JOURNAL OF DESIGN FOR RESILIENCE IN ARCHITECTURE & PLANNING

Research Article
Online: www.drarch.org
Volume 5, Issue 2, (123-137), 2024
DOI: 10.47818/DRArch.2024.v5i2123

Methodological framework of the emotional dimension in the built space for an architectural quality

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Abstract

Architecture quality is complex due to a number of factors. Some of these factors implicitly engage in deep reflection on architectural space, then they end up having a significant impact on the user's architectural experience. For the purposes of this paper, *experience* is considered as any contact between the user and the built environment through the architectural space, where the impact will be the result of both objective and subjective factors. Among these subjective aspects, we focus on the *emotional dimension* of the user's experience. This theoretical article will address this issue using an inductive approach. The main purpose is to examine the role of each of the following elements: firstly, the architect's perception of architectural space, in particular in relation to the traditional duel between form/space or geometry/architecture; secondly, the impact of emotion which is thought to be most closely related to human nature in promoting architectural quality; and finally, we will attempt to define the methodology that will enable the architect to address this emotional dimension in such a technical practice. The desired and appropriate methodological frame is intended to provide a scientific solution to the potential conflict between subjective and objective factors from the disciplines and participants involved. To do so, it should represent the first level (level-0 methodological framework) where the user-centered approach takes precedence and coordinates between architects, environmental psychologists and neuroscientists to prepare the quantitative and qualitative data needed to support the next level (level-1: architectural design), which is primarily the responsibility of the architect.

Keywords: architectural quality, architectural space, emotional dimension, methodological framework, user-centered approach.

1. Introduction

Despite the differences between the architect's and the user's visions, they tend to be reconciled on a common ground known as *architectural quality*. However, in order to achieve this latter effectively, it is necessary to take a higher interest in architecture because of its utilitarian character which the other arts do not have (Mazouz, cited in Bouchareb, 2020), as well as the interest that the architect must show for the user (Noschis, 1988) as a whole and across all levels (Lehman, 2017). Similarly, Eberhard (2009) is convinced that spaces designed based on extensive research can produce positive scientific outcomes such as the reduction of stress and inherent chronic illnesses. So, the depth of architectural thinking on space and the user simultaneously is another argument for highlighting the consistency of researches to be carried out in this field.

Otherwise, the user is less concerned about these fundamental issues. He is seeking a space that fulfills his needs in various dimensions (Preiser & Vischer, 2005). In this way, architectural quality occupies a natural place in design to meet the needs of users through solutions that are functional,

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Article history: Received 07 July 2024, Accepted 02 August 2024, Published 30 August 2024

technical, environmental, social and economic, while being culturally relevant (Government of Quebec: Aide-mémoire sur la qualité architecturale, 2022). Thus, it is important that architectural quality faithfully respects the different levels that make up the human experience, namely: "the physiological, intellectual, emotional, behavioral and spiritual" (Lehaman, 2017, p.26), while the contemporary architecture lacks the sensory dimension (Zineddine & Belakehal, 2021).

Analyzing the current situation makes it is easy to understand a number of factors that impact on architectural quality. These include the need to build more quickly and at a lower cost, construction methods, standardization of programs and building materials, and cost rules that guide the built environment without considering climatic conditions or cultural variables (Laroui, 2017, p.1). According to Boudon (2003), fieldwork also shows that the realized projects focus less on research into materials and massing than on research into concepts. As a result, architectural quality may seem incomplete for the user when the emotional dimension, in particular, is diminished due to various factors such as a reductive vision, limited understanding of the user's needs or even a poor ordering of priority dimensions.

2. Quality and architectural quality

Quality in general is seen positively; However, it can also have negative connotations (Rönn, 2011) and adverse effects on mental well-being (Abbas et al., 2024). This suggests that the concept of quality is open to debate and should be the subject of a well-founded discussion (Rönn, 2011) to manage its effects. Therefore, quality can be defined differently depending on the chosen criteria, although two main approaches can be distinguished. According to Reeves and Bednar (1994, cited in Mjit, 2021, p.594), the first one considers quality objectively, focusing on:

1. The excellence of the service offered.
2. Product compliance with norms and standards.
3. The product production process.

Mjit (2021) also presents the second approach, which involves the user's evaluation. The complexity of dealing with the user's subjective dimension must be considered.

Overall, these two definitions represent architecture that is simultaneously with space and the user's satisfaction on various scales and dimensions, such as technical, architectural, and other factors. This makes the architect's job twice as difficult.

