Journal of Engineering and Applied Sciences 10 (8-12): 261-266, 2015
ISSN: 1816-949X

The Impact of the Learning Process of Architectural Design on the Creativity of Students (Case Study: The Preliminaries of Architectural Design 1 Course)

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Abstract: During more than half a century of university education in the field of architecture and a brief look to the experience of the architecture academic learning in Iran, the offered architecture courses has been investigated and criticized less. The main objective of architecture training is the training of individuals which had dominate on the creatively action spectrum but this question is discussed that does the architecture training program cause students' creativity? At the present time, the findings of intellectuals of educational sciences area has provided a proper field for criticism and investigation and the presentation of multilateral issues resulting from the main objective of architecture training. Therefore, the investigation of creativity education is concerned in the architectural design. For this purpose, at first is engaged to explain education process of the present situation and according to educational psychology findings with the research findings test is acted to organize short-term practices (sketch) in thepreliminaries of architectural design 1 course workshop and the questionnaires and the statistical analysis is evaluated by SPSS of education process. The obtained results show that the education process of present architectural design courses causes three basic components of the creativity metacognitive, to mean, flexibility, fluidity, authenticity and novelty (innovation) can be concluded that this education process causes the nurture of students' creativity.

Key words: Aarchitectural design training, creativity, flexibility, fluidity, authenticity and novelty, innovation

INTRODUCTION

The architecture description highlights this point that architecture always has irrefrangible connection with creativity and innovation and its separation from this aspect of human acts is meant the existential rejection of architecture in its entirety. Therefore, can be raised this question that: does the architecture training process in Iran cause the education of students' creativity? The importance and sensitivity of architecture training toward some of the other specializations is in that in this field can't be acted toward the transfer of knowledge and experiences like natural sciences, technical and engineering branches simply. Available content and information in the architecture design courses is evaluated less on behalf of an educational or research group and consequently, some of the courses are provided during more than several decades without are examined its results and effect and is reviewed and revised if necessary. During more than half a century academic training in architecture field and a brief look to the academic training experience of architecture in Iran and intellectuals' findings of behavioral sciences area especially cognitive and educative psychology sciences is provided a proper area for criticism and investigation and the presentation of multilateral issues resulting from it.

The investigation of architecture training method in Iran show that the principal part and the main axis of it includes architectural design courses. Each architectural design courses plan is considered as foresight of the solution of one issue and student tries to present creatively solution for that solution by using knowledges, motive and mental skills, earned various experiences and values. The other courses as peripheral courses is in order to make efficient and easy the design process. Experience of designer and design time have the important role in choosing how to move in the direction of design (Habibi, 2015).

Different professors usually apply the various methods in the design training due to their knowledge. But, the general process of work is equal nearly. In the architectural design courses usually, there is not a specific sources for presentation and teaching, therefore the training and understanding of meanings is formed on the basis of relation between professor and student and the important point is that usually there is not a specific sources for presentation and teaching for training and

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understanding of meanings are used two ways-theory discussions and design criticism. Theory training of references is on the basis of booklets and class training and partly the presentation of some different books. Design criticism training based on meanings criticism is done by instructors via discussion, on done works by students which is more productive and more important from first stage to mean theory discussions because in this section students themselves start the design and while direct involvement with the issue and step in the direction of raising their understanding and always pay to thought and study and criticism of discussions which arises instructor or instructors and the understanding of subject become more easier and more productive for them from question to answer.

In this process, the student achieve the primitive solution of issue or primitive design singly and creates the solution himself which is the essence of architecture training which is depend on experiences and knowledge transfer and the strengthening of motive and mental skills for creating creatively work. Thus, the performance of thought work on behalf of students for opening familiarity and discussion subject is primitive and necessary conditions for design. In design training can't be relied being creative exclusively to offer idea or novel and accepted solution of society. For each design plan there are a large number of solutions which all of them can be true and may be some offered idea or solutions are not new for others but is new for person, however, which can be an admirable and novel work in its ideal bound. Therefore, if person is supposed to create a new idea should learn to think creatively in different situations and about various subjects and in fact in training process creative thought ability prefer on the offering of creative product.

MATERIALS AND METHODS

Creativity: The first systematic study in the field of creativity is done by Galton which is examined characteristics and attributes in the genius individuals. In the 1920s decade, psychologists' emphasis was on intelligence. At this time, Binet is allocated a portion of researchers to creatively aspect of intelligence (Neler, 2001). The study of cognition and conceptual processes of creative individuals has been investigated with the various emphasizes in the early 20th century which can be named including creativity as the aspect of intelligence, unconscious process, problem solving ability, thoughts association process. The cognition studies led to create several theoretical approaches in the field of creativity (Fig. 1) (Craft, 2002).

