Original Research Article

Examining the Components of Architectural Concept Formationin Teaching Architectural Design With A Background-Based Approach*

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Abstract

Problem statement: Design ability is one of the most critical and complex cognitive abilities a person has tried to cultivate. Designing requires a complex mental process of the ability to obtain many types of information, combine them into a coherent set of ideas, and finally, create a realized form of those ideas. This article explores the formation of the concept in origin and reaches the main design by describing important subcategories and factors such as design education, sketches, creativity, geometry, and the examination of prominent examples. In this regard and using previous studies, it has been tried to reach a conclusion using the origin of concept production. Considering the undeniable role of concepts in the design process, this fundamental question is raised whether it is possible to theorize the formation of the idea (basic design) as well as the existing void before reaching the final solution in the minds of designers (architects). Today, there is a question of whether there is a connection between opinion and will to build objects (architects).

Reserch objective: The purpose of the research: This research aims to fill the gap between opinion and practice in architectural projects and theses. At the core of these studies, a clear and developed view of the nature of ability has been formed to design and develop talents. From this point of view, the ability to design is considered a facet of human cognitive skills that every person benefits from to some extent. The initial idea initiates the creation of the master plan, and the development of the master plan will lead to the final project.

Research method: This research is of the fundamental research type and is based on the qualitative research method and the causal research approach (intuitive discovery). The authors drew upon experiences in architectural design education to analyze and use logical reasoning. For this purpose, the general studies about the subject plan, the literature, and the subject's background are discussed. The evaluations, the required software, the necessary hardware, the work steps and the process of the assessment and tests, the required techniques, and the examination of various parameters are explained. In the next step, the first component, the production of the concept (preliminary design), and the design findings have been introduced.

Conclusion: It can be said that concepts are an intuitive aspect of the architectural design process because they are a mediator between the designer's inner and outer worlds. The main design is the connecting factor between the idea and the action in the design, and the gap created between the two can be repaired by discussing the development of the main structure.

Keywords: *Concept, Idea, Sketch, Geometry, Pattern.*

Introduction and Problem Statement

In the academic centers of the country, apart from the importance of selecting talented students to enter the field of architecture, one should pay attention to many other factors that can influence the flourishing of students' talents, such as the education system, educational environment, and educational methods. An architect's primary concern is finding the unique essence of each design project and a suitable concept for developing the design. Design requires a complex mental process of the ability to obtain many types of information, combine them into a coherent set of ideas, and finally, create a realized form of those ideas (Lawson, 2012). The architectural design process begins with forming abstract concepts in the designer's mi. It leads to an objective and concrete spatial design for life, so there is always a back-and-forth path from details to details in this process. Therefore, concepts as the starting point of the objective function of design form an essential part of this process, and it can be boldly stated that a good design results from a suitable concept. The master plan of an architectural project shows the general structure of the program on a small scale and in a completely abstract way. During the last few decades, many studies have been conducted on various aspects of design ability and its development in the fascinating and growing field of research called "research design." "Research design" is a young and dynamic field that, in less than six decades, has been able to advance in the direction of achieving its epistemology, methodology, and subject area, as a part of an independent academic discipline alongside natural sciences, humanities, and art. the same). Design education lacks a fundamental theory about design learning. Such a lack has caused the training of designers to be exposed to the promotion of inefficient educational methods emanating from theories that cannot describe and explain the unique nature of the ability to design and develop it correctly.

On the other hand, relying solely on the traditions of design education - with all their relative sufficiency in developing design ability - is unjustified and hinders the development of educational methods in design education. The designer's way of thinking is not as a parasite and a sequel to the "analytical thought" of scientists or the "intuitive thought" of artists but as a self-founded way of thinking; A way of thinking that has its process and mechanisms, and the research about it will illuminate unknown layers of the human mind (ibid.). Recent theories about the design process, being aware of its complexities, emphasize more the "power of the designer's thought."

Beyond the reasoning of scholars and the intuitive thought of mystics, the designer "creatively" seeks a solution to the design problem. Concepts in design are so fundamental that they transform the design process. In the meantime, the designer's mind, along with its vertical relationship with the various stages of the design process, monitors each stage of transformation and change.

Along with making the necessary corrections, he accompanies the architect until the last moment of the complete creation of the work, and he stands up to new concepts and continues with his idea despite all the difficulties. the article's fundamental issue is reaching a correct-logical-logical vision and including its necessary subsets. During the last few decades, many studies have been conducted on various aspects of design ability and its development in the fascinating and growing field of research called "research design." The variables that exist in this article are one concept and the other architectural design. The idea is an independent variable and affects other variables, and architectural design is a dependent variable. This article seeks to find the relationship between two factors or variables and identify the independent variable's influence and its amount.

Research Objectives

According to the research problem, this article seeks a clearer understanding of the nature of design and more familiarity with the concept and its

production at the beginning of the creative process of architectural design. Therefore, it pursues goals that can help architects design according to the concept. Hence, its most important goals are as follows:

• Facilitating the process of ideation and concept production until reaching a suitable architectural design.

• Bridging the gap between opinion and practice in architectural projects and theses.

• Understanding the design concept to help the design process, especially in educational use.

• Knowing the concept for a better understanding of a successful plan and using it in other plans.