2.1. Evolution of the concept of architectural quality

There are various phases that characterize the development of architectural quality. However, its evolution is mainly marked by replacing the model based on the skills of the person responsible for design with an industrial model based on the production process (Dehan, 2005)[1]. After the latter's failure, a competition policy was introduced where the best project would be selected from other competing projects (Dehan, 2005). Margerand and Gillet-Goinard (2006) believe that the concern is due to the fact that compliance is assessed based on specifications, whereas satisfaction is linked to users. In addition, this observation will be beneficial in architecture in order to preserve the human essence of space which is tending to fade because of the increasing development of intelligent technologies that are gradually moving away from the emotional dimension of architecture. For their part, Zineddine and Belakehal (2021) encourage architects, both researchers and practitioners, to inspect contemporary architectural quality in terms of the senses, alongside the other dimensions.

Recently, articles on architectural quality have been distinguished by two main aspects. The first highlights the opening of this concept to other, non-quantitative aspects, by emphasizing the psychological and sensory dimensions. This is due to the desire to integrate this dimension in order to meet all user's needs. The second and most predominant aspect is more global and specifically

[1] This section particularly discusses how French architecture has evolved. We think that these stages are generally transferable.

concerns the energy dimension, which aims to improve energy quality in order to meet the current global climate challenges.

2.2. Definition of the concept of quality

Le Robert (cited in Dehan, 2016, p.90) cites the twelfth (XIIth) century as the date of appearance of this word, as it also mentions its origin derived from the Latin "qualis (quel)". Among the six (06) meanings mentioned (Dehan, 2016, p.90), we shall cite the meaning that we consider the most relevant to our purpose, as: 1. attribute, character, property; 2. that which makes a thing, a person, good, better (Dehan, 2016, p.90). Once the word *quality* has been attributed to another, it will give an assessment of it, such as the quality of a product or service is its ability to satisfy the customer's needs (Margerand & Gillet-Goinard, 2006, p.XI).

Architectural quality can also refer to total or partial conformity to the code of a style or subculture with a distinctive taste characteristic. Hence, it's frequently used to assess building's aesthetic value (Larochelle, n.d, cited in Hanafi & Alkama, 2019). This aesthetic dimension emphasized in this definition would only be complete with the integration of certain parameters that enable a true assessment of architectural quality, such as ecological qualities, social and functional aspects, perceptual and experiential aspects (Larochelle, 2010, cited in Laroui, 2017, p.10; Hanafi & Alkama, 2019), which makes it possible to arrive at overall architectural quality.

Technically speaking, the International Organization for Standardization has defined quality and, at the same time, cited the conditions for achieving it concretely according to the ISO 9000 (2015)[2]. The standard defines the ability of a set of intrinsic characteristics to satisfy requirements [and that it is tangible] when the nature of the service offered corresponds to the requirements.

Finally, despite all this diversity of definitions of quality and their different aspects, three pillars form a basis for a global and shared definition. Since Vitruvius and even today, the three essential principles of *solidity*, *habitability* and *beauty* (CAUE28, 2014) support the various attempts to define it in different fields. In architecture, these three concepts are frequently mentioned in the designer's mind, either explicitly or implicitly, fully or partially, and even before they become apparent in the project. Besides, implementing architectural quality factors will make the meaning conducted by these definitions more operational. Dehan (1999, cited in Hanafi, 2021) (Figure 1) has categorized these factors into three (03) groups corresponding respectively to *use*, *durability* and *form*. The intended quality should then emerge from their harmonious use with the different dimensions of the user's needs mentioned above.

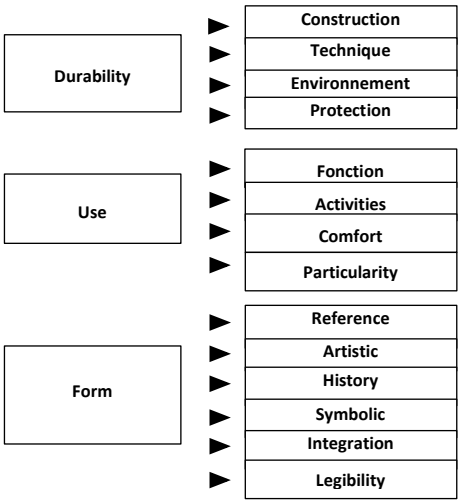

Figure 1 Summary diagram of the architectural quality of an architectural work (Dehan, 1999 in Hanafi, 2021, p.5)

[2]ISO 9000 2015 FR version.

The indicators relating to the three dimensions of architectural quality presented in (Figure 1) include, among them, an artistic indicator that derives from form. This is explained by Özsavaş Uluçay (2017, cited in Müezzinoğlu et al., 2023) who states that architecture and art are a subset of each other and hence have a universal relationship. This artistic component naturally calls for quality to be considered in relation to the effects that art might naturally induce in the user including emotions.

2.3. Characteristics of architectural quality

Listing the characteristics of the quality is another crucial element for comprehending that concept. According to the awareness poster (CAUE28, 2014), these correspond to the following elements:

1. A vision liberated and independent of a dogma or changing fashion in the image of new advanced technologies.
2. The adoption of timeless values that form a hard and permanent core of architecture.
3. The ability to respond to today's demands and challenges.
4. Perfectly in harmony with Mies Van der Rohe's “Less is more” philosophy, these characteristics tend towards minimalism, broadening its scope so that it can respond to a wider range of criteria.

