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Coding Forces and Their Reflections in the Design of Interior Spaces

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Abstract

Symbolic interactionism derives its strength from incorporating elements of advanced sociological theories, such as the conditional theory that requires relational connections between components, the associational theory that obliges multiple elements in the communication process, the communication theory that generates specific loops achieving cognitive depth, in addition to the Gestalt theory, closely related to perceptual processes. There are also approaches that effectively contribute to dealing with the material and configurations of interior design, encompassing functional and aesthetic aspects, which are reflected in human behavior for acceptance and approval. This necessitates components and factors through which all elements interact in building a close relationship between the interior space as an environment with specific characteristics and defined features and the creative vision embodied in the design elements.

Keywords: *Encoding Processes, Reflection, Design, Interior, Space.*

CHAPTER ONE

1. The Research Problem:

Interior design possesses unique characteristics, with technical attributes associated with the materials and resources used globally and ethical aspects tied to the user's engagement with these indoor spaces. This interaction can have both direct and indirect impacts, fostering mutual influence and positive reflections generated by the elements and vocabulary of design within the visual field. In addition, interior design is instrumental in the success of institutions, as it influences factors such as comfort, ease of movement, security measures, and other physical elements in the spatial composition. From this perspective, the design of interior spaces is linked to various theories, including social and psychological theories, specifically theories within the realm of art psychology. Among these approaches, symbolic interactionism stands out as one of the leading trends in sociology. It is rooted in the conditional theory, which underscores the presence of interpersonal relationships between two components. Furthermore, attachment theory binds two or more elements in the communication process, while communication theory creates specific cognitive loops. Additionally, Gestalt theory is closely intertwined with processes of perception. These theories play a substantial role in the manufacturing of interior design by engaging with materials and visual configurations, while relying on the functional, performance, and aesthetic aspects. They effectively stimulate users of these interior spaces, fostering social engagement.

Contemporary scientific paradigms continuously seek to develop theories that intertwine their elements to maximize human benefit. This is achieved by providing cognitive systems that facilitate communication and formal utilization, leveraging their unique properties and nature. This is tangibly exemplified in the components of scientific and research centers, which structure their spaces based on encoding strengths. However, we observe a lack of genuine

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utilization of local social centers' spaces to attain attraction and interaction. This calls for attention and a thorough review of the requirements and standards for productive, positive interaction. Through a specific survey visit to one of the research centers, known as a globally active institution with a social dimension, and a model to be followed in the field of applying the principles and mechanisms of symbolic interaction theory, the research problem is highlighted through the following question:

> **"What is the relationship established through the interaction of encoding forces and their reflection in the design of human-occupied interior spaces?**

2. Importance of the Research:

The importance of this research is based on the following page

A. Enriching the cognitive aspect of encoding forces by highlighting the fundamental principles that underlie these orientations in the culture of interior design and their extended relationships to the research centers' spaces in the Arab region.

B. Shedding light on the concepts of encoding principles and mechanisms for the development of interior spaces for Arab research centers.

C. The research contributes to elucidating the role of the interior designer through the process of understanding, which requires specialized culture and effective guidance to the highest level of spatial factors to achieve a design product with a coding interaction within the interior spaces of global cultural centers.

3. Research Objective:

The current research aims to:

A. Reveal the reflection achieved by encoding forces in interior space design.

4. Research Boundaries:

The research is defined as follows:

A. **Objective Boundaries:** Studying encoding interaction forces and their reflection in the development of research center spaces.

B. **Spatial Boundaries**: The boundaries of interior spaces represented by Arab research centers in the Kingdom of Saudi Arabia, Riyadh city.

C. **Temporal Boundaries**: From the year 2007 to the end of 2022.

5. Term Definitions:

A - Encoding Forces:

1) **Forces:** They are the conflict between two or more components representing the effectiveness of activity for things and the reactions that result from it. (Hafez, 1990, page 6)."

2) Unique and Distinctive Feature of Human Interaction: **

A unique and distinctive characteristic of human interaction is that people interpret and attribute meaning to each other's actions, rather than simply offering a mere response. Their responses are not generated directly; instead, they are based on the meaning they attach to these actions (Blumer, 1996, p. 34).

