

A Comparison between Self-Efficacy and Creativity of Students in Ordinary and Smart Schools

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ABSTRACT: This study was done aiming to make a comparison between self-efficacy and creativity of students in ordinary and smart schools. The method of the study was a causal-comparative method. The statistical population of the study consisted of all second-grade high school students who studied from 2013 to 2014 in Tehran's ordinary and smart schools. The statistical sample of the study consisted of 216 students who were selected using the random cluster sampling method. The collection of data was based on Sherer and Maddux's self-efficacy questionnaire and Torrance's creativity test. Having used the Cronbach's alpha method, the reliability of the tools was 0.72 and 0.62, respectively. In addition, the validity of the questionnaire was measured using content validity; hence the questionnaire was approved by the relevant experts. The analysis of the data obtained from the questionnaires was done based on the SPSS software in two sections: descriptive (average, mean, variance, standard deviation) and inferential (MANOVA). The analysis of the results showed that there is a difference between self-efficacy and creativity of students in ordinary and smart schools; students in smart schools achieved better self-efficacy and creativity scores in all dimensions (fluency, elaboration, innovation, and flexibility). Therefore, it seems that the use of new technologies and the provision of facilities for schools can help students to develop in terms of cognitive processes.

Key words: Smart Schools, Self-Efficacy, Creativity, Innovation.

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INTRODUCTION

The development of ICT in different social systems has brought about basic evolutions in different economic, social, cultural, and educational fields. The emergence of international competition, the effect of new technologies in all aspects of humans' lives, globalization, and the importance of human capital in the age of knowledge and development show that the requirements of today's education are not the same as the requirements in the past. Since information and information-orientation are of today's characteristics, the development of societies is based on knowledge and information; hence the development of human capital can lead to the development of the society through proper educational investment which is suitable for the knowledge age (Basak et al., 2014).

IT is a branch of knowledge based on the development and application of computers, software, and other technical tools, which is used in areas such as evaluation, the examination of educational data, teaching, and learning. The advancement of ICT and its effect on teaching and learning has provided opportunities to create learning environments which are well-designed, learner-based, interesting, interactive, efficient, flexible, significant, and facilitated. In the development of IT, the ultimate purpose is not to only access information and knowledge, but it is also for users to cooperate in order to produce knowledge (Mashayekh, 2011). The integration of electronic technologies in the process of teaching and learning is a necessary and undeniable matter; because learners must learn how to live and work in a society in which electronic media constantly

expose them to cultures and values that are different from theirs (Ebadi, 2011). The process of exploiting IT in education has led to the emergence of smart schools. A smart school is an educational organization which has been systematically designed for activities such as teaching, learning, and school management in order to prepare students to successfully handle living in knowledge age. In such schools, students are provided with educational services such as using electronic learning, maintaining the physical atmosphere of schools, teachers, and students, providing a smart educational system, and an integral and comprehensive approach (Garison and Anderson, 2011). Smart schools include integrated elements which have been designed in order to increase students' curiosity and active cooperation for the purpose of coordinating the efforts of students, teachers, and managers in the direction of satisfying all educational requirements (Ebadi, 2011).

So far, few studies have been done on smart schools in Iran. Zamani et al. (2011) found in their study aiming to examine the weaknesses, opportunities, and threats of providing smart schools that students and teachers' literacy in these schools in terms of computer technology and information is higher than in ordinary schools. In these schools, the central role of teachers changes to a facilitating role. On the other hand, the loss of proper culture and structure for using ICT in education is one of the weaknesses and threats of providing smart schools. Jong (2008) showed that using new technologies and computers in education increases the quality of teaching; and numerous studies have been done in connection to the application of computer programs. Basak et al. (2014) concluded that computer programs

help adults to improve their decision-making skills. Dye et al. (2009) and Boot et al. (2013) inferred that the enhancement of computer cognition affects cognitive functions (active memory, attention, speaking skills, spatial visualization abilities, and fluency).

