

Explanation of the Architectural Education Patterns with a Focus on Increasing Creativity

¹Omid Azeri, ^{2*}Iraj Etessam, ³Farah Habib

¹Ph.D. Candidate, Department of Architecture, Karaj Branch, Islamic Azad University, Karaj, Iran.

^{2*}Professor, Department of Architecture, Science and Research Branch, Islamic Azad University, Tehran, Iran.

³Professor, Department of Architecture, Science and Research Branch, Islamic Azad University, Tehran, Iran.

Received 19.06.2020; Accepted 05.08.2020

ABSTRACT: Architectural education requires efficient methods to demonstrate its efficiency to meet the quantitative and qualitative needs derived from modern socio-economic development. In architectural education, the ability to design is an essential part and the main goal of education. Looking at the various methods and patterns related to architectural education and the type and content of education in architecture, one can observe the necessity of choosing or designing a model of thinking to teach skilled courses, including practical workshops in schools of architecture, institutions and colleges. In this study, they have examined the relationship between emotional intelligence and creativity. Depending on the educational system structure, this examination can improve the educational infrastructure, because the main function of the educational system is self-awareness of students regarding their personality. Students, by recognizing multiple intelligences, can gain the necessary confidence to be creative and self-fulfilling. Although less attention has been paid to identifying and developing creativity in our education system, it is necessary to scrutinize the processes of emotional intelligence and creativity and to examine the effective factors. In the present study, the standard tools for measuring and collecting information, were the Torrance Creativity Questionnaire Test, Gardner's Multiple Intelligence Test, and Academic Improvement Test before and after training. In order to analyze the data and test the hypothesis, the methods used were Delphi's expert method, correlation test, covariance and T-test in SPSS software.

Keywords: *Architectural Education, Creativity, Emotional Intelligence, Torrance Creativity Test.*

INTRODUCTION

The category of teaching art and transferring skills or in other words, training an artist in any intellectual system, plays a unique role in achieving the desired goal. But it should be noted that this training will never remain in the limited borders of formal education. The art education system in Iran has been a kind of "guild system" based on the master-student hierarchy. If there was a hierarchy in each guild that was structurally very similar, this was especially true to the issue of education. Each guild had a head, who was superior to others in knowledge, experience, skill, and professionalism. His selection was made by the members of the guild. Although the terms "education" and "teaching" are synonyms, they slightly differ. "Education", which is more widely used than the word "teaching", refers to

all activities that are formal and informal for learning, as well as activities such as self-study, program training, and distance learning that take place without the teacher's presence. In this view, education includes teaching, and teaching is one of the ways of education. In order to meet the future challenges, human society, in pursuit of ideals such as peace, freedom and social justice, sees education as an inevitable asset. With respect to the advancement in technology and the constant changes that are taking place, the conditions for change must be created in every society. The basic condition for any change is knowledge and awareness that must be followed by planning to achieve the desired goals. The importance of better teaching and learning methods has always been considered by scientists and researchers in educational sciences. Since the

*Corresponding Author Email: irajetessam@yahoo.com

beginning of the twentieth century, in countries all over the globe, many studies on the effectiveness of teaching methods in all subjects have been conducted, by the likes of Momen and Lai, Clapard, Maria Montessori, John Dewey, Herbert and Surandike (Afshar, 1978, 183). It should be noted that the basic elements in the curriculum planning of any field, the structure, content and methodology in the field of "cognitive programming" are important. However, in the field structure, the set of information and facts is not important. Rather, it is an accurate way of thinking about information which is important. Many people have a lot of information about the field, but they don't know how to think about it. In the content of the course, there are two issues: First, what areas should a course cover? Second, at what level of progress and complexity should it be? In the present study, the tools for measuring and collecting standard information were Torrance Creativity Questionnaire and Test, Gardner's Multiple Intelligence Test, and academic achievement test before and after training. For the validation and consistency of the research, and in order to analyze the data and test the hypothesis, the Delphi's expert method, correlation test, covariance test and t-test in SPSS software were utilized. The hypothesis is that there is a significant relationship between creativity and emotional intelligence.

