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Interactive architectural approach (interactive architecture): An effective and adaptive process for architectural design

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Abstract This research attempts to offer a new approach for architectural design process that the concepts of interaction and multi-relations are being achieved through it. This approach, which is identified as an interactive architecture, suggests a process that a dynamic and mutual relation will create among all factors and parameters of design and the effects of each factor or parameters on final design will be considered. In fact, the main axis of the suggested approach is comprehensive interaction with all various aspects of design, since the design problems have multi-aspects, mostly. Thus, the final design will be resulted based on these mutual relations and it is a production which will have a maximum and optimum adaption with all factors and parameters. What makes this attitude more significant and crucial is the chaotic situation that is produced in architecture and urban designing of most cities especially in developing countries and leads to lack of identity in these cities. So, the interactive approach can be able to eliminate the challenges and create the fields of sustainable architecture and urban development through an effective method. However, this process encounters to some constraints and challenges along with some potentials which are discussed in this essay. The research method is analytical-interpretative and based on qualitative analyses.

Introduction

Design process is an issue which has been considered in recent decades and provokes various point of views. Many researches have tried to describe a process which an architect pursues to achieve an architectural production. So that, the main question was that: what is the way and process which a designer pursue in order to achieve final design? The nature of design process's clarification would be a suitable help to improve and develop it. Additionally, it can offer an optimum and more efficient process based on analysing the basic process. On the other

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hand, by creating a systematic structure for a design process, the training and using of design process would be more effective and beneficial for the other designers, amateurs and students. Hence, it is attempted to describe a comprehensive perception of the nature of design process. On that basis, the nature of design process can be offered as a process which eliminates the dilemmas and problems in architectural design through it. Thus, it can be achieved a sustainable and successful process for an architectural design in order to reach an efficient design which will be adapted to all specific contexts and circumstances of a problem. The new horizons will be emerged to designers by demonstrating this hypothesis. The research method is analytical-interpretative and based on qualitative analyses.

Nature of design process

Designing is an attempt to create solutions before implementing them [1]. Design process attempts to use optimum solutions in various levels in order to create concepts by collecting and classifying the appropriate responses in terms of providing the goals of designing [2]. Therefore, there is no best response for a design problem and each design problem may have different solutions [3].

Generally, design requires a complex mental process of ability for gathering a wide range of information, combining them in a coherent set of ideas and finally creating an objective form of that ideas [4]. Extensively, design is a kind of activity that relies on wide varieties of knowledge and factors such as visual arts, building engineering, economic and commercial management and logic studies [5]. Professional designers, in every fields of design, use design principles to achieve the answer through the question. Designers learn the set of patterns, which are used repeatedly, as a style or method to develop methods of speculating problems in their mind [6]. Since the architectural design process is multi aspects and complex, which involves both knowledge and creativity together, and also due to the extensive and various issues and concepts which the subject of architecture and design has in common, it is so difficult and even impossible to determine and identify a clear and comprehensive method for design [7]. Most of the designers and architects believe that design activity is series of actions which are endogenous and indistinguishable [6]. From architects point of view, design process is so varied due to the fact that every designer starts designing based on their specific method or ways [8]. In fact, a designer first organized the design problem in order to understand it by using mind ability, then offers the initial scheme based on creativity. The crucial steps of design process are formed in designer's mind, unconsciously; generating the concept is the most important of them. Moreover, designers can improve their intellectual issues and a mind's ability by using some advices and ways [9].

Researches about design processes, which had started in the late of 1950s, purposed to retrieve the activities related to decision-making in designing in order to pursue a specific process from programming to final step of solution by designers through an effective and appropriate way. Therefore, design activities would be communicative, comparable, reversible and repeatable [10]. Hence, design is an analytic process while it requires analysing, evaluating and selecting [11]. Research basis design in the early years believed that the nature of design process is independent to a great extent from the features of its matter so that design in all fields has a same process [12]. In this view, design is a process which includes dividing the design problem to separated elements by the goal of using research information. After analysing the information, the separated elements are combining to create an integrated unite. [13].

In the first conference of design methods in 1962, the researchers and scholars identified the stages of design process generally in three stages named 'analysis, synthesis and evaluation' [11]. Finally, based on a triple activities of 'analysis', 'synthesis' and 'evaluation', the general diagram of design process can be shown as an interaction between problem and solution in an status that mirror each other (see Fig. 1) [4]. Table 1 explores views of different scholars about the nature of design process.

