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Understanding the design issue in architecture learning; Review the desired components in sufficient understanding of the design as start point for novice designers

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ABSTRACT

Architectural design education is a challenging task that is dependent on several variables. Since the formation of the identity of a designer and learning the design skills is related to this issue, it is of extremely sensitivity. The process of architectural education should be considered and studied in the schools of the architecture. In this regard, the initial steps in learning architectural design are very important in training the designers. This study is conducted to explore how the variables affect the adequate understanding of the issue and the internalization in order to facilitating the beginning of the problem solving by novice designers. Components and special variables like program description by teacher, observation and samples research, corrections of the students, student engagement, direct involvement and imbuing with the design issue concern,... have been detected and the weight of each is

measured. The results indicate how a novice designer faces with design issue and the factor influencing sufficient understanding of it. These results can provide effective strategies to identify and orienting design teachers in design education and facilitating the internalization of design for novice designer.

Keywords: Architectural education, creative thinking, design issue, understanding the issue

1. INTRODUCTION

It is observed that comprehensive and full understanding of the design issue is not accomplished during teaching design and design practice by architecture student and the student is wrestling with ambiguities in his mind about the subject and the design issue in design process. It seems that the comprehensive understanding of the issue accomplishes by dealing with the design issue.

As Brian Lawson points out, "Full understanding of the design issue is not possible without any solution that explains it."

The results of the different approaches are necessary for novice designers because of internalization of the issue. In this regard, the questions concerning approaches of the designers especially novice designers and their role at the beginning of the design process can be considered as follow:

Do the different approaches of the design issue and approaching the subject and the design issue have a direct role in internalization of the design issue and its beginning? What are the factors affecting adequate understanding of the design issue in terms of priority?

In order to answer these questions, different ways such as Q & A, initial corrections, mental context of the novice designers, study and search, interacting with other designers,... as components affecting the understanding of the design issue are related to the imperfect understanding of the students as novice designers, so, it seems that the better understanding of the issue to hearten the student as a novice designer is dependent on recognition, quality and contribution of each components.

Although enough knowledge of the design issue would not lead to the better design, but also the knowledge and inner part of the design issue is necessary. Adequate understanding of the design issue is necessary to provide the beginning to novice designers in order to start design activities. So, finding the variables and approaches to dealing with the design issue can be effective in creating the necessary courage in novice designer and shortening the initial phase.

The study method in this article is based on studying the theories of the design education, interviewing with experienced designers and observing the samples of novice designers in education environment of architecture schools. Also, simultaneous direct involvement with various groups of design and many schools is an appropriate possibility for selecting the statistical population. Answering and dealing with the process of the novice designers with the design issue and the components and variables affecting it is extracted through measures such as early and open interviews. In the later stage, effective components and variables are evaluated.

Architectural education and design issue

There are many ambiguities in defining the design and different theorists have referred to it from various dimensions. In fact, the presentation of full definition of this process needs to search for similarities in different situations of the design and the recognition of the real difference between these situations is essential. In addition, the design in form of different approaches such as architecture, interior design, industrial design,... has different backgrounds for definition. Of course, different theorists have sometimes tried to provide very general definitions, such as:

The optimal solution to a set of real needs in a special situation (Lawson et al., 136, 2005)

Or a change in man-made (according to Chris Jones, Lawson, 37, 384)

These general definitions emphasize on being challenging of the design and its comprehensive range. The design in related to the architecture is considered as process. So, the design in architecture is considered an analytical process that needs analysis, evaluation and selection. In fact, the design can be known as an attempt to devise solutions before implementing them (Lang et al., 2005).

According to the design studies, design thinking process is composed of three kinds of mental activity or mechanism as follows (Tzimar& Churchmanet al., 1984):

A: Mechanism explaining the purpose

This mechanism defines main approach of the design issue and forms a targeted thought that tries to analyze the challenges, features and different issues. In this regard, this activity defines and explains the role of the designer.

B: Issue- solving mechanism

This mechanism is composed of finding and creating options for solving the issue and finding answers on the whole or part of the solution. This mechanism is a kind of inner-mental activity and depends on the imagination and the conceptual and diagnostic ability for creating and describing analytical process. In addition, it is directly related to the intuitive and evaluating processes. Thus, design thinking has never been independent of the target and it is self-evaluation.