MATERIALS AND METHODS

In this study, the dimensions of the problem were examined. For this purpose, the literature and research background were studied and the variables were identified. After recognizing the nature, dimensions and scope of the problem and variables involved in the problem, the behaviors of the variables were identified. Workshops for students and professors of architecture were held at the introductory level to obtain information needed to expand the research. Then, in the specified time period and through specific exercises conducted by the experts and professors, the practical studies were done and after the end of the course, the results were extracted. In the first phase, the population of 40-individuals was assessed by Questionnaire and Torrance Creativity test and the data were extracted (Fig.1).

Population Statistic of
40 individual



Fig. 1: Total Statistical Population for Evaluating the Questionnaire and Torrance's Creativity Test

In the second phase, 18 individuals were randomly selected and evaluated, using Horad Gardner's Multiple Intelligence Test. Then, they were divided in three workshops and assessed with respect to the results before and after the academic progress test. After controlling and encoding the data, the data were extracted through Torrance questionnaire and Gardner's Multiple Intelligence test. For the purpose of evaluation, standardized measurement tools were used, because in the standard method, scoring is accurately determined and their validity and reliability have been confirmed through extensive experience. Among the tools for measuring and collecting standard information, the Torrance Creativity Test, the Gardner Multiple Intelligence Test, the Academic Progress Test "Before and After Education" were used. For the validation and consistency of the research, including the analysis of the data and hypothesis test, the Delphi's expert method, T-test and SPSS software were used.

Literarial Review

Architectural Education

Based on the definitions presented in the field of architectural history, the Oxford Architecture Encyclopedia emphasizes that the architectural design and structure, contains a broader meaning and concept that goes beyond the body and architectural framework, which provides the following comprehensive definition: architecture should be defined as science and art that contains building design with aesthetic geometric qualities, emotional and spiritual qualities, strength, satisfaction and complexity, planning, and a variety of artistic features such as durability and stability of appropriate materials, pleasant color, decorations, dynamism, suitable proportions and acceptable scale, memorable associations, solidarity and relation with previous traditions (Akrami, 2003, 2).

Higher education has undergone great and new developments in the 21st century. The 21st century has been considered as the age of meta-industry. Higher education in this century cannot create the necessary changes with the governing views of the traditional and industrial eras. Therefore, before defining the higher education characteristics related to meta-industrial (information age), it is necessary to review and compare the higher education curricula and their goals before the Renaissance and after the Industrial Revolution. Education has had different goals and methods since ancient times in Iran and the world. The Iranians only taught a certain stratum, which included the aristocracy, the Spartans developed men who were brave and eloquent and the Catholic Church taught physical austerity of soul and familiarity to poverty and obedience. Although the terms "teaching" and "education" are synonymous, they are slightly different. Education, which is more widely used than teaching, refers to all activities that are formal and informal for learning, as well as activities such as self-study, program training, and distance learning without the presence of a teacher. In education, the existence of a teacher

is not necessary, but in teaching it is necessary, and without him/her teaching does not make sense. In this way, education includes teaching, and teaching is one of the ways of education. The importance and effectiveness of better teaching and learning methods has always been considered by scientists and researchers in educational sciences. Since the beginning of the twentieth century, in many countries, numerous studies have been conducted for over forty years on the effectiveness of education methods in all subjects by scholars such as Mumen and Lai, Clapard, Maria Montessori, John Devi, Herbert, Sorendike et al. (Afshar, 1978, 183).

Process of Creativity

Guilford has used the approach of creative education analysis that was previously used by psychologists such as Spearman (1927) and Thurstone (1947) to distinguish intelligence and creative strength. Using a set of different responses that were thought to be intelligent (Fig. 2), he presented his theory which is known as the 'structure of intellect'. In this three-dimensional model (operation, content and product), five types of operation (cognition, memory, convergent thinking, divergent thinking and evaluation), four types of content (figural, symbolic, semantic and behavioral) and six types of products (units, classes, relation, transformation, and implication) are presented. Guilford's intellectual actions are closely related to the issue of intelligence and creativity (Fig. 3) (Haghighi, 2003, 47).

