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Original Research Article

Interpretive Phenomenology of Interface Spaces in House Architecture*

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Abstract

Problem statement: Two main performances, including 'Accessibility' and 'Visibility', have been proposed in (intermediate) interface spaces for design and organization since a long time ago. However, these spaces have not received much attention in design today and even they have often been ignored. As a result, psychological and intellectual requirements, which are realized in interfaces, have not to be met and responded to. In this regard, some phenomenologist architects have an emphasis on all-inclusive interaction of human's existential ranges with architectural space and also they have emphasized the importance of responsiveness to psychological and conceptual needs.

Research objective: The present article seeks to investigate the function of interfaces in house architecture, based on the approach taken by some contemporary phenomenologist architects. This paper aims to achieve optimal performance of such spaces in houses.

Research method: To this end, it has been firstly dealt with the description of attitudes from four phenomenologist architects concerning interfaces based on theoretical studies within the qualitative methodology and benefitting from interpretive and phenomenological approach; then using 'interpretive phenomenology', the conceptual units were built in their works and their functional capabilities of interfaces have been revised in two perceptual-conceptual and behavioral-functional aspects as well as compatible and responsive formative-spatial features to those performances.

Conclusion: The findings show that interfaces possess optimal performance so that they are capable to provide an appropriate accessibility hierarchy of outside-to-inside space. At the same time, they may provide a sense of being calm and under shelter for the audience and they make all of his/her senses and perceptions involved among them. In response to these three functions, distinctive formative features e.g. application of light and shade with different auditory, olfactory and tactile patterns and also having specific formative boundaries may be responsive to them.

Keywords: *Interface, Interior, Exterior, Interaction with space, Phenomenological architecture.*

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Introduction

The least important is assumed for interfaces in design and spatial organization of architecture today while these spaces have been so far effectively responsive to some of the performance since a long time ago. In fact, using maximum and quantitative utilization from space, the performance of such spaces has been tarnished and the houses have lost their position in spatial organization and architectural design. Therefore, the problem of the current study is the ignorance and leaving of interfaces in the architectural design of contemporary houses and thus reductive approach toward architectural space and instrumental attitude to this factor.

Interfaces [1] include some spaces and elements of a building that meet both accessibility [2] and visibility[3] functions among interior and exterior. Sometimes, interfaces comprise constructional details and they often contain space with mobility in them. Thus, all intermediary spaces e.g. frontage, porch, corridor, passage, portico, atrium, and the like, and all elements like portals, openings, windows, and similar elements are included in interfaces (Mirmiran, Malekafzali & Karimifard, 2020, 119). Overall, one can divide and classify three categories of interfaces in architecture according to Table 1.

Today, interfaces are considered minor spaces in house architecture; and they are applicable in design and more or less after dealing with major spaces. In fact, irrespective of two fundamental features of 'spatial independence' and 'hierarchy in space' the human's psychological requirements are overlooked in the preparation of him/her to pass from interior to exterior and vice versa. As a result, their two reverse features have appeared instead of these two characteristics today: 'Space transparency' or 'expansion of field vision' versus spatial independence, and 'spatial fluidity' or 'expansion of accessibility' versus 'hierarchy in space'. These two latter features disturb all spatial boundaries and put forward spaces with very extensive accessibility where the human these leave the human alone in the middle of very large spaces as a small and inferior and unprotected organism. While those spaces in which we live are the embodiment and symbol of our existence and according to phenomenologists they comprise some part of our bio-cosmos and it is expected them to meet effectively extensive psychological and conceptual requirements of their users. Therefore, to recognize how one can justify the effective presence of interfaces for an instrumental approach toward the house under today conditions, two following questions are reviewed in this study:

- How to justify the application of interfaces for architecture in modern houses based on the perspective of phenomenologist architects?
- According to this attitude which formative-spatial features can improve the function of interfaces?

Research literature

Phenomenology entered gradually in the architectural field as one of the interdisciplinary dimensions since the 1960s and 1970s after the potential of accessibility to translated works of phenomenologist philosophers e.g. Martin Heidegger and Gaston Bachelard in the 1950s (Nesbitt, 2017, 28-29). Several studies have been conducted in the field of architecture since that time. It has been so far discussed the subjects e.g. pavilion (Dehghan & Forghani, 2020), urban views (Karimi, Etesam & Shahcheraghi, 2020), Persian garden wall (Mansouri, 2015), and house (Amiri Rigi, 2014) by phenomenological approach, but interfaces have not been yet investigated as the studied subject in the present paper. Similarly, descriptive phenomenology has been assumed as a basis in most cases.

On the other hand, some of the studies in the phenomenological field are in such a way that their contents are irrelevant to phenomenology, but they have utilized this method in their works. For example, Akbari and Niroomand Shishvan (2019) have considered interpretive philosophy as a basis and presented a model for the design process and creation of location from the perspective of body philosophy. In her doctoral treatise, Emami

Table 1. Types of interfaces in architecture. Source: Authors.

Row	Description	Example
1	Connection of interior interface to exteriors and public passage	Flora, fences, monument front yard, lateral yards, patio, corridor, or auricle connects the middle area [central yard] to entrance portal or portico and with portico.
2	Connection of roofed interior space to interior interface or the exteriors	Veranda, open veranda, window, in-window, opening, aperture, wooden decoration, shade, balcony (veranda at upstairs)
3	Connection of two closed and roofed spaces together	Accessible space after the entrance door, small veranda (the small veranda to the room at the middle of a building), small portico, or a corridor that ends to the rooms.