Research Questions

Such theoretical researches are usually question-oriented and do not need many hypotheses. Therefore, this article also sought to find answers to the following questions:

• What is the relationship between idea and concept in terms of meaning and concept?

• How to theorize the concept's formation in designers' minds before reaching the final solution?

• How to connect today's gap between the opinion and practice of designers?

Research Method

The research in this article originated from the fundamental research type and is based on the qualitative research method and the causal research approach (intuitive discovery). They use the authors' experiences in architectural design education, analyses, and logical reasoning. To do this, we will discuss general studies about the topic, literature, and the background of the subject, then research materials and methods, such as the method of conducting research and how tests and evaluations are performed, the required software, the necessary hardware, the work steps and the process of conducting assessments and tests, the required techniques. And the investigation of different parameters has been described, and in the next step, the first components of the concept production (preliminary design) and the design findings have been introduced.

Research Background

Despite the breadth and scope of this article's topic, excellent but insufficient research work has been done. Concepts are beneficial in the advancement of science. It is difficult to imagine science without concepts such as energy, force, acceleration, time, electric charge, and gravity. Similarly, there are concepts in biological sciences. Science concepts help integrate observations and phenomena into hypotheses and theories based on scientific elements. The most important ones are mentioned in the primary research, and the necessary conclusions are drawn from the research records. But in this article, for the sake of brevity, the essential ideas of architectural theorists in defining the concept are briefly mentioned in Table 1.

Concept Definition

Definition of concept from the point of view of researchers in the field of architecture: Brian Lawson defines the concept as "an image of the main ideas that give structure to the plan." Jane Darkie refers to it as the "primary generator" of Colin Rowe, "the organizing principles," and Kolander, "the glue that holds the answer together." Quist interpreted it as "an important issue," and Christopher Alexander interpreted it as a "concept," and some of them used the word "Parti," which means "general idea." (Heylighen, 2005, 290) Of course, among the interior architects, Dr. Nadimi considered the "principle design" a suitable alternative to the concept (Lawson, 2012, 237). If we assume the idea is a strategy, the concept will follow it as a tactic, or if the idea is the desired goal, the effort and path taken in that direction will be presented as a concept (Panahi, Hashempour & Eslami, 2014).

Concept definition from the point of view of researchers of other fields: apparently, concepts in science help to integrate observations and phenomena towards hypotheses and theories based on scientific elements. Kant's definition of the construction of a concept has been interpreted as "... a thought that naturally thinks of the abstraction of something

common to many cases". In Kant's discussion, Christopher Jenavai wrote: "General concepts are formed by abstraction from several species." John Locke's definition of a general idea is similar to the definition of a concept. According to Locke, a general idea is created by abstracting, delineating, or removing standard features or characteristics from several specific ideas that are common to all people (Table 1).

Discussion and Results
• Conceptualization and creation of the subject design and its relationship with the design process

From the time the designer decides to create work until his design is prepared for the implementation stages, various events occur in his movement, including the creative production of the idea and its transformation into an architectural design and product. These events are known as the design process every architect goes through actively or passively (Rahimi, 2010). Due to the multitude of factors affecting it, design is considered a general problem-solving method. It is unlikely that all dimensions of the design problem are precise at the beginning of the process. For this reason, the designer's first task is to identify the design problem (Lang, 2011). In fact, the designer, from his mental power, first gives a structure to the design problem so that he can understand it, and then, with the help of his creativity,

he presents the initial idea of the design. Determining stages of the design process are formed unconsciously in the designer's mind, and the production of the design is the most important (Davoodi & Ayatollahi, 2008).

• The role of the design process in creating ideas and concepts

The design process is actually a set of steps that lead the designer from the design problem to the design solution. Often these two words are used interchangeably; While these two are different in several features such as the time of formation, location, the necessity of the presence or absence of each in the design process, etc. Design is the process of meeting needs and creating a better fit between what exists and what should be (Duerk, 2019, 21). What is particularly important in this direction is the starting point of design and the "idea-finding" stage (Kalami & Nadimi, 2014, 20). Nadimi et al., in the article "Sources of architectural ideation in the process of ideation of several architects from the professional community of the country," with the personal interview method, investigated ideation among the professional architects of the country and described its sources in the form of two parts of factors directed at the designer and the design problem (platform and subject). This research shows that the design issue occupies the most significant percentage of idea-generation resources among

Table 1. Definition of the concept from the perspective of researchers in other fields. Source: Authors.

Definition of the concept from the perspective of researchers in other fields	
Ockham explained in his last writings that the general concept is precisely the act of thinking about several topics together; it is vaguely (in a metaphysical way) completely unique, while it is "general and comprehensive" in having a referable state of several topics.	(William of Ockham)
John Locke's definition of a general idea is similar to the definition of a concept. According to Locke, the general idea is created by abstracting, delineating, or removing standard features or features from several specific ideas. A common characteristic is similar for all different people.	(John Locke)
Kant's definition of the concept has been interpreted as "... a thought that naturally thinks of something common to many cases...". In Kant's discussion, Christopher Jenavai wrote: "General concepts are formed by abstraction from several species."	(Immanuel Kant)
For Schopenhauer, empirical concepts are "...merely abstract, known through intuitive understanding, and conventionally derived from our thinking or the reduction or retention of some attributes". Schopenhauer states that the concept is the reduction of past images while preserving their distinctions.	(Schopenhauer)
He explains that general concepts are made through abstraction. A general idea is a common element in many conceptions of category members.	(John Stuart Mill)
According to him, the concept can be abstracted from several perceptions, but it is only the starting point.	(William James)

professional architects in Iran (Nadimi & Shariat Rad, 2012). Despite the variety and plurality in the methods presented by the thinkers, these techniques will be defined as four analogical, paradigmatic, logical, and theoretical categories.