So, as it can be understood, quality in architecture should be viewed in a positive light because, as per Rönn (2011), it represents a high-level goal. From a European perspective, (Rönn, 2011) outlines three tiers for achieving quality. The first tier is seen as a project-related attribute, the second focuses on the talent and skills of the architect, and the third involves assessing how well the project integrates into its surroundings (Rönn, 2011). This suggests that quality is multifaceted and should be considered from different perspectives, with emotions highlighted as a key and critical factor in this article.

3. Emotions as determinants factor in architectural quality

It is common to accuse emotions of being the opposite of reason (Schenk, 2009). However, they play very important roles, such as maintaining social cohesion, determining priorities in relationships, informing individuals about the state of their environment and informing others about their motivational and emotional state (Niedenthal et al., 2009). It is therefore essential to review their real importance for the user experience in architecture.

3.1. Definition of emotions

Debates on emotions require a consensual framework in order to come up with a well-defined definition. Kleinginna and Kleinginna (1981, cited in Proulx, 2001) were able to distinguish the following three components: affective, cognitive and polymorphism to characterize emotions. Similarly, Sander (2008-2009) specifies the following parameters that are part of this definition:

1. The subjective dimension.
2. The categories of trigger stimuli.
3. Physiological mechanisms.
4. The expression of emotional behavior.
5. Adaptive effects.
6. Disruptive effects.

In terms of a consensual and synthesized definition for this multitude of parameters, Scherer (2001, cited in Coppain & Sander, 2010, P.17) proposes to define emotions as a set of episodic variations in several components of the organism in response to events evaluated as important by the organism. The proposal by Kleinginna and Kleinginna (1981, P.355, cited in Proulx, 2001, pp. 54-55) is more generalized, stating that emotion is a complex set of interactions of subjective and objective factors, mediated by neural/hormonal systems.

These attempts to define a general formula for emotions are beneficial for architects so they give them an indication of the elements to use in their design to integrate the emotional dimension in order to enhance the architectural experience.

3.2. The emotional dimension of architecture

Although emotions are accused of lacking objectivity, according to Serero and Terracol (2019) they remain a key component in the user experience. And because good architecture is only exceptional and therefore naturally emotional (Ardenne & Polla, 2011, p.15, cited in Bambridge, 2018, p.9), Cyrille[3] (cited in Monnet & Vos, 2011) argues that architecture has always had a complex and long-standing relationship with emotions.

In fact, the study of the link between architecture and emotions was first approached through environmental psychology in the 1950s, when the collaboration between the doctor Jonas Salk and the architect Louis Khan led to the conclusion that our built environment has an impact on the way we think, feel and behave (Pin, 2016, cited in Meriaux et al., 2021). In this context of direct influence, certain bad conditions relating to noise, insalubrity, narrowness of spaces and light conditions are likely to destabilize people and give rise to bad emotions such as anxiety (Stassi, 2012), whereas the main aim is to procure positive emotions (Stassi, 2012) such as the enchantment that modern architecture, which has transformed the human being into measurable data, lacks (Gilsoul, 2009).

It is important to note that the emotional dimension in architecture is not an abstract value that can be calculated. It is a parameter to be thought of in parallel with space, and more particularly with the internal space that constitutes the genesis of architecture. Zevi Bruno (cited in Boudon, 2003, p.53) describes architecture in terms of internal space and its emotional qualities, saying that a beautiful building is one whose internal space attracts, uplifts and spiritually subjugates us; an ugly building is one whose internal space tires or repels us. So, the architect who wants to address such a topic as quality and emotions in architecture, is supposed to start with space, which is the central focus of design. Hence, the user's emotional connection to the architectural space is primarily established through mobility, spatial perception, and the emotions triggered, rather than solely through ocular stimulation (Ioannou, 2023, p.11).

4. Architectural space as a focus for cultivating the emotional dimension

Quality is inherent in architecture, because it enables it to achieve more than just creating technically feasible spaces. Brigitte Métra[4] (cited in Jourdheuil, 2020, pp.10-11) expressed the same idea saying that standard cells with no quality are often imposed to them and in some cases, they are no longer allowed to do any architecture, and their work is reduced to that on the facades. On another dimension, Sana Layeb (2022, p.54) refers to Bellusso et al. (2017) to show the negative impact of the normative approach that reduces architectural and sensitive quality in special education facilities for children with autism. Here, the normative approach which has shown to be insufficient in delivering holistic quality, is accused of diminishing the architectural and sensitive qualities of the architectural space.

Considering the architectural space as a maturing stage of development for the concepts that are supposed to satisfy the various needs, it is essential for the architect to think more carefully about it (the space) in order to exploit all its characteristics to achieve the necessary qualities, including emotional impact. We shall approach the ensuing elements according to this perspective.

