

## The Relationship between Academic Self-Efficacy and Creativity with Critical Thinking in University Students

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**ABSTRACT:** The purpose of the present study was to examine the relationship between academic self-efficacy and creativity with critical thinking in undergraduate students of Shahid Chamran University of Ahvaz. The statistical population of this study consisted of all the undergraduate students of Shahid Chamran University of Ahvaz within the academic years of 2011-2012. The sample of this study included 240 students (115 male, 125 female) who were selected using a multi-stage random method. Data were collected using the Abedi's creativity questionnaire, the academic self-efficacy questionnaire, and the B form of California Critical Thinking Skills Test. The results of the simple correlation showed that the creativity and its components i.e., flexibility, fluency and elaboration (except for originality) as well as academic self-efficacy had a positive and significant relationship with critical thinking. The results of regression analysis also showed that such variables as flexibility, fluency, elaboration and academic self-efficacy played a major role in predicting critical thinking.

**Keywords:** creativity, academic self-efficacy, critical thinking, university students

### INTRODUCTION

The education's experts believe that instead of acquiring scientific facts, learners should focus on the scientific facts' acquisition methods and instead of occupying their minds with the scientific facts they should learn how to think, to decide and judge about different matters. During the teaching process, the learners should be able to support and nourish various viewpoints and their own scientific and critical thinking. Obtaining such objectives requires the appropriate learning opportunities (Sha'bani and Mehr Mohammadi, 2000).

The critical thinking assists people in making prompt decisions and enables them to cooperate with the society. Generally, the ability to make sound judgments to improve the trend of democracy and to increase the productivity of judicial and economic systems is crucially important (Facione, 2010). According to Güven and Kurume (2006) the society needs people who have a wide variety of characteristics. These characteristics include the learning and application of different thinking methods such as conducting research, problem solving, creativity and the critical thinking. The critical thinking means how to think properly in an attempt to gain awareness of the world and it consists of the mental processes of data identification, analysis and evaluation. In other words, the critical thinking is the art of thinking around thinking in order to turn the thoughts into better, clearer, more accurate or more

defendable ones (Shamsaee, Alhani, and Cheraghi, 2010). Therefore, psychologists and teachers attempt to find out the differences between those people who completely have critical thinking and those who do not succeed in doing this; however, this is not an easy job due to the complexity of the humans' thinking and mental processes and many various elements affect on the critical thinking that make a person think critically (Kelly and Irene, 2010). Most research activities have focused on measuring the critical thinking of the learners within the past twenty five years and conducting research in field of processes and factors required for facilitating the critical thinking has been neglected (Banning, 2006). The self-efficacy variable is one of the variables on which few studies have been made; however, some traces of the beliefs regarding self-efficacy can be distinguished in the definitions of critical thinking. In his definition of the critical thinking, Ennis (1987) describes the critical thinking as a rational and reasonable way of thinking for making decisions about the beliefs and performing tasks. In line with this, Moaffi & Ghanizadeh (2010) have stated that such beliefs are not limited to the external world; they can also mention the inner world of every individual like self-admission, Self-actualization, self-esteem and self-efficacy.

The feeling of academic self-efficacy, as a motivational factor, plays a considerable role in developing skills of the critical thinking (Artino and

Stephens, 2009). The academic self-efficacy refers to the beliefs of the individual in terms of his or her own capacities and capabilities about a specific field or task (Bandura, 1986). The researches have shown that whenever the individuals have low self-efficacy attitudes, they become very pessimistic toward their own capabilities and demonstrate very weak performance in the educational systems (Siebert, 2006., Pajares, 1992). Fisher (2001) states that it is obvious that if the people make decisions by thinking and prompt insight, it will lead to reasonable and rational results and any success in making a rational decision will result in increasing their sense of self-efficacy. When the sense of self-efficacy is increased, the decisions made by the individual are trustworthy. According to Facione (2010) a good critical thinker is identified by the cognitive skills and approach adopted by him or her toward life. Any focus on improving the critical thinking skills is fruitless unless the inner motivation is developed and improved for using those skills. Accordingly, stating that the objective of every educational system is an effective learning and the effective learning is influenced by the beliefs of the individuals about their own self-efficacies, Woolfolk and Hoy (1998) mention that the critical thinking is one of the factors that have a considerable relationship with the self-efficacy belief as a motivational belief. Also, Phan (2010) found out that the students' critical thinking can be foreseen by means of their self-efficacy. He believed that the academic self-efficacy of the students is dominated by their critical thinking. Thus, it appears that there is a close relationship between the individuals' self-efficacy and their critical thinking. Although the studies conducted in this respect are not widespread, they have verified the relationship between these two variables. Today, the critical thinking and the motivational factors affecting it including self-efficacy has allotted an important status to itself in the educational systems. Taking the above explanations into account, identification of the variables related to critical thinking should be one of the basic topics in the educational settings especially at the universities (Macpherson and Stanovich, 2007).

