A COMPARISON OF THE EFFECT OF EFFECTIVE EDUCATION SCIENCE ON CREATING CREATIVITY, SELF-EFFICACY AND THE INCENTIVES FOR ACADEMIC ACHIEVEMENT AMONG SMART SCHOOL STUDENTS AND ORDINARY SCHOOLS

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Abstract. The purpose of this study was conducted in order to compare the effect of effective science education on creativity, self-efficacy and academic achievement motivation among students of smart schools (ICT based) and elementary schools in the first sixth grade of Dezfol city in the academic year of 2017-2018. This study was carried out using a causal-comparative method.The research tools were Torrance Creativity Questionnaire, Barati Self-efficacy Questionnaire and Hartre's Educational Motivation Questionnaire. The results show that ICTs in the school group have more ICT than the ordinary school. Based on the results of the F-scores, creativity is significant at the level of 0.01. The results show that the difference in mean scores of creativity component is significant between the two groups.Results show educational motivation scores in the ICT group are more than that of the ordinary school. Based on the results of the F score, there is a significant correlation between academic motivations at the level of 0.01. The results showed that the difference in mean scores of academic motivation component was significant between the two groups.

Keywords: creativity, self-efficacy, motivation for academic achievement, students, smart schools

Introduction. The motivation structure for academic achievement in school refers to behaviours related to learning progress (Parviz, 2005). There are many approaches to defining the motivation of academic achievement; some of the strategies address the motivations for success in general. One of them is the goal approach. The goal approach is based on adaptive and maladaptive motivations (Tamizi, 2015). Researches in this regard have shown that children with unique abilities have different responses to educational and learning problems. Some people, with their high levels of ability, are faced these difficulties. They seem to have little ability and they are disappointed that their efforts are not successful, sometimes they are interpreted in terms of the learned helplessness which is maladaptive because, prevents the achievement of children with valuable goals and the actualization of their intrinsic abilities.On the contrary, the group faces problems that can overcome the challenges they face, they do not get upset, even in their own way, and they feel pleasure in overcoming the challenge. They focus on shifting strategies with maximum effort and richer levels of problem solving. These reactions are called responses in the direction of domination (Khaef Elahi, 2003).

Learning Objectives Mayer, fraccastoro&mcnary (2007) predicts in his goal-based theory that the behavior of individuals with different biases in reaching goals will depend on their perception of their abilities. Tom kins & meilenda (2009) points out that in terms of functional purpose, target, function and adequacy, students recognize success as their eligibility criterion.In this case, people are looking for other goals and they are looking for new activities and increasing their adequacy. In other words, students who are considered functional goals are initially interested in acquiring positive evaluations of their abilities, trying to avoid negative ones,these individuals prefer to receive a positive evaluation in a more easy task than to accept the possibility of a negative evaluation in a more important and challenging task (Mayer & Salovey, 2000).

But students with learning goals first of all understand the acquisition of new skills or the development of their knowledge, even if they require errors in this way, it is therefore necessary to identify with the scientific research the most important correlations of the motivation of academic achievement and the relative share of each in explaining the motivation of academic achievement. In the Encyclopedia of Education, Hossen et al. (2000) differentiate the motivation of academic achievement to that dimension of motivation, which is called the student's inner motivation.

The inner motivation is a psychological state, and when it comes to having a person with the necessary qualities and self-controlling. Self-controlling is divided into two parts: the opportunity to control or the opportunity given to the student to decide for his or her academic affairs,or the feeling that the student must have in order to be able to act on that basis (Pederson, 2003).

A period of education is a period of life that rapid cognitive and social changes occur in which. Therefore, adaptation to challenges and educational opportunities has always been a concern for education. In a variety of perspectives, the set of abilities and talents that are involved in this adaptive manner have been considered. Students are future developers who need to pay attention to their educational issues individually andit is also not so important for the future of society to develop. From the viewpoint of researchers, creativity has had many implications and there is still a consensus on a single definition that does not cover all aspects (Spence, 2007).

Therefore, the nature of creativity varies greatly from one school to another, and each school expresses theoretical self-esteem. According to this, creativity is thought to be the result of a conflict resolution created in an unconscious manner. Humanists emphasize that creativity is the result of mental health, self-perfection, and human integrity, and medical assemblies emphasize the relationship of creativity to the human brain (Shakiba, 2012).