Koopayee, Norouz Borazjani & Safian (2018) assumed reference to the given work and finding of common empathetic language with the element as the only way for the proper conception of architectural work and she implied seven steps in the path toward achieving empathy. The interpretive phenomenology methods have been well presented in these studies, but the subject of the current paper has not been surveyed that denotes interpretation of attitude of a group of phenomenologist architects regarding the phenomenon of the interface.

Some researchers also have referred to analysis on intellectual fundamentals of phenomenologists and implied requirements and constraints of them in different ways. For instance, in his various books and papers, Mohammad Reza Shirazi (2010, 2013) dealt with the investigation in concept and position of phenomenology in the analysis of architecture and the environment. Also in their surveys, Sharifian, Tahoori, Etesam & Zabihi (2019) have investigated phenomenological studies concerning theories of Juhani Oelevi Pallasmaa and Steven Holl. It has been also discussed only on the general interpretation of phenomenological attitude of architects in this research while any specific subject was not investigated about their approach.

Therefore, the major difference between the current paper and other studies is that the present paper looks for an investigation into the necessity of the existence of interface in the architecture of modern houses based on the attitude of a group of contemporary phenomenologist architects. Likewise, it employs the interpretive phenomenology method to analyze the attitude of these architects.

Methodology

Unlike the instrumental approach to house architecture, the highest importance is attributed to the improvement of quality and way on the interaction between human and space in phenomenological approach toward architecture; and the architectural space is assumed very beyond of the area for life. This approach considers all perceptual-conceptual and behavioral-functional trends involved in the interaction of the spatial user with the space and it addresses more contemplatively to important psychological and conceptual needs of the spatial user. To this purpose, in this study, the views of Norberg-Schulz[4], Pallasemaa[5], Zumthor[6] , and Perez Gomez[7] , four salient phenomenologist architects, about the interface were selected for purposeful review using the qualitative method. This review aims to extract similarities and differences between attitudes of these architects about need (perceptual-conceptual aspect), functions (behavioral-functional aspect), and formative-spatial features of interfaces. Then, these functions result from the attitude of phenomenologists by comparison and analysis of similarities and differences between their attitudes about interfaces, functions, and necessary formative features for their optimal implementation. According to Morse's attitude, one of the advantages of this technique is that no variable is manipulated there and none of the background variables are controlled (Morse, 2005, 859). Thus, an interpretive approach is utilized at three steps to review the approach of these scholars (Table 2). At the first step, it is tried to review and extracted the text of data. At the second step, the horizon of data mining

Table 2. Research processes and steps. Source: Authors.

Research processes and steps			
Data collection and interpretation	Step 1	Reading and perception of total data text	Researchers should carefully read data texts, which are written totally on the sheet, to be familiarized with the contents and to achieve a general sense of them (Giorgi, 2007, 74)
	Step 2	Building horizon for data-mining and abstraction	The writings related to interface from several phenomenologist architects are surveyed by data-mining and it is tried to classify and cluster statements with the same concept and level together.
Data judgment	Step 3	Building of conceptual units	Need (perceptual-conceptual dimension)
			Function (behavioral-functional dimension)
			Formative-spatial features of interface responsive to them
		Deductive analysis	Deductive analysis: Attitudes of architects derived from the given conceptual units are shared and differentiated in their works.
		Conclusion	Reasoning and conclusion show conditions and ways of justification of optimal function for interfaces in contemporary architecture.

and abstraction is done. And also at the third step, the relevant conceptual units are built. As a result, deep description is presented to conceive nature and essence of experiencing interface from their attitude by theoretical search in writings and speeches of four phenomenologist architects at the first and second steps. In the third step, data are judged and measured using both induction and logical deduction methods. The deductive analysis and search are also done for similar attitudes and in the similarity of conceptual units among phenomenologist architects by induction; and conclusion of the study is terminated by logical deduction to justify the requirement (perceptual-conceptual dimension), functions (behavioral-functional dimension), and formative-spatial features of interfaces.

Theoretical bases and framework

• Theoretical framework for review of phenomenologists

The phenomenologists, in particular Heidegger, have not made great effort to separate the boundaries and to show their distinctions from other customary approaches, but several separated main distinctions can be listed according to their writings as follows:

- Assuming integration of perception and emotion and confrontation of all human's disposition toward his/her existence and environment

Heidegger considered this holistic approach as requisite for humanity's nature of philosophy and invited all experts to 'Integrated Existence[8]' in which perception and emotion possess intrinsic unity at the interior extent and they have been unified at exterior extent (Woods, 2003, 51).

- Avoidance from the approach of dominance over environment and avoidance from analysis of perception and emotion derived from the environment

The human perceives and feels and analyzes his/her existence and environment in a phenomenological approach and thereby s/he analyzes and deduces and judges about them, but the result of these relations is void and they are exposed to something omnipresent, always actual and directly perceivable by our physical body-ware all the times. This body includes deep and harmonic and uniform perception and sense of environment and space that is beyond or objectives in our mind and they are not embedded within subjective conceptualizations and they originate from our existence in the environment and space.

According to Heidegger's attitude in the book of 'Being and Time', our biological space includes bounded situation that mainly covers qualitative space versus a homogenous geometrical place in which we are located. Referring to making anything at hand that depends on our daily life, he complains from assuming anything even space as instrumental. He wrote: 'What we are very close to it; is the room and we confront with it not something like 'middle

of four walls', but similar to a device for residence. Even sunlight serves as a piece at hand for us.' (Ray, 2006, 32)

- Thinking and thanking

The human is always related and proportional to the phenomena and his/her task is to allow anything to be what they have been by 'Thinking and Thanking[9]'' versus the being and does not assume the being as something at his/her hand. Hence, s/he can accept their independent existence and leave thinking such as organization of things and categorization for their nature and thereby to become really as 'resident in being' (ibid., 55).