The original studies of psychology in the field of creativity was done by Guilford in the 1950s decade. Guilford who play an important role in emergence of psychometrics approach said his explanations of human's intellect which is acted as a base in explanation of creative thought and leads to develop theory tests and the other various tools for assessment of the creativity level and or divergent thought style (Niu and Sternberg, 2001). Researches like Martindal Gotkalo, Stav, Monchirod, Lobart, Perkel Holing, Veez and Ranko states that creativity can be evaluated in the routine life. The emphasis on recognition of creative thought and divergent thought led to identify the creativity evaluation criteria. Gilford began the measuring tools of divergent thought and Torrance (1974) continued the Guilford test is stable on the divergent thought features. Researchers such as Guilford (1970) and Torrance (1974) consider there features of flexibility, fluidity and validity and novelty as base of creative thought and divergent thought or creativity is evaluated by using of them in tests (Table 1).

Torrance (1974) has offered several tests for creativity which the most popular of them is Torence test of creative thinking which is measured by several pictorial and verbal question. The aim of this test application is to measure individual creativity talents in consequence of the

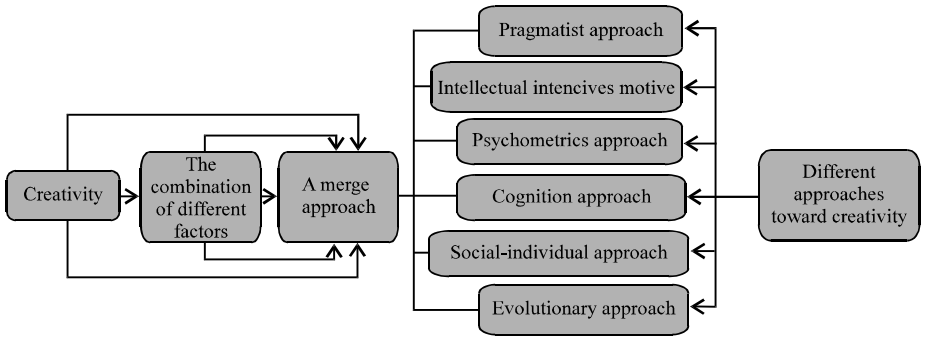

Fig. 1: Theoretical approaches to creativity (researchers)

Table 1: The features of the recognition of creative thought

Features	Description of creative thoughts
Flexibility	Person's ability for dominance on intellectual obstacles including quantitative scale from different ways
Fluidity	It is expressed the facility which by using it saved information is used easily in needed time including quantitative scale in offeringquestions, responses, beliefs, solutions
Validity and novelty (innovation)	It is shown by a rare or unusual response including qualitative scale of questions, responses, beliefs and thoughtful and unusual solutions
Curiosity	Ability in searching of Issues and solutions
Risks	Inclined to take risk
Analysis	To break or split the symbolic structures into organizing elements
Expansion	Via adding things into simple motives to make them more complex. Including the ability to create slight phases, diversity in application of question, response, beliefs, solutions and attention to details
Uncommon compound	Put together disparate thoughts (creative thinker has the power to combine phenomena, ideas and meanings and can merge phenomena altogether and use in a better form)
Complexity	Inclined to pondering in complex designs and invisible and difficult issues
Organization	Reshape the designs, efficiencies and their usage
creativity	Having the features like adaptation, magnification and zoom out, replacement, to organize again, retroaction and combination
Imagination and intellectual visualization	Including freedom from mental imaginations

intervention of training in acceleration of talent utilization (Akbar, 2005). The test is established based on controlling of three main components:

Flexibility: Be unusual respondents with valuation on the each person's responses based on the frequency statistics of that response in the whole group (Lavson, 2009; Kitto *et al*., 1994; Lee and Chen, 2008; Passig and Eden, 2000).

Fluidity: Vigilance in responses with valuation by ranking the vigilance degree of labels (Karakelle, 2009; Solso, 2002; Long, 2009; Glassner and Baruch, 2007; Moore and Gay, 1967).

Validity and novelty (innovation): The production of unlikely, unusual and unconventional dependents especially bound tests.

