bigger than 0.05, so there is no strong evidence to reject H0. Therefore with the certainty degree of %95 it can be said that metacognitive strategy training can enhance the students’ self-efficacy in the experimental group.

5. Conclusion

The main hypothesis of the study is: Metacognitive strategy training enhances junior high school grade 2 students’ meaningful general self-efficacy. The analysis revealed these trainings enhances self-efficacy but this enhancement is not meaningful. As it was observed in the obtained results, this study had one hypothesis which analysis indicated the trainings in %95 level are not meaningful but at the level of %92 are meaningful and the hypothesis is rejected with a little difference.

These findings are convergent with (Higgins, 2000)’s study about metacognitive skill trainings on the students’ self-efficacy. His study revealed these trainings have no effect to enhance the students’ self-efficacy. One of the reasons he mentions in his research is the period of training to the subjects is short and he offers the longer strategy training period can help the students’ self-efficacy enhancement. Since the most important factors in enhancement for self-efficacy are performance achievements which to improve the students’ performance longer trainings during the academic year is needed. The results of this study are not congruent with Ramp&Goofi’s research results. Their study revealed metacognitive strategy training causes enhancement in the students’ meaningful self-efficacy. In this study they have used the training method based on process (pbi) and the training period was a complete semester with 16 sessions. It is possible the students’ self-efficacy progress change with a change in training type and the number of sessions. Also the results of this study are not consistent with the study (Pajares & Schunk, 2002) have done. (Pajares & Schunk, 2002) have done a lot of researches about the relationship between self-efficacy and academic progress and concluded self-efficacy beliefs are not positively interrelated with academic progress. Any way despite the results of this study according to (Semmar, 2006)’s idea metacognitive strategies are among necessary tools for the students’ achievements and have a close relationships with their self-efficacy and academic progress. The students benefit from the metacognition training because of its effect on their motivation (Mayer, 2001; Pintrich, 2000). (Goh, 2002) emphasized the learners’ metacognitive knowledge is related to effective learning in all learning fields.

According to the backgrounds and the results of the current studies and analyzed studies which most of them verify the role of metacognitive skill training in the academic progress, it is suggested that at first metacognitive skill training be taught to the teachers and then the skills be transferred to the students. As regards to the novelty of the concepts of self-efficacy and metacognition, especially in Iran a very good opportunity is presented to the researchers to expand these very important concepts. It is suggested to the researchers to study in the following fields in order to expand the concept of self-efficacy and metacognition:

* To prepare tests in the other fields of self-efficacy such as academic, math, writing, exercising, teaching,…… self-efficacy.

* Implementing longitudinal studies in order to compare the growth of metacognitive skill acquisition in the students’ different academic periods.

* Concurrent comparison of the students’ self-efficacy beliefs in different provinces
References


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* Analysis of different models of metacognitive skill training