- Avoidance from external, quantitative, and essence-oriented approach to place and space and ontological tendency to it

For the architectural world, the highly important aspect of the phenomenological approach lies here in that it is tried to move away from those approaches, which have been so far presented toward place and space by the thinkers. These approaches have been followed since the time of Aristotle through Descartes, Newton, and Leibnitz and even until the twentieth century and it does not need to repeat them. These include a range in which place is assumed as an objective phenomenon with quantity and dimension where things are located at one end up to the other end of this spectrum where it is a subjective phenomenon that is perceived and abstracted from the distance between phenomena. The phenomenological approach recedes from such attitudes and it is argued that place is a platform for the realization of being and especially being of the human. Architecture makes objective the features of an environment by building and it converts blank space into a rich location to achieve a goal called 'Housing' (Safian & Ansari, 2014, 58).

- Persistence and emphasis in distance and hermeneutic nature of our conception, perception, and feeling of being and space

Based on Heidegger's phenomenological approach, we always encounter a vague understanding of existence and space then interpret them for ourselves; our perception becomes wider and deeper at any phase. However, we are trying not to put perceived prediction as the only basis for interpretation and to allow the space to include us and to be open-ended to its impact. Based on Heidegger's viewpoint, thinking should be accompanied to an open-ended approach toward being so that we are present versus phenomena and even to be submerged into their conception. He has called this status 'Exploration of phenomena' (ibid., 81) and according to his perspective, open-endedness is a subject that has not been mentioned in Husserl's phenomenology (ibid., 148).

It can be concluded from these cases that the phenomenological approach toward architectural space is more dependent on users' perception and feeling of space than others; it is a feeling that indicates a general perception of the external world and internal integration with it. Accordingly, it is tried to read and perceive attitudes of four phenomenologist architects by taking the first and second steps in this paper (reading and perception of generality of data text, horizon-drawing for data-mining and abstraction), regardless of predictive approach and by benefiting from Heidegger's statement in the phenomenological approach. It is emphasized that wider and deeper perception will result at any step taken by the study on their attitude and the interface will be openly thought and interpreted proportional to this process. At the same time, the building of conceptual boundary and finding of different horizons of the approach taken by these phenomenologist architects at the second step will be some cases that should be done by reflection and attention and not forgetting these items. Inter alia, what deems as important is the quality and way of user's interaction with interface and also functional capabilities of the interface in optimal responsiveness to these bidirectional interactions that should be reviewed in the paradigm of four phenomenologist architects.

• Theoretical framework for building of conceptual units

The human is the main user of architectural spaces and is assumed as an important factor for recognition

and perception of the space. Human disposition and psychological characteristics are the foremost factors affecting human interaction with his/her surrounding world. Environmental psychology studies may show that humans and the environment affect each other to the extent that environmental qualities can stimulate emotions or create perceptions in spatial users, humans can be also effective in spatial perception and cognition by possession of his/her existential extents. This bilateral interaction in perception and reception of environment reveals recognition and awareness of humans' disposition in process of interaction with space and design of architectural spaces, especially from a phenomenological perspective in which the main attention is paid to internal integration of human with his/her external environment.

Disposition of any human includes five ranges: The first is a range of feelings and emotions; the second is a range of beliefs and ideas, the third comprises of a range of wishes and needs; the fourth includes a range of statements and the fifth extent is a range of his/her actions. The first three ranges are internal extents and two latter ranges including speech and practice are called external extents (Malekian, 2016, 43-46). Three fundamental concepts of need and function and 'responsive space[10]' are organized together in the designing process, so that designer can then obtain an appropriate response (Ranjbar Kermani,2008). In other words, in response to spatial requirements, designers recognize the functions and then create some spaces that could be better responsive to those functions. It is obvious that all five extents of human disposition are typically effective in the creation of needs as well as functions and the spaces to be created. By interaction with the extent of feelings and emotions and range of beliefs, space may affect human and influence in him/her. On the other hand, the human can also have sensual and empirical relations with space and recognize it and some beliefs may emerge to the human. Also by interaction with the extent of wish and will, human pays attention to spatial functions and recalls that what potentials can be provided by the space that may respond to his/her functional requests. Alternately, the external extents of human disposition represent a way of interaction among humans and space and with his/her behaviors and determine specific functions of space in response to those behaviors so that spatial functions and their real features can affect human disposition in interaction with speech range and they can indicate the maximum human interaction with the space by interaction with practice extent. Therefore, the following conceptual units can be designated briefly and based on five ranges of human disposition to analyze the quality of human interaction with the space:

- Analysis on quality of human's perceptual-conceptual interaction with space (perceptual-conceptual dimension)

This proposition deals with the needs that arise from the interaction between the human and interface and affect his/her beliefs, feelings, emotions, and wishes. It is also associated with subjective receptions of the spatial user. The needs include a sense of attachment and visual communications, a sense of being interior, vacancy, and the like.

- Analysis on quality of human's behavioral-functional interaction with space (behavioral-functional dimension)

It is discussed about behaviors and functions, which have been created by responsiveness to perceptual-conceptual dimension at this range. Attention is paid to what is revealed from the external range of human disposition; namely, his/her speech and action extents since the functional structure of space may affect the emergence of behaviors in the environment and it is mutually affected by their behaviors and prediction of their occurrence. These features include the function of an entrance space in the security of section for the user, hierarchical order in functional domains, the hierarchy of accessibility, and reflection of interaction with behavioral patterns and lifestyle of humans in the meeting of needs.