Enlightenment means the designer's insight related to the nature of the problem and its potential solutions. Banishment and proof is a process in which potential and lasting solutions are achieved. Through expanding the relationship between architectural designs with creativity, it can be said that design

involves many simulation processes that arise from a number of interconnected designs. Design is a process of self-argument in which the elements of a problem are related to specific patterns, which are then transformed and become a general plan (Lang, 2011, 4).

Education of Architecture and Creativity

In most universities and architectural education centers in Iran, how to teach according to the definitions presented in the text has been one of the main concerns of professors, thinkers and educational planners of the country. We still see teaching methods in educational centers which have caused confusion among architecture students. In this category, teaching creativity (Fig. 4) in architectural learners is significant in multiple ways, because the formation of thought and mind, acquiring scientific skills (hand ability) and finally creating harmony between the mind and hand of the learner by the teachers in the early semesters can determine the students' ability in architectural education. Considering the research factors such as creative thinking, creating self-reliance and increasing emotional intelligence in proportion to the learner's ability, one can evaluate the beginning of architectural education as positive and assuring the students of the ability and power of design thinking to create architectural work in the coming academic years. These creative and innovative architects are the capital of any society. Further we discuss about various types of thinking so that familiarity with these topics will be the way to solve the problem of creativity in architectural education.

Relationship between Intelligence and Creativity

Guilford (1970), in the model of "structure of mind, considers creativity to consist of eight basic dimensions (Ryan and Deci, 2010) as: problem sensitivity, fluidity, new ideas, flexibility,