- Analogy method

Based on the classification of William Gordon (Gordon, 1961) and Brad Bennett, the analogy can be divided into four types: 1- Symbolic metaphor seeks inspiration from appearance and form. Many of Calatrava's works fall into this category. 2- Direct analogy: uses events, behavior, and relationships between elements for analogy, such as Renzo Piano's California Academy of Sciences. 3- Personal metaphor: the designer puts himself in the place of the subject or the background of the design, such as the Berlin parliament building by Norman Foster. 4- Fantasy analogy: technology allows the dreams in the architect's mind to be realized. Jean Nouvel used the same method in the design of the Arab Institute in Paris.

- The pattern method

In this method, by studying the history and background of architecture in each field, we recognize patterns, and these patterns are sometimes known as types, models, or archetypes. They will be the primary generators for the formation of architecture (Durand & Nicolas, 2000).

- Logical method

Resources such as program, site, and climate are used as the primary generators of the work formation. This method uses trial and error, design studies, and analytical diagrams. The climatic approach, contextualize, and regionalism (response to the site) are subsets of this method (Jormakka & Schurer, 2007).

- Theoretical method

The theoretical method includes two subgroups of design based on the rules of geometry and mathematics and procedure based on the laws of philosophy. Geometric design can be divided into two categories: technique based on geometry

(Euclidean and non-Euclidean) and design based on shape variability.

• Supporting concepts

The researchers of this area include all the design processes, including three everyday activities. They know analysis, composition, and evaluation. Designers describe the existing situation in the analysis stage and respond to provide the future status of the project in the composition stage, so the formation of initial concepts in the composition stage and the starting point (inspiration) in the design process. In this method, first, one or more general plans or organizing concepts are presented, then for the smaller parts of the project, ideas are given that are in harmony with the overall concept. This design method can be called reaching from the whole to the region. In this method, the ideas that form the general and macro opinions of the design problem become more mature and complex step by step during the design process (Duerk, 2019).

• Design and production of the master plan

- Design thinking

In the reality of design practice, some people have outstanding design abilities. Highly creative and talented individuals with international reputations within and outside their professional peer groups are considered successful designers. However, studies based on the behavior of novice designers (usually students) or, at best, talented designers are relatively ongoing. This is because these people are easier to access for study. But if studies of designer behavior are limited to studies of relatively inexperienced designers, our understanding of design ability will also be limited. Studying outstanding or exceptional designers may give us different insights and knowledge of design expertise (Cross, 2004). There are two groups of studies, each from an accepted scientific path. They conclude that the mind's patterns and mechanisms during design differ from the mechanisms of the mind during other actions. These two groups are:

- Empirical studies of design thinking

In 1972, Brian Lawson raised two questions; One,

is the way of thinking of an architect different from that of a scientist, for example, a psychologist? If the answer is yes, "does this difference reflect an inherent difference between architects and psychologists, or a difference in the nature of their work?" (Lawson, 2012, 48). To find the answer, in an experimental experiment, Lawson asked two groups of final-year architecture students and psychology graduate students to put pieces together and combine them to create a complete cube. The research results indicated that, in a significant way, the way of working of the members of each of these groups was similar to each other but different from the work of the members of the opposite group. To answer the second question, Lawson conducted other tests among juniors and seniors and concluded, "The educational experience is discipline-specific rather than an inherent cognitive mode" (ibid., 50).

- Logical investigations of the design thinking method

Another branch of research - which plays a fundamental role in forming the theoretical foundations of the design system and considering the design thinking method as an independent which is the study of design action from the perspective of logic science. In 1976, "Lionel March" in an article called "Design Logic and the Question of Value," first criticized the logical models used in the analytical method and emphasized that: "Placing the design theory on the inappropriate forms of logic or science, It is a big mistake (March, 1984). There are three pillars in logical propositions: 1. Data, 2. Rule and 3. Result. Peirce expresses the third state, where the result and the rule are present, but the initial data is unclear. March showed that when designing anything or a product, from the beginning, we know the desired result (function), and we have the rule of its operation, but we do not have that product. In this case, we need to shape the product or "that thing." After March, Rosenberg and Eekels developed March's work (Eekels & Roozenburg, 1995). But Rosenberg and Eccles believe that the core of the design action is where we know the desired function,

but we don't know "what" and "how" to achieve it. This event requires simultaneously coordinating the two variables of form and work method (March, 1984).