Dehghani *et al.* (2011) showed that there is a positive relationship between self-efficacy and the students' critical thinking. Hence, they introduced self-efficacy as an important motivational factor for developing the critical thinking and they introduced it as the expansion factor of the critical thinking skill section.

Also, Abedini *et al.* (2010) conducted a study aiming at studying the relationship between the motivational beliefs (self-efficacy beliefs, beliefs of control during learning and the test anxiety) and the

cognitive and the metacognitive strategies (critical thinking, metacognitive Self-regulation about the female junior students of humanity high school of city of Tehran. Finally, the research's results showed that there is a significant relationship between the motivational beliefs, cognitive and metacognitive strategies and the students having higher self-efficacy levels make more use of the cognitive and metacognitive strategies and critical thinking as a metacognitive skill have a direct relationship with the individual's self-efficacy.

Creativity is one of the other variables which relates to the critical thinking. The studies have shown that growth of creativity and the critical thinking can be beneficial for the personal and social life of the students (Sternberg and Luppatt, 1991). The studies showed a wide variety of attitudes regarding the relationship between creativity and the critical thinking and each one of these attitudes are different and in some cases contradict with each other (Yang and Lin, 2004). Some of these viewpoints acknowledge the complementary function of these two mental process types (Bleedorn, 1993). Sternberg (1998) express s creativity as a combination of power of originality, flexibility and being sensitive against the attitudes which enable the learner to think about the different and productive results beyond the irrational way of thinking that will result in personal satisfaction and probably the others' satisfaction. Also, Facione (2002) introduces five steps of the critical thinking: At the fifth step about presenting the mentioned reasoning, he states that submission of logic may be used during the process of critical analysis. Therefore, the critical thinking requires a robust understanding of knowledge and the ability to identify inferential relations and to study the validity of the statements. This analytical process is completely different and is much similar to the process of critical thinking.

The main research question was whether there is a relationship between academic self-efficacy and creativity with the critical thinking .To answer this question, the following hypotheses are proposed:

Hypothesis 1: There is a relationship between creativity and critical thinking in university students.

Hypothesis 2: There is a relationship between fluency and critical thinking in university students.

Hypothesis 3: There is a relationship between flexibility and critical thinking in university students.

Hypothesis 4: There is a relationship between elaboration and critical thinking in university students.

Hypothesis 5: There is a relationship between originality and critical thinking in university students.

Hypothesis 6: There is a relationship between academic self-efficacy and critical thinking in university students.

Hypothesis 7: There is a multiple relationship between fluency, flexibility, elaboration, originality and academic self-efficacy with critical thinking in university students.

**MATERIALS AND METHODS**

The research population consisted of all the students of Shahid Chamran University (about 10,000 students) in the academic year of 2011-2012. Two hundred and forty university students (115 boys and 125 girls) were selected through multi-stage random sampling. The scales used in this study were: 1) The Abedi Creativity Test Questionnaire (ATC): Abedi (1993) [24] developed a test containing 60 questions (multi-choice ones) for measuring creativity in accordance with the definition given by Torrence (1965). The materials used for this test are categorized in four groups of fluency, originality, flexibility and elaboration. In 1993, the preliminary form of this test was executed by Abbedi on 650 students of the third level of guidance school in Tehran. The reliability coefficients of components of fluency, originality, flexibility and elaboration obtained by test-retest reliability method were 0.85, 0.84, 0.84 and 0.80 respectively. In the present study, for measuring the reliability of this questionnaire, the Cronbach's Alpha and Split-Half methods were used and respectively the originality (0.75 and 0.73), fluency, (0.61 and 0.62), flexibility (0.53, 0.48) and elaboration (0.66, 0.60) were calculated. Also, in the present research, the validity of the questionnaire was measured using its correlation with test of Torrence and the following results were obtained: fluency (0.63), flexibility (0.45), originality (0.48) and elaboration (0.46) and finally the total test (0.56). 2) Academic efficacy questionnaire: This scale has five components reflecting