According to this, the test was held in 16 sections in the architecture workshop of architectural design preliminaries (1) and with the number of 26 students and by using practices which was stable on three main components of creativity. The reason for choosingarchitectural design preliminaries (1) course is to have maximum coequal bound of students in raising creativity and lack of enjoyment of necessary knowledge in the field of architecture training and this that did not experience the necessary creativity training before. The tests was held in two stages in the form of offering short-term practices in the design format and the building of cubic small model.

In the first stage, the test was only with raising the design issue and asked the students to offer a design in the format of hands-free design. The designs was gathered in a specific period.

In the second stage, asked the students to pay library study in the area of given practice and offer reports in workshop with gathering information and with done analysis and criticism and discussions, the course's instructor is acted toward summing up the subject and classification of information and put the necessary theoretical information available for students. After that the students are acted toward the offering of other design which was based on the subject relevant to done researches and trainings in the format of hands-free design. In the end, all gathered designs was analyzed and evaluated in two stages.

RESULTS AND DISCUSSION

The analysis of test: To compare the two student statistical society in the case of before training and after it is used" t" test. the statistical society and reviewed components and the classification of sessions based on 16 training sessions of 2014-2015 semester has been regulated according to Table 2.

According to the significant difference between the obtained average score was found that training played a basic role in the increasing of flexibility component (Table 3) between the students who passed preliminaries training process (Fig. 2).

This difference was also 7 about the fluidity component is noteworthy according to a session practice (Table 4). And finally, the validity and novelty which according to be bigger of obtained t from the t of Table 5 (2.49<4.45) and freedom degree 24 and the average difference of 10 points was represented the notable of architectural design preliminaries one period role in the increasing of another one of creativity components.

The research data to assess three main components of creativity metacognitive to mean fluidity, flexibility and innovation or validity and novelty, to investigate the effect of training process of architectural design preliminaries (1) course on the breeding of students' creativity show that:

Table 2: The classification of training sessions and sketches

	Training in workshop			Sketch test and the building of cubic small model	
Variable	Flexibility	Fluidity	Validity and novelty	Mining mind	Creativity in design
The number of sessions of test and teaching	3	1	3	4	5

Table 3: The evaluation of flexibility component in the sketch tests

Statistical index groups	Average (d)	The number of students (n)	SD (s)	Freedom degree (df)	t	The significant level
After training	17	26	5.71	24	4.60	0.001
Before training	10	26	1.87	-	-	-

Table 4: The evaluation of fluidity component in the sketch tests

Statistical index groups	average (d)	The number of students n	SD (s)	Freedom degree (df)	t	The significant level
After training	26	26	5.27	24	3.32	0.001
Before training	19	26	5.53	-	-	-

Table 5: the evaluation of validity and novelty component in the sketch tests

Statistical index groups	Average (d)	Number of students (d)	SD (s)	Freedom degree (df)	t	Significant level
After training	31	26	3.34	24	4.45	0.001
Before training	21	26	7.04	-	-	-

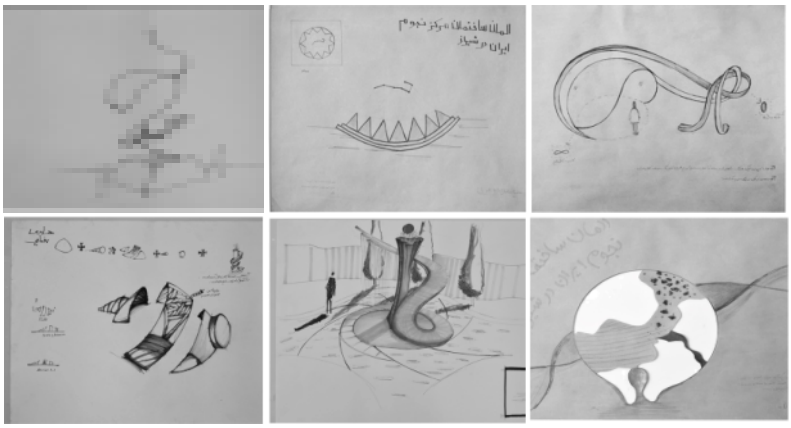

Fig. 2: Before training students sketches

Fluidity metacognitive component increases under architectural design training. This claim was approved in an acceptable level of statistical confidence. This change is proved at 7 score. This finding show that the design training can increase the level of production of mind greatly.

The increasing of the flexibility metacognitive component under architectural design training was approved in an acceptable level of statistical confidence. This change also wasat 7 score. This finding also show that design training can help to increase diversity and strength of mind at the same time with the increasing of thought production power.