- Design training

Design education as we know it today is a relatively new phenomenon. It shows the history of motion design education step by step from the workplace to the college and university workshop. Today's designers can no longer be trained to follow specific strategies because the pace of global change they must work on will quickly overtake them. It is no longer possible to immerse a student of architecture or industrial design in a few traditional techniques. They must learn to recognize new technology as it develops and take advantage of it (Lawson, 2012, 7). In recent years, scattered researchers have reviewed design dimensions and methodological elements and researched them more precisely, the result of which is the change or expansion of some intellectual and strategic bases of design system research. Architectural research can be divided into two classes: First, research is conducted to review and receive hidden points in existing architectural works. The second is the research that follows the architectural design process for the known case that will be built or for the claim that remains in the design stage. Based on this, research can be referred to as research on how to design and plan (Heydari, 2015, 14). In many types of design, it is crucial not only to have technical ability but also to have a comprehensive aesthetic understanding. The designer must understand the aesthetic experience of the person, especially the experience of the visual world, and in this sense, designers share the field with artists. Becoming a good designer without developing good drawing skills is difficult. In fact, designers' handwriting is often gorgeous (Lawson, 2012, 16). Designing requires a complex mental process of the ability to obtain many types of information, combine them into a coherent set of ideas, and, finally, create a realized form of those ideas.

The issue that an architectural design should be a product of the architect's imagination and creativity or whether the architect's creativity should flourish during a scientific process and with precise planning has always been a debate among the teachers of the field of architecture.

There have always been schools that dictated formalism to students, and there were also professors who encouraged architecture to be pragmatic. However, some were on the side of moderation and considered both previous issues. It seems that during the last two decades in architecture education (especially in the units of Islamic Free University), the indoctrination of its pure formalism has won in the teaching of architecture due to its simplicity and ease of work, and this is currently being implemented. Architectural consulting has been more popular among engineers due to various professional conditions and related limitations, including economic issues and construction costs. They create and prefer arriving at the design through the form to arriving at the design through the function and balance between these two (Janipour & Asti, 2013).

• **The concept of planning in the architectural design process**

During two decades of design research, compilation, and proposal of design methods, it was formed into three main currents, which were called three generations of design methods: the first generation, analysis-combination methods; The second generation, collaborative methods; The third generation, subject-test design methods. The first and second generations practically failed and could not make a way forward. Because the nature of the act of design, unlike other methods such as mathematics, physics, etc., which are problem-solving, cannot be reduced to either the first-generation analytical methods or the second-generation research methods. This was while the third generation relied on the mental structure of the designer himself, which was absent in the first-generation design methods. The third generation is the subject-test design generation.

In the third-generation methods, the designer must first give a structure to the design problem to be able to understand it and be able to solve it. In the opinion of most of the theorists of the first generation, this thought is considered obscurity and was deemed impractical. Third-generation designers think of the design process to be a guess-analysis process instead of an analysis combination. In Table 2, the design process's generations, has been reviewed and presented.

It is a problem-solving process. In the late 1960s, fundamental discussions of design methodology were highlighted by Rittel and Weber. They were the ones who described design and planning issues as "wicked and mysterious" issues and were fundamentally unwilling to turn to scientific and engineering techniques - which deal with "tame" issues - (Cross, 2001, 50). Rittel has compared rebellious or mysterious issues with tame and pleasant issues. Since design issues are uncertain and ambiguous, they cannot be solved simply by collecting and combining information and knowledge. To find a solution, designers often consider intractable problems tame (Lang, 2011, 48).

Therefore, in response to the question of why designers can analyze the problem without completing the issue, it can be stated that they first guess their proposed answer by structuring the problem and relying on past experiences and previous concepts to achieve their goal.

This type of problem-solving is the third-generation method invented by Karl Popper. In this method, an expert designer does not drown himself in information but looks for a frame or framework to advance the design based on it. A group of designers considers only one aspect or a unique design feature to achieve the primary method and increase the composition. When expert architects become more familiar with the project and become aware of its issues, they gradually recognize some concepts and ideas as more important and appropriate than others. This method of seeing and addressing only a series of

Table 2. Review of the generations of the design process. Source: Bastani & Mahmoudi, 2018.

| | Intuitive design | | Systematic patterns | | Environmental patterns | |
			Phase	Logical	Environmental design	Interactive
Chris Jones	The Age of Evolution	Assisted design	Systematic design		Design in the present age	
	Technique And profession	Drawing (black box)			Social innovations	The combination of intuition and rationalism
Horst Rittel	____	____	Rational and systematic model		Participatory model	____
John Lang	____	____	Rational model		Controversial model	Hypothesis model and test
Ashraf Salameh	____	Intuitive model	Rationalist model		Participatory model	____
Hamid Nadimi	____	____	Analysis-Synthesis model		Participatory model	Concept-test methods
Worth Wogan	____	____	Systematic models		Participatory model	Intuition and systematic

problems in problem-solving is called the "Chinese problem" or problem arrangement in research design literature. In this way, every designer arranges the problem from their point of view and then starts to answer it. However, to reach a concrete and objective project, the designer gradually develops and expands his concept by using a "creative process" in which experience plays a significant role and continuously revises and adjusts it during the process. So that in this process, there is always a flow from the plan to the idea and vice versa (Fig. 1).

A suitable design idea answers many aspects of the problem at the same time. For this reason, as a whole unit, the blueprint can be likened to the seed of a plant, which stores all the information related to the plant's shape, characteristics, and growth stages. The main design does the same thing as Hillier and his colleagues, ordering the design problem and considering it a prerequisite for solving it (Nadimi, 1999b). At the beginning of the design process, designers deal with various aspects of the problem from their point of view, and sometimes they present one or more plans to solve the problem. The next

step is the development of the leading design and detail design.