the perception of the students of their competencies regarding doing their homework (Patrick, Hicks and Ryan, 1997). The reliability of this scale has been reported 0.87 by Midgley et al. (2000) by the Cronbach's alpha method. The construct validity of this scale has been approved in many other studies. In the present study, the questionnaire's reliability using the Cronbach's alpha and Spearman-Brown and Gutman methods were estimated 0.75, 0.73 and 0.70 respectively and also the validity of this questionnaire was achieved equal to  $r = 0.42$  which is significant at  $p < 0.001$  level. 3) California Critical Thinking Skills Test (CCTST)-Form B: This scale measures the cognitive skills of the critical thinking. This test includes 34 multiple choice questions that contain the subscales of analysis (9 questions), evaluation (13 questions) and deduction (12 questions). This test was designed and developed by Facione (1992). Khodamoradi et al. (2007) reported the internal correlation coefficient as between 0.70 to 0.77 for subscales of this questionnaire which indicates that the subtests have a positive and significant correlation with each other and also with the test's total score. In the present study, the reliability coefficient of California's critical thinking skills test was estimated 0.72 using Split-Half method and 0.76 using Cronbach's alpha method and the result of these coefficients were estimated respectively for the analysis, evaluation and deduction of the Cronbach's alpha (as 0.70, 0.72, 0.66) and the Spearman-Brown's Split-Half method (as 0.66, 0.63 and 0.58). Similarly, the validity of this test by means of the internal consistency was calculated 0.68 for evaluation, 0.69 for analysis and 0.72 for deduction which was significant at  $p < 0.001$  level.

**RESULTS**

Table 1 shows the means and standard deviations of the scales. Table 2 shows correlation coefficients of the predictive variables with criterion variable.

**Table 1.** Mean and standard deviation of the predictive variables and criterion variable

Variable	M	SD	N
<b>Creativity</b>	126.1	1.86	240
<b>Fluency</b>	33.52	5.27	240
<b>Flexibility</b>	22.59	3.65	240
<b>Elaboration</b>	24.93	6.02	240
<b>Originality</b>	49.51	7.90	240
<b>Academic Self-Efficacy</b>	19.40	2.71	240
<b>Critical Thinking</b>	14.49	3.47	240

**Table 2.** Correlation coefficients of the predictive variables and criterion variable

Criterion Variable	Predictive Variables	Correlation Coefficient (R)	Sig.
Critical Thinking	Creativity	0.49	P≤0.001
	Fluency	0.24	P≤0.001
	Flexibility	0.38	P≤0.001
	Elaboration	0.40	P≤0.001
	Originality	-0.03	P=0.552
	Academic Self-Efficacy	0.44	P≤0.001

As it can be seen in table 2, there is a positive and significant correlation between creativity and critical thinking ( $r= 0.49, P\leq 0.001$ ). Thus, the research's first hypothesis is verified. There is a positive and significant correlation between fluency and critical thinking ( $r= 0.24, P\leq 0.001$ ). Thus, the hypothesis 2 is approved. There is a positive and significant correlation between flexibility and critical thinking ( $r= 0.38, P\leq 0.001$ ). Thus, the hypothesis 3 is approved. There is a positive and significant correlation between elaboration and critical thinking ( $r= 0.40, P\leq 0.001$ ). Thus, the hypothesis 4 is approved. There is a negative and non-significant correlation between originality and critical thinking ( $r= -0.03, P=0.552$ ). Thus, the hypothesis 5 is rejected. Also, there is a positive and significant correlation between

academic self-efficacy and critical thinking ( $r= 0.44, P\leq 0.001$ ). Thus, the hypothesis 6 is approved.