- Description and analysis of responsive features of space (formative-spatial features)

These features can be proposed about the quality

of responsive space of those needs based on need-analyses that are derived from conducting analyses on perceptual-conceptual dimension and behavioral-functional aspect. These quantitative and qualitative formative features of the space are composed of spatial dimensions, geometry, and related harmonies used materials, related texture and color of bodies and their internal lighting, etc.

Therefore, the dimension of perceptual-conceptual interaction with form and space, aspect of behavioral-functional interaction with form and space, and formative-spatial feature of interfaces responsive to them are conceptual units based on which attitudes of phenomenologists about interface will be analyzed.

It has been tried in Fig. 1 to present a research procedure based on the theoretical framework of the paper.

Findings

In this section, the given findings will be interpreted within the framework of three conceptual units (perceptual-conceptual interaction dimension, behavioral-functional interaction dimension, and formative-spatial feature of interface responsive to two dimensions) after reading and perceiving the generality of attitudes of phenomenologist architects about the interface and drawing horizon for their data-mining and abstraction based on the theoretical framework of the paper, which has been derived before from theoretical framework based on human disposition. Afterward, similarities and differences between conceptual units, which derived from attitudes of these four phenomenologist architects will be reviewed by deductive approach and evaluated by analytical approach in this paper. It has been sufficed to the quality of advancement of given steps and building of conceptual units for Norberg-Schulz's approach and tables of the building of conceptual units for other architects.

• Experience of interface from Schulz's attitude

- Step 1. Reading and perceiving generality of data text

Norberg-Schulz derives his attitude from the psychology of Gestalt perception and assumes gestalt nature and holistic approach to things and especially to the space as the main factor for its perception. He wrote: 'Three fundamental Gestalt principles or rules, which formed according to the general proportion of images, include proximity, closure or limit, and continuity. These three

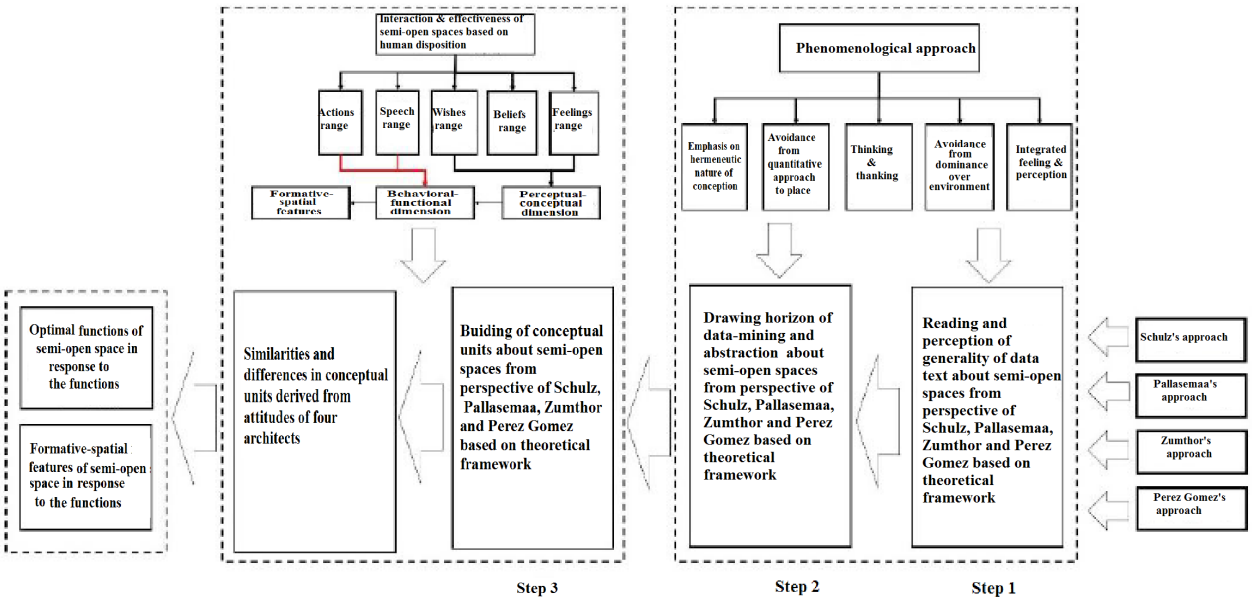

Fig. 1. Research procedure based on the theoretical framework. Source: Authors.

principles can define human's behavioral-functional interaction with space. Norberg-Schulz considered boundaries and limits, ranges, and also the height of architectural works as the factors for their gestalt perception, and follow this process by the presentation of some questions e.g. how limits and heights could be defined and or create limitations in the space e.g. domain, threshold, and path in architecture.' From Schulz's perspective, the definition of boundary for interfaces may contribute to the definition of their optimal function. Based on Norberg-Schulz attitude, four formative-spatial experiences that provide our gestalt perception of space and also formative and spatial structure that has emerged in all architectural interfaces are as follows:

1- Domain is a place where the moments of our presence often occur.

2- We move through the path and pass from the threshold and reach the target. The fundamental form of the path is a continuous passage. The path has mainly a horizontal structure and is called under titles like passage, auricle, corridor, portal, and counter; and there are many examples for its fundamental forms.

