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Relationship of Self-regulation, Information Technology and Life Skills with University Students' Creativity

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ABSTRACT

Background: The aim of the present study was to determine the relationship of self-regulation, information technology and life skills with university students' creativity. **Objective:** The study population consisted of 1976 undergraduate students. The sample size was calculated at 392 subjects based on Morgan sample size table. Data were collected using random cluster technique. The study was a descriptive correlational study and data were collected using Abedi's creativity questionnaire (1993), Carey, Neil and Collins self-regulation questionnaire (2004), a researcher-made information technology questionnaire and Saatchi, Kamkari and Askarian's life skills questionnaire (2012). Data were analyzed by Pearson's coefficient, multi-variate regression analysis and independent t-test. **Results:** The results showed a direct (positive) and significant relationship between self-regulation and students' creativity; however, there was no significant relationship between life skills and information technology and students' creativity. Multi-variate regression analysis showed that self-regulations is a significant predictive factor for creativity; however, life skills and information technology are not significant predictive factors for creativity. **Conclusion:** Therefore, self-regulation has a direct relationship with creativity and plays a significant role in nurturing creative individuals.

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INTRODUCTION

Creativity is one of the main components of thought, which helps man materialize his idealistic goals and actualize his capabilities. Fortunately the results of studies on creativity have shown that all the individuals have creativity to varying degrees and it is possible to develop and actualize it by education (Yang and Cheng, 2009).

One of the questions which has baffled many researches and scholars in the field of education during the past four decades and has prompted a large number of research studies is whether it possible to develop creativity or not and whether creativity is an inherent characteristic or it is influenced by social factors. Like many other subjects in the fields of education science and psychology, contradictory views and ideas have been proposed on the subject. Evaluation of previous studies by MacCan (1986), Mansfydvbas (1981) and Kalt and Butcher (1968) shows that followers of the principle of inherence believed that creativity was a potential capability and characteristic but even pioneering scholars (Terman, 1925; Cox, 1926; and Galten, 1869), too, believed that although creativity has a hereditary component like intelligence, it can be influenced by environmental factors, too.

Zimmerman (1986), as one of the theorists of the social-cognitive theory, described self-regulatory learning strategies as a type of learning in which the learners try to initiate their own learning efforts, rather than rely on teachers, parents or other education authorities to gain knowledge and skills; in other words, he believed self-regulation during learning was the active participation of the learner from behavioral, motivational, cognitive and extra-cognitive viewpoints during the learning process to improve learning. Therefore, according to Zimmerman and Pons (1988) self-regulatory learning strategies have components which might consist of the following: behavioral self-regulation, motivational self-regulation, cognitive self-regulation and extra-cognitive self-regulation.

Behavioral self-regulation is defined as the optimal use of difference sources which improve the learning process. These sources include time, location and the method used to get assistance from the sources available, including teachers, parents, friends, teaching and auxiliary teaching materials (Zimmerman and Pons, 1988).

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Khosravi, Husseini, Talepasand and Azami (2011) evaluated the relationship between self-regulatory cognitive learning strategies and creativity and showed a positive and significant relationship between these two entities.

The extensive use and effects of information technology on various aspects of life at present and on future human communities have become one of the most important current issues of the world, attracting the attention of a large number of researchers and decision-makers. Evidence shows that at present in many developed countries the majority of investments in information technology involve the realm of science because in the first place, technology is increasingly penetrating into all the aspects of human life and in the second place, information technology is an important tool for data processing. Therefore, individuals should be taught to gain necessary information to be able to achieve necessary skills. The most important fields in relation to the integration of information technology with education involve the following: teaching and learning, professional growth of teachers, instructions in relation to citizenship services, management and infrastructures of production and presentation of educational services (Khan, 2010). The World Health Organization defines life skills as abilities and skills that enable children and adolescents to adapt to and solve everyday challenges and responsibilities. The main life skills in intrapersonal and interpersonal fields include communication skills, sympathy, self-confidence, abilities to solve problems, make decisions, inhibit stress and tension, critical and creative thinking and the ability to build and maintain good relationships. Life skill programs concentrate on teaching and learning these intrapersonal and interpersonal abilities (Wenzel, Weichold and Rainer, 2009). Life skills are basic skills, by which individuals shoulder the responsibilities of their lives rather than evade them. These skills teach individuals how to solve their problems to influence their mental health (Sue Yeung, 2007).

