The Effect of Computer-Aided Learning (CAL) On, Creativity and Academic Performance in Students

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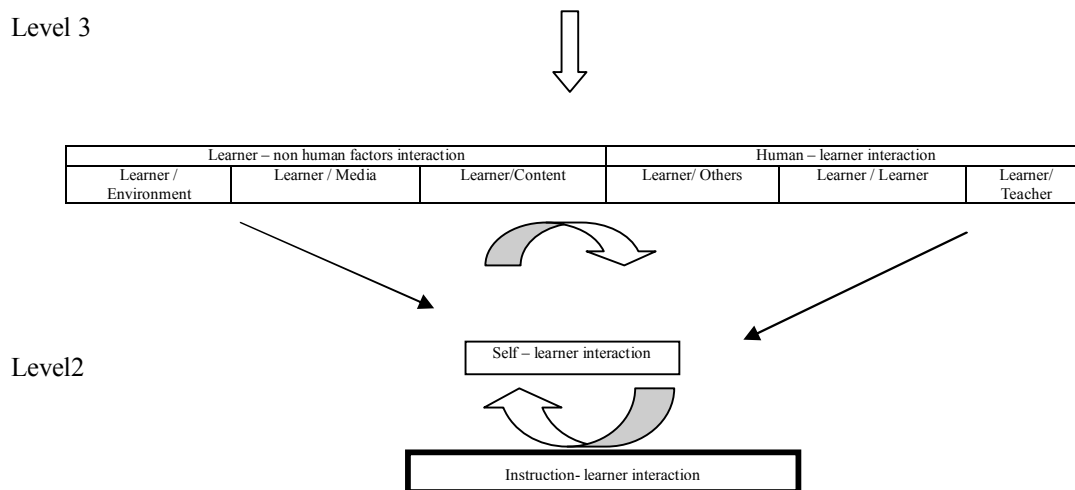**Corresponding Author Email:**ladan_59m@yahoo.com

ABSTRACT

The present study was carried out with the aim of investigating the effect of Computer-Assisted Instruction (CAI) on, creativity and academic performance of the students at the sixth grade elementary schools in Kerman. For this reason of 1761boy students at 6thgrade elementary schools in Kerman by cluster sampling method one primary school has been selected. Then randomly we choose the two classes of this school. 31students who were selected by random sampling was divided into two groups 15 of them in traditional education and training and the others students in Computer-Assisted Instruction (CAI) group. At first we get a pretest by using the Torrance creativity questionnaire (1986) and cognition O'Neal and Abedi (1996) questionnaire after two months of traditional and Computer-Assisted training and education[6], post- test was examined. The scores of math exam were used for academic performance. The data was analyzed by using SPSS19. Research findings obtained by using (t-independent test) for measuring academic performance between two groups and Covariance analyzing method for measuring the effectiveness of the components of creativity and meta-cognition showed that computer-assisted instruction in creativity and meta-cognition has a significant impact but on students' academic performance, a significant difference could not be seen.
Key words: Creativity, Meta-cognition, Computer-assisted instruction, Academic performance

INTRODUCTION

Due to the role of new and modern technologies in today's world, many various opportunities can be created for the process of education ubiquitously emphasizing on the training of teacher-based affairs to transfer on the student. The main purpose is how these approaches can make the process of learning towards the students effectively and how they can adjust their tasks based on the same issues through interacting along with facilitator instruments going towards the educational progression. The combination of technology in lesson plan is one of the most modern approaches for implementing the educational targets. In many countries the information technology and communications has the highest importance as a strategic case for supporting the coaches in learning planning and designing processes [1].The appearance of computer and Internet has also the highest significant on the educational systems. One of these important ways can be subjected to the change of teachers' role and learning approaches and navigations [2]. The world is rapidly changing facing with traditional learning methods with information of overcoming ability [3].Seif believes that in traditional educational planning or teacher-based educational activities and students play key role in this regard and the educational purposes are clearly specified in educational planning [4]. Hiromi (2002) gives a new framework of this interaction by mentioning the interactions levels in relation to the traditional educational system including the interactions of students-students[7], students-teachers and content-student in a computer-based environment (diagram, Torrance)