3- Threshold is also a discontinuous and distinctive passage. Building a threshold appears in the façade of construction as a physical gestalt. As a form of threshold, the façade (view) has more characteristically a portal that not only makes possible openness inside the building but also it meets all of the expectations of visitor since the moment of entry. Attention is firstly paid to the entrance of the building and its façade and it is focused on the contribution of symmetry, general lines, and given height and performance of entry to the building (Norberg-Schulz, 2009, 136).

4- Destination or target denotes immense concept regarding place structure because the center of that location is this target (Norberg-Schulz, 2018, 15). Schulz describes destination space mainly by formative-spatial morphology of middle space and also considers the most known morphology of that skyline as dome-like that links ground to the sky (ibid., 16).

Schulz reread house in the concept of interior space. He assumes human success for the definition of interior and exterior as the basic condition for human residence. He denotes a sense of being inside as one of the paramount dimensions of a human's perceptual-conceptual interaction with space. According to his opinion, as locations and environment affect mutually each other subjects of interior and exterior may emerge. Being inside is the first goal and consequence of place; namely, it means being far away from what exists outside. He also considers two concepts of interior and exterior included in qualitative affairs beyond their usual topological meanings and writes: 'Inside/outside proportion is one of the fundamental questions in location art or architecture that is not resolved by drawing and description and not assumed as a static pattern.' (Norberg-Schulz, 2017, 211) He assumes interior and exterior as two sides of a coin and considers confrontation between internal and external forces as the hermeneutics of environment with specific practice. This interpretation recalls the relation, dependence, and ultimate unity of two aspects of an object. In fact, it can be implied that Norberg-Schulz intends to propose a phenomenological reading of architecture in both natural and human-made aspects. Schulz considers the achievement of the unified and integrated subjective image to be another aspect of dimensions of Human perceptual-conceptual interaction with space and implies tendency or intentionality to the place in his impression and reveals interaction between fields of belief, emotion, and desire in experienced visiting of them. He exactly reminds the reader of this point that such an interaction may not occur separately and in isolation from each other, but it reaches to a type of harmony and integrated generality that has a gestalt feature; therefore, the upset mind could not experience such an interaction. When this harmony appears, the spirit of place is revealed to the experiencer.

In response to this question of what we might confront upon entry and visiting a place; and in other words, in an interface what objects cause being

accustomed to a place and assuming it as unique? Norberg-Schulz takes an example of Paris and presents objective evidence that indicates that space is derived from the audience's mind. He mentions: 'these characteristics have formed specific unifications and they can be interpreted as the base of typological unities that include objective identity and they could not be reduced to abstract geometrical elements e.g. point, line and plane, but they should be observed as numerous being forms that appeared. Confrontation to Paris mainly denotes recognition of the released generality and this released generality should also possess gestalt quality that applies to Paris. Existence of spirit of place is the reason for this event and anything has been configured within a specific environment.' (Norberg-Schulz, 2009, 132) Norberg-Schulz assumes perception of spaces (including interfaces) subject to perceiving of features in an interface that was unified and rather than objective unity, he evaluates space atmosphere and its memorial nature in the past experiences of audiences as important. Norberg-Schulz properly believes the presuppositions and all mental memories of humans as effective in their perception of subconscious space. In fact, perception is not compliant to or equivalent with sensual data and it is mainly based on its precognition of objects. (Norberg-Schulz, 2018, 121)

- Step 2- Drawing horizon of data-mining and abstraction

The term 'drawing horizon' is used because each individual perceives various horizons of this concept using various sensual perceptions and stances versus the given phenomenon. Therefore, a researcher should identify and extract various horizons of an individual from the written texts about the phenomenon (Parvari, 2017, 57). One could draw a horizon and summarize Norberg-Schulz's approach about the interface in three categories:

1- Norberg-Schulz's First category: Norberg-Schulz's approach toward Human's perception of space and concept of place: Looking at space by gestalt vision is considered as the main factor to perceive it. Acquiring a subjectively unified and integrated image is one of the important factors to perceive place. Interaction with space may not occur separately and in isolation, but it necessitates a type of harmony and integrated unity. These pieces of evidence may not be reduced to abstract geometric elements e.g. point, line and plane, but they should be seen similar to methods of existence that appear in different forms. Some phrases are visible in Schulz's writing that represents the holistic approach and integrated being about which Heidegger implied in his phenomenological approach. This holistic approach cannot be analyzed and at the same time, it is considered as a result of human interaction with space to perceive and receive it. In another part of his writing, Schulz has referred to possession of identity and the effect of memorization in the building of place concept and assumes possible exploration of phenomena by open-ended thinking on surroundings. He expresses: 'Perception is not compliant to or equivalent with sensual data and it is mainly based on precognition of the same objects and or objective evidence, which represent the space originated from audience's mind may lead to being accustomed to a place and assuming it as unique.' By ontological tendency to the space in other sections of his writings, he implies a sense of being inside and secured feeling created with the presence of semi-space open in this space. From his perspective, some opposite concepts synchronously emerge at this interface that is affected by the quality of perception of both interior and exterior spaces. In his opinion, if places and environments affect each other mutually, the subject of internality and externality may emerge. The first goal and consequence of place is the being inside; namely, it is being far from anything outside and or successful definition of interior and exterior is the basic condition for human residence.

2- **Norberg-Schulz's Seconde category: Norberg-Schulz's approach toward the function of space:** Using gestalt attitude, Schulz describes and explains the functions of the space. He says: domain is the place where most of the moments of our existence

occur. Three fundamental Gestalt principles or rules are as follows: Proximity, closure or limit, and continuity. By accepting this idea that place is the platform for the realization of being and especially human's existence, he considers the building of space as the foremost factor contributing to the space in responsiveness to the function. From his perspective, the building is more dependent on subjective features of space creators than objective characteristics of the environment.