Overall, there is not a specific definition for solving the issue that theorists agree with it, but despite of current dissentions, the situations can be described: when a person faces with a situation or a task that cannot respond immediately to it by his information and abilities, it said he faces with an issue (Seif et al., 515, 1991).

Thus, the main feature of the issue is that cannot be solved with the first response that comes into the mind and solving it needs using the knowledge and the prior principles in a new combination. Morgan writes in definition of the issue solving:

"Overall, the issue is a conflict or difference between the current positions that we want to build." (Quoted from Morgan, Seif et al., 515, 1991).

Hence, these theorists considered the issue solving as learning.

C: Evaluation mechanism

This mechanism focuses on critical thinking. In this activity, the proposed solutions are put into the review and evaluation. What is needed in this stage is to predict the different situations of the proposed solutions and critical evaluation of them.

In general, researchers of design study have enumerated the design issue uncertain, unspeakable, involving the subjective/ personal interpretation and without specific hierarchy. Also, they believe the answers to these issues are diverse and countless. In this regard, the characteristics of the design process are described briefly as follows (quoted from Lawson, Izadi et al., 2003), thus, the design process:

-is an endless flow

-is never absolute and perfect.

-contains understanding the directions of the issues and solving them.

-is not aside from value (and sometimes personal) judgments.

These features emphasize on employing the design issue and the components affecting it in design education.

In the context of architectural education, creating the ability in the design makes a major contribution and the main objective of the education. The main goal of the studio courses of architecture is to train designer and create the design capabilities and skills in students.

Architecture student in architectural practice along with the master learns how to start the design and presents a design with a specific process that not only has the primary requirements, but contains perspectives and personal interests of the data interpreter; a promenade from the question to the answer (Taqi et al., 1995).

Moreover, the creative part of architecture is very important in most of architecture schools, because the design extent is a place that humanism insights and knowledge of science and technology are transfigured in form of framework and the space of architecture (Izadi et al., 2003).

2. DESIGN AS CREATIVE ISSUE- SOLVING

In general, there are two types of thinking way in order to deal with the issues: creative thinking (creative) and reproductive thinking (Seif et al., 523, 1991). In reproductive thinking, the learner deals with a class of the same issues that have the same solutions. In creative thinking, the product is new strategies that the others have not already achieved (Seif et al., 543, 1991). So, the feature of this thinking is freshness of the thinking results. Hence, the design has the feature of creative thinking and issue solving is a kind of creativity. Ganiyeh in this regard states:

"A major scientific discovery or a great artwork is certainly result from the issue solving behavior rely on a lot of knowledge already learned, whether these knowledge are the type of public knowledge in science or the type of private knowledge known by the artist.

Many scientists declared that they study and explore the issues related to the artwork for a long time before creating it. Indeed, if this was otherwise be surprising. These statements do not show a huge difference between issue solving and creative efforts that led to the important work. As mentioned, the design process is based on the method of creative thinking. This research sees the design as a creative issue solving and examines it in the educational framework. Creative thinking is along with produced knowledge and creates new answers for issue solving and the designer applies creative thinking in design process for creating ideas and attaining the concept of the design (Mahmoodi et al., 2004).

If the design assumes a creative issue solving, the answer to it needs a number of steps that each of the issue solving process are faced with it. Different models are provided to solve the design issue and explain the design process. The common features of the design issues are the design issue are not clear and should be identified.

Eberhard in this regard mentions: "if the design issue can be described in accordance with ambiguous features, then it is also true that the designers never appeared pleased of the presented issue." (Lawson et al., 64, 2005).

Generally, five main processes have been diagnosed as the basis of the creativity in design, they are: "initial reception", "preparation", "negation and affirmation" (Lawson et al., 177, 2005). Some studies are considered the initial reception and preparation phase as one phase and are not separated from each other (Lang et al., 164, 2004). What is should be deal with in this study is considered adequate understanding of the design issue that is related to knowledge activity and recognition.

3. EXPLAINING THE ISSUE: ADEQUATE UNDERSTANDING OF THE DESIGN ISSUE

Generally, understanding an issue involves three general aspects. They include understanding the issue; thing that is understood or the same issue and at last it is a scientific strategy that link the first two aspects together. Design issue also needs to be recognized

and understood. The design issue is rarely defined at the beginning, but many experienced designers argue there is a need for a clear issue for a creative work (Lawson et al., 175, 2005).

