



RELATIONSHIP BETWEEN THINKING STYLES, CRITICAL THINKING AND CREATIVITY AMONG THE STUDENTS OF SEMNAN UNIVERSITY OF MEDICAL SCIENCES

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ABSTRACT

This study was conducted to investigate the relationship between thinking styles, critical thinking, and creativity among students in Semnan University of Medical Sciences in the academic year of 2014-2015. For this purpose, 214 samples (92 males and 122 females) were selected among students by using random sampling method. This study is descriptive and correlational. To collect data, California Critical Thinking Questionnaire and Abedi's Creativity Questionnaire were used. The data were analyzed using Spss software. To analyze data, Pearson correlation coefficient and regression analysis were used. The mean difference between male and female subjects was examined according to each variables of thinking style, variables of critical thinking and creativity using t-test for independent groups. The results showed that thinking styles (legislative, judicial, liberal, general, internal) and critical thinking (deduction, interpretation and induction) have significant positive correlation with creativity and thinking styles (uni-polar, partial, conservative) have significant negative correlation with creativity. In addition, executive thinking style and critical thinking (evaluation of logical reasoning) have non-significant positive relationship with creativity and legislative, executive, judicial, general, anarchic, and liberal thinking styles have significant and positive correlation with critical thinking (identification of hypotheses). Additionally, results showed that the mean scores of girl and boy subjects are different significantly in thinking styles and critical thinking at 0.05 level and mean scores of girl and boy subjects are not different significantly in variables of creativity, thinking styles (executive, judicial, liberal, uni-polar, oligarchy and hierarchical) and critical thinking (inference, evaluation, logical reasoning). Based on the results of this study, paying attention to style of thinking, critical thinking, and creativity is sensible and important. Creating and fostering them can pave the way for educational system development and consequently the development of society.

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Introduction

In recent decades, researchers have been more interested in the study of types, styles and ways of thinking [1,2 and 3]. Some of these researchers have tended to examine thinking styles. Sternberg (1988) states that thinking styles are preferred methods of people to use cognitive abilities. These styles show how people like to use their abilities in everyday life [4]. According to Sternberg theory, different ways of process information by people is called thinking styles. In fact, thinking styles are preferred methods and the way of using their abilities rather than abilities themselves. They refer to a way of thinking preferred. Although there are controversial views on terminology of thinking style among theorists, all agree that people use fixed and distinct way to encode, store, and process information in mind, that it is independent of intelligence [5]. According to Sternberg, thinking styles are distinct in five dimensions of functions, forms, levels, areas, and trends that function includes legislative, executive, and judicial. Levels refer to general and detailed categories and trend refers to liberal and conservative styles. Forms mean uni-polar, hierarchic, oligarchic, and anarchic styles. Areas also refer to internal and external style of thinking [6]. Thirteen thinking style of Sternberg can be divided in two general groups. The first type of thinking styles that is creativity-generating which includes legislative, judicial, general, hierarchical, and liberal style requiring complex data processing, and executive,

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partial, uni-polar and conservative thinking styles requiring simple data processing. The remaining four styles (anarchical, oligarchy, internal and external), depending on the specific task style, can be either simple or complex thinking styles [7].

Another variable associated with different thinking styles of students that researchers have studied and analyzed it from different aspects in recent decades is critical thinking and fostering it as one of the main goals of schools and universities. Critical thinking is a general term used mainly to refer to two very different concepts of ability and willingness. Ability refers to capability of a person to think critically, while the willingness refers to the desire of the person to think critically [1]. One of the most appropriate definitions of critical thinking was presented by Robert Ennis (1987). He considers critical thinking as reasonable reflective thinking focused on decision-making for believing, and he states that a myriad of skills, including trends shape such logical or reasonable reflective thinking [8]. Watson and Glaser stated: critical thinking is blend of knowledge, attitude, and performance in each person. They consider critical thinking ability in the five following skills: 1) deduction: deduction is a result that one gains it from occurred continuous phenomena. It is ability to distinguish right data from wrong data among information given 2) identification of Hypotheses: Hypothesis is a pre-specified phrase taken for granted or proposed to be accepted. Identifying hypotheses is in fact the ability of identifying proposed hypotheses of expressed phrases. 3) Inference: in inference, result or results are obtained from logical introduction. In inference, mental bias should not affect judgment and conclusion, since it leads to wrong conclusion. In inference, minds moves from part to whole in a way that general result is obtained from partial introduction. In addition, in inference, the ability to make distinction between primary information and data and general result is very important. Interpretation: it is one's ability to process information and to determine its validity. In this process, it should be judged on whether results are derived reasonably or logically from data and introductions. Therefore, in interpretation, inference does not take place, but the results are available to us and the important thing is that data and introductions are analyzed and evaluated that if results derived from them are true or false. 5) Evaluation of logical arguments: in important cases of making decision on choosing strong and weak arguments, it is more desirable to be able to distinguish between strong and weak arguments. A logical argument is strong when it is important and has direct relationship with the question, while it is weak when it not directly related to the question (even if it is very important), or it is less important and related to with scientific and less important aspects of question [9].

The definition of Watson and Glaser of critical thinking is the basis to test critical thinking that are widely used in assessment of critical thinking and it is accepted by most researchers in various scientific fields. As mentioned earlier, some thinking styles are creative [7]. To provide a full definition of creativity is a little difficult. Mac Gulderk and Oliver believe that creativity includes personal creation, risk taking, designing new ideas, and it is one of the basic human characteristics. [10].