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B. Encoding:

1) A symbol, such as a symbol of belonging, emanates from the entity or object it represents, thereby reaffirming its current presence (Todorov, 2012, page 25).
2) It is a function, sign, or signal that represents objects and subjects, taking the place of the thing being symbolized and rendering it available to the senses (Al-Aswad, 2002, page 26).

Procedural Definition: Encoding Forces:

Procedural definition refers to encoding forces as the strategic mechanisms that emerge to drive performance activity at both the technical and human levels, interlinked in terms of values and creativity to accomplish functional tasks within interior design**.**

Procedural Definition: Interior Space:

Procedural definition defines interior space as the designated spatial area with dimensions of length, width, and height. This space contains a collection of components and elements that are organized in accordance with functional (performance and aesthetic) principles. It encompasses symbolic interactions within its content**.**

CHAPTER TWO

Firstly, the Forces of Interaction between Concept and Application and Their Reflection on Interior Spaces:

Interior design represents a crucial link in shaping interior environments characterized by their distinctive qualities and attributes that make them both functionally performance-oriented and visually and aesthetically representative. It is a significant element among the technical building components of interior spaces. Therefore, it must be distinguished by features that set it apart from other art forms, serving as both a practical and creative field that reaches the realms of critique, analysis, processing, and composition. Given its close connection to society, its effectiveness has been realized through the integration of sociological institutions and the art of design as a means to achieve psychological dimensions and psychological impacts.

Concepts are like keys that unlock words and phrases, shaping the meanings and implications of topics. They serve as linguistic foundations for describing and expressing vocabulary. Interaction and interactivity work together in a harmonious way, with interaction being the force that emerges instantaneously between a component and a phenomenon or situation. Meanwhile, interactivity refers to "analytical patterns preferred in the field of sociology, involving reciprocal actions and interactions between individuals and groups" (Dortier, 2009, p.247) It's like when people communicate and interact with each other, there are certain forces and actions that shape the process. Some interactions happen in the moment, while others are ongoing and meet daily needs. It's a unique and special characteristic of human interaction that people interpret and understand each other's actions." (Blumer, 1996, p. 78).

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1. The symbolic and value-based interconnection between sociology and art and design:

The sociologists and aestheticians have explored the connection between sociology and art and design. They examine how natural and social factors influence the artist (designer) and their creative artistic production. This aligns with the perspective of beauty scholars and philosophers who study aesthetics through external and specific factors (such as the environment, era, and gender) Aesthetic scholars have also noted the impact of the intensity of life on an individual's need for creativity and expression of artistic genius and its associated aspects (Lalu, n.d.p. 6).

The relationship embodied by the nature of artistic production, regardless of its type, must inevitably align with societal relationships and their reflections within the diverse factors contributing to creating a suitable and sustainable environment for humanity. This is what has made sociology closely and continuously intertwined with the applications of art and design, as well as the realization of social studies and the impact of population environments with their multifaceted functions and components in the priorities of scientific approaches.

2. The conceptual interpretation of symbolic meanings and their effectiveness in interior spaces:

Shaping forms in interior design in their symbolic form is a creative process in the composition of new patterns of processes that rely on the fundamental process of symbolic interaction between users of spaces and the potential for sensory perception. This is achieved through lines, colors, surface depth, or movement, which is the essence of symbolic interaction of visual form, often expressing human emotions or connecting internal life environmentally through symbols. The design form is a "symbol of human emotions," because design forms must express human emotions, and these forms are not sensory but perceptible forms. Some works of art give wings to the imagination (Hakim, 1986, p. 12). What goes to the mind of the contemplative user of spaces is the similarity of this artistic image to the structural nature of the form, which creates a symbol of the underlying condition that the user senses.

Hence, the form becomes a symbolic sign, representing something with no physical resemblance, which is achieved in many contemporary design works, especially for buildings representing cultural centers. The formal employment of these spaces and the realization of content represented by fear, joy, war, justice, democracy, loyalty, ownership, and other descriptions that grant a specific visual identity to the place, the symbol plays a leading role in achieving expressive power as an effective contribution to the user's feelings. Symbolic forms must express the issues in the way that issues are expressed as the formulation of an idea or concept for a specific situation, such as the interior spaces for meetings or conferences. The symbolic form has a "unique entity because it is a creative symbol and not an imitation of nature or reality. On this basis, we can aesthetically appreciate it by looking at the work itself and its internal beauty, unity, effectiveness, and vitality" (Hakim, 1986, p. 26).