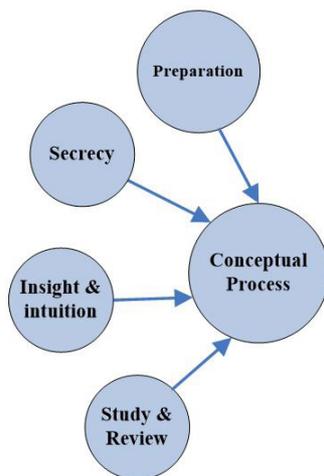


Fig. 2: Four Main Creativity Processes in Design

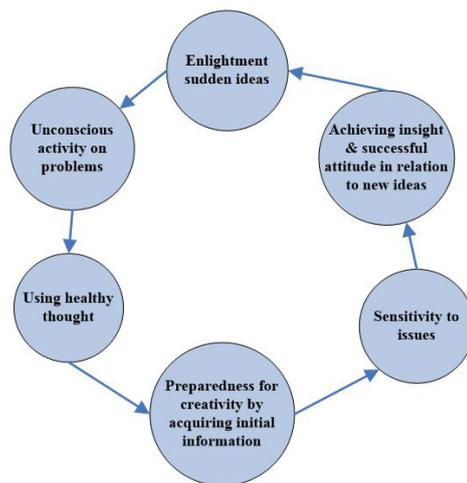


Fig. 3: Creativity Stages

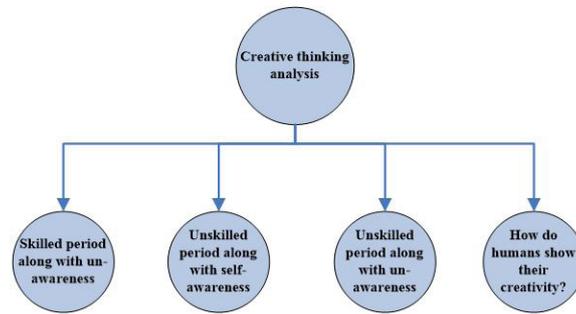


Fig. 4: Creative Thought Analysis

institutionalization, analysis, complexity, and evaluation. According to Guilford's view, there are several sub-dimensions under each of these basic dimensions. Based on this model, Guilford has created a set of tests to measure creativity, which includes 13 tests. Nine classic tests and Torrance Form test (1989) consider creativity to be of four main factors such as fluidity: meaning the ability to produce many ideas, initiative: meaning the ability to produce innovative, immaterial and fresh ideas, flexibility: meaning the ability to produce various ideas or various different methods, and expansion: meaning the ability to pay attention to details (Monteghi, 2012). Guilford's (1970) study on the limitations of intelligence tests and the concept of divergent thinking led to models and approaches to creativity. One of the consequences of these developments was the formation of discussions about the dependence of creativity, in which the study of creativity in the field of emotions with emotional creativity attracted a lot of attention. This concept was introduced by Averill et al. (Averill and Thomas-Knowles, 1991) at the same time as the concept of emotional intelligence by Salvi and Meyer (1990). Averill (1994) looked at social constructivism and believed that emotions in addition of being a product of biological forces, are forms of social interactions that make up the social norms and rules, and when these forms and norms change, there is a change in emotions. Based on this property of variability, he proposed the possibility of emotional creativity. Averill and Nunley (2010) defined the dimensions and elements of this type of creativity. Based on this definition,

emotional creativity shows itself in a new way, based on which it improves individual thinking and increases the relationship between individuals. On the basis of this definition, three main elements of emotional creativity are innovation, effectiveness and honesty. Innovation means the ability to change the usual emotions and create a new emotional state that is contrary to norms and standards or a new combination of common individual emotions. Effectiveness refers to the coordination of creative responses with social and cultural contexts, in such a way that it is possible to establish desirable relationships with others and to improve individual thinking.

In simple words, emotional intelligence indicates what is appropriate and what is wrong in social relationships and in psychological and emotional interactions; that is, individuals in different situations, can keep hope alive, empathize with others, listen to the feelings of others, and ignore small rewards for greater rewards. In distinguishing between cognitive intelligence and emotional intelligence, the cognitive intelligence allows us to know how information is processed. Cognitions, similarities, differences, inferences, and conclusion are all clearly in the realm of cognitive and intellectual cognition. While recognizing one's emotions and using them to make the right decisions in life, the ability to manage one's mood, and mental state and controlling one's impulses is measured by emotional intelligence. Emotional intelligence is genetically acquired and can be improved throughout a person's life through education (Fig. 5).

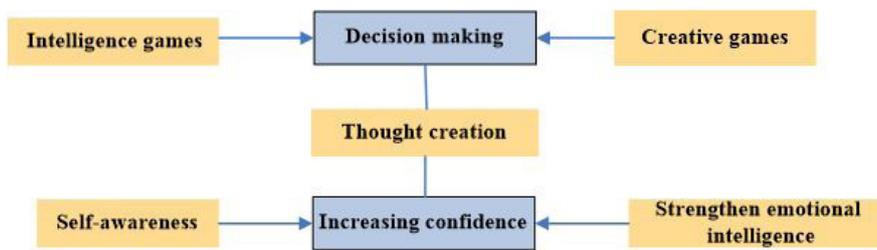


Fig. 5: Analysis of the Formation of Creative Thoughts

Damage to the parietal parts, especially in the right hemisphere, disrupts many tests of spatial abilities. In people with bifurcated brain, the dominance of the right hemisphere in spatial skills has been confirmed. Members of this small group (with a half-brain) are people who suffer from some form of incurable epilepsy. Their annexations begin in one hemisphere of the brain and spread to the opposite side through two hundred million nerve fibers called the corpus callosum. Surgery (elimination of the corpus callosum) surprisingly causes minor changes in a person's behavior, while specifically reducing the number and severity of annexations (Glatli, 1999, 8).

RESULTS AND DISCUSSION

How to Distribute Research Variables based on Central and Scatter Indicators

Data description indices are divided into three groups: central indicators, dispersion indicators, and form indicators (Fig.6). In this section, how to distribute research variables based on the most important central indicators (24 Mean), dispersion indicators (25 Standard Deviation) are examined.