UNICEF (2003) defines life skills as a broad category of mental, social and interpersonal skills that help individuals make their decisions based on knowledge, communicate effectively, develop their interactive and personal management skills and have a healthy and fruitful life.

Research shows that some factors influence the development and nurturing of individuals' creativity and pave the way for its presence or absence. Various research studies have been carried out on creativity. For example, De Dreu and Nijstad (2011) carried out a study entitled "When nurturing of creativity is prevented" and reported that creativity increases by the learners' becoming active and by improvements in their flexibility. The study was carried out experimentally and the results showed that self-regulation, motivation and positive emotional relationships increase creativity in learners.

The results of a study by Pintrich and DeGroot (1990) showed that students who use more self-regulatory strategies, during lectures given by the teacher or during studying, try to simultaneously decode information and establish a logical relationship between previous information, control this process, create a suitable information, promoting their educational performance.

Richardson and Yan (2003) showed that teachers who have more experience with the internet have higher self-sufficiency and efficacy and are more successful in their teaching career. In addition, Piper and Austin (2004) evaluated elementary and high school teachers in Pennsylvania and concluded that the efficacy of teachers who use the internet and software programs is significantly higher than that in teachers who do not use the internet.

Teaching of life skills to adolescents promotes their decision-making and communication abilities and self-confidence (Tuttle, 2000). Such teaching has significant effects in four fields of life aims, problem-solving and decision-making, interpersonal relationships and maintenance of physical health and personal effectiveness (Shechtman, Levy and Leich, 2005).

At present, the abilities of talented individuals are ignored and no attempts are made to identify and nurture their talents, which is attributed to the fact that there is confusion over the techniques used to nurture creativity and actualize it. Therefore, various research studies are required in relation to the identification of better techniques to nurture creativity and its development and more importantly evaluate factors effective in creativity. As a result, factors such as life skills, information technology and self-regulation are very important. The present study was an attempt to evaluate the relationship between the factors mentioned above and creativity in university students in order to determine whether there is a relationship between self-regulation, information technology and life skills and students' creativity or not and which variables under study can predict students' creativity.

Methodology:

Subjects:

The subjects consisted of all the undergraduate students in teacher training centers in West Azerbaijan Province, who had studied in the centers for at least two terms. The total number of students was 1976 based on a report by the student office. The sample size was calculated at 322 according to Morgan sample size table. Random cluster sampling technique was used based on city (Urmia, Khoy and Salmas), gender (male, female) and finally, class.

Tools:

In the present study, 4 questionnaires were used to collect the subjects' data.

Abedi's creativity questionnaire: This questionnaire was created by Abedi in Tehran in 1993 based on a theory by Torrens on creativity in 1984. The questionnaire has 60 questions each with three answers and consists of 4 subtests on fluency, elaboration, creativity and flexibility. The multiple choices show the low, moderate and high creativity. The range of creativity score of each subject in each test is 60–180. Questions 1 to 22 are on fluency, 23 to 33 are on elaboration, 34 to 49 are on creativity and 50 to 60 are on flexibility (Abedi, 1993). The reliability of subscales of fluency, creativity, flexibility and elaboration, using the re-test technique have been reported to be 0.85, 0.82, 0.84 and 0.80, respectively, with the overall reliability of 0.91 for the questionnaire (Abedi, 1993). The criterion reproducibility of Abedi's creativity questionnaire using the B form of pictorial creativity test of Torrens was calculated to be 0.26 with 441 students, which was statistically significant at a significance level of 0.01 (Emamipour, 2001). Reliability of the questionnaire was calculated at 0.88 using Cronbach's alpha in this study.