Secondly: the reflection of symbolic interaction forces in the components of interior spaces:

Reflection phenomenon arises through a set of values represented by shapes with their inherent characteristics and features falling under the visual qualities of objects, expressed by the identity and distinction of objects according to what is generated by the symbolic interaction force within the entities in the interior design environment. These may undergo some processes and adaptations between deletion, addition, overlay, and proportion in achieving relational relationships between the components of interior spaces.

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Symbolic Internationalism is one of the fundamental pillars upon which social theory relies when analyzing social patterns and intervening in the ways that establish a relationship between individuals and society, taking into consideration the means and tools that enable these frequencies or reflections at the level of perception, behavior, and interpersonal interaction with the components of human existence. Since it starts at the micro level, beginning with individuals and their behavior as an entry point to understand the social pattern (Joullani, 1997, p. 215). Thus, individual actions become constant to form a structure of roles, and these roles can be viewed in terms of human expectations towards each other in terms of meanings and symbols. Here, the focus is either on role structures and social patterns or on role behavior and social action (Krepp, 1999, p. 130). It also looks at social structures implicitly, following the same method as Parsons, but it does not occupy itself with self-analysis at the level of patterns (Krepp, 1999, p. 131). Its interest lies in those structures of symbolic interaction formed through language, meanings, mental images, and formal compositions, based on an important fact that every individual must incorporate the roles of others within the scope of activity and performance.

Interactive theorists study the structural system in interior design, which is a space for social interaction. The relationship between spatial perception and its components is crucial because it negotiates the truth within the space. The recipient perceives the physical existence and interacts with it. Designers and recipients interact with each other based on these statements. (Ahmed, 1995, p. 180), taking into consideration the existence of (face-to-face interaction), which involves direct, non-symbolic interaction that occurs in physical space. Likewise, there is unfocused interaction, a non-symbolic interaction that occurs in mental space and does not lead to direct communication but instead reflects on the symbol at the receiver's end. Symbolic Interaction, a sociological theory, represents a dynamic reflection on the meanings individuals attach to symbols and how this leads to the development of the self-concept and the formation of identity (Giddens, 2005, p. 360). In addition to the impact of interaction that is mediated through the reflection of symbols in the receiver's mind, it also affects the feedback received through the feedback loop, which relates to the reflection generated by a symbol in the receiver's mind.

The visual relationship, whether between one part and another or between one part and the whole, thus determines the expression in which the symbolic interaction's force is embodied when conveying the desired meaning in internal spatial configurations. This prompts us to focus on three levels that determine the meanings of symbolic formations, as follows:

1. Semantic Meanings:

These relationships are based on the effectiveness of signals and what they signify, which are shaped by levels of expression such as shape, color, size, and rhythm. Their connotations represent content like intended meanings and the aesthetics that are socially linked to the inner space and its symbolic landmarks.

2. Syntactic Meanings:

It revolves around the formal relationship of signals, indicating shape and its characteristics, and is conveyed through vocabulary, pattern, model, property, and style.

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3. Technical Meanings:

It focuses on the intellectual and scientific development and its relation to technical and structural evolution of environmental components and their relationship with humans, distinct from signals, interpretation, and encoding (Gandeisonas, 1980, p. 245).

Thirdly, the theory of Gestalt and its relation to symbolic interaction:

This theory is based on the sensory perception of contrasting images and the elements contained within them, surrounded by a background. It emphasizes the specific differentiation of elements, depending on the influence of the forces present in the visual field of the image and its background. It assumes the existence of a configuration between its specific laws and the latent processes in the nervous system. The ideas of this theory are divided into (configuration, symmetries, visual field forces, laws of aggregation) (Lang, 1987, p. 86).

A. Configuration: It is the thing composed of the structure closed in the visible world. Shapes and configurations appear as a visible part on the background that harmonizes with everything and dominates, being associated with a level and subject to laws, as follows:

1) Everything exceeds the sum of its constituent parts, and the resulting form from assembling these parts. The form of the accomplishment is a culmination of assembling its constituent elements and the relationships between them. The final characteristics of the accomplishment are acquired from the characteristics of its parts.

2) Parts acquire additional characteristics beyond their original traits as a result of their belonging to the overall shape of the accomplishment. For example, the sea in the natural world is a complementary part of the landscape and possesses additional traits because it is a part of the whole picture.