De Bono [14] believes that design relies on the method of thinking which he calls 'design thinking'. So, the differences of design pattern are basically considered as a follower of design problem's status [13]. Most design's definition has common features. First, the nature of design refers to a process, second, this process is goal-oriented, the goals such as designing, problem solving, removing needs, enhancing creating a new useful product [15]. In this research, process means that a series of coherent and explicit actions which binds goal and solution together. In the other words, a logical and purposeful sequences of some actions are called process [16]. Design method also needs both 'sequences of decisions' and 'design process' or 'the way of design formation'. Besides, sequences of decisions include 'analysis, synthesis, evaluation and decision' must be done in the stages of design process with a high level of details [4]. Additionally, most of the researches done in the field of design processes emphasize on 'cognitive solution' [17]. Hence, design problems are identified mostly through the attempts to solve them, so that it seems problem and solution are formed together in design process. Interaction between design problem and its solution shows that analysing the problem and identifying the various aspects of it, support the mind's ability and designer's thought in order to achieve the solution [4].

Client, user, legislator and designer

The fields of design are encountered to the others from the largest aspects to the smallest issues [18]. Therefore, it is serious important issue to identify the participants, introduce the users, professionals, legislators and those other people
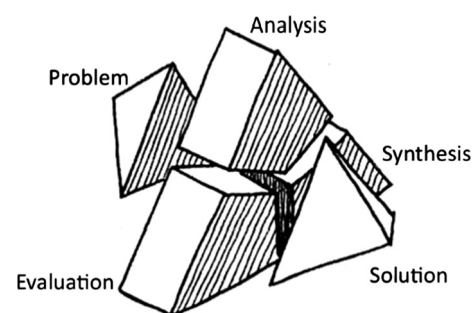

Fig. 1 The model of design process as an interaction among problem and solution [4].

Table 1 Views of different scholars about the nature of design process.

Scholar	View
Roozenburg and Eekels	Mostly, the primary model and drawing of design process are based on the logical sequences of these activities: '*analysis*', '*synthesis*' and '*evaluation*' [34]. In this model, the triple sequences make a cycle [35]
Wallas	He described four levels in formation of design process solution (model of the creative process) consisting of: '*preparation, incubation, illumination, and verification*' [36]
Guilford	He illustrated a model consisting of six stage as general intellectual processes: '*Cognition, memory recording, memory retention, divergent production, convergent production, evaluation*' [37]
Koberg and Bagnall	They suggested a model with six levels for creative problem-solving which is included these levels: '*Accept the situation, Analyse, define, Ideate, Select, Implement, Evaluate*' [38]
Lawson	He believed that the creative design process has five levels which consists of: '*first insight, preparation, incubation, illumination, verification*' [39]
Laseau	A process to reach a solution in design includes this stages: '*problem definition, developing alternatives, evaluation alternatives, selection, and communication*'. Additionally, for a creative design, designers do these actions: '*representation, abstraction, manipulation, discovery, verification, stimulation*' [10]
Alexander and Chermayeff	Design process consists of two stage: '*analysis*' and '*synthesis*' [10]. Every objects' life starts when a new problem requires new form for that object, and ends when a newer form is doing the expected function of that object in a better way. The lifetime of every object has six level: '*research, design, manufacturing, distribution and became a common object to use, object disability*' [23]
Lang	The rational activities of design process are included: '*analysis, synthesis, prediction, evaluation and decision*' [6] The main stages of environment design process are: '*cognition, designing, selection, implementation and evaluation after implementation*'. The main stages of environment design process can be considered as a general model of decision-making [6]
Archer	He introduced a model for design process which was predicted the permission of returning from one stage to another stage during the process [10]. In this model, another stage was added to two stages of '*analysis*' and '*synthesis*' (Alexander model) which is named '*connection*' [22]
Jones	He presented a model that the relation among the level of analysis, synthesis and evaluation is created in a circular diagram based on the transition of the crude and abstract idea of them to a decision-making status and finally to a strong and final status of ideas [40]. Jones identified six approaches of design processes which were included '*Black box, Glass box, Problem structure, Observation and Gradual evolution*'. [22]
Markus	There are two distinctive designing structure: one is sequential and the other one is iterative process [10]
Rezevesti	Design is a process which has four features: '*investigative, creative, rational and decision-making*'
Rowe	Based on observing the designers during their work, it can be described a process for designing which consists : *a combining of the conceptual schemas, images and discovering the new designing ideas, analysing the design issues, constraints of a place, separability of projects and developing the concepts* [41]
Do	He categorized the designers activity in three main groups of '*organizations*', '*conceptions*' and finally '*built*'. He believed that every activity needs a variety of external informations and it is implemented through using different methods of drawing [42]
Ching	Design is a vital, accessible, pleasant and constructive process which is naturally creative [43]
Broadbent	Designing in architectural field is a kind of activity about creating designs and suggestions which are changing the existing things to a better of greater things, usually most of the time [44]
Hamel	The design thinking moves through a cycle and there is a great deal of overlap of the following levels of activity: '*task, analysis, synthesis and moulding*'. Within each level of activity, '*orientation, execution and evaluation*' occurred recurrently [45]

involved in design [3]. Usually, in designing a problem comes from a client not a designer mind; a person who has a need but unable to solve the problem or even entirely understand of it without any help. Thus, client is a brilliant sample of problems source and also design constraints [4].