4.1. Architectural space, attempts at a definition

Etymologically, the word space is derived from the Latin word *spatium*, which meant racecourse, expanse, distance (Paquot & Younès, 2012, p.8), while the Larousse online dictionary (n.d.) gives

[3] Cyrille Simonnet, professor of architectural history in the History of Art Unit of the Faculty of Arts and editor of the journal Faces.

[4] Brigitte Métra, born in Besançon on 25 March 1954, is a French architect. A former associate of Jean Nouvel, she runs an architectural practice and has designed a number of buildings in France and China, including the associate architect of the Philharmonie de Paris.

several variants, including: Def.1: A particular property of an object which causes it to occupy a certain extent, a certain volume within an extent, a volume, necessarily larger than it, and which can be measured. Def.2: Surface, area, volume intended for a particular use.

These different definitions tend to designate a surface or expanse with particular properties intended for a specific use and occupying a volume. This is a great fit for the field of architecture, where the goal of the intervention is to create one space or several spaces in accordance to the intended use and attributes of this latter. However, in order to formulate a synthesis of architectural space, we can refer to Amaldi (2007) who defined it in relation to both the designer who deals with abstract notions and the user who lives the subjective experience. This shows that the most exhaustive definition should not take into account a single actor or a single dimension, but rather consider them as two parts of the equation.

4.2. Typology of spaces as a set of scales for integrating the emotional dimension

The aim of this study is about highlighting other factors that influence design, such as the architect's perception of space, that is why the emphasis is on the complementarity between these different types of space rather than on discussing which dimension is better than others.

As seen below in (Figure 2), Boudon (2003)[5] proposed four types of spaces where three of them are explicit and one is implicit.

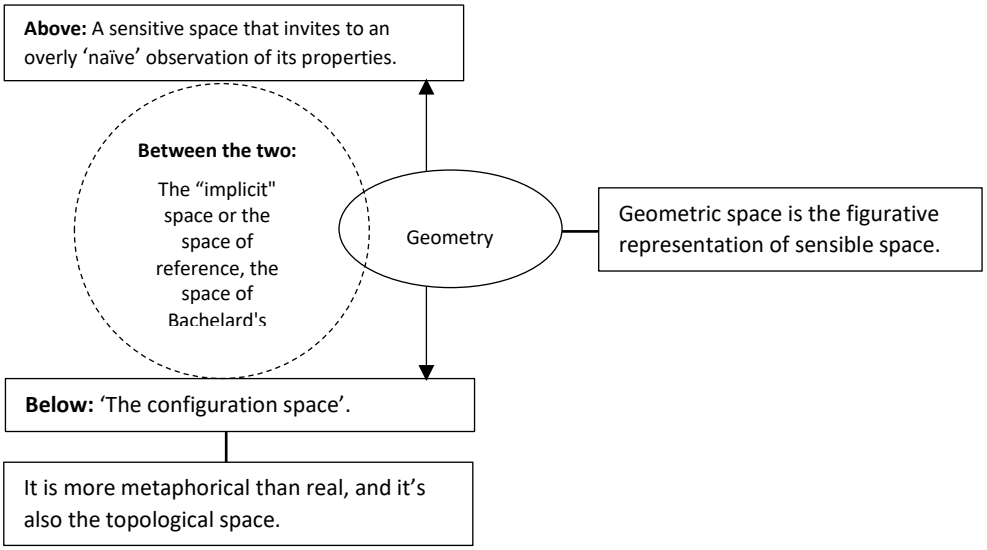

Figure 2 Diagram of types of space according to Boudon's thinking (Prepared by the author on the basis of Boudon, 2007, p.80).

The manipulation of these types of space is a scale play in which the reference space (space of design) is attributed to the architect under the following nominations: *concrete*, *true*, *abstract*, *geometric space*, or even *the space of the building*, becomes for the user the *space of representation*, *sensitive space*, *phenomenological space* (Boudon, 2003). But the problem arises when the term architecture is used interchangeably for these different types (Layeb, 2016-2015), or even when the only definition of architecture is the concept of *concrete space* (Boudon, 2003).

Overall, this typology of spaces represents architectural design on two levels. The first expresses the articulation between its mental side as a global and abstract image of one or more objects (Larousse, 2001, cited in Othmani, 2010) and the second is practical as an act of creating a whole (Othmani, 2010). It is, therefore, essential to focus on the design of space, not in its processual form, but rather as an act of managing space (Pingusson, 2010) in relation to these different types

[5] Bachelardian philosophy has been mentioned in the diagram (Figure 2) in order to respect the description given by the author Philippe Boudon, although we are cautious about his philosophy built in a personal and tormented context.

in order to determine the appropriate level to incorporate the emotional dimension to provide the best possible architectural quality with a strong and distinct architectural character.