The covariance analysis test was used to verify the accuracy

of research hypotheses. The results of this test were studied separately for each of the variables.

First Assumption: Evaluating the Normality of the Variables

In order to perform statistical methods and statistical calculation of the test and draw a logical inference about the research hypotheses, the most important action is to select the appropriate statistical method for research.

For this purpose, awareness of the data distribution is the main priority. Therefore, in this study, Kolmogorov-Smirnov and Shapiro Wilk test was used to investigate the assumption that the research data are normal. In this test, according to the following assumptions, a step was taken to check the normality of the data:

According to the table, if the significance level for all independent and dependent variables is greater than the test level (0.05), the distribution of data is normal. You can also measure the central limit of the normal distribution of variables. In this case, if the sample size is greater than 30, the data distribution can be considered normal.

As can be seen from the data in Table 1, the significance level of the Kolmogorov-Smirnov and Shapiro Wilk test for all

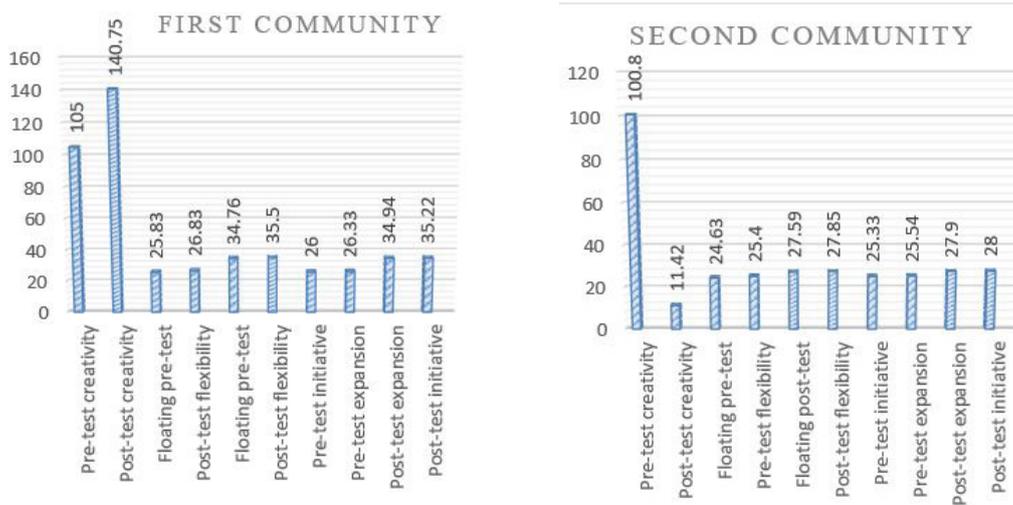


Fig. 6: Central Indicators, Distribution and Distribution of Variables Studied in the Study

Table 1: Kolmogorov-Smirnov and Shapiro Wilk Test of Research Variables

Variables	Kolmogorov-Smirnov statistics	Significance level	Shapiro Wilk statistics	Significance level
Creativity post-test	0.213	0.324	0.459	0.432
Creativity Pre-test	0.334	0.129	0.598	0.276

variables is greater than 0.05. As a result, the variables studied in this study have a normal distribution and parametric tests can be used to prove the research hypotheses.

Second Assumption: Investigating the Variance Homogeneity of the Research Variables

According to Table 2, since the amount of significance level for all research variables in Levine's test is greater than 0.05, therefore, it is concluded that in all research variables the variance homogeneity assumption is confirmed. One-way covariance analysis was used to confirm the research hypotheses.

According to Table 3, it is clear that the significant level with $f = 434.971$ is less than 0.05 ($p = 0.000$), so it is concluded that the new patterns of architectural education affect the creativity

of design students, which confirms this hypothesis. It should be noted that the impact intensity level is 95.2 %.