Self-regulation questionnaire: The short form of self-regulatory questionnaire was developed by Carey, Neal and Collins (2004) using one factor of the self-regulation questionnaire of Brown *et al.* (1999). The short form of the questionnaire has 31 items and is scored based on Likert 5-score scale (from completely disagree=1 to completely agree=5). Reliability of the questionnaire was reported to be 0.92 using Cronbach's alpha. In addition, the correlation between the short and long forms was reported to be 0.96 (Carey *et al.*, 2004). Zeinali, Sharifi, Enayati, Asgari and Pasha (2011) translated and validated this questionnaire. Reproducibility of this questionnaire was confirmed by factor analysis. The results of confirmatory factor analysis loaded the self-regulatory questionnaire with 28 items on 1 factor at $\beta=0.30-0.60$. The fitness index of the questionnaire was reported to be favorable (CMIN/DF=2.54, CMIN=888.91, CFI=0.94, NFIRMSEA=0.06=0.92). The reliability of the questionnaire was estimated at 0.88 using Cronbach's alpha (Zeinali *et al.*, 2011). In the present study the reliability of the questionnaire was estimated at 0.84 using Cronbach's alpha.

Information technology questionnaire: This is a researcher-made questionnaire and contains 16 items in 5-score Likert scale (very little=0, little=1, moderate=2, high=3, very high=4). The range of scores is 0–64. The formal reproducibility of the questionnaire items has been confirmed by experts. In the present study, the reliability of the questionnaire was estimated at 0.88 using Cronbach's alpha.

Life skills questionnaire: This questionnaire has been developed to measure 19 life skills, has 144 items and uses Likert 5-score scale. The range of scores in 0–567 and the subject has higher acquired life skills if he/she has higher scores (Saatchi, Kamkari and Askarian, 2012). Yousefi (2004) reported a reliability of 0.95 for this questionnaire with university students using Cronbach's alpha (reported by Saatchi *et al.*, 2012). In the present study, the reliability of this questionnaire was estimated at 0.94 using Cronbach's alpha.

Procedural steps, study design and statistical tests:

The study design was correlational, considering the aims and the extent of control the researcher had on the descriptive research variables. Questionnaires were used to collect data using random cluster sampling technique among undergraduate students of Teacher Training Centers of West Azerbaijan Province, Iran. Data were analyzed with correlational statistical tests, independent t-test and multi-variable regression analysis.

Results:

The subjects consisted of 322 undergraduate students (171 males and 151 females) in Teacher Training Centers of West Azerbaijan Province, Iran. The students were 19–50 years of age and had studied for at least 2 terms.

Table 1: Means, standard deviations, minimums and maximums of students' scores in each of the variables under study

Variable	Mean	Standard deviation	Minimum score	Maximum score
Life skills	197.61	18.68	158	252
Self-regulation	102.76	13.86	64	131
Information technology	45.73	12.49	16	80
Creativity	131.09	17.52	80	179

Table 1 presents means, standard deviations, minimums and maximums of the students' scores in life skill, self-regulation, information technology and creativity variables. Table 2 presents these variables in relation to gender.

Table 2: Differences in life skills, self-regulation, information technology and creativity between male and female students

T-test	Gender	Mean	Variance equality test		t	Degree of freedom	Significance
			F- leven	Significance			
Life skills	Male	197.07	1.94	0.17	0.49	213	0.62
	Female	198.34					
Self-regulation	Male	102.37	0.13	0.72	0.48	230	0.63
	Female	103.26					
Information technology	Male	46.64	0.43	0.51	-1.36	249	0.17
	Female	44.47					
Creativity	Male	131.80	1.52	0.07	-0.74	223	0.46
	Female	130.04					

Based on Table 2, there were no significant differences in life skills, self-regulation, information technology and creativity between male and female students and these variable were similar between these two groups of students ($P=0.62$, $t(213)=0.49$) ($P=0.63$, $t(230)=0.48$) ($P=0.17$, $t(249)=1.36$) ($P=0.62$, $t(213)=0.49$) ($P=0.46$, $t(223)=0.74$).