4.3. Typology of spaces and the relationship between them

Architecture begins with an idea and ends by giving it concrete form. According to Boudon (2003), this transformation occurs through a fundamental and permanent process of back and forth between reasoning in architectural mode and representation in geometrical mode with the contribution of other specialties like mathematics. The graphic below with the notes that follow show the contribution as well as the crucial role of each of these specialties in this transition from idea to volume:

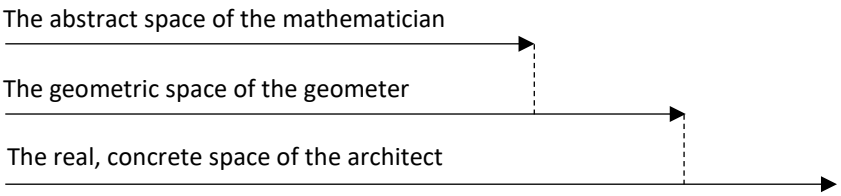

Figure 3 Abstraction of the Boudon's thinking on the difference types of space (Prepared by the author on the basis of Boudon's text, 2003, p.80).

- The mathematician ignores the distinctions between the various types of space, since he doesn't need to consider how to occupy the space he creates. As a result, the soul of the space is absent in this type.
- Despite staying relatively superficial, the geometer is one step ahead of the mathematician and gives the space a form based on a naive realism of spatial properties (Boudon, 2003, p.80).
- The architect goes further and puts the greatest effort into designing the real, concrete space where we walk and where our body's activity takes place (Boudon, 2003, p.59).

This anatomy of the process of transforming the idea into a concrete/real space will facilitate achieving the desired holistic quality. In this instance, the logical sequence of these different stages reveals its characteristics, making it possible to determine exactly the role that each actor must play. Bachelard, as expressed by Boudon (2003), places geometry halfway between the abstract space and the concrete space; as such, for the architect, geometry is nothing more than an abstract mathematical tool that enables him to represent phenomena geometrically and organize them. Thus, according to Boudon (2003), this issue is not limited to the geometric representation of the phenomenon, because architecture focuses on the phenomenon itself to be represented, which gives the architect the ultimate responsibility of enhancing the space for the user by taking into account his experience of it, rather than focusing solely on the design.

This first stage of reflection on space as the genesis of architectural quality should be assisted by a second one dedicated to the reflection on the methodological framework to discuss the best way of coordinating the various actors from different disciplines who can contribute to achieving holistic architectural quality.

5. Methodology for dealing with the emotional dimension

Research on architectural and urban ambiences has traditionally adopted a method based on an intelligibility model made up of quantitative and qualitative parameters, as well as a more interdisciplinary method at the intersection of in situ perception, intersensoriality and social representations (Augoyard, cited in Gilsoul, 2009). Recently, artificial intelligence has emerged as a major player in the emotional aspect of architecture design, proposing to analyze user's sensitive and emotional data[6] (Serero & Terracol, 2019). Overall, rather than relying on descriptive theorizing

[6] The example mentioned by the author (Serero & Terracol, 2019, p.29) is a database that classifies emotions related to the perception of space using artificial intelligence.

studies, the emotional problem can be resolved through collaborative work including architecture, environmental psychology and neurosciences. This work needs to be carried out within a multidisciplinary, interdisciplinary or transdisciplinary framework in order to benefit from the contributions of each of the disciplines involved, depending on the aims assigned (Moser, 2009).

5.1. Methodological framework for integrating the emotional dimension into architectural design

The three primary issues that are likely to impede the study of ambiences are listed by Gilsoul (2009, p. 83) as follows:

1. The complexity of ambience where intersensoriality engages interdisciplinarity.
2. The problem of objectivity which concerns the method used to operationalize and objectify sensitive data.
3. The question of *continuous creation* (Grosjean, Thibaud, dir. 2001, cited in Gilsoul, 2009, p.83), where we need to explain the creation of atmosphere in relation to the built environment and social practices.

In fact, the methodological delicacy becomes more apparent because emotions must be understood simultaneously in relation to the user and the physical attributes of the space. Hence, environmental psychology is the best basic method to study them more effectively.

However, complexity does not seem to be the only issue that the architect has to deal with; the most critical one is the subjectivity of the user. The section that follows gives a sight on acceptable methods and instruments to provide methodological clarity on the topic of the emotional dimension in architecture.

5.2. Environmental psychology

Applying the psychological dimension to a technical field like architecture is challenging for a practicing architect. In this case, environmental psychology allows us to deal with the reciprocal interaction between the surroundings and the user's perceptions, emotions, attitudes, and behavior (Lecomte, 2017, p.97). These themes are the three main axes of environmental psychology mentioned by Bonnefoy (2017, p.12) in the following order:

1. The effects of the physical and social environment on cognition and behavior.
2. Perception, evaluation and representation of the environment.
3. The relationship with the living environment.