According to Table 4, it is clear that a significant level with $f = 100.474$ is less than 0.05 ($p = 0.000$), so it is concluded that the new patterns of architectural education affect the creative flexibility of design students, which confirms this hypothesis. It should be noted that the impact intensity level is 80.9%.

According to Table 5, it is clear that a significant level with $f = 126.265$ is less than 0.05 ($p = 0.000$), so it is concluded that the new patterns of architectural education affect the fluid creativity of design students, which confirms this hypothesis. It should be noted that the impact intensity level is 84.4%.

According to Table 6, it is clear that a significant level with $f = 104.096$ is less than 0.05 ($p = 0.000$), so it is concluded that new patterns of architectural education affect the creative

Table 2: Investigating the Variance Homogeneity of the Research Variables

Variables	Significance level	Levine's statistics
Creativity post-test	0.453	0.187
Creativity Pre-test	0.233	0.210

Table 3: Covariance Analysis Results

Source	Significance level	F	Mean Square	Degree of freedom	Total Mean square
Corrected model	0.000	306.156	3623.100	2	7246.200 ^a
Pre-test creativity	0.144	2.246	26.585	1	26.585
Group	0.000	434.971	5147.517	1	5147.517
Error			11.834	31	366.859
Total				34	541366.000
Correct Model				33	7613.059

a. R Squared =.952 (Adjusted R Squared =.949)

Table 4: Covariance Analysis Result (Source: Authors)

Source	Significance level	F	Mean Square	Degree of freedom	Total Mean square
Corrected model	0.000	76.016	310.170	2	620.340 ^a
Pre-test Flexibility	0.001	13.278	54.180	1	54.180
Group	0.000	100.474	409.965	1	409.965
Error			4.080	36	146.891
Total				39	39182.000
Correct Model				38	767.231

a. R Squared =.809 (Adjusted R Squared =.798)

Table 5: Results of Covariance Analysis

Source	Significance level	F	Mean Square	Degree of freedom	Total Mean square
Corrected model	0.000	97.187	263.201	2	526.403 ^a
Pre-test Fluidity	0.001	12.142	32.882	1	32.882
Group	0.000	126.265	341.948	1	341.948
Error			2.708	36	97.495
Total				39	37424.000
Correct Model				38	623.897

a. R Squared = .844 (Adjusted R Squared = .835)

Table 6: Covariance Analysis Result

Source	Significance level	F	Mean Square	Degree of freedom	Total Mean square
Corrected model	0.000	65.328	238.181	2	476.362 ^a
Pre-test Expansion	0.023	5.699	20.779	1	20.779
Group	0.000	104.096	379.527	1	379.527
Error			3.646	34	123.962
Total				37	36468.000
Correct Model				36	600.324

a. R Squared = .794 (Adjusted R Squared = .781)

Table 7: Covariance Analysis Result

Source	Significance level	F	Mean Square	Degree of freedom	Total Mean square
Corrected model	0.000	84.298	245.725	2	491.451 ^a
Pre-test Innovation	0.007	8.332	24.288	1	24.288
Group	0.000	143.382	417.950	1	417.950
Error			2.915	35	102.023
Total				38	38362.333
Correct Model				37	593.474

a. R Squared = .828 (Adjusted R Squared = .818)

expansion of design students, which confirms this hypothesis. It should be noted that the impact intensity level is 79.4%. According to Table 7, it is clear that a significant level with $f = 143.382$ is less than 0.05 ($p = 0.000$), so it is concluded that the new patterns of architectural education affects the creative innovation of design students, which confirms this hypothesis.

It should be noted that the impact intensity level is 82.8%. According to Table 8, when the obtained significant level is less than 0.05, there is a significant relationship between the two variables. According to the results, there is a significant relationship between the creativity and dimensions of emotional intelligence (due to the lower than 0.05 level of significance).