On the other hand, educational success, social advances, and constructive interaction with the environment are the education system and families' expectations for youngsters and students. There are many prerequisites for the achievement of these objectives some of which must be provided by families, and some other are rooted in people's cognitive and behavioral characteristics. One of these mental characteristics is self-efficacy which affects all motivational and cognitive aspects of people. Self-efficacy refers to people's beliefs in their abilities to use motives, cognitive sources, and control over a certain event. Thus, one of the basic aspects of self-efficacy is the belief that people can affect their lives' events by applying control; in stressful situations, applying control over conditions is an important factor which helps to adapt to different situations (Bandura, 1997). The positive feeling of self-efficacy greatly contributes to proper performance, activation, and mental health. People who experience inability, depression, and dissatisfaction in life are those who find their skills and abilities insufficient. Therefore, advances, accomplishments, positive mental health, and happiness require an optimistic feeling (Bandura, 1999). Different studies have been done in connection to the consequences of self-efficacy. Putwain et al. (2012) found that students with high self-efficacy have better educational performances than those with lower self-efficacy; they showed that educational self-efficacy determines the advances of education and emotions. Asgari et al. (2013) concluded in their study that there is a relation between self-efficacy and educational progression. Lavoie et al, 2008, showed that there is a significant relation between self-efficacy and life quality and neurological-mood disorders. Therefore, learning about self-efficacy and its related factors is crucial.

According to Bandura (1997), people's perceptions of their self-efficacy are developed by four sources: victorious experiences (personal life history), mastery experiences (observing others' behaviors and the consequences of their behaviors), verbal persuasion (the effect of others' words about abilities and skills), and physiological and emotional states (unpleasant physiological arousal compared to pleasant physiological arousal). Later, Maduks (2002, according to Mathisen and Bronnick, 2009) added another source to the four mentioned sources: imaginal experiences. In imaginal (intellectual) experiences, people can affect their own perceptions

of self-efficacy by intellectually visualizing a situation and others or their effective and ineffective behaviors in that situation. In addition, Rodebaugh (2006) believes that there is a relation between communicational skills and self-efficacy. Khazayi et al. (2014) concluded in their study that there is a relation between the level of self-efficacy and assertiveness. Mathisen and Bronnick (2009) showed that the implementation of a creativity educational program helps to increase self-efficacy. Other purposes in any educational system include creativity development and innovation. There are various definitions for creativity; according to Torrance, 1987, creativity is one of the most indefinite and disorderly expressions in psychology and education. This indefiniteness is because of the abstraction of this concept, not the complexity of creativity; because creativity can easily be felt in life. He believes that creativity comprises sensitivity to problems, inadequacies, difficulties, errors existing in knowledge, and speculation, forming hypotheses about the inadequacies, evaluating and testing the hypotheses and speculations, modifying the hypotheses, and conclusion. Sternberg (2009) believes that creativity has a metacognition dimension and that it is related to intellectual processes such as thinking, intelligence, visualization, and processing information. Meihali (2007, according to Silvia et al., 2008) believes that creativity is a multi-variable phenomenon, i.e. factors such as the society, family, personality, and cognitive abilities affect it simultaneously.

Torrance, 1987, who is influenced by Gilford's theoretical framework, considers creativity composed of four main elements: 1) fluency (the ability to produce numerous ideas in the form of images, considering their response and belief); 2) Innovation (the ability to produce ideas that are different from ordinary and common ideas); 3) Flexibility (the ability to produce various types of ideas in the form of an image, and offering new solutions) and 4) Elaboration (the ability to add details and the ability to complete image-based ideas). In this regard, Emamverdi et al. (2013) showed that there is a strong relation between the IT system and creativity; and using new IT systems in schools is an important factor which helps to produce creativity, flexibility, and new ideas.

Davoudi and Moghimi (2013) showed that learning skills have a significant effect on creativity. Therefore, considering the few studies in connection to the consequences of founding smart schools, their increasing development, and also the importance and role of self-efficacy and creativity variables in educational and social progression, the present study is seeking to find an answer to the question, "Is there a difference between students' self-efficacy and creativity in ordinary an smart schools?"