The user not only considered as a main factor, but has an influence on the other factors [3]. The clients may be the users of the design, maybe not [4]. Although the main and apparent parts of a designer work is creating place and space, the other important part of architecture (which is infrastructure) is balanced interaction based on the logic and emotion of client [3]. It is essential to understand the relation between the designer and client in order to perceive the fitness among requirement of user and building designer [6]. The relation between client and user is mutual, so it depends on the nature of design problem and client–designer relation that designer is permitted to satisfy his artistic interests to what extent. Therefore, there is a stress factor in the midst of client–designer relation. Each of them depends on the other one, meanwhile, both worried about the different solutions that might be the other one involves in his work, too much [4]. Thus, it is unpermitted that the architecture reflects the personal and selfish legendary ideas of architect or exhibits the merely vulgar images [3]. As Le Corbusier told that the architects must be involved the requirements and demands of client in design while he combines the spaces and forms with his artistic and functional ideas and it must be done in an appropriate mutual relation with client [19]. In most environments, the needs of users and demands interests groups must be met simultaneously. However, it must be considered that receiving the needs of users does not mean programming for users, it means programming with them [20].

The foundation of a collaborative design approach is based on the change of the amount of different involved groups which participate in process. The architect, user, client, legislator and the other groups participate in different stages of process based on their role and the ability of decision-making [21]. However, nowadays most of the projects are ordered by clients who are not users of those buildings. This issue causes a 'gap' among designers, clients and users. The design problem is more obscure when the client is not the final user of the design [4]. Although design cannot be done among a social gap, there is a social gap and administrative gap in some designs [6]. Indeed, presence of the other performer such as clients, users and legislators makes the design so challenging. Hence, the designing must be considered as an activity containing a wide range of social skills, which enables the designer to discuss for a mutual agreement or to be a director and this means the presence of tension or even conflict [22].

Moreover, the environment design issue has appeared when a difference emerges among the current combination of environment and the combination which satisfies the needs of people [6]. In fact, form means the appearance of systematic demands and needs. It is the final production of the process which has been aroused by the effects of various factors and demands. The designer has responsibility to create order (discipline) [23] and creates environments which enhance human perception [6]. The purpose of designing is to combine different elements in order to illustrate the values [22].

It is expected from designers to participate in extending the design problem [4]. Therefore, the designer and user require collaboration in design. It is a way for a designer to understand the user and client and also to make a relationship with them

and knows their needs; for a user, it is a way to acquire the experience from the others (people and designer) and promote his knowledge [3]. During recent decades, the collaboration becomes a significant topic in landscape programming and demands for people's collaboration have been increased along with the discussion about sustainable development and multifunctional landscapes [24]. The collaboration design is a view which does not put people on one side and the architect on the other side, but also locates the designer among people and in ideal status it means that *'design has done with people'* [25]. In the other word, the collaboration design is considered as an activity based on the redistribution of power in designing actions among designers, beneficiary groups and peoples, which prepares an appropriate condition for people collaboration in a meaningful, practical and purposeful method in order to reach environmental sustainability [26].

Legislator is another factor which is effective in design process. Although the legislator is not involved in designing, directly, he imposes the ranges that must be considered by designers. There is an apparent conflict among designers and those, who responsible for implementing the rules that define the range of designer works [4]. It is important to know that sustainable interaction among local community and land, is impossible only through the government intervention (outside people). In the other words, interaction among them depends on the consistency of local community collaboration [26].

Design constraints

The first step in preparing a design is illustrating the effective forces in creating the form and determining the model or pattern which is produced by effects of the pressures comes from those forces and the form must be reflected them [23]. Therefore, the design is a process that a form is produced along with its technology and social environment's demands [25] and every good form is balanced with this system as it seems that the form is located in a point which effects of mutual forces are neutralized each other, completely [23]. Architectural domains are divided into two parts, that each four groups of design generators (designer, client, user and legislator) are influenced on them by different extent and in their specific way [4]. These domains include the following:

- **Internal constraints**: These constraints are created by relations among parts of an element or a system that supposed to design and they give more freedom to designer and also they are the basis of the design. They include the numbers, size, different types and qualities and almost they are considered as the main part of design planning.
- **External constraints**: This part is given more constraint to design and is not optional for a designer and also sometimes it determines entire design. External constraints are the essence of the special or maybe a unique circumstance that makes the design distinctive. Parameters such as external constraints are created by some factors including context, position or special background which are implemented by the design.