As shown in Table 3 multiple regression analysis (enter method) showed that the fluency, flexibility, extension, originality and academic self-efficacy with critical thinking ( $F=22.22, P< 0.001$ ). These variables explained 32% of critical thinking variance. Thus, the hypothesis 7 is approved

The results from multiple regression analysis (stepwise model) showed that the academic self-efficacy, flexibility, fluency and elaboration had significant multiple correlation with critical thinking ( $F= 27.55, P< 0.001$ ). These four variables are predictors of critical thinking. Based on the obtained results, the component of originality eliminated from regression (Table4).

**Table 3.** The results of multiple regression analysis with enter model

Dependant Variable	Predictors	MR	RS	F P	Regression coefficients				
					1	2	3	4	5
critical thinking	1. academic self-efficacy	0.4 4	0.20	F=57.71 p≤0.001	β=0.44 t=7.66 p=0.001	-	-	-	-
	2. elaboration	0.4 9	0.24	F=37.55 p≤0.001	β=0.38 t=6.61 p=0.001	β=0.21 t=3.65 p=0.001	-	-	-
	3. flexibility	0.5 2	0.28	F=30.36 p≤0.001	β=0.33 t=5.64 p=0.001	β=0.14 t=2.47 p=0.014	β=0.21 t=3.51 p=0.001	-	-
	4. fluency	0.5 2	0.28	F=22.7 p≤0.001	β=0.33 t=5.62 p=0.001	β=0.14 t=2.38 p=0.018	β=0.20 t=3.00 p=0.003	β=0.02 t=0.30 p=0.75	-
	5. originality	0.5 6	0.32	F=22.22 p≤0.001	β=0.34 t=5.99 p=0.001	β=0.14 t=2.46 p=0.015	β=0.25 t=3.75 p=0.001	β=0.06 t=0.95 p=0.340	β=-0.22 t=-3.86 p=0.001

**Table 4.** The results of multiple regression analysis with stepwise model

Dependant Variable	Pridictors	MR	RS	F P	Regression coefficients			
					1	2	3	4
critical thinking	1. academic self-efficacy	0.44	0.20	F=57.71 p≤0.001	β=0.44 t=7.66 p=0.001	-	-	-
	2. flexibility	0.51	0.26	F=41.57 p≤0.001	β=0.35 t=6.07 p=0.001	β=0.26 t=4.44 p=0.001	-	-
	3. fluency	0.54	0.30	F=33.53 p≤0.001	β=0.37 t=6.44 p=0.001	β=0.32 t=5.44 p=0.001	β=-0.21 t=-3.63 p=0.001	-
	4. elaboration	0.56	0.32	F=27.55 p≤0.001	β=0.34 t=6.01 p=0.001	β=0.28 t=4.51 p=0.001	β=-0.21 t=-3.75 p=0.001	β=0.15 t=2.65 p=0.008

**DISCUSSION**

The present study has been designed for studying the relationship between creativity with the critical thinking. In general, the results of correlation analysis show that there is a positive and significant relationship between creativity and critical thinking and also the academic self-efficacy and critical thinking. Baker, Rudd & Pomeroy (2001) state that the critical thinking skills are consistent with the creative thinking skills and by understanding the relationship between these two structures, the teachers are able to increase the capacity of the students to learn these two skills. In addition, creativity is consistent with qualitative definitions of the critical thinking using terms such as: sensitivity toward beauty, awareness of inner feelings, critical thinking with self-confidence and cognitive maturity (Kelly and Irene, 2010). Besides, the result of this study shows that the academic efficacy is significantly related to the critical thinking. In order to explain this finding, Bandura (2001) states that there is a significant relationship between the critical thinking and the meta-cognitive variables, such as motivation and self-efficacy beliefs. Self-evaluating the beliefs and opinions by the individuals in a critical manner verifies the critical thinking and this motivational capability assist people in developing their own potentials and beliefs into capabilities which leads to growing the critical thinking skills. High self-efficacy creates motivation and high level of motivation is followed by increased critical thinking (Bandura and Lock, 2003). According to Halpern (2007) while training the critical thinking, the desires and cognitive capabilities of the learners should be considered. If the students are not inclined to make use of the critical training skills, training such skills to them will not be sufficient.

The most important suggestion of this research is to some identified cognitive features in relation with the critical thinking should be developed. This way, the learners who have inner motivations will act for learning these skills in their own educational environment and their own personal life. As a result, they will develop the spirit of accepting criticisms.

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