Level 3

Learner – non human factors interaction			Human – learner interaction		
Learner / Environment	Learner / Media	Learner/Content	Learner/ Others	Learner / Learner	Learner/ Teacher

Self – learner interaction

Level2

Instruction- learner interaction

Diagram 1: levels of interactions in electronically learning environment (quoted of Hiromi, 2002)

Some specialists call the computer-based application as CAI that the computer is used as an instrument for assisting the process of learning and education. Hence,a suitable designed CAI program can increase the consciousness of a learner in relation to the lesson subjects giving enough exercises and experiences for the whole learners leading to the progression of the students frequently [10]. Shabani believes thatthe computer-aided training is called to educational or learning situations that a teacher is responsible for the main learning activities controlling them through the direct relationship of a student with computer. The applied computer in education system is called Computer Assisted Instruction. In teaching by computer the progression is achieved by controlling the machine and this educational machine lets the same progression to student go towards the successful learning. Hence, the learning and educational machines are subjected to those cases that the educational topics being planned by their applications transferring to the learners [8]. The creation and innovation are also subjected to those cases that their application is based on the adulthood conditions regarding to their childhood times because the childhood is combined with these innovative technologies. One of the most important educational approaches is subjected to the technological tools [6]. Torrance considers the creation in the combination of four main following factors:
1. Fluidity: it is subjected to the production of talents and ideas
2. Development: paying attention to details
3. Innovation: talent of producing new ideas
4. Flexibility: talent of producing ideas and various methods [7].

Domenz emphasizes on the computer assisted learning pointing to the effective learning cases and theoretical frameworks; hence, we conclude the most important impacts on computer assisted learning such as the correct partnership learning case [9]. Hiyani (1995) states that many various studies have shown the value of software being conducted by students in compare to software only corrects the response of students[21].A study carried out on college students showed that students receiving their information through computer are more success than students received their information through correct response from their own feedback. Douglas considers the computer assisted education as a combination of traditional method and visual education having both benefits in this regard. The aim of this kind of education is subjected to provide the educational programs along with traditional educational cycles. These plans can play a key role in the process of learning deepening the concepts in this path. This kind of educational and learning method can develop and expand the electronically and informational technology being paid attention considerably [12]. The results of Zakeri's research showed that the function of students trained by software educational method in educational progression is better than students trained by traditional educational method [1].In a mega-analysis carried out on 36 studies independently, the application of computer has shown positive impact on the growth of students' education system. In these studies students with learning disorder received computer assisted educations showed increased significant function in the mathematics, reading and writing [13]. Paperthas paid attention to the learning based on computer to represent and develop the new lesson plan attitudes considerably. The structuralism style with the given educational software programs makes students to face with experiences that permit students to find opportunities or inventions possible. The learners confront with activities including the open targets conducting them to digest the deepest concepts [14]. Zamani showed that the application of computer-assisted education can increase the speed of learning recovering the educational function [15]. In a research carried out in order to indicate the comparison of learning in traditional

environment in computer-assisted setting and its study with cognitive style, it is shown that people with verbal cognitive style in computer-assisted learning environment have positive attitudes and better function in this pavement [16]. Fletcher et al in another research to evaluate the impact of computer technology on students' educational progression showed that the process of learning with computer was evaluated positively in educational progression [17]. Also Bialou and SivinKachalaniz in their research showed the application of software programs positive effectively [18], also, Farzad et al in a research titling the impact of cognitive approaches and self regulation in learning environment and its comparison with traditional environments found out that student in picture-verbal dimension had better function in computer-assisted environment [19]. Technologies and traditional methods cannot meet the learning-teaching requirement and as a result the newest methods should be applied instead of traditional methods [25].Due to the appearance of technology and new methods in educational process, our country should apply these patterns efficiently. For the reason, the researcher aimed at seeking the effectiveness of the computer-assisted method on students' educational progression. Sincethere are no carried out any studies in relation to the students' educational progression based on computer-assisted issues, the present study is to find the evaluation of computer-assisted method effectiveness on students' educational progression and their function in this regard. This has been carried out by the use of Zarand Azad University psychological students. Thus, the researcher wants to know whether the computer-assisted education can increase the innovation and creation of students. Does it increase the students' educational progression and function [12]?