These constraints can come from designer, client, user or legislator, although each group has a different level of flexibility. In general, Flexibility is used about the capability of

modifying in objects and things. In architecture and environment design flexibility means the spatial flexibility and organization of built environment space and changes in them in order to achieve new conditions, requirements and applications [27]. Fig. 2 indicates the model of flexibility among all four effective groups of design.

Interactive architectural approach

Architectural design process is complex series of different variables in various levels and scales which has an interaction and effects on each other in order to provide the goals of an architecture project [2]. The design activity can be considered as a new way to combine the known elements together or to introduce new concepts [28].

Additionally, the design activity is done mostly in groups [18]. When two or more person involve in a design process, they have to speak to each other about it. The nature of design thinking is discussion-base [29]. The design issues are multi-aspects and extremely interactive, mostly. It is happened rarely that each part of the design only fulfils one purpose [4].

Hence, interaction means a mutual relation among two or more person or groups or system. American dictionary explain the meaning of interaction as '*the activity of talking to other people or working together with them*' and also '*a process by which two or more things have an effect on each other*' [30]. So, the '*Interactive architectural approach*', which is called '*interactive architecture*' here, is an approach that the mutual relations between the factors, groups and systems affecting architectural design process are analysed based on it and the final architectural design will be a result of a relative balance of mutual interaction of all these factors, groups and systems. Since design problems are multi-aspects, the purpose of interactive design is to achieve a level that creates a kind of balanced mutual relation among different aspects. It is important to say that the balance does not necessarily mean the equality of each force, but it means to achieve a level which the resultant of different forces and factors will be equated and neutralized by each other. So, the effectiveness of each various factors will be different.
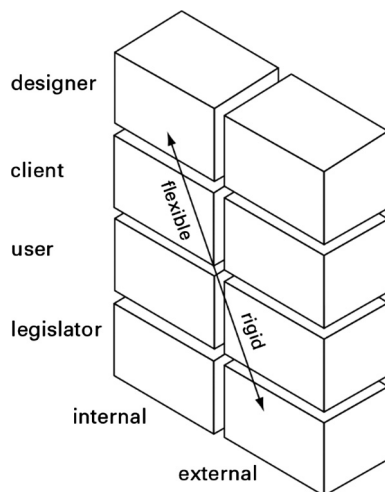
Moreover, interactive architecture will analyse all aspects of an architectural design and make a mutual relation between different aspects of it. Eventually, the final production will be achieved in the level that the balance is established among all factors and aspects. Based on this, interactive architectural approach can be considered a kind of contextual architecture. Contextualisam is a standpoint that focuses on the specific features of a place in order to use them in design. In Contextualisam, the human aspects as well as the physical aspects are considered. Contextualisam means adaption to physical, historical and social-cultural backgrounds [31]. Interactive architecture also makes a multi and mutual connection with the different context of design and achieves a coexistence and integration with them. Additionally, the design provides the field of the creation and development of next designs, itself.

Furthermore, based on the nature and concepts of interactive architecture (which has been described), this architectural approach surveys all three factors of sense of place (meaning, activity, physical environment [32]) and produces places that contain all three factors. Indeed, the process of interactive architecture has analysed all these three factors and then reproduces them based on the mutual relations.

The multi mutual relations, which are created in interactive architecture, result in the dynamic collaboration of all groups and factors with design process, so that it can be considered as a kind of collaborative design. One of the bases of interactive architecture is to be collaborative and also to be able to collaborate and based on this, the users, clients and citizens participate in design process. Hence, their (mental) images about places have been extracted and then have been used to create new places and spaces. Another important result is producing of identical places with high level of sense of belonging.

In addition, interactive architecture can be discussed in fields of sustainable architecture and sustainable development. In fact, interactive architectural approach can be used as an effective and practical method in order to achieve sustainability in architecture and development. The main purpose of sustainable development was to provide the basic requirements, enhance and improve the level of living for all and also better preservation and management of ecosystems and make a secure and blissful future [33]. Interactive architectural approach is pursuing these topics and wants to achieve the high level of satisfaction in different aspects of an architectural design.

Conceptual model of design process in interactive architecture

Fig. 3 illustrates the conceptual model of design process in interactive design, based on the inspiration from the ideas and models describing the design process in architecture and then develops and adapts them to the concepts of interactive architecture.