Therefore, beginning the design process as a creative work needs adequate understanding of the design issue that it refers to initial reception step and explained procedures of the creativity process.

In fact, the comprehensive recognition and understanding the issue in the context of education is also a part of the issue solving. There are many uncertainties associated with architectural education. It seems that the student facing with the designer issue and understanding it is affected by the different controlling components.

In this study, the aim of adequate understanding the design issue is not an ideal view that is away from the reality, but it is comprehensive attention and multi dimensions understanding the design issues that give a new approach to the designer. In fact, creative understanding the issue limitations is one of the most important capabilities of the designer.

4. INVESTIGATION AND ANALYSIS

General trend of this research consists of two total stages that their aim is to identify the variables and their analysis in respective phases. Recognizing the target statistical population and explaining correctly studied statistical population is considered as a background for implementation of this approach.

4.1 target population[11] and studied population, novice designers

The target statistical population, the beginner students of the architecture population are as novice designers. This population consists of freshman and sophomore of architecture major as novice designers. It includes the architecture students from second semester to the end of the forth semester. This period (from second semester to the end of the forth semester) is very important because of forming the character of the students as designer influenced by conditions and various facilities and the abilities that they get. The studied statistical population is selected and studied objectively and selectively. In sampling way, two main principles of sampling are observed, which means that the sampling framework cover studied population or target population and the sampling is applied unbiased. In this study, the statistical population includes 40 samples that are selected from two different architecture schools. The students are studying at the architecture undergraduate and they are in the third and fourth semester. Also, they have been mainly questioned by the teacher in architectural design courses with long term practices. So, the design method is based on strengthening the character of the designer at the both universities with adequate experience and record to guide the beginner student in initial steps.

4.2 preliminary / diagnostic phases

To explore and explain the components and variables affecting the design issue, a preliminary step with recognition approach and highlighting the studied components and variables were performed. In this step, a diagnostic step is predicted to recognize the probable components affecting on discussing and understanding the design issue and also in order to test these components in research process. The main activity in this step is to find and refine components affecting the subject of the research.

In fact, reviewed components in this study are those have been common and are considered as key components in architecture schools. On one hand these components are active in order to understand the design issue, and on the other hand as an internal mechanism in a hidden system. So, although the approaches dealing with the issue and its indicative variables cannot be limited to these approaches in this study, but these approaches are based on the more experienced designers' view and are the most common approaches to deal with the design issue in architecture teaching in architectural studios. The interviews were mainly focused on the elements that give courage to the designer in order to begin the design. Most of implications were e traced by studying objective samples in studied environments and also interviewing with more experienced designers with more record and tested components and variables classified as follows:

- visible/ obvious variables:
  - Explaining the teacher program
  - initial corrections by the teacher
  - initial Q & A and corrections of other students with the teacher
  - library study and reviewing the related samples with the issue
  - Analyzing and criticizing the samples associated with the design issue in studio.
  - holding initial skis meetings regarding to the design issue
  - seeing and dealing directly with concrete samples
  - slideshow regarding to the design issue
  - observing and reviewing the previous students work samples
- intangible/ hidden variables
  - being familiarity with the subject area
  - debating and discussing the issue with other aligned students
  - consulting and discussing the issue with more experienced students
  - corrections with other teachers

4.3 analytical phases; the extraction of the results

In this step, the components and the review of them in statistical population are evaluated. Analysis method is based on the exposure novice designer in design issue through applying each of the experienced variables on introduced practice during a semester. So, the questionnaires were prepared and distributed among the novice designer at the end of the semester and after experiencing the understanding of the design issue. The novice designers mainly had experienced the design process and creative thinking during the at least two semesters and a maximum of four semesters. Evaluation process has been strengthen with reliance on analysis of design teachers' view in order to control study results and analysis and conclusion based on evaluation of novice students. Therefore, the results of this study are not only based on novice students view, but the evaluations are based on teacher analysis are considered.

The design issue presented to novice designers has been important, because the design issue in this study has a key role in adopting the designer approach. So, it was designed that the design issue challenges the novice designers and the design subject not to be so tangible that like the settlement design, the designer achieves to tangible samples in his mind. Hence, the design issue in this study has been the design of "exhibition gallery of artwork". It is clear that the limitations of the issue like the extension of the design, respective tiny spaces, the place of the design, were shared with designers.

Explaining the program was performed in one session by the teacher. The first question before distributing the questions was related to how to explain the program and the evaluation of the design issue based on his statements.