On the other hand, the characteristics of environmental psychology, such as uncertainty, the holistic aspect and flexibility provide support for dealing with these themes of perception and representation of the environment (Moser, 2009, pp.58-60). This process simultaneously involves perceptual, cognitive, affective and conative processes, all combined with past personal experiences (Moser, 2009, p.65).

5.3. Emotions through the prism of environmental psychology

Environmental psychology is an inductive approach that gives architects a comprehensive or systematic understanding of the subject of their research (Moser, 2009). As seen in (Figure 4), Nasar (1998, p.5, cited in Moser & Weiss, 2003, p.56) deconstructs the evaluative response to the environment and visualizes the emotional reactions to various individual and environmental factors with the aim of explaining the mechanism by which emotions emerge.

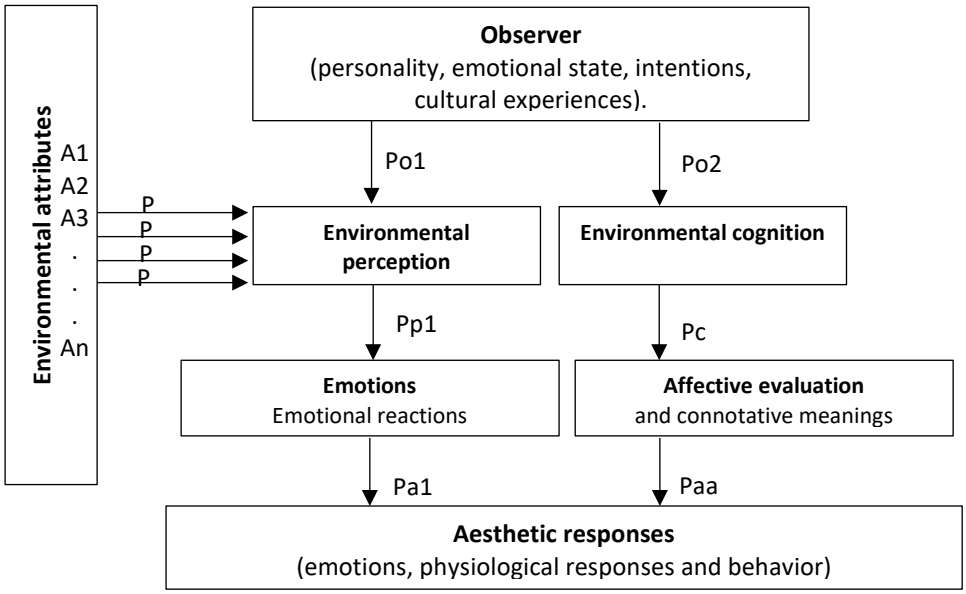

Figure 4 David Miller's model of the evaluative response to graphic environment (Nasar, 1998, p.5, cited in Moser & Weiss, 2003, p.56).

According to Lehman (2017), a balanced approach to researching emotions in this setting is favored by developing a system that learns from every contact between the user and his architectural surroundings (Figure 5). This will allow architecture to engage more actively with the social sciences which have a significant influence on the field of emotional dimension research.

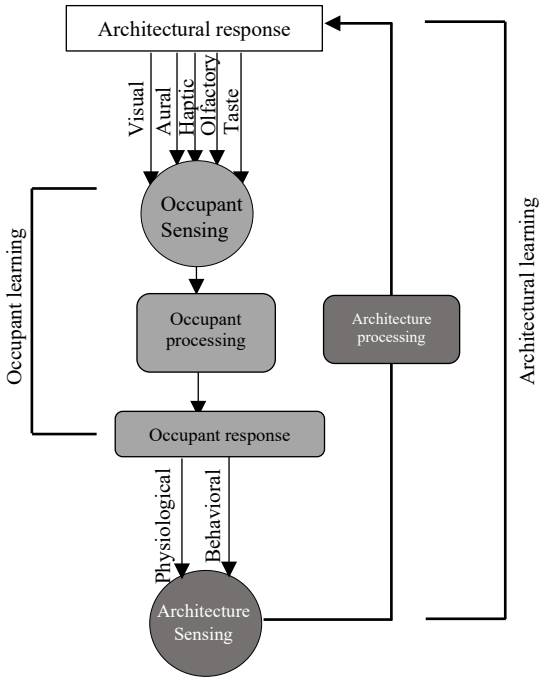

Figure 5 The role of adaptive architecture (Lehman, 2017, p.73)

5.4. The methods most commonly used in environmental psychology

Architects have to investigate and assess user's emotional responses to their designs. To do so, they can adopt two global approaches, either the approach called the *place-centered method* which uses the environment and its characteristics as its focal point (Moser, 2009, p.63) or the other one called *person-centered method* (Moser, 2009) also known as *occupant-centered design* (Lehma, 2017, p.3) which focuses on the user's subjective appreciation of the environment. However, the

success of this type of issues depends on the right selection of data collection techniques as well as the quality and applicability of the information provided to architects by environmental psychologists (Moser & Weiss, 2003).