• **How to represent concepts in the architectural design process**

One tool that plays a crucial role in solving design problems as a creative process and advancing design concepts is sketching (Cross, 1999, 31). At the beginning of the design process, they are unstructured and vague drawings of the initial ideas of the design, which are read and interpreted in the following stages and finally lead to a tangible design. In a professional definition, sketching can be considered a simple and quick drawing or painting of the prominent and essential parts of a subject or a scene without dealing with the details often used for preliminary studies (D. K. Ching, 2019, 102). Figs. 2 and 3 are examples of sketches drawn by prominent architects to represent the initial ideas.

In the early stages of design, architects often use sketches and diagrams to illustrate functional and formal reasoning. Design sketches are exterior representations that help visualize and evaluate the spatial arrangement of artifacts (Yi, 2005, 1). The architect creates the whole architecture quickly and mentally based on specific conditions. The main work is done when the architectural board is in mind (Fig. 4). In the next step, to transfer what is imagined and produce a functional space, he designs and then
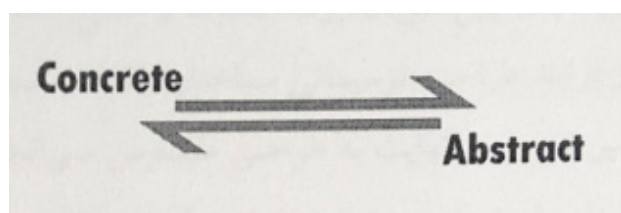

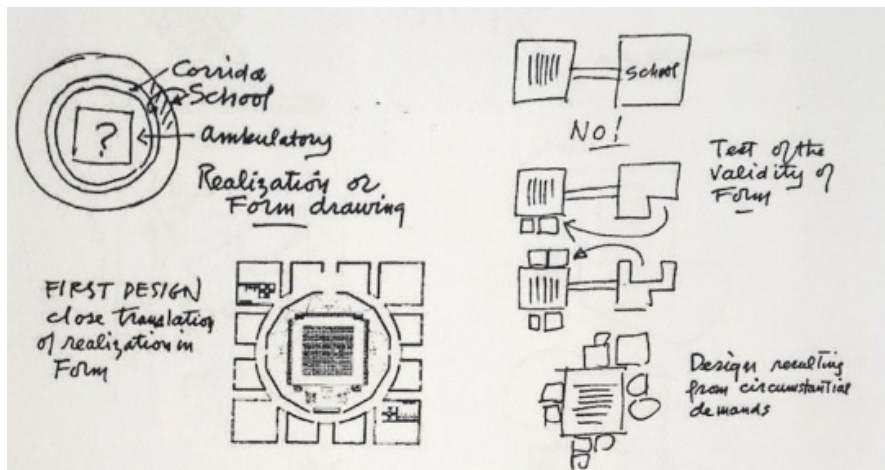Fig. 1. Garlic from summary to detail (whole to part). Source: Authors.

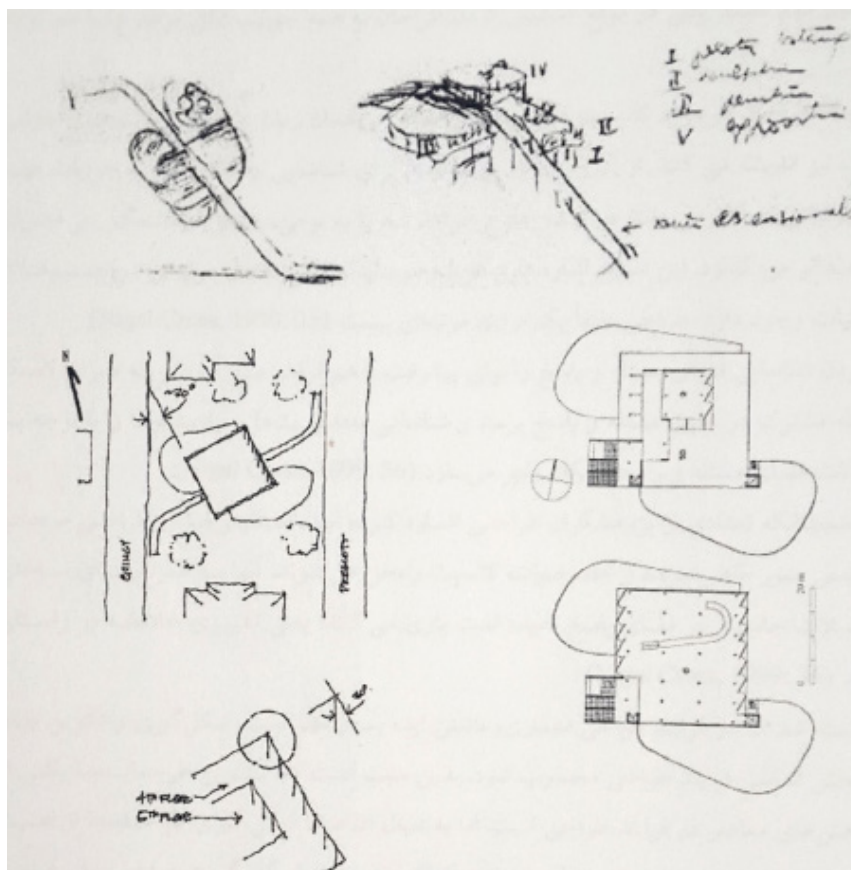Fig. 2. Louis Kahn. First Unified Church (1975), New York. Source: Lazio, 1998.

