

THE EFFECT OF VISUAL PERCEPTION ON A SPATIAL SEQUENCE IN THE AQUARIUM MUSEUM

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ABSTRACT

Perception is a sensory-mental process through which a person gives meaning to the surrounding elements, and one of the most important types is visual perception, whose effect differs from one person to another depending on factors specific to the perceiving person or the perceived thing. Architecture is distinguished from other arts by the interaction of form with time during the visual sequence, whether external or internal, functionally and aesthetically.

One of the visually distinguished buildings is the Aquarium Museums, which have aesthetic and functional characteristics that are visually perceived through the internal and external visual sequence.

The purpose of the research is to study the effect of visual perception on the visual sequence in aquarium museums, by studying both visual perception and visual sequence in terms of characteristics, components, types, and Mutual effect then studying the functional and aesthetic requirements of Aquarium museums.

Through the information obtained by the research, a model is proposed to evaluate the reciprocal relationship between visual perception and visual sequence in aquarium museums, and then to prove the validity of this model through an analytical study.

KEYWORDS: Visual perception, Aquarium Museum, Spatial sequence, Gestalt theory.

تأثير الإدراك البصري على المتابعة الفراغية في متحف الاحياء المائية

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المخلص

الإدراك عملية حسية-عقلية يعطي الإنسان من خلالها معنى للعناصر المحيطة ، ومن أهم أنواع الإدراك البصري ، الذي يختلف تأثيره من شخص لآخر اعتماداً على عوامل خاصة بالإدراك أو الشيء المدرك، وتتميز العمارة عن الفنون الأخرى بتفاعل الشكل مع الوقت خلال التسلسل المرئي ، سواء كان خارجياً أو داخلياً ، وظيفياً وجمالياً، ومن أحد المباني المميزة بصرياً هي متاحف الأكواريوم ، والتي تتميز بخصائص جمالية ووظيفية يتم إدراكها بصرياً من خلال التسلسل المرئي الداخلي والخارجي.

الغرض من البحث هو دراسة تأثير الإدراك البصري على التسلسل البصري في متاحف الأحواض المائية ، من خلال دراسة الإدراك البصري والتسلسل البصري من حيث الخصائص والمكونات والأنواع والتأثير المتبادل ثم دراسة المتطلبات الوظيفية والجمالية للحوض. المتاحف.

من خلال المعلومات التي تم الوصول إليها في البحث ، تم اقتراح نموذج لتقييم العلاقة المتبادلة بين الإدراك البصري والمتابعة البصريه في متاحف الأحواض المائية ، ومن ثم إثبات صحة هذا النموذج من خلال الدراسة التحليلية.

الكلمات المفتاحية: الإدراك البصري، متحف الاحياء المائية، المتابعة الفراغية، نظرية الجشطالت.

1. INTRODUCTION

Aquarium museums are specialized museums for displaying and studying living organisms and plants that live in water.

This museum is characterized by formative properties that express it and are visually perceived through the external and internal visual sequence, which consists of the interaction of the building with the surrounding environment externally and the interaction of spaces internally through time.

1.1. Research problem:

Impaired visual perception of the external and internal spatial sequence elements in aquarium museums.

1.2. Hypothesis:

The possibility of making a model to evaluate the relationship between visual perception and spatial sequence in aquarium museums and this model can be applied to existing buildings or during design.

1.3. The objectives of the research:

* Create a model to evaluate the relationship between visual perception and spatial sequence in aquarium museums and this model can be applied to existing buildings or during design.

* Derive the relationship between visual perception requirements and spatial sequence in aquarium museums.

2. AQUARIUM MUSEUMS:

The museum is a non-profit building, that displays everything related to man and his environment with the aim of preservation, study, and education [1].

Museums are classified in several ways, the most important one is the nature of the museum group[2]:

* Culture group (Archaeology - Art - History - Ethnicity - Science and Technology).