Did they notice the design issue after the first encounter with the issue by explaining the teacher program? The time of presenting the question was very important because there was a better background to answer the question.

Table 1

Distribution of the student's response to understanding the design issue after explaining the teacher's program

Students response	yes	Rather yes	No	Total
% of responses	5/32%	5/52%	15%	100%
Number	13	21	6	40

(Source: the author)

Therefore, the first questionnaire was discussed in order to understand and present the first efforts for explaining the answer by the student. In this regard, in order to answer this question in accordance with table 1, the answers were 33% yes, 53% partly yes and 15% no. This result explains the especial nature of the design issue in scheming the design and the student understanding of it (table 1).

With regard to upon table it specified that there are effective and intermediate variables in explaining and understanding the design issue. This study tries to evaluate the components and variables and provides effective strategies.

Hence, the results are evaluated and analyzed according to the diagnostic step and explain the effective variable on understanding the design issue. In evaluating these variables, table 2 and 3 show the results of the tangible and intangible variables.

According table 2 and figure 2, novice designers have been questioned based on the effect of each component. The results show that understanding the design issue has a special nature many intermediating are affected. Based on this table and figure, other tangible variables play a direct role in understanding the design issue.

Table 2 shows that the variables 3,4 and 5 (library study, review and criticize the samples of the design issue in studio and also holding initial skis) have had an effective role in understanding the design issue.

Reviewing the variable 2 explains another significant point and emphasizes on the importance and significant role of the question and the answers of the other students in studio in order to understand the design issue.

Table and figure 3 review intangible or hidden variables confounding in the understanding the design issue. The results of the survey suggest that in addition to tangible variables, the role of intangible variables is significant in understanding the design issue.

One of the significant components in this study is discussion of novice designer with other equal designers about the design issue that has an important role in revealing the hidden and ambiguous dimensions of the issue. It is emphasized by investigated ones in initial interviews. Moreover, the review of the respective table and figure shows that other components as hidden practical order have significant effects on architectural design education and understanding the design issue.

Having prior context of familiarity with the design issue, enjoying the experiences of the students and using the guidelines of other teachers are significant variables that are reviewed.

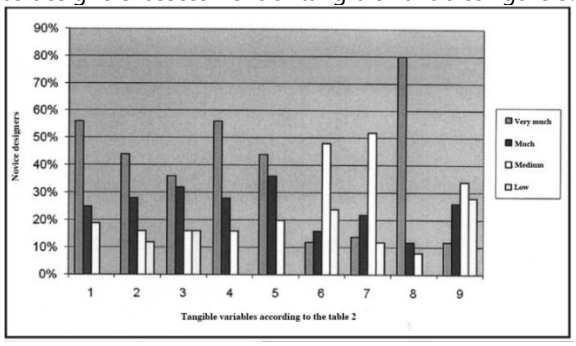
Also, for better analysis of the results, charts 2-2 and 3-3 have been obtained from summarizing the charts 2 and 3 that indicate the importance of the variables in two general categories. These figures represent the results of the evaluation that can be presented a more clear evaluation. Based on these two charts, the variables 6, 7 and 9 are evaluated from tangible variables and the variables 1, 3 and 4 are evaluated from intangible variable with negative impact. General observations and mental backgrounds expected other indications. For example, observation and the review the sample of prior students work, interaction and discussion with the high level students has low effect on these results. This can have various reasons.

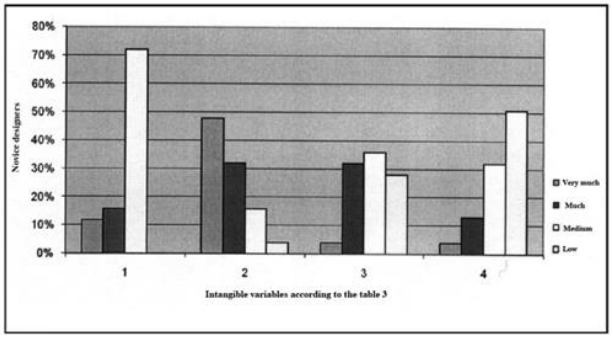
Table 2
Studying the value of tangible variables and assessment the influence of each component in understanding the design issue