An important point about the model is that all the stages of process are done based on multi mutual relations and the solution is not resulted only by one factor. Although the designer has a key role and manages the process and also is responsible to achieve the final solution, his effect is not unilateral and based on his desires. Points below add more details and useful tips in order to understand the model as well:

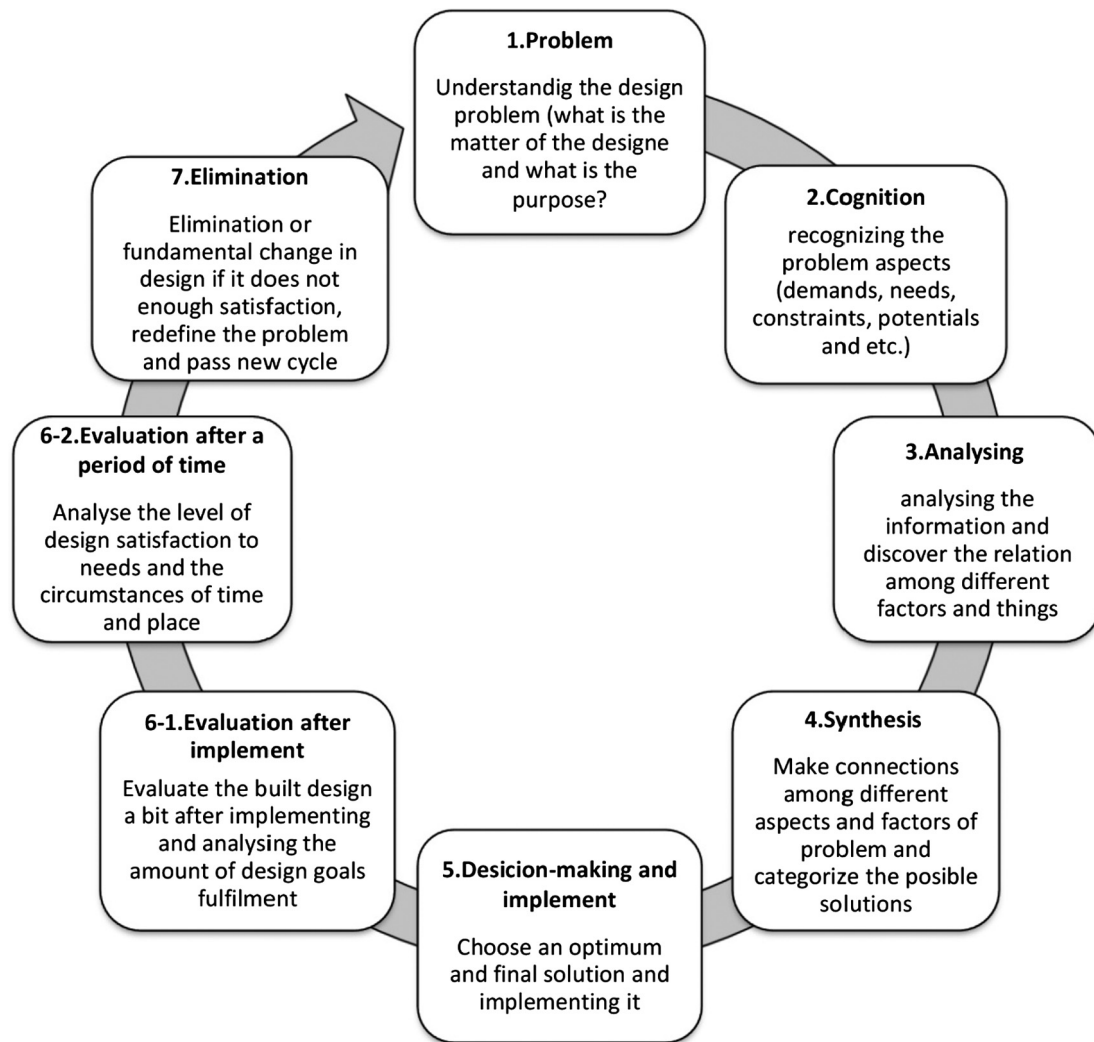(1) This model is designed based on multi mutual relations and the design process is done on that method.

Fig. 2 The model of flexibility among all four effective groups of design [4].

Fig. 3 Conceptual model of design process in interactive design (designed by authors).

(2) In cognition stage, the different aspects of problem background must be studied and on that basis, comprehensive information and perception of its nature is achieved. In this stage, it must be discovered the mutual relation among problem and its backgrounds. These relations have a strategic and essential role in interactive architecture. Although depended on situations and circumstances some of the contexts may be attended more, all contexts must be studied as well as enough. In interactive architecture, the relation with all contexts has been considered as well.

(3) In cognition stage, different scientific tools and methods can be used requirement. Semiology approach can be used as one of the methods that are capable to recognize and decode the architectural and urban environment and also the social-cultural context of problem [32].