Creativity is ability or power to create new products through using imagination power. Most psychologists agree that creativity refers to new and valuable achievements. Eysenck believes that creativity is a mental process leading to problem-solving, ideation, conceptualization, making art forms, theorizing, and products that are innovative and unique [11]. Creativity is related with cognitive, emotional, environmental, and motivational variables [12]. Macdade (2000) found significant correlations between thinking styles and critical thinking, and this proves this that thinking styles play important role in critical thinking [13]. Zhang (2003) also showed a significant positive correlation between critical thinking and legislative, executive, and judicial thinking styles. In addition, he found a negative correlation between the conservative thinking style and critical thinking. Studying the relationship between thinking styles and critical thinking, Ching and Chang (2004) conclude that critical thinking is negatively correlated with partial and conservative thinking styles, and positive correlation with legislative, judicial uni-polar, oligarchic, external, and internal thinking styles. While there was no correlation between hierarchical, liberal, and anarchical thinking styles [14]. Some experts believe that using proper thinking styles or making them coordinated with abilities, we can overcome problems and make maximum use of our capabilities [15]. Several studies have shown that thinking styles are correlated with the processes of creativity, problem solving, decision making, academic achievement, and factors such as culture, gender, age, education, work history, etc., affect people thinking styles [15].

Hedayati et al (2011) found a difference in legal, partial, conservative, external, and internal thinking style among female and male people [16]. Mobini Dehkordi et al (2011) also refer to relationship between thinking styles and creativity. They argue legislative, judicial, liberal thinking styles have positive and significant correlation with creativity, while there is negative and significant relationship between executive, partial, uni-polar, and conservative thinking styles [17]. Keshtkaran et al (2009) concluded that there is a significant relationship between creativity and styles of thinking [18]. Zhou and Zhang (2011) also found a relationship between thinking styles and creativity concepts [19]. Attlee et al (2011) also suggest that there is a significant relationship between thinking styles and creativity [20]. Glassner and Schwarzer (2007) found a relationship between creative thinking and critical thinking in their studies in which by strengthening critical thinking, creative thinking also improved [21]. Ian Piaui (2011) also found a positive and significant relationship between creative thinking and critical thinking among teachers in his study and he stated that teachers who have high level of creative thinking and critical thinking, they can make better decisions in complex and confusing situations [22]. In a study conducted by Kohanyia (2011), it was found that creativity is higher among women than compared to men [23]. Based on the above-mentioned points, the relationship between thinking style, critical thinking, and creativity is examined by following hypotheses:

1. There is a relationship among styles of thinking and critical thinking, and creativity.
2. There is a relationship among styles of thinking and critical thinking, and creativity of males and females.

Areas	13.Internal	0/571	-0/145	0/301	0/237	0/011	0/273	-0/355	0/199	-0/576	0/199	0/073	0/453							
	14.External	-0/087	0/050	0/143	0/041	0/138	-0/003	-0/087	0/502	0/047	-0/116	0/252	0/052	0/100						
Critical thinking	15.Deduction	0/582	-0/086	-0/161	0/011	-0/149	-0/029	-0/028	-0/014	-0/288	0/170	0/145	-0/063	-0/045	0/144					
	16.Identification of hypotheses	-0/021	0/111	0/732	0/589	0/761	0/072	0/468	0/010	0/289	-0/288	0/140	0/672	-0/281	-0/053	-0/145				
	17.Induction	0/389	0/236	-0/270	-0/207	-0/094	-0/169	0/232	0/071	0/356	0/013	-0/191	-0/188	-0/264	-0/077	0/032	0/064			
	18.Interpretation	0/491	0/146	-0/178	0/023	-0/096	-0/418	0/112	-0/504	0/121	-0/674	0/038	-0/060	-0/021	-0/641	-0/025	0/158	0/299		
	19.Evaluation of logical reasoning	0/113	0/177	-0/150	0/118	0/030	-0/103	-0/087	-0/014	0/095	-0/035	0/142	-0/151	-0/178	-0/255	-0/161	0/055	0/555	0/213	1

Conclusion

The aim of this study was to examine the relationship between thinking styles, critical thinking and creativity among the students of Semnan University of Medical Sciences. The results showed that thinking styles (legislative, judicial, liberal, general, and internal), deduction, interpretation, and induction have significant positive correlation with creativity and thinking styles (uni-polar, partial, and conservative) and creativity are significantly and negatively correlated. This result is in line with results of studied conducted by (Mac Dead, 2000; Zhang, 2003; Ching and Chang, 2004 Mobini Dehkordi et al., 2011; Keshtkaran et al., 2009; Zhou and Zhang, 2011; Attlee and et al., 2011, Glassner and Schwarzer, 2007 and Glassner and Schwarzer, 2007). This result confirms the first hypothesis. In addition, results show that the mean scores of general, partial, conservative, anarchical, internal and external thinking styles and critical thinking (deduction, identification of hypotheses, interpretation) were significantly different between two genders. This result confirms the second hypothesis. In contrast, the mean scores of creativity and executive, judicial, liberal, hierarchical, uni-polar, oligarchic thinking styles and critical thinking (deduction, evaluating logical reasoning) were not different significantly in two genders. Lack of difference in creativity of female and male is not consistent with results of studied conducted by Kohanyia (2011); suggesting higher score of creativity in females compared to males [23]. This inconsistency may be due to differences in cultural and social characteristics of the samples examined in this study. According to the results of past studies as well as current study, the importance of paying attention to critical thinking to the thinking styles become more pronounced. Since paying attention to critical thinking and creativity is most important goal of any education system creating and fostering them could be effective in progress and development of educational system in particular and society in general. It is clear that success in training creative people with critical thinking is promising in goals paving the way for development of the educational system and consequently development of society.

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