Table 8: Correlation between Creativity and Emotional Intelligence

		Creativity	Body	Internal	Middle	Space	Verbal	Logical
Creativity	Correlation coefficient	1	0.54	0.255	0.254	0.291	0.291	0.122
	Significance level		0.043	0.041	0.042	0.036	0.043	0.002
	Amount	16	16	16	16	16	16	16
Body	Correlation coefficient		1	0.136	0.283	0.150	0.118	0.234
	Significance level			0.002	0.005	0.043	0.043	0.001
	Amount		18	18	18	18	18	18
Internal	Correlation coefficient			1	0.314	0.208	0.149	0.196
	Significance level				0.004	0.008	0.006	0.036
	Amount			18	18	18	18	18
Middle	Correlation coefficient				1	0.323	0.110	0.234
	Significance level					0.001	0.003	0.002
	Amount				18	18	18	18
Space	Correlation coefficient					1	0.427	0.701
	Significance level						0.007	0.017
	Amount					18	18	18
Verbal	Correlation coefficient						1	0.229
	Significance level							0.020
	Amount						18	18
Logical	Correlation coefficient							1
	Significance level							
	Amount							18

CONCLUSION

What was proposed in this study as one of the main topics is the emergence of creative approaches such as creating different solutions against a problem, the role of vision and dynamism in the proposed solutions. The mentioned approaches are the most important indicators that can be examined in the process of student assessment. Based on the research model, three working groups were formed in the form of three architectural studios in the third semester.

According to the method studied in architectural education, two categories of traditional education were studied based on Thorns' theory of creativity and emotional intelligence factors. After extracting the correlation between these two methods, the relationship with the emotional intelligence of research variables was determined. The results of data analysis indicate that there is a significant relationship between research variables (decision making, interpersonal relationships, group education, leadership and oral communication) and