(4) The methods and researches in human sciences can be used in order to recognize the human values of problem and its background.

(5) There will be more potential to do next stages of design and creating interaction among different factors, when designer recognizes the design contexts and design problem and also discovers the relations as well. However, the amount of designer success depends on various factors.

(6) In next stage, the analysing will be done based on studying and gathering information in cognition stage. Analysing means that organizing and arranging the problem [4]. In analysing stage, the attempting is to make logical connections among different factors of problem. In fact, a logical and systematically organization will be created between various groups and factors of problem, in this stage. Then, the design process will be advanced based on this logical organization. The conceptual model of this logical organization will be explained more in the next part.

(7) In synthesis stage, the solution will be achieved and extracted. The feature of synthesis is attempting to move forward and creating solution for the problem-producing the solutions [4]. The final solution must be provided the satisfaction of all different groups and problem factors, relatively. Here, Satisfaction means adaption and sustainable relation with all design contexts and also desirability from human factors' (users, clients and citizens) point of view.

(8) Implementing the design must be done based on technical points and considered the environment and climate. The strategies of sustainable architecture can be used in implementation stage.
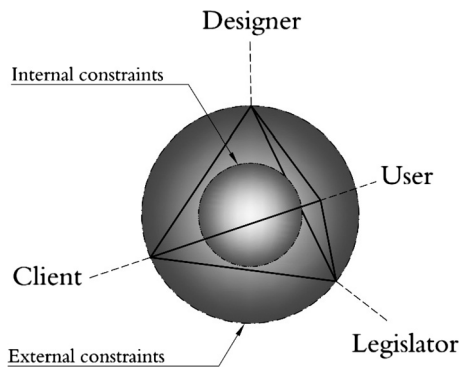
Fig. 4 The conceptual model of different aspects of design in interactive architecture (designed by authors).

(9) The evaluation stage will be measured the proposed solutions for the purposes which was identified in analysing stage, critically [4]. Evaluation consists of two main parts. One, a bit after implementing the design and start using by users, the other one is after a long period of time. These evaluations are done to find the level of design's responsibility to the demands of users and also the amount of adaption to contexts, although the contexts may be changed a lot by passing the time. All in all, the design must be evaluated with its time circumstances and then try adaption until the design has no ability for adaption and needs fundamental changes or elimination. This will start a new cycle for a new problem.

(10) It is important to mention that a period of time for evaluation is various, depends on the nature of design and the circumstances of time and place. Therefore, the design's efficiency can be evaluated in various interval until it needs the fundamental changes. Additionally, the evaluation can be done based on the signs of changes which occurred in using the design or environment or the satisfaction of users and citizens.

(11) The elimination stage is the time that the design was indicated inefficiently after evaluating and could not provide the satisfaction of the factors and groups related to the design. Therefore, the design needs fundamental changes and it must be revised. This will be the beginning of a new design process.

(12) Design process is like a cycle but the stages do not come after each other, necessarily. It can be returned to previous stage in every stage and review the stage. When the stages of a cycle are done, another cycle will be starting and this process will occur continually during the time.

Conceptual model of multi-relations in interactive architecture

The relation between designer, client, user, legislator and also internal and external constraints, in interactive architectural approach, can be illustrator as a conceptual model like Fig. 4.

The points below can be mentioned based on the suggested model:

(1) The purpose of interactive architectural approach is achieving a level that balanced and mutual relations are established among all various factors.
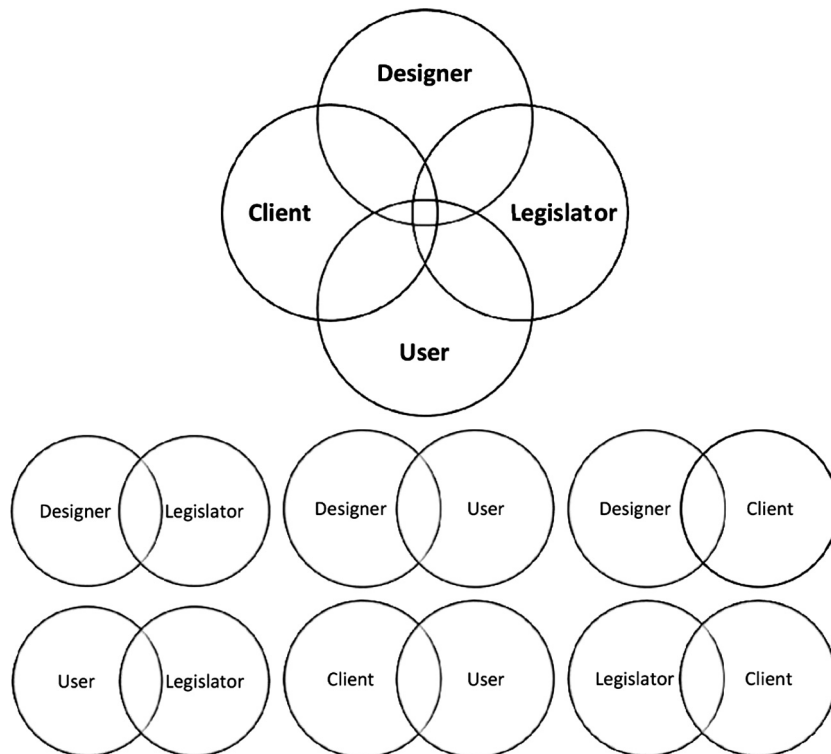

