Investigation of relationship between academic self-efficacy and mathematics achievement evaluation of students using summative evaluation

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Abstract

It seems that people are able to achieve self-efficacy in most of life areas with the help of supportive bases and using spiritual intelligence and their potential capabilities facing with challenging assignments. In the present study, we examine the role of academic self-efficacy in mathematics academic achievement of students. The current study is considered as one of the correlational studies. Population of study included fourth grade high school female students of Kermanshah province. It was selected among available high schools considering cluster method and facilities available in one high school. Thirty and five subjects were selected as sample of study among fourth grade students of this high school. According to normality of data, parametric tests were used. SPSS software was used to analyze the data. After analyzing the data, a significant relationship was not observed between subscales of academic self-efficacy and mathematics performance of students in at this level of education.

Keywords: self-efficacy, academic achievement, summative evaluation, mathematics.
Introduction:

Self-efficacy and factors influencing it have been considered and studied by many psychologists and education experts for several years. Among the various dimensions of self-efficacy, academic self-efficacy affecting the cognitive and metacognitive strategies, self-organizing, resilience in the face of problems, and selection of field of study, is an important variable. In educational areas, the role of perceived self-efficacy of students has been often considered as a mediator motivational variable in cognitive processes associated with learning and other emotional and motivational phenomena. It seems that self-efficacy is affected by educational structures, teacher’s expectations, and normative comparisons. It is also an important factor in the formation of emotional expectations and consequences related to educational phenomenon on one hand (Narimani, Khoshnoodi nia chamachaee, Zahed, & Abolghasemi, 2013). Nowadays, all educational programs at all levels of education include mathematics at least several hours of mathematics education. In complicated and advanced world of today, experts believe that learning mathematics knowledge can help to creative thinking and dynamic ideas (Scholoenfeld, 1989). Despite the special role of mathematics in formal and the public education, it is not an interesting lesson from the students’ perspective and they show less interest to it. Studying factors affecting academic achievement in mathematics has been further considered by educational experts over the past three decades. Various research findings have shown that academic achievement in mathematics not only affected by knowledge structures and information processing processes, but also it is related to motivational factors including beliefs, attitudes, motivations, values, and anxieties (Bassant, 1995).

One of the factors that can affect mathematical performance is self-efficacy. Self-efficacy was derived from social cognition of famous psychologist known as Albert Bandura referring to beliefs and judgments of an individual to his abilities to perform the duties and responsibilities. Belief in self-efficacy affects many aspects of life, such as the selection of objectives, effort, making decisions, level of continuity and sustainability, and dealing with challenging issues. It presents in various areas. Academic self-efficacy as one of the areas of self-efficacy has been considered by experts defined as one’s judgment on his capabilities to organize and perform certain activities to achieve different types of academic achievement plans (Zimmerman, 1995). Academic self-efficacy leads to increased educational aspirations directly and indirectly. Students with high self-efficacy are more diligent and participate in doing tasks more than students who have doubt on their ability (Pintrich & Schunk, 2002). For example, one students who has higher self-efficacy in mathematics feels that he will do well facing with mathematics lesson problem. In contrast, one student who has lower level of self-efficacy in mathematics has no sense of achievement regarding mathematical problems and even he may not prepare himself to take an exam in this lesson, since he may think that his effort will be useless. Students with high self-efficacy have higher level of self-regulation skills compared to students with low self-efficacy. They focus their senses on their learning tasks, use new strategies they
use newer, use of their time more effectively, guide their performance guidance, and do any adaptive activity that is necessary to their learning. In contrast, students who do not have high levels of self-efficacy think that they have no cognitive skills necessary to deal with the issue. As a result, they do not consider it seriously. These students are often labeled as lazy, unresponsive, unmotivated, and depending on others (Bandura, 1997). Academic achievement evaluation is comparing the results obtained from performance assessment of learners with educational goals and making decision on that if educational activities and learning efforts have been successful with students. The goal of assessment or measurement is to provide information necessary for making judgment on goodness or quality of learners’ performances. This process of using information obtained from learners’ assessment to make a decision is known as evaluation (Cruickshank, Jenkins, & Metcalf, 2006).

In summative evaluation, all students’ learnt materials are determined during a period of education aimed at giving students score and judgment about the effectiveness of the work of the teacher. Since this type of evaluation is called summative evaluation in which sum of learners’ learnt materials are evaluated, it is done usually at the end of educational course that is why it is referred as final evaluation. However, it can be used frequently during an educational course. Educational goals determine the summative evaluation, but usually it includes teacher-made achievement tests, observation, testing various performance measures of students (Linn & Gronlund, 2000). Studies conducted on academic self-efficacy showed that this concept is associated with cognitive, metacognitive and motivation factors (Narimani & Vahidi, 2013). For example, we can refer to a study conducted by Pajares noted who think that there is positive relationship between self-regulation and academic self-efficacy (Pajares, 2002). A positive relationship was also reported between academic self-efficacy and academic motivation and academic self-efficacy and academic performance (Kim & Park, 2000).