3) Meaning is achieved through the overall control of the whole over its parts. Each part adds its characteristics to the whole and the meanings it acquires from the entire accomplishment. In this way, perception is achieved for every integrated and interconnected part (Khayyat, 1995, page 34).

B- Similarity: An optical process where similar elements are compared with variations in their origin. This process takes place in the nervous system, governing the presence of elements in integrated forms. Similar processes occur in stored images as a result of experience and previous experiments. This forms the basis for perception.

C - Visual Field Forces: There are attractive forces between two or more elements, depending on the nature of the relationship between these elements, which carries the gravity of balance, stability, symmetry, or harmony, among others, in visual perception. All forces in visual experience appear in the perception of the recipient and are subject to the laws of nature.

D - Assembly Laws: The gestalt laws of perception manifest themselves according to the laws of assembly. The visual system organizes the parts into wholes based on the laws of assembly (Lang, 1987, p. 87).

Fourthly: Encoding and its Variability in Form.

The process involves giving meanings to sensory inputs in memory in a way that helps retain and facilitates their later processing. It's essentially a transformation of sensory inputs from their natural form into various forms of cognitive representation, whether visual, symbolic, or auditory. A cognitive information processing system cannot carry out its cognitive

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functions on sensory inputs as they are in their natural state unless they are encoded and encoded, which often occurs in short-term memory, after receiving these inputs from sensory memory (M.H. Human, 1989, p. 76).

Scientific evidence suggests that sensory information is encoded into different types of memory traces depending on the nature of the receiving sense. The following types of encoding processes can be distinguished:

1. Visual Coding: In this type of encoding, sensory input properties, such as color, shape, size, and location, are represented with specific meanings.
2. Acoustic Coding: Here, information is represented in an auditory manner by forming traces of the heard sounds, including aspects like rhythm, intensity, and frequency.
3. Haptic Coding: This encoding represents information through the sense of touch, forming traces related to the texture, roughness, hardness, and temperature of objects.
4. Semantic Coding: Information is represented by its meaning in semantic coding, often linked to both visual and auditory encoding.
5. Motor Coding: This type of encoding represents motor actions through their sequences and execution methods. It is also connected to visual and verbal encoding (Green, 1984, p. 45).

It should be noted here that not all sensory inputs we receive at any given moment are encoded, as their volume often exceeds the capacity of short-term memory. Since unencoded inputs do not enter cognitive processes, they are not considered part of our experience. Therefore, the inability to encode several sensory inputs can be attributed to a failure in attention (Za'alool, 2009, p. 68).

Shapes serve multiple purposes in interior spaces, and designers adopt them to achieve symbolic expression and positive interaction. These purposes include:

1) Immediate Purpose
2) Historical Purpose
3) Social Purpose
4) Individual Purpose
5) Aesthetical Purpose
6) Symbolic Purpose

Taking into consideration that the aesthetic and symbolic purposes are present in all designs in certain proportions and are always not supplementary or incidental but rather an essential component of the formal flow at the level of composition and expression. This means that the aesthetic or symbolic purpose is the fundamental functional purpose of interaction in interior design, aiming to achieve aesthetic depth through the design relationships between various formal configurations, according to their function, through harmony, coherence, proportion, scale, dimensions, regularity of orientation, and compatible distribution (Khadra, 1999, page 11).

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The researcher believes that symbolic interactivity relies on these fundamental theories in the field of psychology, which achieve arousal, motivation, education, perception, and are based on the laws of behaviorism, associationism, and gestalt in comprehending and understanding the world, the environment, and perception that embodies the ways of human interaction with the entire visible and invisible world.

CHAPTER THREE

1. Research Methodology: The descriptive methodology was adopted for the purpose of analysis, tailored to the research's objectives and subject matter.

2. Research Community and Sample: A research community comprising the latest influential technologies in the reception process was adopted. This community was designed by the architect, Zaha Hadid, who is knowledgeable about human interaction within social spaces. It possesses unique qualities that align with the motivations of the recipient who interacts with each element of interior design. Specifically, in the Arab region, within the Kingdom of Saudi Arabia, in the capital city of Riyadh. The center's construction stands out within the context and field of petroleum. In this model, principles of the semiotic theory (symbolic interaction) were integrated as a reflective and essential element, considering it the first center in the Arab region that employs all the techniques of symbolic encoding to achieve cognitive and visual interaction.