Fig. 5 The relations of different factors in interactive architecture (top: compact model/down: expanded model) (designed by authors).

(2) This model produces from information which is resulted in cognition stage.

(3) Different tools and methods can be used in order to recognize these groups and discover the relations among them. For instance, the methods like interview, questionnaire, discussion or observation can be used for recognizing the client and user.

(4) There is a multi-relation among designer, user and legislator which is affected by internal and external constraints. In fact, this multi-relation is formed in a field of internal and external constraints. Therefore, the final production will be created in this field, too.

(5) The balance is relative in this relation and it will be changed based on the circumstances of place and time. The relative balance is amount of adaption which results among different factors of a design. This adoption produces from a commonalities and differences interaction of each factor in a relation with the others.

(6) Internal and external constraints act as the controller factor and also deterrent factor. Internal constraints result from the mutual relations among designer, client, user and legislator. External constraints affect these mutual relations from outside. Apparently, the internal constraints will be less when the adaption and flexibility produce more among these four groups, thus they understand each other better.

The above conceptual model can be expanded for a better understanding and also the relation among different factors will be analysed. Therefore, Fig. 5 shows these mutual relations. All these four groups are important as well in interactive architecture and none of them can be ignores or removes, although the designer has a key role. In these multi-relations, designer acts as an analyser and must be able to make an appropriate conclusion to achieve a comprehensive solution. The solution should contain the views of all four groups. In fact, it is the designer who must find and make a final solution for a design problem. It is the designer who must be able to make a connection among different factors of design and perform analysis. However, the ability of designer is limited in some fields or relations and cannot involve on them.

Based on above models and points, a matrix can be illustrated like Fig. 6 and analysing the interests of each group in different fields. This matrix is unique and differentiated based on design problem, the features and circumstances of design contexts and also the effective groups and factors. The important point is that the various designers have various views and on that basis it is possible that one or more axis may be considered more by each designer. Here, designers must be considered all axis of design as well, according to the concepts of interactive architecture, and use all of them in final solutions, effectively. This means that, in interactive architecture, the designer cannot act completely unilateral to solve design problems and ignore the other factors or groups or even impose his views or ideas. In fact, interactive architecture is multi mutual relation, as it mentioned before.

Moreover, designer must analyse the image of users, clients and citizens about the design problem and after that improves the sense of belonging in creating the new places by reproduce the results of that analyse in design process.
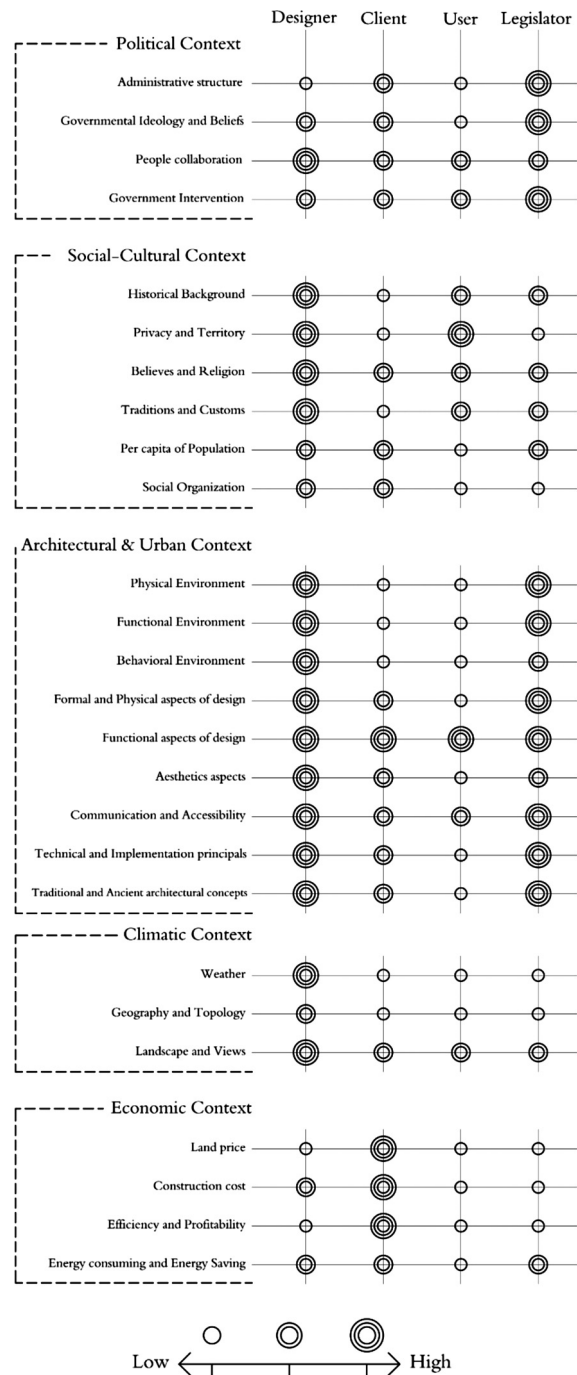