In order to determine the relationship between self-regulation, information technology and life skills on one hand and the students' creativity on the other and also to determine the extent to which these variable can predict creativity, first the correlation matrix of the variables and then the regression model of estimation of prediction are presented.

Table 3: The correlation coefficient between life skills, self-regulation, information technology and the students' creativity

Pearson's correlation coefficient	Creativity	Number	Significance	Predictive coefficient
Life skills	0.11	201	0.20	%1.2
Self-regulation	0.40	229	0.001	%16
Information technology	-0.04	249	0.50	%00

Based on Table 3, there was no significant relationship between life skills and information technology on one hand and the students' creativity on the other. However, there was a positive (direct) and significant relationship between self-regulation and students' creativity. Self-regulation alone, without considering the effect of other variables, can be a predictive factor for 16% of changes in creativity of students.

Table 4 presents the multi-variate regression analysis of the relationship between life skills, self-regulation and information technology and students' creativity.

Table 4: Multi-variate regression analysis of the life skills, self-regulation and information technology with students' creativity

Analysis variables		Method	R	R ²	Degree of freedom	F	Significance	β	Significance
Creativity	Life skills	inter	0.32	0.10	3	6.28	0.001	-0.07	0.40
	Self-regulation				165			0.33	0.001
	Information technology				168			0.11	0.15

The analysis showed that 10% of the students' creativity variable can be predicted by life skills, self-regulation and information technology. The results of multi-variate analysis and its significance showed that the presented model was significant ($P<0.001$, $F(3,165)=6.28$). In this model, self-regulation had a positive and significant effect on students' creativity and was its significant predictor ($P<0.001$, $\beta=0.33$). However, life skills and information technology had no significant effect on students' creativity and were not its significant predictors ($P<0.40$, $\beta=0.07$ and $P<0.15$, $\beta=0.11$, respectively).

Discussion and Conclusion:

The results of the present study showed that there is a significant relationship between self-regulation and students' creativity, with self-regulation being a direct predictor of students' creativity. Previous studies have shown that there is a positive and significant relationship between self-regulatory cognitive learning strategies and students' creativity (Khosravi *et al.*, 2011). Pintrich (2004) reported that self-regulation is an active and organized process, through which the learners regulate their learning aims and make an attempt to supervise their cognition, motivation and behavior. Self-regulatory learning strategies include self-learning strategies, self-questioning, self-monitoring and self-reinforcement, which help learners facilitate learning by using cognitive processes (Montague, 2008). The results of the present study are consistent with those of previous studies and confirm them; therefore, it can be concluded that self-regulation is effective in acquiring new knowledge and in promoting students' creativity. Students will enjoy greater creativity with an increase in their self-regulatory process.

In addition, the results of the present study showed no significant relationship between information technology and life skills on one hand and students' creativity on the other. The results of the present study are not consistent with those of a study by Richardson and Yan (2003) on the self-efficiency and success of teachers who have greater experience with the internet and those of a study by Piper and Austin (2004), who reported that elementary and high school teachers in Pennsylvania, with greater experience with the internet and software programs, are significantly more effective than those who do not use the internet. The results of the present study are not consistent with those of a study by Tuttle (2006), who reported that teaching life skills to adolescents results in an increase in decision-making and communication abilities and increases their self-confidence, and with those of a study by Shechtman, Levy and Leich (2005), who reported that teaching life skills is effective in 4 fields of life aims, problem-solving and decision-making abilities, interpersonal relationships, an maintenance of physical health and personal efficiency. The discrepancy between the results of different studies might be attributed to differences in study populations. Another reason might be the greater role of information technology and life skills in people's life in developed countries compared to less developed countries. In general, it is suggested that future studies evaluate such matters again.

Finally, it can be concluded that self-regulation is an effective variable in university students' creativity, and information technology and life skills have no effect on students' creativity. It is suggested that self-regulatory techniques be taught to university students in order to promote their creativity.

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