Torrance's view is one of the valid views. In the view of this researcher, creative thinking is the process of sensing problems and issues, disagreements on information, errors in elements and factors of objects, ... guessing and formulating hypotheses about these deficiencies, evaluating and testing this guesses and hypotheses,probably correct them and re-test them and eventually link the results. Torrance has analysed the creativity process. Torrance considers creative thinking to be of four main factors: fluidity: the ability to generate abundant ideas, initiative: the ability to

produce novel ideas, abnormal and fresh flexibility:That is, the ability to create ideas and methods of expansion, namely the ability to pay attention to detail. Following on to Torrance's way, and for applying and shortening the time needed for performance and scoring, Mr. Abedi's creativity test was designed based on Torrens' point of view to determine the creativity of individuals.As with many definitions of creativity, there are different perspectives on the factors influencing creativity (Rostami, 1996).

The self-efficacy has been driven from Aardelt's social cognition theory (2011), a well-known psychologist that refers one's beliefs or judgments about his abilities to perform tasks and responsibilities. The theory of social cognition is based onthe in a triple causality system of behavior, environment and personality.This model emphasizes the interrelationship between behavior, environmental influences, and individual factors (cognitive, emotional, and biological factors) that point to individual perception to describe psychological functions. According to this theory, people in a triple causality system affect their motivation and behavior. Clenents (2014) rejected the one-dimensional effects of the environment on individual behavior, one of the most important hypotheses of behavior oriented psychologists. Humans have a kind of self-control system and self-regulating force and by that they control their system, their feelings and behaviours and play a decisive role in their destiny (Ali Nejad, 2013).

Marsh and Dallos (2008) Thus, human behavior is not limited to environmental control, but cognitive processes play an important role in human behavior. Man's performance and learning are influenced by cognitive, emotional and feeling tendencies, expectations, beliefs and values. Man is an active being and affects events in his life. Man is influenced by psychological factors and actively affects his motives and behavior. According to Bandura, individuals are driven not by inner forces, nor by environmental stimuli,but also determine the psychological functions, behavior, environment and its stimuli.Lester (2005) suggests that self-efficacy is an effective means by which cognitive, social, emotional, and behavioural skills of an individual are effectively organized to achieve the goals. According to him, having the knowledge, skills, and previous achievements of people is not a good predictor of the future function of individuals,but also human belief about his/her abilities to do their work on how it's function is effective. There is a clear difference between having different skills with the ability to combine them in appropriate ways to perform tasks in different situations. "People know exactly what they need to do and have the skills to do their job, but they are often not successful in the proper implementation of the skills" (Qods, 2015).

Cook and Wimberly (2004) self-knowledge is activated through the processing of cognitive, motivational and emotional skills that are responsible for the transfer of knowledge and abilities to skilled behavior. In short, self-esteem does not refer to skill or skills, but also having the belief in the ability to do work in different job positions. Efficiency belief is an important factor in the system of human competence. Tasks are dependent on changes in their work beliefs by different individuals with similar skills in different situations in weak, moderate or strong situations or by individuals in different circumstances. Skills can be easily influenced by self-doubt, and thus even those who are very prone to have a lesser sense of self-control than their own abilities. For this reason, self-efficacy enables individuals to do extraordinary work using skills to deal with obstacles (Moghaddam, 2007).

Therefore, perceived self-efficacy is an important factor for successful performance and basic skills for doing it. Effective functioning requires both skills and beliefs in the ability to perform those skills.Managing changing, ambiguous, unpredictable, and stressful situations requires multiple skills. Previous skills to respond to the different needs of different situations should often be organized in new ways. Therefore, exchanges with the environment are partly influenced by individual judgments about their abilities. This means that people believe that they can perform tasks in certain circumstances. Perceived self-efficacy is not a criterion for having personal skills, but it means that the individual has come to believe that he can perform his duties in different conditions with any skill he has. According to the said articles, the purpose of this study was the comparison of the effect of effective science education on creativity, self-efficacy and academic achievement motivation among smart schools' students (ICT-based) and primary schools in the sixth grade of the 4th district of Golpayegan in the academic year of 2017-2018.

Methodology

This study is conducted using a causal-comparative method. In a causal-comparative research, the goal is to get out of the effect (dependent variable) for the probable cause (independent variable), and in this regard, this study is retrospective. This research plan is used when the change is independent because of its being inherent or immoral and inhuman non-manipulation, and the researcher wants to evaluate the dependent variable (effect) into the independent variables of the effect (cause). In this research, a purpose-based sampling method has been used due to the wide extent of the statistical population and the impossibility of conducting research on the whole population. The population of the study was the study of the sixth grade primary school of dezfol in the academic year of 2017-2018.