METHODOLOGY

Since this study is trying to compare students' self-efficacy and creativity in ordinary and smart schools, the research method was a comparative-causal method. The statistical population of the study consisted of all male second-grade high school students in Tehran, studying between the years 2013 and 2014. In this regard, 216 students were selected as respondents using the random cluster sampling method.

The data-collecting tool in the present study was Sherer and Maduks's comprehended self-efficacy questionnaire, and Torrance's imaginal-creativity test.

1. The general self-efficacy questionnaire (including 17 questions) which was provided by Sherer and Maduks, 1982, was evaluated on the basis of the Likert 5-point scoring scale. Thus, 85 showed high self-efficacy, 51 showed medium self-efficacy, and 17 showed low self-efficacy. This scale measures three behavioral aspects: tendency towards beginning behavior, tendency towards developing efforts in order to complete homework, and resisting hurdles. Sherer and Maduks (1982) reported the reliability coefficient of the scale to be 0.86. Barati Bakhtiari (1997), calculated the coefficient to be 0.76 using the Spearman Braun split-half method, 0.76 using the Gattman split-half method, and 0.79 using the Cronbach's alpha. In the present study, the reliability of the test was calculated to be 0.72 using the Cronbach's alpha coefficient. In addition, content validity was used in order to evaluate validity; and the questionnaire was approved by experts.

2. Torrance's creativity test (form B) which was provided in 1974 in order to examine creative thinking. The pictorial shapes of creative thinking require responses which mainly have pictorial

essence. This test was applicable in two forms (A and B) from kindergarten levels to post-high school levels. Form "B" includes three activities: fluency, flexibility, and innovation. Rodebaugh (2006), reported the retest coefficient for fluency in a 10-week period to be 0.82, 0.78 for flexibility, 0.59 for innovation, and the total score was 0.83. Pirkhaefi (1995), calculated the overall reliability of the test to be 0.80 in the Iranian sample. In the present study, the coefficient was calculated to be 0.76 using the Cronbach's alpha method. The analysis of the data obtained from the questionnaire was done using the SPSS software in two sections: descriptive (mean, variance, standard deviation) and inferential (the "t" test for independent groups).

RESULTS

In this section, the findings of the study are presented. First, the descriptive characteristics of variables are given in tables 1 and 2.

According to the results presented in table 1, the mean and standard deviation of elaboration (for the sample) were 59.73 and 9.42, respectively, for students in smart schools; and they were 52.38 and 9.26 for students in ordinary schools.

According to the results presented in table 2, the mean and standard deviation of self-efficacy were 64.35 and 5.26, respectively, for students in smart schools; and they were 56.19 and 59.43 for students in ordinary schools. The MANOVA statistical method was used in order to examine the hypotheses of the study. Before the MANOVA analysis, the level of adaptability between the variables was examined using the Wilks Lambda test; and the obtained results are given in table 3. As shown in this table, according to ($F=3.5$) and ($P=0.05$), there is at least one difference between the two groups.

Table 1. Mean and standard deviation of creativity variables in students of ordinary and smart schools

Variable	Type of School	Mean	Standard Deviation
Elaboration	Smart	59.73	9.42
	Ordinary	52.38	9.26
Fluency	Smart	17.27	5.09
	Ordinary	13.43	4.46
Innovation	Smart	14.49	4.27
	Ordinary	11.06	3.94
Flexibility	Smart	21.09	3.16
	Ordinary	16.53	2.86

Table 2. Mean and standard deviation of self-efficacy variables in students of ordinary and smart schools

Variable	Type of school	Mean	Standard deviation
Self-efficacy	smart	64.35	5.26

Table 3. The Wilks Lambda test in the analysis of multifold variance

Test	Value	F	The Degree of Freedom of Effect	The Degree of Freedom	Significance Level
Wilks Lambda	0.89	3.5	5	214	0.05