MATERIALS AND METHODS
This study has been carried out by using both traditional and computer-assisted educational system as well as pre and post tests by the semi-experimental method.

SAMPLING AND STATISTICAL POPULATION
The statistical population of the present study includes 32 psychological students of ZARAND Azad University entered in 2010 that they were divided into traditional and computer-assisted educational methods randomly [19].
Measurement instruments
In order to measure the variables, the following tools were applied:
1- Torrance creation questionnaire: this test is designed based on Torrance definition of the creation process. Abedi prepared a paper-pencil multiple test based on Torrance creative thinking test structure providing the short time required for achieving and scoring the creation tests [13].
Validity and reliability of Torrance creation questionnaire
The first form of the test was achieved by Abedi on 650 students of third guidance school in Tehran. The correlation coefficients between the scores of four creation measurement test and lesson scores in 0.01 level were significant that it was fluctuating between the maximum 0.22 (math and innovative section) and minimum 0.05 (math and flexibility section scores). The correlation coefficients between test scores and other creation tests were significant at 0.01 levels. The obtained results using the analysis method have shown that the test in creation section had enough and acceptable validity [21,22]. The internal convergent method and Cronbach alpha were applied in order to evaluate the reliability in this case. These coefficients for measuring the test fluidity 0.75, innovation 0.67, flexibility 0.61 and development 0.61 were reported. The main elements methods were also applied in order to estimate the degree of material arrangement in every section. The test materials had fairly high correlation in every four section ranging from 0.55 to 0.85 with the first hidden variables[9].
Evaluation of educational function
The aim of educational function is subjected to those scores that students of both groups obtained from the motivation and excitement lessons in final semester.

LESSON PLAN
It was achieved in order to evaluate the impact of the computer-assisted education in motivation and excitement lessons on the creation and educational function variables by the use of educational software and the given educational movies and clips as well as video projectors during a one semester.

COMPLETION METHOD
The psychology students of ZARAND Azad University were selected as the sample of statistical population after the obtained permission in 2010 and then they were divided into two groups of traditional and computer-assisted education randomly; first the pre-test using Torrance creation questionnaires [25],was achieved of both related groups and then a one test of traditional education and computer-assisted

method was carried out on the same students. The scores of the test regarding to motivation and excitement lessons were considered as the educational function test. The independent T test was applied in order to analyze the data and the statistical description and the comparison of educational function between groups and the covariance analysis was also used in order to measure the effectiveness of the creation. Smirnov-Colmograph test was applied to test the normality and Levin Test was utilized in order to evaluate the variances' convergence. The whole data were assessed using SPSS Software.

RESULTS
The descriptive and inferential data findings were shown in tables and diagrams as following:

Table 1: descriptive statistics of group A (traditional education)

Degrees	Number	Mean	Deviation
Pre-test of creation	16	59.06	5.10
Post-test of creation	16	65.60	4.17
Students' educational function	16	16	2.53

Table 2: descriptive statistics of group B (computer-assisted education)

Degrees	Number	Mean	Deviation
Pre-test of creation	16	65.18	4.66
Post-test of creation	16	77.18	2.007
Students' educational function	16	17.25	2.74

Table 3: results of T independent test to measure the educational function

Levine test			T test for the means equilibrium						
			Statistics of T test	DF	Degree of P (two-sided)	Difference of means	Std deviation	Confidence distance 95% of means difference	
Educational function	Statistics of F test	Degree of P						Low limit	High limit
Variances equilibrium assumption	0.167	0.686	-1.315	29	0.199	-1.25	0.95	-3.194	0.69
Inequality of variances assumption			-1.318	28.99	0.198	-1.25	0.94	-3.18	0.68