Fig. 3. Le Corbusier. Carpenter Center for the Visual Arts (1993), Harvard University. Source: Lazio, 1998.

produces architecture with the help of the previously exposed teachings (Fig. 5).

We see that designers think about the overall concept and, at the same time, consider the minor aspects of implementing the same idea. Therefore, they use sketches to identify and reflect on essential details. This suggests that although there is a hierarchical structure in decisions, from the overall concept to the elements, design is not precisely a hierarchical process (Cross, 1999, 35).

Gaining experience is an essential part of becoming an expert. Sources of ideas are everywhere, among everyday life objects, in nature, and especially in the program and the project site environment.
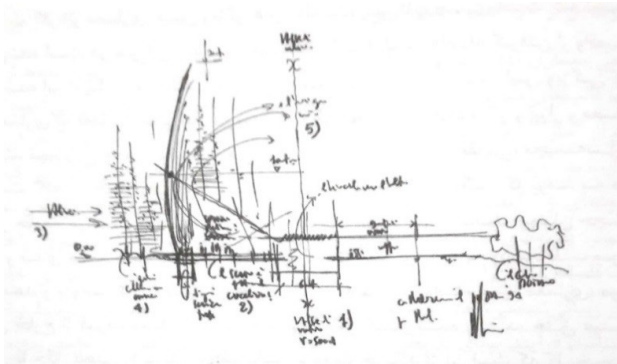
Fig. 4. Sketch by Renzo Piano when the architectural board was created in his mind. Source: Heydari, 2015.

Fig. 5. Architecture production is shown in Fig. 4. Source: Heydari, 2015, 106.

Even some designers and architects are influenced by the natural form of the human body and its anatomy. One of the fundamental sources of designers' ideas in the creative process of design is the designer's own experience or his previous mentalities, as well as using the experiences of others and course, sharing his experiences with others. Therefore, one of the basic approaches in the formation of motifs is to adapt well-known works of design and use the motifs of such works. This is done through "analogy." According to the specific situation of his plan, in this method, the designer uses the ideas and concepts that come in the form of outstanding architectural work. So, general principles should be extracted from previous unique answers (similar cases) and applied in particular circumstances; "Generalization" and "Realization." But in all cases, using design records is not as simple as imitating. Instead, the general principles governing a project should be extracted based on the process of abstraction and summarization. After that, the designer develops specific regulations for the new design situation during the allocation or personalization operation that takes place using personal experiences, information analysis, site analysis, and many other things. And since the design process is a continuous revelation process and in the relationship between opinion and action, it is not a one-way process but a dynamic and controversial process. There is always a back-and-forth relationship between the specific design principles and the new design (Fig. 6). It can be said

that the use of this design method is used in "various levels of architectural education." Differences in the level of people's ability to understand and read different levels of work. In such a way that at low levels, the use of records is imitative and associative, and correctly, the validity of these works is based on the kind of look that the "expert" designer has on them (Fig. 7).

• **The role of geometry in the creative process of architectural design**

Geometry is the primary tool of all architects in creating architectural works. The world is formed based on geometry. The glorious geometry of existence gives birth to multiplicity from the heart of unity. All exquisite phenomena are immersed in a harmonious order (Nadimi, 1999b). In the school of Pythagoras, mathematics and geometry were not in their quantitative sense but a means to reach quality, order, and harmony in the world. Pythagoras left two valuable legacies for both the Western world and Islamic civilization. Firstly, the world's order is not only mathematical but also a musical order; secondly, mathematics has both quantitative and qualitative aspects (Taghvaei, 2014, 50). Geometry gives us the ability to draw shapes accurately. Geometry can provide divine pleasure to everyone due to geometric shapes' pure presence and perfection (Antoniades, 2011, 329). In the Iranian Islamic world, the order is intertwined with the concept of manifestation and creation. In this view, through the manifestation of the existence of every creature, depending on its capacity and ability,
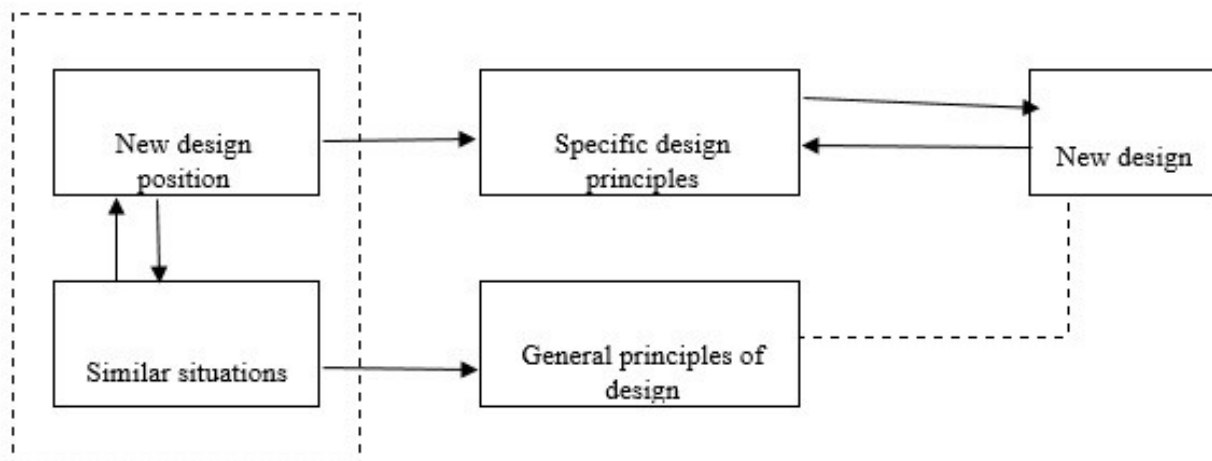
Fig. 6. Proposed model for designing the theme using previous highlights (responses). Source: Authors.
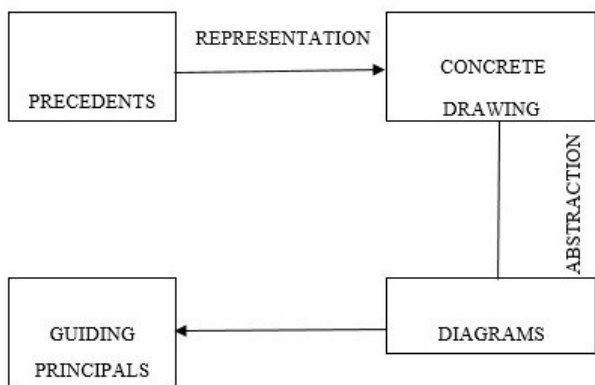