The method of the study was a causal-comparative method. The statistical population consisted of Ahmadi primary school students in Golpayegan city with 135 (with ICT) and Adib Golpayegan primary school with 110 (traditional-style school). The Cook's formula has been used to estimate the sample number. Determining the sample size using Cook's formula requires that you know the size of the population. Based on the number of students in two schools, of which 245 people have been announced, the 149 people were selected as sample size.

Research tools
Torrance creativity questionnaire

This questionnaire was built by Torrance et al as a criterion for measuring creativity in 1992 and has 60 questions. The responsiveness options are in the form of a (score 0), b (score 1) and c (score 2). Having higher scores means to higher creativity. Torrance (1989) obtained reliability coefficients of 0.9 and 0.8 and validity coefficients of

0.63 for this questionnaire (Alborzi, 2012).

Haghighat (1998) in a study reported correlation of this test with the Abedi creativity test equal to 0.72 and the Cronbach's alpha coefficient was reported equal to 0.86. Alborzi (2012) reported an alpha coefficient of 0.88 for this test and showed that the correlation of each dimension with the total score in the range from 0.63 to 0.78, which is significant level of less than 0.01.

Self-efficacy questionnaire

This scale has 17 questions, which each question based on the Likert scale is set from totally disagree to totally agree. Scale scoring is that each article has a score of 5 to 7 points. Some questions are from right to left, and the rest of the questions are scoring reversed, from left to right. So the maximum score that a person can get from this scale is a score of 85 and a minimum score is 71. This scale has been translated and validated by Barati (1996).

Educational Motivation Questionnaire

The Hartre's Standard Educational Motivation Questionnaire includes 33 items and aims to evaluate academic motivation among students. This tool is a modified form of the Hartre Scale (1981 1981) as a measure of academic motivation measuring tool. This questionnaire is based on Likert scale (never, 1; rarely; 2; sometimes; 3; most of the time; 4; almost always; 5). As stated, the Hartre main scale evaluates academic motivation with bipolar questions, one of which is the inner motivation and the another pole is external motivation,And the subject's response to the subject matter can only be one of the external or internal reasons, because in many academic subjects both internal and external motives play a role,Leper et al. (2005) developed the Hartre scale in the form of common scales, which the each question considers only one of the reasons for the internal and external motivation.

To collect the required information, a library survey was used to write the research literature and the field method was used to collect experimental data on the research questions, and using standard questionnaires. The used questionnaire consisted of two distinct sections, which in the first part were used to obtain demographic information of the sample. In each case, the statements of each questionnaire were used as a Likert scale for answering the questions. Respondents were asked to answer questions of I am totally agree to totally disagreeafter collecting data, we will analyse the data.

Findings and results

Analysis of variance (MANOVA) will be used to test the hypotheses. Before executing MANOVA, one of these defaults is the normalization of the variables. The Kolmogorov-Smirnov test was used to test this default, and Table 1 shows the results.

Table 1: Results of the Kolmogorov-Smirnov test for the variables in the research

Variables	F	significantly
Creativity	0.88	0.099
Efficacy	0.86	0.378
educational motivation	0.87	0.357

As can be seen from the table above, with regard to the significance of F and the significance level above than 0.05, the data of these variables are ordinary. For testing them, variance analysis can be used.

Hypothesis 1: Creativity differs among school students with ICT and ordinary school students.

Table 2 shows the mean, standard deviation, and Cronbach's alpha coefficients of creativity in the two groups.

Table 2: Mean and standard deviation and Cronbach's alpha coefficients of creativity component

Cronbach's alpha	SD	Mean	Variables	
0.763	0.78	31.45	School has ICT	**Creativity**
0.654	0.46	28.43	Ordinary school	

The results of Table 2 show that ICTs in the school group have more ICT than the ordinary school. Multivariate analysis of variance (MANOVA) will be used to test the hypothesis. Table 3 shows the results of variance analysis in creativity comparisons between the two groups.

Table 3: Multivariate analysis of variance (MANOVA) in creativity comparisons between two groups

Variables	Averages of squares	Average error squares	F	Significant level
Creativity	5465.73	7.507	43.043	0.001

Based on the results of Table 3, the F score of creativity is significant at the level of 0.01. The results show that the difference in mean scores of creativity component is significant between the two groups.

4-2-4Hypothesis 2: Self-efficacy differs among school students with ICT and ordinary school students.

Table 4 shows the mean, standard deviation and Cronbach's alpha coefficients of self-efficacy in two groups.

Table 4: Mean and standard deviation and Cronbach's alpha coefficients of self-efficacy

Cronbach's alpha	SD	Mean		Variables
0.747	2.74	41.63	School has ICT	Self-efficacy
0.785	2.74	29.74	Ordinary school	

The results of Table 4 show that self-efficacy scores in the school group have more information and communication technology than ordinary schools. Multivariate analysis of variance (MANOVA) will be used to test the hypothesis. Table 5 shows the results of variance analysis in the comparison of self-efficacy between the two groups.