3. Research instrument: The research tool was determined based on the theoretical framework's axes as a scientific foundation upon which the research relies for analysis and obtaining problematic outputs related to the subject matter. Subsequently, axes were aligned with the research's objectives.

The interrelationships of symbolic interaction forces.

Components of the internal space and its encoding levels.

4. Model Description and Analysis:

A - Description:

The King Abdullah Center for Petroleum Studies and Research, abbreviated as CAPSAR, is a consultancy and research center in the field of global energy economics and sustainability. It provides consulting services to entities and authorities in the Saudi energy sector. Established by a decision of the Saudi Cabinet on July 10, 2007, CAPSAR is a non-profit center that conducts independent research in the field of energy economics. It employs international experts from over 15 nationalities.

In 2020, CAPSAR was included in the annual global ranking of research centers and civil society organizations published by the University of Pennsylvania in the United States. It was listed among the top energy research centers, ranking 12th in the list of the top 60 research centers in energy policies and resources. In the Middle East and North Africa region, which includes 101 research centers, CAPSAR ranked 15th according to the annual global ranking of research centers and civil society organizations published by the University of Pennsylvania in the United States.

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"B - Analysis:

Interrelation of Symbolic Interaction Forces:

The interrelations emerged based on visual stimuli in the structural composition of the building, both externally and internally, taking into account the building's location in the desert, which serves as an open space for such structures. This building, in its technical processes, embodies the sustainable environmental aspect that achieves the best and most complete relationships reflected in the origins of interactive forces in encoding the engineering components. This suggests breaking free from the constraints of symmetrical engineering, as the spaces follow the shape and external structure of the building. In other words, compatibility is achieved through the interactive exchange of the building's structure, as shown in figures (1, 2)."

The descriptive relational aspects of this social center encompass various meanings and connotations. Some relate to renewal and authenticity, while others draw their elements from uniqueness and contemporaneity. This interplay stems from the fundamental aspects of the interaction between openness to the outside and the diversity of ceiling structures in accordance with the manifestations of natural lighting within the area (place). The stimuli for interactive forces are embodied by the internal spaces in their diverse, unrestricted geometrical configurations, elevating the focus towards extension and continuity through the structural forms of column configurations, as seen in figures (3, 4).

The levels of internal structural and operational meanings have come to contribute to raising the level of cognitive interaction and the sense that the strength of the space falls within the realm of imaginative interaction towards those forms that deepen the connections between the pathways of corridors and vertical networks, as exemplified in figure (5) and the network as in the main hall of the auditorium space, which represents a gathering and public meeting place that accommodates the largest group of attendees, as seen in figure (6).

The components of interior space and their encoding levels:

Form configurations come to life through their activities in the visual, auditory, tactile, semantic, and kinetic levels, bestowing upon the spaces their dynamic forces. Through these levels, patterns of thought and emotional movement flow, merging with deep perception through the perspectives of creativity and development, achieved by the paths of movement and navigation within aesthetic configurations. Their function is to break rigidity and achieve diversity, as shown in figures 7 and 8.

We observe the design of interior spaces designed based on the interaction resulting from expression by the engineer and designer (Zaha Haddad), reflecting self-awareness and technical processing in constructing and structuring the design. The interior design encoding is based on the convergence of three elements:

A) The world of visual reality, from which it originates, borrowing its materials, subject to interpretation.

B) The world of form, meaning the necessities imposed by the material used and the method of manufacture.

C) The world of thoughts and emotions that drive and imprint the designer who wishes to embody them. Expressive action cannot occur without an external (stimulating) source that leads to an internal (self) reaction in the person experiencing it. To achieve this emotional

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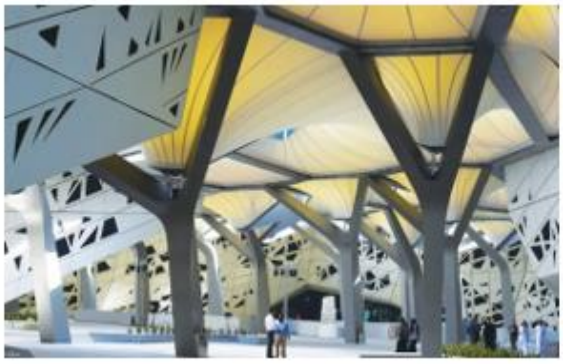
response, there must be a material, form, or subject that stimulates it, and there must be cognitive possibilities connected to the individual's life and environment. This is what reinforced the presentation of a different pattern for encoding renewal from a contemporary perspective that moves forward towards a technical world where functional, aesthetic, and technical aspects intersect as the link in the formal and ethical cohesion, as shown in figures 9, 10, 11, and 12.