Fig. 7. By reading the previous salient works (answers) by the designer at high levels of architectural education. Source: Authors.

it always benefits from this grace. Faizani, which is layered and curtained, expresses and processes existence with the help of geometry with limits and sizes that specify possible existential requirements and capacities (ibid., 2014, 78).

Geometry has been a source of attraction for architects for several reasons: 1) Geometry provides architects with a set of precise, reasonable forms (forms that inherently carry proof of their formal existence). 2) Geometry makes architects feel at ease in using shapes that can be duplicated or repeated if necessary without any fear of practical error. 3) Geometry gives architects tremendous freedom even under the restrictive conditions of choosing a predetermined shape. 4) Geometry, while disciplining architecture and architects in the material world, has also given them the metaphorical possibility of approaching God and His universal or divine cause - through the use of explicit universal forms (square, circle, and sphere). 5) Geometry reassures the architect while enabling a range of inner motivations through the different emotions it creates through the different proportions of a form. 6) Geometry creates a unifying force of internal communication among the mystics who were aware of the secrets. Therefore it was considered a means of distinguishing professional and social identity. 7) Geometry has given architects more opportunities to think and manipulate and optimally use pre-selected shapes so that they don't waste time inventing new shapes every time and in vain (Antoniades, 2012, 332). In this way, geometry has a special place in the production and creation of the design and is one of the pillars of creating material and spiritual order in the creation of the spatial system of architecture.

Conclusion

According to the nature of this article, which is based on the review and criticism of theories and the background of the research, the conclusion is mainly focused on the results and suggestions to solve the shortcomings and problems faced by architects. The issues that exist in the educational system regarding the place of the application of the master plan in the minds of the students in the process of architectural design can be examined from several
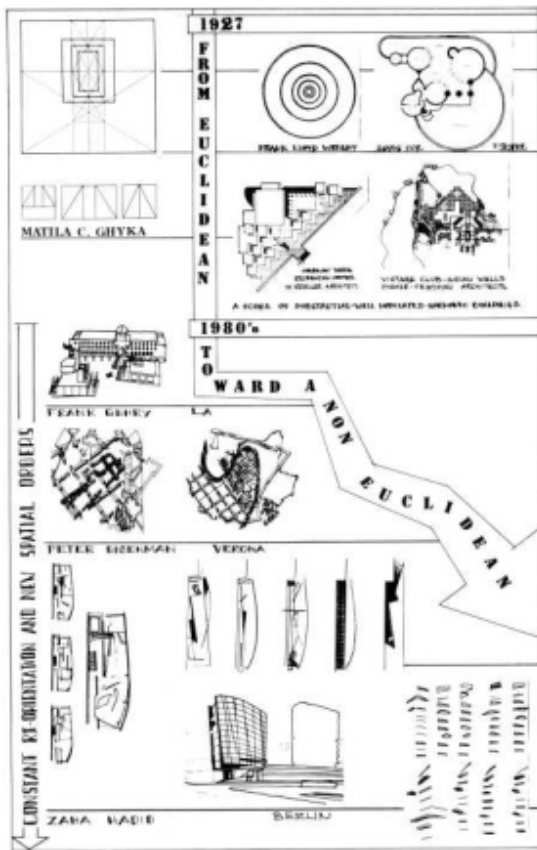
Fig. 8. Euclidean geometry exercises of the modern movement to explicit, non-Euclidean dynamics; The work of non-historical modern pioneers, Eisenman, Gohari, Hadid. Source: Antoniades, 2012.