Among the many approaches to assessing spatial experience in relation to emotional state, it is worthwhile to list the most popular techniques available, going from the most theoretical to the most experimental in terms of how they have evolved over time.

a. Basically, the theoretical methods mentioned by Moser and Weiss (2003, pp.60-77) such as:

1. Sensory pathways.
2. Simulation.
3. Questionnaires.
4. The theory of personal constructs.
5. Semantic differentiator.

b. The intermediate phase is one step ahead of the classic tools, using physiological reactions to measure the somato vegetative reactions generated by the evaluation (Proulx, 2001).

c. The most recent stage provides highly sophisticated data from the neurosciences to explain this mechanism of influence. This approach has shown in an unexpected way that there is a possibility that the brain can reorganize itself and that this reorganization can improve human emotions, thoughts and actions (Verdonk et al., 2021). These results were confirmed by neuroimaging, observing the activation of certain areas in response to specific categories of primary emotions (Verdonk et al., 2021).

6. Toward the right methodology for good architectural quality through emotions

Emotions are problematic since they are subjective and are not static (Moser, 2009, p.59), as a result, it's challenging to handle them (Gilsoul, 2009). However, in order to deal with them, designers have traditionally had recourse to the theories and findings of a few related disciplines (Pallasmaa, 2013, cited in Gepshteina & Snider, 2019), such as psychology and environmental psychology which have enabled the study of sensitive experience. Subsequently, the results from environmental psychology were much scientifically improved by the neurosciences thanks to their extremely advanced and modern instruments. The experimentalist paradigm of neurosciences has also allowed to understand the human cognition (Shamay-Tsoory & Mendelsohn, 2019). As a beneficial result, the alliance between architecture and neuroscience has given rise to the new field of neuroarchitecture, which serves as a window into exactly what happens in humans after they encounter certain buildings or locations as shown in (Figure 6) through the implication of its main elements (George & Prakash, 2024, p.6).

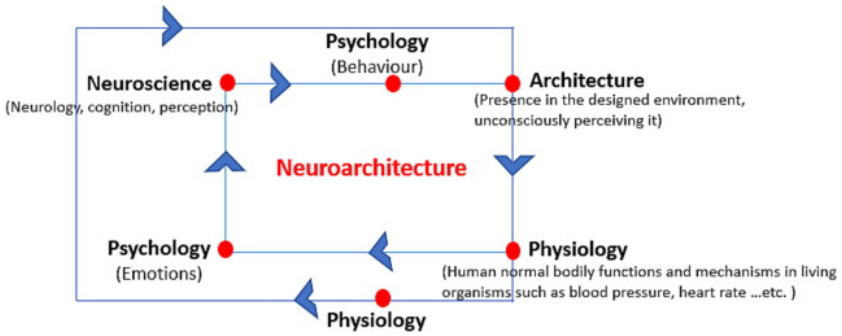

Figure 6 The cyclic relationship between the pillars of Neuroarchitecture (Assem, Khodeir, and Fathy 2023, p.5, cited in George & Prakash, 2024, p.6).

Though, despite the accuracy of neuroscience in relation to other theoretical fields, Levine (1983, cited in Dalton, 2023) points to an “explanatory gap” in terms of the mechanism that could be at the origin of the emergence of this emotional impact during the interaction between the user

and the architectural space. This can be explained by the fact that this mechanism of influence cannot be comprehended by merely imaging neuronal activity in connection to the mental process (Dalton, 2003) since there is a complete field of cooperative research between classical techniques and neuroscience that has to be established. This work which unites architects and scientists will be able to answer the fundamental question of what we are going to design and how this design is going to provide a positive experience for the user (Eberhard, 2009). Effectively, some recent researches were able to explain how surroundings can impact the user's emotions and behaviors through the neurosciences field. Abbas et al. (2024) have confirmed that emotional response to architecture is innate and that's why there is a close relationship between humans and architectural through emotions. So far, this emotional response is affected by architectural forms (Banaei et al., 2017, cited in Abbas et al., 2024).

Based on these observations, our research suggests that this collaboration should bring together architects, environmental psychologists and neuroscientists. The latter's intervention should take place at the base of the pyramid (Level-0) designated for the establishment of a methodological framework that can organize collaboration between the *classical approaches* of environmental psychology and the experimental approaches of neuroscience (Figure 7). The reason for placing them at this initial level is that they are complementary and will enable the designer to begin the design process with a thorough understanding of how the environment interacts with it, thanks to the tools employed by each of them.