Effect of components	Very much	much	medium	low	
parameter	%	%	%	%	total
Explain the teacher program	56%	25%	19%	0%	100%
initial Q & A and corrections of other students with the teacher	44%	28%	16%	12%	100%
library study and reviewing the related samples with the issue	36%	32%	16%	16%	100%
Analyzing and criticizing the samples associated with the design issue in studio.	56%	28%	16%	0%	100%
holding initial skis meetings regarding to the design issue	44%	36%	20%	0%	100%
seeing and dealing directly with concrete samples	12%	16%	48%	24%	100%
slideshow	14%	22%	52%	12%	100%
Initial corrections with teacher during first sessions	80%	12%	8%	0%	100%
Observation & study the work samples of prior students	12%	26%	34%	28%	100%

(Source: the author)

Figure 2
The novice designers' assessment of tangible variablesFigure 3: The novice designers' assessment of intangible variables





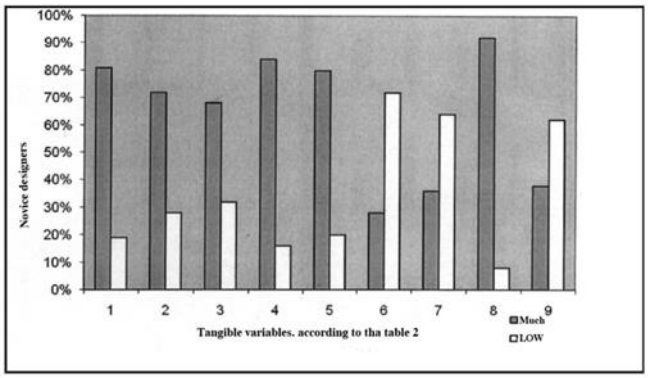
(Source: the author)(Source: the author)

Table 3
Studying the value of intangible variables and the assessment of the impact of each component in understanding the design issue

Effect of components	Very much	much	medium	low	
parameter	%	%	%	%	total
being familiarity with the subject area	12%	16%	72%	0%	100%
debating and discussing the issue with other aligned students	48%	32%	16%	4%	100%
consulting and discussing the issue with more experienced students	4%	32%	36%	28%	100%
corrections with other teachers	4%	13%	32%	51%	100%

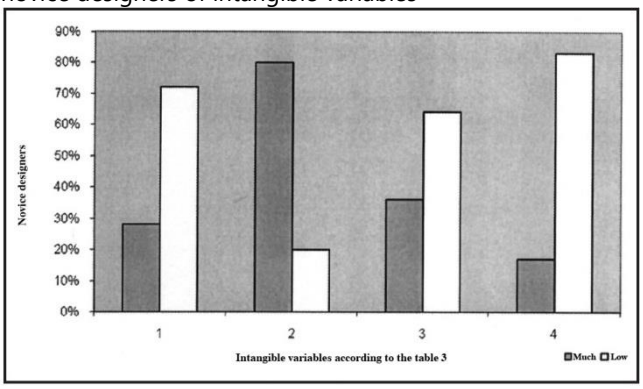
(Source: the author)

Figure 2-2
Summarizing the assessment of the novice designers of tangible variables



(Source: the author)

Figure 3-3
Summarizing the assessment of the novice designers of intangible variables



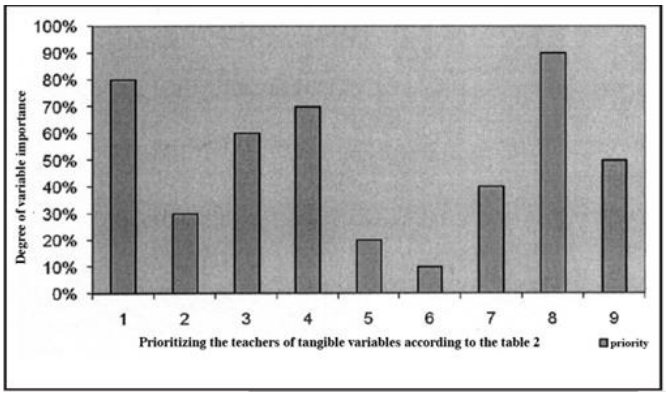
(Source: the author)

In fact, the results do not explain that variables do not certainly play an effective role in understanding the design issue, but the results suggest the changes of current education system of architecture schools that are resulted from various factors.

Since the purpose of this study is not these reasons, it is briefly tried to consider the analytical process of the research.