As it shown in above-mentioned table, the Levine test was firstly measured (the equilibrium of variances). It is observed that the degree of P (significance) equals to 0.686; that is, the assumption of the variances' equilibrium is established. Thus, we use the first line of the tables for studying the equilibrium assumption of the means in this regard. The degree of P (significance) equals to 0.199 higher than 0.05 representing the acceptance of zero of assumption; that is, the means are different together. Hence, computer-assisted education and traditional education method do not have significant difference on the educational function.
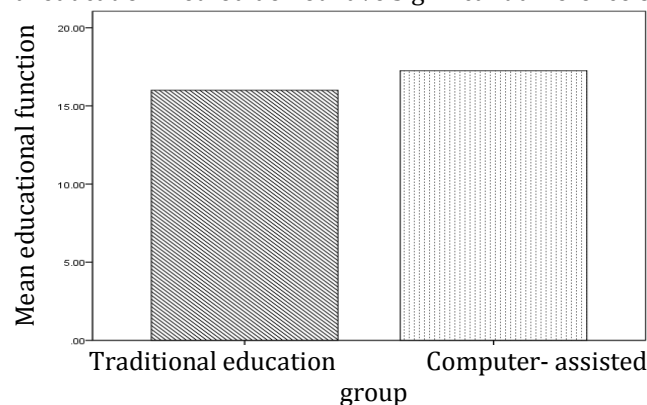
Diagram 1: mean educational function scores in computer-assisted education method are higher than traditional education.

This diagram is given in order to compare the mean educational function scores of both groups; as it shown, there was no observed a significant difference in this case.

Table 4: results of regression slopes convergence assumption for creation variable

Tests	Df	Mean squares	Degree of F	Sig level
Pre-test	1	48.01	7.27	0.012
Groups	2	300.253	45.49	0.00
Pre-	1	70.93	2.04	0.10

test*groups				
error	27	6.6		

Due to the mentioned results, the interactive impact of pre-test and groups with 0.23 significance level (higher than 0.05) is not significant. Hence, the regression slopes convergence assumption in variable of creation is established efficiently.

Table 6: results of variances convergence assumption by the use of Levine test

Scale	DF in fraction	DF in denominator	Levine statistics F	Sig level
Creation	**1**	**29**	**3.72**	**0.06**

As it shown in above-mentioned table, the degree of F is observed with the degrees of freedom (1 and 29) at 0.05 significant level) in relation to the related variables representing the confirmation of zero assumption and convergence of the groups' variances among both related groups[17,29].

Table 7: results of multi covariance analysis to compare the mean of creation post test with pre tests of both groups

Test	Value	F	DF of hypothesis	DF of error	Sig level
Pilai effect	0.641	16.046	3	27	0.00
LambadaiVilkiz	0.359	16.046	3	27	0.00
Hoteling effect	1.783	16.046	3	27	0.00
Largest root	1.783	16.046	3	27	0.00

Based on the above-mentioned table results, it can be stated that there is a significant difference between the computer-assisted and traditional education groups in creation variable.

Table 8: results of covariance analysis to compare the creation pre-tests in both groups

Effect	Dependent variable	Total squares	DF	Mean squares	F	Sig level
Group	**Creation**	1039.511	1	1039.511	99.152	0.00