3- Norberg-Schulz's Third category: Norberg-Schulz's approach toward formative features of space: Coincided with the description of the quality of perceiving of place by phenomenological approach in several points of his writing, Norberg-Schulz expresses distinctive formative features of the space. Although it should be noticed that his paradigms mainly cover qualitative space and similar to Heidegger, he avoids looking at space as an instrument and spatial quantification. One could infer the necessity for having a specific domain and spatial boundary from his writings as follows: the borders and limits, boundaries, and also height of architectural works are also applicable to perceive them by Gestalt principles; definition of the border for the middle spaces may contribute to their optimal performance; four formative-spatial experiences that provide our gestalt perception of space are as follows: Domain, path, threshold, and destination; any domain is specified by the related clear border and extent; anything has been configured in the certain environment. Similarly, he generalizes his implications to pavement geometry of space and its formative representation and implies: the fundamental path is a continuous passage; the path mainly comprises of a horizontal structure; the threshold is also a discontinuous and distinctive passage. In some part of his writing, Norberg-Schulz takes a step farther and refers to the spatial organization of element and accessibility hierarchy in space: 'We move through the path and pass from threshold to reach the target; threshold of the building appears as physical gestalt in the façade of the building.'

- Step 3- Construction of conceptual units

Table 3 shows a summary of Norberg-Schulz attitude within the dimension of perceptual-conceptual interaction with form and space, dimension of behavioral-functional interaction with form and space, and formative-spatial feature of the responsive interface to them.

Experiencing interface by the attitude of Pallasmaa

In this section, based on six studies that have examined the works of Pallasmaa, it was attempted to take interpretive phenomenology steps e.g. Norberg-Schulz approach; Thus, it was dealt with reading and perceiving of the generality of data text and drawing horizon and data-mining and abstraction by accurate study and assay in books of *Architectural Atmosphere* (Borch, Pallasmaa & Bomet, 2020), *Embodied Imagination* (Pallasmaa, 2016), *Skin's Eyes* (Pallasmaa, 2013), and also a joint book written by Pallasmaa and Sara Robinson (2018) titled *'Mind in architecture*'. Some written essays of Mohammad

Table 3. Analysis of conceptual unites of interface based on the attitude of Christian Norberg-Schulz. Source: Authors.

	Conceptual units		
Christian-Norberg Schulz	Dimension of perceptual-conceptual interaction with form and space	Dimension of behavioral-functional interaction with form and space	Formative-spatial feature of responsive interface and by interaction with five ranges
	1- Sense of internality 2- Identity finding and building 3- Acquiring of subjective unified and integrated image, holistic approach [Gestalt]	1- Proximity and interaction 2- Closure or limit and equanimity 3- Continuity	1- Having defined interior space, and receding from what is in outside 2- Possession of specific domain of space 3- Having threshold for emphasis in spatial independence 4- Hierarchy in passing through space

Shirazi were also used where they analyzed phenomenological position by conduction analysis on architecture and environment, especially Juhani Pallasmaa's sense architecture and phenomenology. Table 4 indicates a summary of Pallasmaa's approach toward the building of conceptual units within the dimension of perceptual-conceptual interaction with form and space, dimension of behavioral interaction with form and their responsive space, and formative-spatial feature of semi-open space.

• Experience of interface based on the attitude of Zumthor

Similar to the approaches of (Zumthor, 2015) and Pallasmaa, Zumthor's attitude has been followed in most of his writings about architectural space. Zumthor has expressed his emotions and perception about the surrounding environment through the spatial atmosphere more than other phenomenologists. For instance, he could express well his phenomenological attitude about the environment and architectural space in books titled '*Atmosphere*', '*Architectural Thought*' and 'Phenomenological approach in the paradigm of Peter Zumthor.' Similarly, the book entitled 'A sense of history' is the result of a debate between Zumthor and Landing about Zumthor's attitude toward the surrounding world and type of his vision of history in using it in his architectural works include writings, which have been used for reading and perceiving of the generality of data text, drawing horizon and abstraction of their data and also building of conceptual units. Table 5 represents a summary of Zumthor's attitude about the construction of conceptual units within the dimension of perceptual-conceptual interaction with form and space, aspect of behavioral-functional interaction, and formative-spatial feature of the interface as responsive to them.

• Experience of interface based on the attitude of Perez Gomez

Although, compared to the other three phenomenologist architects, the writings of Perez Gomez (2019) are less available, in his book titled '*Timely Meditation*: Architectural theories and practices', his phenomenological attitude can be properly perceived toward architectural space and way of his analysis on architectural works. The type of his approach to history, irrespective of retrospective attitude, represents his phenomenological attitude. Likewise, his attitudes have been also followed within short essays and debates with other phenomenologists e.g. Steven Holl and Juhani Pallasmaa in the book 'Questions on Perceived Architectural Phenomenology' (Holl, Pallasmaa & Perez Gomez, 2017) and assumed as the basis for measurement and analysis in the section of the study. Table 6 indicates a summary of the

Table 4. Analysis of conceptual unites of interface based on the attitude of Juhani Pallasmaa. Source: Authors.