Table 5: Multivariate analysis of variance (MANOVA) in comparison of self-efficacy among the two groups

Variables	mean squares	Mean Square Error	F	Significant level
self-efficacy	3456.65	45.757	54.106	0.001

Based on the results of Table 5, the F-score of self-efficacy is significant at 0.01 levels. The results showed that the difference in mean of self-efficacy scores between the two groups was significant.

4-4-3. hypothesis 3: There is a difference between the student's motivation and the ICT and the ordinary school students.

Table 6 shows the mean, standard deviation, and Cronbach's alpha coefficients of educational motivation in the two groups.

Table 6: Mean and standard deviation and Cronbach's alpha coefficients of academic motivation

Cronbach's alpha	SD	Mean		Variables
0.91	10.25	54.18	School has ICT	Academic motivation
0.92	8.38	39.47	Ordinary school	

The results of Table 6 show that the motivation scores in the school group have more information and communication technology than the ordinary school. To test the hypothesis, variance analysis (MANOVA) will be used. Table 7 shows the results of variance analysis in comparing the educational motivation between the two groups.

Table 7: Analysis of variance (MANOVA) in comparing academic motivation among the two groups

Variables	mean squares	Mean Square Error	F	Significance level
Academic motivation	4567.431	55.812	64.347	0.001

Based on the results of Table 7, the F-scores related to academic motivation are significant at the level of 0.01. The results showed that the difference in mean scores of academic motivation component is significant between the two groups.

Discussion and conclusion

The results show that ICTs in the school group have more ICT than the ordinary school. Based on the results of the F-scores, creativity is significant at the level of 0.01. The results show that the difference in mean scores of creativity component is significant between the two groups.The results show that self-efficacy scores in school ICT is more than of ordinary school.Based on the results of F score, self-efficacy is significant at the level of 0.01. The results showed that the difference in mean of self-efficacy scores between the two groups is significant.

The results show that the ICT scores in the school group are more than that of the normal school, based on the results of the F score of the academic motivation at the level of 0.01. The results showed that the difference in mean scores of academic motivation component is significant between the two groups. In a research in line with the above-mentioned research Niayzi (2016) entitled the effect of the ICT-based education on the level of knowledge and critical thinking of primary school students in Tehran showed that they received the content through educational media, as well as the results suggested that ICT-based education has been increased critical thinking in the components of analysis, inference and evaluation.Also, Soleimani (2010) The evaluating relationship between the level of interest of teachers to ICT and its application levels based on the interest-based acceptance model among high school principals in Isfahan showed that between the levels of ICT application (lack of use, familiarity, readiness, mechanical use, normal use, improvement, integration, renewal, and improvement), and the stages of interest (awareness, information acquisition, personalization, process management, evaluation and logical conclusion, cooperation and coordination, re-focus) there are positive relationship at all levels of the relationship and this relationship is significant at P <0.05.Also, the findings of the study show that most of the teachers are interested in the interest-based acceptance model (awareness, information acquisition, personalization, process management, rational assessment, co-ordination, re-examination) in the personalization phase, and most of the teachers are at the level of familiarity among the eight levels of ICT

application in interest-based acceptance model (lack of use, familiarity, readiness, mechanical use, normal use, improvement, integration, renewal).

Also, the results of the research indicate that there is no significant difference in the interest of teachers in ICT on the basis of gender and field of study. However, in terms of educational qualifications and courses taught by them and educational areas, there is a significant difference in the degree of interest among teachers. Also, there is no significant difference in the levels of ICT use based on gender, academic degree, field of study and different educational areas, but the levels of ICT application are different according to the courses taught by teachers. This research has some limitations that should be addressed. Some research limitations have been mentioned below.

1. Fatigue of the subjects and their complaints about the high number of research questions

2. The assumption of the researcher at the beginning of the research was that based on the present subject, comprehensive and extensive research was carried out, but in the course of research progress, the lack of sufficient background (especially in Iran) in relation to the subject under discussion was another research problem Is present.

3. Time limit for doing research

4. Low culture of trust, responsibility and responsiveness to research questions at the community level

5. Limited statistical society

6. All data was collected using the questionnaire, hence the subject's psychological conditions could affect his response.

Suggestions

1. Performing similar research in order to allow more generalizability of results and control of disturbing variables

2. It is suggested that the research be carried out in a wider time so that the sample size can be increased so that the results can be more reliably accepted.

3. Perform similar research in other groups of population

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