Fig. 6   A sample of analysis matrix of interest and importance of design factors in different fields (designed by authors).

The challenges encounter to interactive architecture

Interactive architecture encounters some challenges which are flexible or non-flexible. These challenges are as follows:

(1) Basically, it takes time and even huge expenses for a comprehensive understanding of design contexts and also recognizing the design problem. So that, designers or client and users pass this quickly and limitedly.

(2) Some aspects of the problem and design context are huge extension or even cannot be recognized. For example, the political context is one of those cases that have some considerations and difficulties for recognizing. This context would be encountered to large constraints depending on the local government and social organization.

(3) One of the serious challenges is legislator factor and the rules which affect the problem. Usually, the rules are imposed to design from upstream forces and have low flexibility. Designers, clients and users have to respect these rules. This aspect of interactive architecture can be effective when a dynamic and mutual relation establishes among legislator and the other factors, and the rules get moderated, refined and developed through this interaction, consequently. The point is this relation must be done by legislator as an upstream factor, when he is reluctant; it seems difficult or even impossible to make a connection by designer, client and user face. The obvious thing is these rules must be refine and develop and adapted to the circumstances of time and place. Therefore, the dynamic collaboration and relation among all four groups is vital to reach more efficiency and success.

(4) As it mentioned above, designer has a key role in the process of interactive architecture. Designer must have enough ability to identify and discover the relations and also make connection between different factors and develop it in order to achieve an efficient design. Designer's inability to make connections results failure. Additionally, designer should avoid unilateral view to different aspects of problem and balances and adapts his view to the circumstances and factors of design, based on flexibility. Designer must analyse all aspects and does not ignore or neglect any aspect.

(5) It is important to say that the success of interactive architecture depends on the continuous training of all groups who collaborate in design problem. Designers, clients and users must be trained through different tools in order to perceive the circumstances of time and place and also to find out the optimum solutions. Training has an important and essential role in improving and developing the architectural and environmental design.

Conclusion

The aim of this research was to find a way to improve the architectural design process and increase its quality. Achieving this aim can remove and solve the most of the difficulties and ambiguities in architectural design process, particularly. Thus, a fundamental, comprehensive and practical model of architectural design process (conceptual model of interactive architecture) has been offered. The basics which are formed in this model include the following:

- A comprehensive and exclusive view to different aspects of design process.
- Considering the design contexts.
- Discovering and understanding relations between different factors and analysing them.
- Creating multi mutual relations (interaction) among all factors.

- The ability of flexibility and adaption.
- Creating a relative balance among all views and factors (which involve in design) and also the circumstances of design.
- Modification the design constraints.
- Attending to future development.

All in all, the main axis of the suggested approach is comprehensive interaction with all various aspects of design, since the design problems have multi-aspects, mostly. It is believed that most of challenges and difficulties in design can be eliminated or even decreased by using interaction approach in design process. In this approach, the ability of flexibility and adaption is so important and vital. The designer has a strategic and key role to achieve optimum solution, although he cannot impose his idea or act unilateral. Finally, it can be expected that the final design will reach an appropriate interaction, which is accepted by all involving factors in designing, and also achieve the highest level of adaptation with its contexts. Therefore, interactive architectural approach would be considered as an efficient and practical model to achieve the sustainability in architecture and urban development. Furthermore, interactive architectural approach can be identified as a kind of contextual architecture due to the adaption with all contexts of design. Additionally, interactive architectural approach has a great potential to create the places with sense of belonging.

Conflict of interest

None.

Acknowledgement

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