	Conceptual units		
Juhani Pallasmaa	Dimension of perceptual-conceptual interaction with form and space	Dimension of behavioral-functional interaction with form and space	Formative-spatial feature of responsive interface and by interaction with five ranges
	1- Involvement of all senses, without overlooking any sense 2- Sense of selfness 3- Sense of presence in space 4- Stimulation of fantasy and memory	1- Application of five senses 2- Pause upon entry, and action of the entrance with memory 3- Looking at architecture inside given conscious experience 4- Giving life by shade to the existing phenomenon in lighting	1- Utilization from heterogeneous theme structures, geometrical space, and various qualities 2- Possession of distinct features in interior form e.g. portal, threshold, a waiting place at the entrance portal 3- Paying attention to light and shade creation in the design of middle space 4- Creation of different acoustic and echo patterns in house spaces by the building of interface 5- Creation of different olfactory patterns in interface

Table 5. Analysis of conceptual unites of interface based on the attitude of Peter Zumthor. Source: Authors.

	Conceptual units		
Peter Zumthor	Dimension of perceptual-conceptual interaction with form and space	Dimension of behavioral-functional interaction with form and space	Formative-spatial feature of responsive interface and by interaction with five ranges
	1- Involvement of all senses and without overlooking each of senses 2- Need to silence to achieve internal composure, presence, and integration 3- Sense of security in spaces 4- Perception of atmosphere in spaces 5- Sense of internality 6- Guiding in a specific path, preparation, stimulation, surprise, resting, and nerve relaxation	1- Preparation for passing and entry in space, the experience of passing through spaces e.g. connection link, threshold, intersection 2- Often intangible passing from outside to inside	1- Harmony of theme structures and tactility 2- Provision of spatial silence 3- Having a spatial limit between two subsequent spaces 4- Paying attention to the quality of threshold, and specific and defined formative passage and boundaries 5- Arrangement of spatial elements and sequence and having spatial hierarchy in passing from outside to inside

Table 6. Analysis of conceptual unites of interface based on the attitude of Perez Gomez. Source: Authors.

	Conceptual units		
Perez Gomez	Dimension of perceptual-conceptual interaction with form and space	Dimension of behavioral-functional interaction with form and space	Formative-spatial feature of responsive interface and by interaction with five ranges
	1- Sense of internality 2- Paying attention to the presence of meaningful qualities in biological space 3- Stimulation of audience's imagination by the aid of sensual qualities in the environment 4- Perception of place concept	1- Reflection and pause and motivating for thinking	1- Application of interfaces motivational space that is located between two words similar to an exciting vacuum 2- Creation of different acoustic and echo patterns in house spaces by creation of interface 3- Having certain and defined formative boundary

attitude of Perez Gomez about the construction of conceptual units within the dimension of perceptual-conceptual interaction with form and space, aspect of behavioral-functional interaction, and formative-spatial feature of interfaces responsive to them.

Discussion

If the structure of conceptual units are shared and differentiated from the attitudes of architects a table is derived as follows (Table 7):

This table suggests that the attitude of these phenomenologist architects toward architectural space (including interface) is an open and integrated approach. They have left quantitative, instrumental, and categorical attitudes governing architecture, and based on a phenomenological approach toward place and space, they have tried to reread human perception and have a feeling of architecture. According to their attitude, phenomenology pays attention to the perception of place concept and precognition. Of course, some differences may be also found in their method of treating with and paying attention to interfaces. What is important is the attention paid to the proposition of perceptual-conceptual interaction in the process of creating an architectural work and then having a presence in that. All of them have referred to several concepts such as deep feeling and perception of space, sense of internality, involvement of all senses of audience in exposure to space, creation of a sense of existence and stimulation of space, and perceived spatial concept e.g. semi-open space. On the other hand, among these architects, Norberg-Schulz and Gomez paid more attention to the concept of environment and quality of its formation than Pallasmaa and Zumthor. However, Pallasmaa and Zumthor have also proposed a more accurate description of human senses and way of involvement of the audience in the creation of sensual qualities to the readers. One may probably assume one of the main reasons for

Table 7. Similarity and difference between attitudes about conceptual unites of the interface. Source: Authors.

Conceptual units	Description	Norberg-Schulz	Pallasmaa	Zumthor	Perez Gomez
Dimension of perceptual-conceptual interaction	Involvement of all external five senses and even internal senses in all formative-spatial features of the interface		•	•	
	Application of meaningful formative-spatial features	•			•
	Building of subjective harmonic image of them				
	Stimulation of imagination and memory		•		
	Creation of a sense of internality	•		•	•
	Sense of security in space and finding of equanimity and sense of existence			•	
	Guiding in a specific path, preparation, stimulation, and nerve relaxation			•	
Dimension of behavioral-functional interaction	Experiencing space with all visual, auditory, tactile, and olfactory senses	•	•		•
	Presence inside			•	
	Closure and limitation	•			
	Preparation for reflection and thinking		•		•
	Preparation and experience of passing through spaces e.g. connection link, threshold, intersection			•	
	Having a pause while entering, and the action of entering along with memory		•		
Formative-spatial feature of the interface	Possession of distinctive formative features e.g. color and light	•			
	Different acoustic and echo patterns		•	•	
	Application of different geometry and materials		•	•	
	Creation of light and shade		•	•	
	Tactility		•	•	
	Creation of silence in space, having border and limit between both spaces			•	
	Having specific domain	•			
	Having specific formative boundaries e.g. portal, counter, threshold, passage		•		
	For emphasis on spatial independence	•			
	Possession of spatial hierarchy in the passage from outside to inside			•	

such a difference in those concepts which have been formed by the subjectivity of these architects so that some of them have emphasized the perceived concept of place while other groups underlined building them by sensual perceptions.