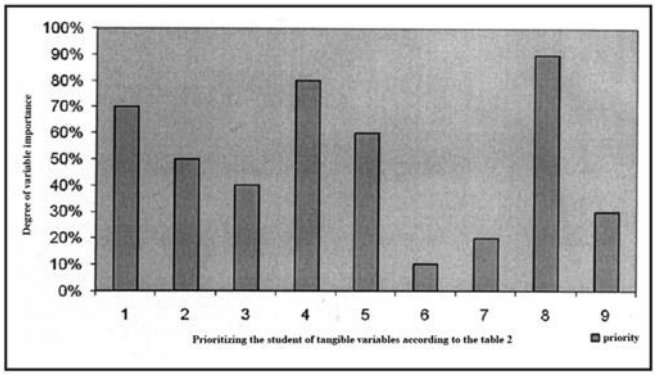
On one hand, in other part of this study, the assessment of the variables has been examined from the perspective of teachers. Six experienced teachers were asked to prioritize the tangible and intangible variables. On the other hand, studied novice designers are preferred two sets of variables. The comparison of diagram 1-4 and 2-4 and also 1-5 and 2-5 provide significant results in this regard:

Figure 1-4
Prioritizing the teachers of tangible variables



(Source: the author)

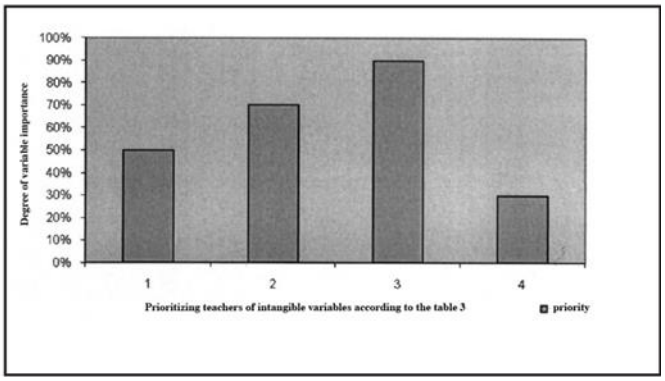
Figure 2-4
Prioritizing the student of tangible variables



(Source: the author)

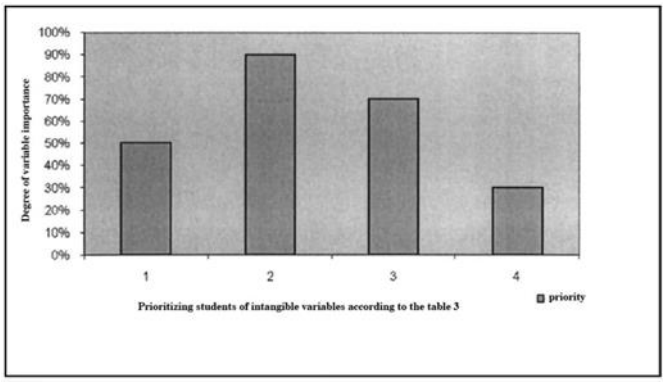
The survey of above charts shows that in relation to the evaluated tangible variables, the priority of the variables 8, 4 and 1 (initial corrections by teacher during the first session explains the teacher program and also analysis the relative sample with the design issue confirmed by two groups of students and teachers) were studied.

Figure 1-5
Prioritizing teachers of intangible variables



(Source: the author)

Figure 2-5
Prioritizing students of intangible variables



(Source: the author)

But the variable number 9 is observation and survey of work samples of prior student that emphasized by teachers, while they are emphasized by students and is not a partly low level in precedence of the variables.

This shows the possible change in design process in current education and variable separation in different levels of education. Hence, this study intends to review the current levels of architecture education in current schools of architecture, but the implications of this research can provide hidden clues for careful survey of educational process.

Also, other fine points are cleared in surveying the intangible variables of figure 3-3 and the comparison of figure 5-1 and 5-2 other fine points are cleared. According to figure 3-3 the students evaluated the variable 2, ie, a discussion with the same students. Studying figures 5-1 and 5-2 clears that the teachers assigned the priority ti variable 3, ie, consult and discussion about the issue with more experienced students. The comparison of these two results seems challenging. This result can provide important implications in hidden and gradual changes but not so obvious.

In this regard, incident results such as fade relation of students with different levels are achieved that have had effective role in the results of the architecture design education. The emphasis of the teachers has been the active relation and dynamic partnership of the students with different levels in architecture design studios.