The obtained results of the above-mentioned table indicated that the covariance analysis in creation variable ($p<0.05$) is significant.
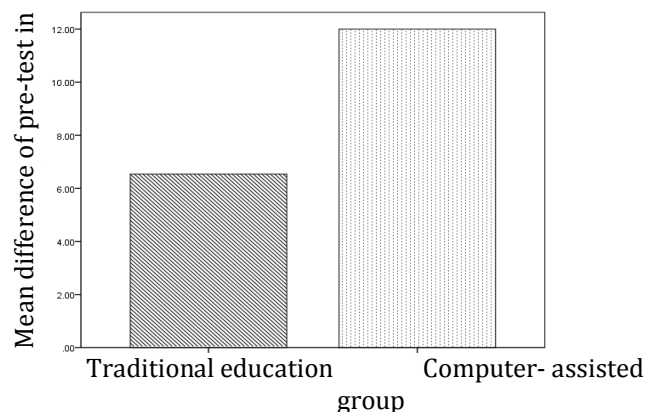
Diagram 2: study of computer-assisted education effectiveness in terms of creation

This diagram is given to compare the mean of students' creation variable at both related groups; as it shown, there is observed a difference in this case.

DISCUSSION

Due to the importance of the education process in the country, it is struggles to reach to the high effective educational system in this pavement recovering and developing these approaches efficiently. Thus, the present study is aimed at seeking the best ways of computer-assisted approaches and the findings of the same study showed that:

In the evaluation of the first research hypothesis, the computer-assisted and traditional educational methods did not have any differences in students' educational function. Hence, the computer-assisted

education is not highly effective in the progression of the educational function. This result is coincident with the results of Karami Ghazafi et al in relation to the impact of chemistry using educational software and traditional method in educational progression of the students showing in knowledge level and attitude no any significant differences; it also is coincident with the research results of Cepni et al in relation to the computer-assisted of creation and scientific attitudes of students indicating few changes of the educational affairs and the Aachresh research also is coincident with the above mentioned research in relation to the impact of computer-assisted on the educational progression of science lesson showing this kind of education did not have a significant difference between the boys and girls regarding to obtain the scores of educational progression. In the study of the second hypothesis, by the use of covariance analysis test, the effectiveness of the computer-assisted educational system on the students' creation was assessed confirming the effectiveness of the same educational system on students' creation efficiently[27,28,29,15]. Now, the comparison of these both methods were carried out in order to evaluate the degree of their influence on the students' educational function and then by the use of T independent test, we compared the mean difference of both groups' scores and the results showed that the computer-assisted education method is effective than traditional educational method in terms of creation process; this result is coincident with the research results of Farhoodi et al titling the influence of computer-assisted education method on the increase of creation among third grade high school students representing the agent increase of flexibility and development of creation process; and it also is coincident with the results of Fatemi Eghtaa et al titling the comparison of computer-assisted education method with traditional education method in creation of students in mathematics class. The results of Ahmadi et al title the impact of computer-assisted education method on creation and learning among fourth grade primary school students representing the four main factors of fluidity, flexibility, development and originality increased in this regard[30,31,32,18,25].

By the use of covariance analysis the effectiveness of the computer-assisted education method was investigated on students' creation process. The results showed that the computer-assisted education method is very effective on students' creation issues. Now, the comparison of these both methods were carried out in order to evaluate the degree of their influence on the students' educational function and then by the use of T independent test, we compared the mean difference of both groups' scores and the results showed that the computer-assisted education method is effective than traditional educational method in terms of creation process; this result is coincident with the research results of Hussein inasab titling the influence of computer-assisted education method on the increase of creation among nursing students representing the agent increase of flexibility and development of creation process; by relying on the research findings, it can be stated that the computer-assisted education has not the positive impact on the increase of mean pre-test scores on students' creation process[34]. The computer-assisted education method, intelligent board and other educational technologies should be highly paid attention. Since the research findings are coincident with many researches, it can be concluded that the computer-assisted education plays a key role in students' creation; it is recommended to observe the success of the whole students in relation to their creation. Of course, the completion of the study was coincident with some limitations such as the participant students had different attitudes and motivations in the study; they were also different in terms of the intelligent subject and this may make some intervening thinking affairs in the final results of the study. In addition, only the creation and educational function were evaluated in this study. Due to the results of the study, it is suggested to investigate one extra element in relation to the students' educational progression because of the computer-assisted education method that it should be highly paid attention in the educational centers [9].

ACKNOWLEDGMENT

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