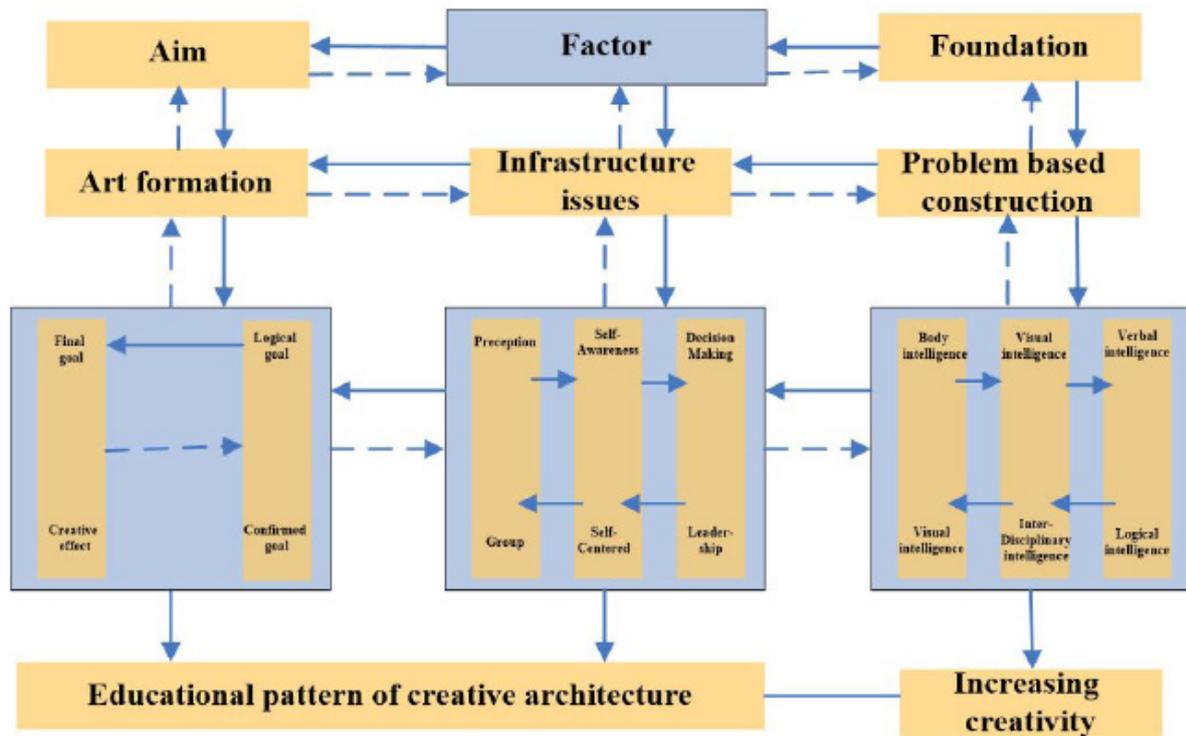


Fig. 7: Final Research Model

improving students' creativity. Based on research variables; diagnosis, evaluating strengths and weaknesses, evaluation after implementation of research method, assigning exercises appropriate to each student's ability, purposeful growth of exercises from simple to complex, involving students in solving problems, assigning thinking responsibility to students, adopting methods of encouragement and helping to increase the student's self-confidence, will cause the student to be more creative in solving problems. Emotional intelligence, which is characterized by indicators such as accurate understanding of signs, the ability to communicate correctly with others (design issues, surrounding, classmates, professors, etc.), innovation, creativity, etc., grows in this process and causes feedback for more creativity in problem solving. According to the results of the inferential statistics analysis in the correlation test between creativity and emotional intelligence, there is a significant relationship between creativity and the dimensions of emotional intelligence (based on the lower than 0.05 significance level). According to the inferential statistical analysis obtained from Kolmogorov-Smirnov and Shapiro Wilk test, the assumption that the research data are normal was proved to be true and the significance level of Kolmogorov-Smirnov and Shapiro Wilk for all variables was greater than 0.05. Hence, these variables are normally distributed in the present study, and parametric tests show that the significance level with $f = 434.971$ is less than 0.05 ($p = 0.000$). So, it is

concluded that the new architectural educational patterns affect the creativity of design students, and this hypothesis is confirmed. It should be noted that the impact intensity level is 95.2%. The interaction of the teacher with the student and the students with each other, which is one of the indicators of emotional intelligence, was developed in the group work of the studios. The participation of students in the group activity assessment process increased this social skill, and as the study results show, it has a direct effect on increasing the creation of more legible and creative designs. The correlation test between the emotional intelligence and Thorn's Creativity test shows the truthfulness of the assumptions (Fig. 7).

REFERENCES

- Afshar, E. (1978). *Tehran ancient Iranian calendar*. Tehran: Shakoofan Press.
- Akrami, Gh. R., (2003). Definition of Architecture, First Step of Education. *Honarhaye Ziba*, 16(4), 33-48.
- Averill, R. J., & Thomas-Knowles, C. (1991). *Emotional creativity* In K. T. Strongman (Ed.), *International Review of Studies of Emotion*. London: Wiley.
- Averill, J., & Nunley, E. (2010). Neurosis: The dark side of emotional creativity. *The dark side of creativity*, 255-276.
- Glatli, A. (1999). *Brain and Mind*. (A. R. Najl Rahim, Trans.). Tehran: Shirazeh Publishing.
- Guilford, J. P. (1970). *Traits of Creativity, Creativity selected reading*.

Penguin Books.

Haghighi, J., Behruzi, N., Shokrkon, H., & Mehrabizadeh Honarmand, M. (2003). Comparison of the nine combinations of intelligence and creativity in terms of personality characters in first year high school students in Ahvaz. *Journal of Educational Sciences and Psychology*, 2-1(10), 59-82.

Lang, J. (2011). *Creation of architectural theory*. (A. Einifar, Trans.). Tehran: University of Tehran.

Monteghi, M. (2012). Creativity on kindergarten and primary students. *Scientific journal Pejohesh planning*, (1), 1-28.

Ryan, R., & Deci, E. (2010). *Promoting self-determined school engagement* In Wentzel, K., Wigfield, A. (Ed.), *Handbook of motivation at school*. New York: Routledge.

Thurstone, L. L. (1947). *Multiple-factor analysis; a development and expansion of The Vectors of Mind*. University of Chicago Press.