5. TESTING RESULTS

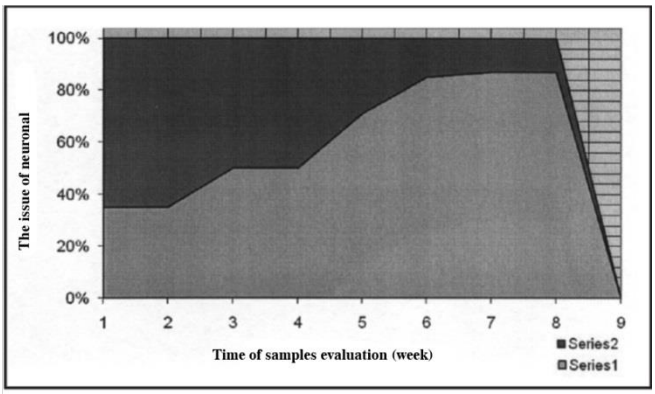
In order to test and evaluate the results, another group of students were studied as novice designers during a semester based on the results of the analytical phase. In this comprehensive study, the case study is considered 14 novice designers that have been teaching in forth semester in accordance with the statistical community. In this review the main approach deals with the design issue and the results of analytical study are studied. In this regard, based on the results of previous stage, important and intervening variables are emphasized. So, the following approaches are gradually studied during the first six to eight weeks of the semester in order to complete the internalization process of design issue:

-Describing the teacher program/ creating mental storm
-Strengthen student's questions and answers on the design issue
-Studying and analyzing the correlated samples
-Initial skis meeting with the design issue
-Correcting the design by the teacher during the initial sessions

It should be noted that these approaches are not consecutive and their simultaneous implementation are viewed. In this regard, the assessment of novice designers during the first eight weeks of self-assessment by the student and teacher has been made of how to deal with the issue. The results of these assessments are shown in figure 6.

Figure 6

Process of speed and internal improvement and adequate understanding the design issue during the first eight weeks of semester



(Source: the author)

Figure 6 shows that the most population of case study in a proper time have reached to an adequate understanding the design issue that is more clear in comparison with table 1. Also, a closer look at the graph represents the subtle hints that emphasize o alternating the internalization process. This graph also shows that design issue is not understood immediately after facing with design issue, but implantation of explained approaches based on tangible or intangible components provides adequate understanding of the issue in a proper time.

6. CONCLUSION

The results of this study represent the nuance in architectural design learning and explain the question and ambiguities in this regard that were supposed evident issue before. Based on the explained theoretical framework, the studies show the following results:

1. Understanding the design issue is gradual and is not required in a certain period, but ot is acquired in a period of time and based on the intervention of affected various variables and in terms of quality and quantity of intermediate variables.

2. Understanding the design issue is multidimensional and has a multilateral nature. In fact, this understanding is not accomplished only by discussing the design issue, but various variables effect on it. This study reviews the effective components on understanding the design issue and two groups of tangible and intangible variables are evaluated.
3. Based on performed studies, it is concluded that the design and design issue can be deal in three ways and these three ways can be considered by instructors at the beginning of the design issue and can be effective in creating adequate understanding the design issue for novice designers.

Motivating the student to ask questions and answer them and creating mental conflicts in order to internalize the issue. This can considered as a brain storming at the first session of the design issue.

Discussing the issue simultaneously along with studying and realizing correlated design samples in adequate understanding of the design issue is another effective way that is suggested in discussing the issue. Although this way seems challenging in some design issues that the teacher supposes the novice designer's mind is neutral and without mental background, since the case study in this study is novice designers. The results of the study explain that the approach in creating an effective background and understanding the design issue is very effective.

Holding skis meetings simultaneously with explaining the program and discussing the issue is another important approach. The implementation of this approach is emphasized in creating adequate understanding of the design issue based on performed studies. It is notable that these approaches are not in contradiction with each other and the implementation of these approaches can be effective in creating adequate understanding of designers, internalization of the issue and shortening the first pause of novice designers and it can create a secure beginning for design process.

Another point that this study is achieved to it can provide implications for necessary review and the assessment of the current education system of architecture. The emphasis is on activating the architecture schools and encouraging students interactions especially at different levels of learning are implications that seek more contemplation on their effective components. This rethinking also will have an important role in improving the quality of architectural education in architecture schools.

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