Fig. 9. A summary of the various methods used by architects in geometry. Source: Antoniades, 2012.

points of view:: the lack of sufficient help for students to receive a suitable master plan and during its stages until reaching the product; Using "steps" or "creative" methods and not using the new form of "interactive thinking" to create the design of primary materials by professors in design workshops; Failure to see and criticize good examples of architecture where the designer has been able to handle the project's demands well. Among them, schemes are drawings that show ideal organized relationships to be used for different levels of organization of a scheme. Architects are faced with various issues in the design of each project: from complying with building regulations and bylaws to employer's demands and operational, climatic, and executive matters, etc., all of them must have received a suitable answer in the architectural plan. Meanwhile, the architect's primary duty is to understand each project's essence. Identifying this single essence and responding to it requires going through a series of stages that almost all successful architects go through consciously or unconsciously. During these stages, the student-designer must refine various design issues in the form of a general plan and achieve a comprehensive and responsive goal by expanding it.

To achieve his goal, the designer begins to guess and design his proposed answer by structuring the problem and relying on past experiences and previous concepts. This type of problem-solving is the third-generation method invented by Karl Popper. In this method, an expert designer does not drown himself in information but looks for a frame or framework to advance the design based on it. Detailed empirical research was conducted regarding the problem-solving method of architects. Comparison of this detail with non-architects confirms the principles of the third-generation theories and the subject-exam design model, proving that designers' thought process is more "answer-oriented" than "problem-oriented."

This means that designers start solving the problem by sharing their estimated answers. Design is perhaps a process in which "problem" and "solution" appear together because sometimes, even a complete understanding of the design problem is impossible without a solution to explain it. One of the fundamental sources of designers' ideas in the creative process of design is the designer's own experience or his previous mentalities, as well as using the experiences of others and course, sharing his experiences with others. Therefore, one of the basic approaches in the formation of motifs is to adapt well-known works of design and use the motifs of such works, which is done through "analogy." Of course, collecting and selecting different outstanding results to achieve a suitable basic design to answer the design issues requires experience and intelligent effort. It may be accepted that the selection of samples in such a model is based on "similarities." This similarity can be done in the dimensions of "needs," "platform," "construction," and "values" in the works of several architects who have different principles or based on the results of a prominent architect and his guiding principles. Early in the design process, architects sketch to help themselves see, reason, and understand the form they are working with and to explore critical ideas and responses. During sketching, the designer puts his mental ideas on paper every moment, criticizes his drawings, and puts question marks on them. This article points out that design thinking and the process of sketching have content of polemics and questions and answers, and they consider it a hermeneutic feature. In the early stages of design, architects often use sketches and diagrams to demonstrate functional and formal reasoning.

Design sketches are external representations that help visualize and evaluate the spatial arrangement of artifacts. Another source of concept production is geometry. Architectural space is formed based on simple or complex geometry, and in any case, it is much simpler than the natural environment, and throughout history, humans have exercised their dominion over nature through its geometry. Geometry gives us the ability to draw shapes accurately. Geometry can provide divine pleasure to anyone due to geometric shapes' pure presence and clarity.

In the research from which this article was extracted, the idea and concept were examined and analyzed in a hair-splitting manner. The position of "idea" and "concept" in architecture and how to transform thoughts and imagination into architectural space, the design process, and ultimately the association and transmission of these concepts to the audience is critical in architectural discussions. The process resulting from this research has concluded that the idea is the initial thought and the project format and is the strategy to deal with it, while the concept deals with the meaningfulness of the theory and its realization and is considered a kind of tactic. The architecture of thought is formed based on ideas and concepts, and the influencing variables on the origin of concept formation in this regard can be: basic design training (guidance and nurturing of student's creativity), sketching (strengthening the power of visual thinking), sample examination successful ones (previous prominent examples) and use appropriate geometry. The following diagram was extracted from the researcher's opinion according to the conducted studies:
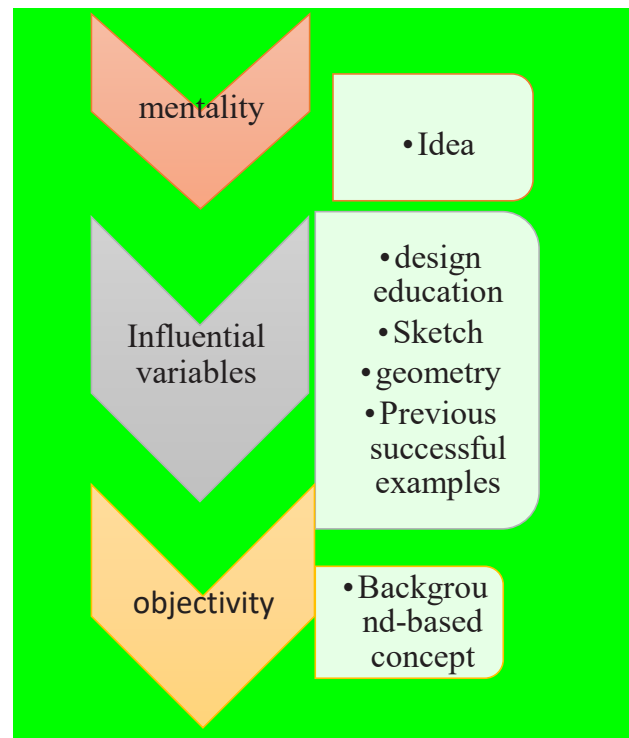

Fig. 10. Conclusion and theorizing diagram. The origin of the background-oriented concept. Source: Authors.

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