In describing the dimension of human's behavioral-functional interaction with space and in other words, Pallasmaa has paid more attention to the behavioral-functional consequence of the perceptual-conceptual dimension than other theorists and he has described more functional cases while trying to perceive the environment by the audience. Among them, it can be referred to the pause upon entry and related definition, shade and light, and their way of practice in interfaces. It should be noticed of course that Zumthor has also dealt with this field by symbolic expression to review his diaries of trips and to describe architectural works. It seems, among them, phenomenologist architects were more active in the field of design and paid more attention to functional features of the interface and specific behaviors in this space.

Among responsive formative-spatial features of the interface to these requirements and functions, which have emerged by overlapping of attitudes of these architects, one can refer to some cases e.g. possession of certain domain and threshold for interfaces, utilization from specific quantitative and

qualitative features in this space such as creation of different olfactory, gustatory and auditory patterns in interfaces, the harmony of theme structures and tactility, the proper definition of formative-spatial boundaries and having hierarchy in passing from subsequent spaces. It is an interesting point that all of the existing areas in architectural work have been described as an event, which has been formed by nature similar to the harmonic order. Either of these architects has typically expressed these events by their language and mentality; Norberg-Schulz talks about Paris and given biosphere and presents features of an interface entry. Pallasmaa expresses details of house rooms by quoting from Bachelard and mentions the harmonic rhythm of sensual perceptions in the given interface by a rhythmic order. Zumthor implies his perception of a hall at a hotel in Finland and various perceptual dimensions in the design of interface in his hot spa system. Perez Gomez typically suffices with historical identity in his architectural works with borrowing from the philosophy of Gadamer, but despite their different descriptions and subjective orders, the atmosphere governing over their statement shows a point that all of them looked at the world and interface by phenomenological approach. All these architects have assumed precognition as an important element in the perception of this space and considered it as the requirement for the proper perception of place and the formation of suitable qualities of such a space.

Conclusion

The findings indicate that the main perceptual-conceptual requirements, which are emphasized for interface before phenomenologists, can be expressed in three following items:

1- 'Stimulation of human's senses and involvement of all of his perceptions': This factor creates a stronger subjective image of space and provides a better perception of space for the audience.

2- 'Creation of a sense of internality and secured sense of space': To achieve security and equanimity are some of the foremost requirements the human seeks for them in architectural spaces, from perspectives of phenomenologists, the interface could properly affect the creation of this important factor.

3- 'Guiding in specific path, preparation, stimulation': By the creation of pause between spaces at both ends, the interface has reduced duality and on the other hand made them stronger by giving meaning to those spaces.

Similarly, it was characterized that the interfaces could meet the above-said needs by the following functions:

1- 'Function spatial experience with all visual, auditory, tactile and olfactory senses': Namely, the interface can provide an opportunity for its audience to create different experiences from presence in the interior or exterior space with the creation of change in the sensual quality of the environment.

2- 'Function of presence inside, and closure and limitation, and preparation for reflection and thinking': The interfaces, especially inside-inside interfaces e.g. corridors that are often located at the point of connection in public spaces, may increase a sense of privacy in space and potential for reflection in passing from one space to another despite their specific qualities and prepare the individual for presence in new space with specific requirements.

3- 'Function of preparation and experience of passing through spaces, pause upon entry, and action of entry with memory: This function can be more searched in interfaces of entry. The individual is prepared to enter interior or exterior fields by the concepts that are borrowed from individual experiences and diaries in passing from such spaces. Finally, the interfaces should possess some qualities to provide for such practices, including that one can use the distinction in color and texture of materials in these spaces and contribute to spatial independence by application of opposite elements in walls and thresholds at the same time. Despite different pavement geometry and also by application of disharmonic materials, the interfaces may contribute to the creation of various acoustic and echo patterns

in space and better perception of space by users. The appropriate spatial geometry can provide better functions of passing from outside to inside, pause, and preparation to enter inside. Similarly, by application of plants and natural materials, one could add reminiscence of the environment through the creation of olfactory patterns. the entry of pollutants inside the interfaces can be prevented by creating a hierarchy of accessibility and change at the level of passing from the threshold and the connection of open space to the closed space and thereby adding to spatial independence, and creating a sense of internality. Likewise, it can be helped for providing silence in the construction and creation of mental composure in humans by a pause in passing from the main spaces. The existence of certain formative boundaries e.g. by the creation of portal and threshold etc. can be effective in providing such silence and a rising sense of personality and belonging to the space. It can be added to the sense of security and attachment by application of depth or dent that takes entry a little inside to change the lighting at entrance place. The interface can provide different qualities of light and shade by application of suitable arrays. These qualities may provide a sense of internality and conceptual embodiment for the individual. Similarly, they can provide a sense of presence in the familiar and cozy space.

According to phenomenologist architects, if the above-said formative-spatial qualities and features are considered in the design of interfaces, then these three important functions can be provided, including involvement of all internal and external senses with form and space, internality, and hierarchy of passing from outside to inside and thereby to avoid from marginalizing by instrumental attitude to house architecture with interfaces by strong presence.

Endnote

1. An organ within several organs that are connected to all parts in buildings.
Rafiei Sarashki, Bijan, Rafizadeh, Neda & Ranjbar Kermani, Ali Mohammad. (2008). Iran Mehrazi Glossary. Tehran: Housing Bldg. Research Center, under entry of Miyanvar (Interface)
2. Accessibility
3. Visibility
4. Christian Norberg-Schulz
5. Juhani Uolevi Pallasmaa
6. Peter Zumthor
7.Alberto Pérez-Gómez
8. Integrated existence
9. Thinking and thanking
10. Ranjbar Kermani, Ali Mohammad. 2020. Textbook of design process in architecture.

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