This study was conducted to answer the following questions:

1. Do all subscales of academic self-efficacy have relationship with mathematics performance?
2. Which of academic self-efficacy subscales have the greatest effect on mathematics performance?

**Population of study**

Population of study included fourth grade high school female students of Kermanshah province in academic year of 2015-2016. Cluster sampling method was used and among the Kermanshah high schools, one of them was selected. Sample of study included 35 female high school students.
Research Tools:

Academic self-efficacy scale of Morgan and Jinks was used to investigate the academic efficiency (1991). The scale has 30 questions and three subscales, including talent, effort and context. Items of the scale are accompanied by Likert point having four graded options. Developers of this scale announced its internal reliability 0.82 using Cronbach's alpha coefficient. Cronbach's alpha coefficient of three subscales of talent and efforts and context was respectively, 0.78, 0.66, and 0.70. In Iran, Karim Zadeh and Mohseni (2006) reported validity of this scale desired by factor analysis. In addition, they reported reliability through Cronbach's for overall self-efficacy 0.76, 0.66 for talent, 0.65 for effort, and 0.60 for context. In the present study, regarding the validity of tools used in previous studies, its reliability was calculated only by using Cronbach's alpha that it was obtained 0.69 (Karim zadeh & Mohseni, 2006).

Procedure

Questionnaire was used to collect data. After entering to class and before distributing the questionnaires, firstly, list of name of students was prepared. Then, test was given to students and they were asked to express their own ideas accurately. A brief explanation was provided regarding the number of questions and time required to respond the questions. Then, questionnaires were given to them and after the completion, they were collected. Time of implementation was in average between 30 and 35 minutes for each class.

Results

Table 1 shows the value obtained in all three components of academic self-efficacy. According to the values obtained for the P-value, as it is seen, all data follow a normal distribution. Thus, parametric tests were used.

<table>
<thead>
<tr>
<th>Normality of data</th>
<th>S core</th>
<th>Talent</th>
<th>Context</th>
<th>Effort</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>1</td>
<td>38.8</td>
<td>41.1</td>
<td>11.4</td>
</tr>
<tr>
<td>SD</td>
<td>2.3</td>
<td>5.6</td>
<td>2.8</td>
<td>1.7</td>
</tr>
<tr>
<td>P-value</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.16</td>
</tr>
</tbody>
</table>

In tables 2 and 3, we examined the correlation between mathematics performance and academic self-efficacy scales. As can be seen, according to the P-value obtained that is
higher than 0.05 in each table, no significant relationship was found between mathematics performance and studies scales.

Table 2: Correlation between mathematics performance and talent scale

<table>
<thead>
<tr>
<th>Talent scale</th>
<th>Performance of students</th>
<th>P-value</th>
<th>Correlation of coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0.23</td>
<td>0.41</td>
</tr>
</tbody>
</table>

Table 2: Correlation between mathematics performance and context scale

<table>
<thead>
<tr>
<th>Context scale</th>
<th>Performance of students</th>
<th>P-value</th>
<th>Correlation of coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0.84</td>
<td>0.072</td>
</tr>
</tbody>
</table>

Table 2: Correlation between mathematics performance and effort scale

<table>
<thead>
<tr>
<th>Effort scale</th>
<th>Performance of students</th>
<th>P-value</th>
<th>Correlation of coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0.47</td>
<td>0.25</td>
</tr>
</tbody>
</table>

**Discussion and conclusion**

One whose evaluation of himself is positive, he realizes himself effective and does his tasks with much effort, since he believes that he can obtain more achievements. Shank (2000) says that students can change self-efficacy and self-regulation through hard work, perseverance and the help of teachers and friends. Educational program of cognitive-behavioral change has been defined as follows: changing the manifest behavior of person by manipulating his hidden thought processes secret. As this program has behavioral aspect, it uses the important principles of reinforcement. However, as it emphasizes on using the cognitive processes to change the behavior, it has cognitive aspect (Schunk, 2000). It is expected that students who are studying and learning science in an environment, along with their individual differences in different dimensions, such as differences in appearance and family aspects, have differences in self-efficacy area. It is suggested that officials and authorities improve the sense of ability in students being aware of the role of educational self-efficiency in the education and using appropriate instructional strategies. For example, educational planners can design curriculum or textbooks and lessons in such way that this requirement can be met, using their innovations. In this study, no significant correlation was found in each of sub-scales of academic self-efficiency and
mathematics performance of students. This study is not consistent with studies conducted in this area previously. In this study, scored obtained for academic self-efficiency sub-scales were acceptable, while the mean of mathematics score of students was not high. It may be due to special conditions of this level of education and students’ problems to participate in University Entrance Exam. As sample of study was low in this study, it is recommended that this study to be conducted using large number of samples among fame and female students and differences to be studies in this regard.
References