This research is supervisor on this claim that the validity and novelty or innovation strength increase under influence of design training. This claim was approved in an acceptable level of statistical confidence. Change in innovation was at 10 score which showed the jump more than other metacognitive components (Fig. 3).

This finding also is ipsilateral with theoretical discussions of creativity which are claime that with the rise of flexibility and fluidity metacognitive components are witness of appearance and outburst the other metacognitive component to mean innovation. In fact, the claim of the knowledgeable like Torrance (1974) and Gilford (1970) which are believed the emergence of innovative ideas will find a double speed with become well-trained of mind in production of idea and find skill in diversification to ideas have reality and was approved from the perspective of this research.

In fact, individuals like Guilford, Solso and Torrance which know the fluidity as flow of mind and thought and having diverse and different responses is placed in a close relation with flexibility which intellectuals such as Gilford and Torrance know, it inseparable components of creative and believe the flexibility provides the possibility to see issues more than a prospect and allows the solutions become brighten with review of complex issues.

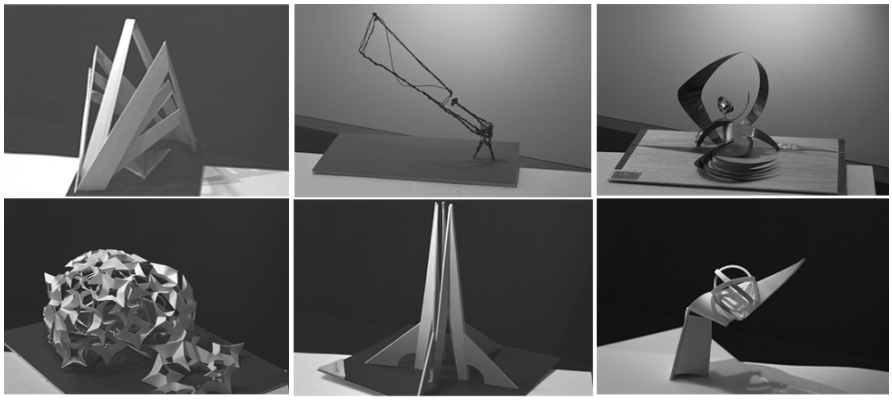

Fig. 3: After training student's conceptual sketches

CONCLUSION

This research show that the general process of training of architectural design courses cause the rise of quality level of formative components of creativity. This subject is ipsilateral with researchers which Guilford (1970), Torrance (1974) have done about the creativity training and are claimed that creativity is able to train in the level of metacognitive components (fluidity, flexibility and validity). Since, these components are the most important formative components of creativity can be concluded the training process pattern of architectural design courses has led to increase the creativity of new architecture students. Therefore, can be concluded this training process promotes the working level of mind and personality of individuals for better and higher efficiency and conformity.

The obtained results of analyses of two flexibility and fluidity components have almost the same average difference in two stages of before and after training which has a sign of high correlation of these two components. This result is harmonious with the researches of Guilford, Torrance, Valach and Kogan, Mansfild, Ranko and Albert which are claimed that the flexibility and fluidity metacognitive components is back and sides of a coin and in fact have correlation altogether. They believe that with increasing of idea production ability, the diversity and change property increase naturally. In fact, each new idea is accompany with a change toward the old idea. In this research, also the fluidity and flexibility metacognitive components have the same increased degree which itself is a confirmation on truth of theoretical discussions.

This finding is ipsilateral with research results of Peer, Vandroval, Herest, etc., Coelho and Sousa (2011) which suggests the positive relation between the orientations of learning aim and creativity.

The other result is that the brainstorming techniques and creative solving of issue are considered a proper ways for stimulation of metacognitive components of creativity. Another point is that matched with new researchers was found that providing motivational and creative conditions in training process and applying the appropriate practices, these techniques have this ability which can create a tangible jump in the fluidity, flexibility and innovation elements both in person's mind and personality.

This research despite of having restrictions such as be small sample and performance in range of architecture scientific field could show mind and personality is expandable with suitable planning. Undoubtedly, in the meantime the training process pattern of architectural design courses could act effective in promotion of metacognitive components of creativity and increase the possibility of increasing of the mind's capacity.

The evaluation necessity of ability and function of the architectural design courses in two area of theoretical and architectural design workshop which caused conduct such research can open the way for continuing such researches more than ever and the role which educative science findings can play about this should be considered more.

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