Table 4. The results of the multifold variance analysis of self-efficacy and creativity scores of students in ordinary and smart schools

Source of Differences	Dependent Variable	Sum of Square	Degree of Freedom	Average of Squares	F	Significance Level
Group	Self-Efficacy	1163.56	1	1163.56	8.56	0.001
	Elaboration	924.57	1	924.57	6.38	0.001
	Fluency	125.29	1	125.29	4.61	0.001
	Innovation	109.43	1	109.43	4.92	0.001
	Flexibility	246.28	1	246.28	8.83	0.001

According to the results presented in table 4, students' self-efficacy in smart schools, considering $F=8.56$ and $P=0.001$, was significantly higher than students' self-efficacy in ordinary schools. Additionally, students' creativity in smart schools, considering $F=6.38$ and $P=0.001$ for elaboration, $P=0.001$ and $F=4.61$ for fluency, $P=0.001$ and $F=4.92$ for innovation, and $P=0.00$ and $F=8.83$ for flexibility, was significantly higher than students' creativity in ordinary schools. As shown in the table above, students in smart schools had better performances in all dimensions (elaboration, fluency, innovation, and flexibility).

DISCUSSION AND CONCLUSION

The development of ICT in societies' different systems has brought about basic evolutions in different economic, social, cultural, and educational fields. In our society, the increasing application of this human requirement has made it possible to form smart and develop smart schools. Hence the present study was done for students in ordinary and smart schools for the purpose of comparing the levels of self-efficacy and creativity which are two important variables determining success in individuals' personal and social lives.

As mentioned in the "findings" section, the results obtained from the statistical tests showed that students in smart schools had higher creativity and self-efficacy than those in ordinary schools. Generally, these findings were in line with the results of the studies conducted by researchers such as, Zamani et al. (2011), Dye et al. (2009), Boot et al. (2008), Atri Ebrahimpour et al. (2013), Mathisen and Bronnick (2009), Emamverdi et al. (2013), and Davoudi and Moghimi (2013). The progression of ICT and its effect on teaching and learning techniques have provided opportunities to create learning environments which are well-designed, learner-based, interesting, interactive, efficient, flexible, meaningful, and facilitated. The approach of smart schools is an integral and comprehensive approach. It is considered comprehensive because it is attempting to satisfy students' needs and make it possible for them to develop their talents by using different learning

techniques and multi-media instruments (visual, verbal, auditory, and practical); and it is integral because it, instead of making an instrumental use of "IT", tries to make the educational system efficient by integrating curriculums and learning techniques. In addition, the educational models existing in smart schools require students' active participation. As reported by Zamani et al. (2011), in smart schools, students and teachers' literacy in terms of computer science and information is higher than in ordinary schools. In addition, the role of teacher-focused changes to a facilitating role. Basak et al. (2014) concluded that real-life-based computer programs help adults to make better decisions. On the other hand, the positive feeling of self-efficacy greatly influences proper performance, activation, and mental health. People who experience inability, depression, and dissatisfaction in life are those who find their skills and abilities insufficient. Therefore, advances, accomplishments, positive mental health, and happiness require an optimistic feeling (Bandura, 1999). Bandera believes that self-efficacy is one of the variables which helps individuals have control; it is undoubtedly one of the basic and effective factors in positive mental health; and the positive feeling of self-efficacy greatly contributes to peoples' proper performance and activation. Creativity, as an important cognitive ability, plays a considerable role in the achievement of proper solutions, sensitivity to problems, inadequacies, difficulties, and the errors existing in knowledge. Therefore, it is important that we pay attention to useful educational programs and the required conditions for enhancing the variables. In smart schools, since teachers act as facilitators, students actively participate in learning processes. In addition, the extensiveness and attractiveness of the available data can help students to become familiar with new, different, and innovative ideas. Since students in smart schools learn how to use computers and the internet, they can use the information available in this environment to focus on school-related and non-academic activities in their free time; and this has helped to enhance thinking processes, decision-making, and also the feeling of being valuable and efficient.

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