We also find the presence based on the future vision in addressing the advanced service level in providing modern indoor pools. It symbolizes the depth of Arab civilization in preserving the aquatic environment as a vital asset represented by the climate's nature. These choices manifested in providing comfort for the users of these buildings in the desert, as shown in figures 13 and 14.

Form (1)

Form (2)



Form (3)

Form (4)

Form (5)

Form (6)

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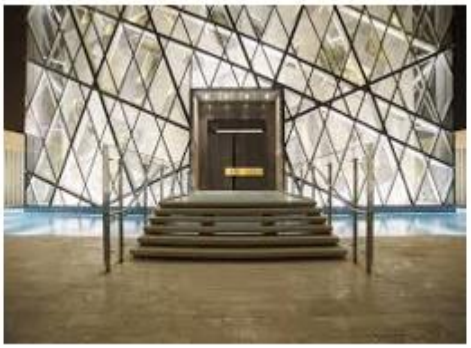
Form (7)

Form (8)

Form (9)

Form (10)



Form (10)

Form (11)

Form (12)

Form (13)

By the design of Engineer Zaha Haddad, King Abdullah Petroleum Studies and Research Center in Riyadh.

Source: **https://www.gheir.com/%D8%AF**

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CHAPTER FOUR

1. Results and Discussion:

In light of the analysis of the internal spaces of the Petroleum Research Center, the following results have emerged:

A- Achieving the synergistic power of encoding based on advanced cognitive techniques in the structural design between the interior and exterior, allowing for the freedom to design interior spaces to achieve positive interaction for users of those spaces.

B- The formal harmony between interrelated relationships provides the interior design with a spacious area for formal harmony and interconnection of those relationships through symmetrical vertical and horizontal configurations of columns and networks that form functional bridges.

C- Achieving the level of interaction for forms that express the level of perception in processing natural and artificial lighting and the flow of openness towards processing in roofs and openness to nature, given the desert nature of the location, high temperatures, and climate fluctuations.

D- Establishing links between the types of materials used, their extent, and their references related to heritage aspects with a renewed and advanced perspective that has been processed through imaginative representation to evoke a sense of heritage and authenticity.

E- The mechanisms of engagement (visual, auditory, tactile, semantic, and kinetic) provide interior spaces with their diversity and multiplicity, dynamic forces for movement and navigation between corridors and side spaces.

F- Achieving encoding that reflects self-awareness through triggers (the world of visual reality, the world of triggers, the world of thoughts and emotions) to embody architectural encoding of external configurations and their corresponding internal spaces in formal alignment, as an inspiration for structural representation.

G- Relying on the indicators of the laws of gestalt has endowed interior designs with qualities of diversity and integration as a cohesive organic unit that contributes to the interplay of functional, aesthetic, and technical aspects together to achieve equality in performance.

Conclusions:

In light of the findings and the theoretical framework, we draw the following conclusions:

A. Interactive forces stem from spatial components by drawing inspiration from heritage and civilization, and by building modern bridges to achieve encoding in interior design.

B. The configurational effort of encoding forces depends on the presence of intellectual and organizational pathways and levels that frame the design, based on the environment, climate, space, external factors, and the nature of materials used in the design.

C. Interrelationship relationships are characterized by formal, functional, and aesthetic compatibility, achieving appropriate performance with degrees of visual harmony in the structure of interior spaces for social and research centers.

D. The exchange of reception and communication levels is based on the symbolic expression of the intended purpose.

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Recommendations:

Based on the analysis results and conclusions, the research recommends the following:

A. Establish a relationship between natural environments and the components characterized by climate factors, as well as processes that can achieve the highest level of efficiency according to a codification perspective for designed shapes of spaces with extensive use, such as research and social centers.

B. Foster a common focus on sustainable green environments and the effectiveness of encoding as driving and attractive forces for perception and sensation to elevate human development.

C. Emphasize the establishment of comparative relationships between the components involved in the design of open spaces and enclosed spaces at the level of formal encoding for local service center buildings.

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