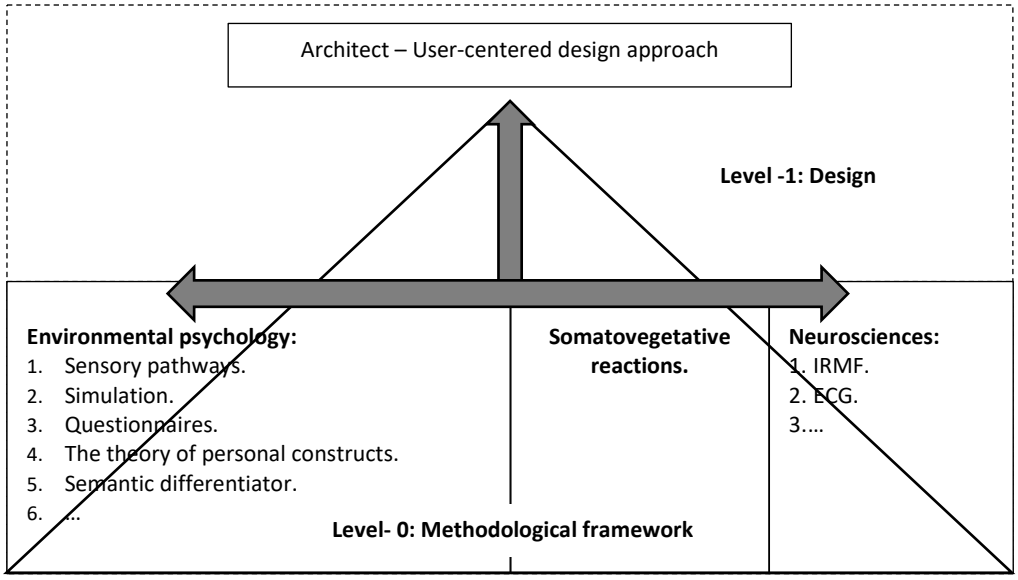

Figure 7 Constituents of the framework Methodologies for studying the emotional dimension in the built environment (The author)

This beneficial combination is particularly relevant for those who are interested in the emotional dimension of architecture. According to this scheme (Figure 7), they will take as their starting point the theories of environmental psychology in order to support the scientistic approach where the computer model that is very widespread in current architectural practice does not take affect into account and merely simulates emotions (Gilsoul, 2009), even though we are always confident that the variables chosen are the right ones, thanks to the rigorous scientific filter of neuroscience.

Dehan (1999, cited in Laroui, 2017, p.9) states that the majority of the factors that make up architectural quality are not technical, many of them cannot be measured objectively, and some require the mediation of a survey and sociological analysis. Based on this, we think that this methodological framework is considered complete to help us comprehend emotions in the built environment. In fact, it is considered as such because it offers a wide range of data which covers a quantitative physiological and cognitive data for the functioning of the body and brain besides qualitative data collected using the traditional instruments of environmental psychology.

In this case, we would say that this methodological framework addressed to the emotional issue must be able to identify the following components:

1. **The appropriate approach** would be a user-centered approach which values the user's needs in the design and attempts to meet them.
2. **The appropriate tools** that can provide more precise qualitative and quantitative variables which are easy to measure and quantify.
3. **The exact variables** dictated by the nature of the project to be designed in the next design level (Figure 7. Level-1: User-centered design).

7. Conclusion:

In response to the quest for quality in architecture and its associated parameters, it was essential to analyze the existing postulates using an inductive approach in order to identify any potential gaps. The final objective is to reconcile the fundamental concepts involved, namely the *architect*, the *user* and the *architectural space*, in order to arrive at a methodological framework that facilitates the harmonious fusion of the emotional dimension of the user and the technical practice of architecture to achieve an architectural project of satisfactory emotional quality for the user. To achieve this, architects must adopt a new culture that incorporates teamwork with scientists into their design practice which is already based on their creative and intuitive approaches (Eberhard, 2009).

So, given that architecture aims to achieve quality at a higher level by using the central and determining component, namely architectural space, it is essential that the architect begins to verify this desired quality at the start of the design process, as soon as he begins to develop the architectural space. In other words, it is necessary for the architect to manage his vision of the architectural space in such a way as to project the impact on quality by considering, on the one hand, the needs of the user and, on the other, the spatial variables.

Fundamentally, it is impossible to ensure high-quality architecture based only on quantitative requirements. Respect for the user and all of his needs, which inevitably includes the emotional dimension, is necessary to achieve this satisfaction. However, to be able to speak about optimal architectural quality, only positive emotions procured through architecture should be taken into account. Hence, the term *emotional* should not be considered in the broadest sense of the word. In order to achieve this objective, it is essential to take several parameters into account in a person-centered-design approach that focuses primarily on the user.

Even though it's widely accepted that emotions play a crucial role in architectural space, architects find it so challenging to include them that they have reduced this issue to the aesthetics and/or external form. Indeed, emotions are fragile so that they require adequate data from an appropriate methodology to reconcile the quantitative and qualitative dimensions.

In conclusion, we can state that architectural design can go further in terms of technology and intelligence, but it also needs to be qualitative, taking into account the emotional experience that distinguishes human beings.

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Resume

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