* Natural group (Natural history - historical plants - geology - historical animals - aquatic life).

* Archaic group (libraries-manuscripts)

The Aquarium Museum is an aquatic aquarium in which living organisms, including fish and plants, are raised and have a transparent facade for display [3].

The Aquarium museum consists of the following elements:

Main entrance - Lobby - qualitative tanks - digital presentation hall - main aquarium - aquarium services (laboratories - stores - service spaces) - public services (restaurants - cafeterias - shops - library - multi-purpose hall) - administrative spaces.

2.1. Aquarium Components

The aquarium is made of transparent material, mostly acrylic, and its size is commensurate with the quality and volume of the light reality (it is forbidden to use natural lighting because it leads to the formation of algae), the color temp and photo synthetically active radiation must be taken into account [4].

* Heater: To achieve the appropriate temperature for the need of the organism.

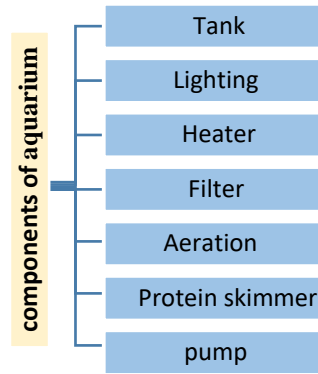


Fig. 1: Aquarium components

- * Filter: Responsible for water purification internally and externally.
- * Protein skimmer: To remove protein waste and suspended particles.
- *Aeration: To achieve the percentage of dissolved oxygen in the water to preserve life.
- * Pump: Stirring and moving the water.

2.2 Aquarium Classification

Aquarium museums are classified into Fig. 2.

- * according to water type: Sweet - salty - semi-salty
- * according to the type of fish: touch pool- coral reef-predator- crocodile- community- turtles- jellyfish- penguin- fossil- delphinium.
- * according to habitat regions: Laccadive sea- east Africa coastal- red sea...etc.
- * according to aquarium size: main- secondary- tunnel- research
- * according to the technique: virtual- interactive- Excavations in augmented reality.

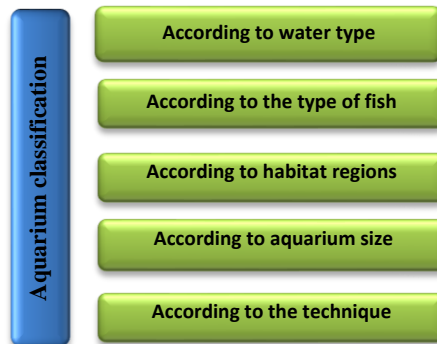


Fig. 2: Aquarium classification [5]

3. FORMATION OF AQUARIUM MUSEUM:

The Aquarium is characterized by a distinctive formation, whether on the external level or on the level of forming internal spaces, The architectural formation is defined as the physical shape of the building.

3.1 Factors Affecting the Formation of Aquarium Museum

These are the elements that must be considered while designing the Aquarium Fig. 3.

* **Site:** There are two options for aquarium location next to or on water, And to take into account the interaction of the shape with the wind and the quality of building and finishing materials suitable for coastal areas.

* **Function:** The external shape of the museum and the visual expression of the internal spaces must express the museum's function and the exhibits' nature.

* **Aesthetic:** It is the pleasure that the viewer feels when looking at the building and it has several types (physical aesthetic - emotional aesthetic - thoughtful aesthetic)

* **Structure system:** It is the skeleton that forms the building, it is one of the important elements to achieve the function of the building.

The interaction with the structural skeleton is done visually in three ways (dominant - implicit - participant).



Fig. 3: Factors affecting the formation of aquarium museum Primorsky Aquarium Russia -Arch Daily.com [6]

3.2 Elements Forming the Interior Space

* **Floor:** It is the horizontal plane that represents the base of the space.

Functional effect: Endurance - ease of maintenance - degree of reflection and absorption of sound and lighting - safety from slipping.

Aesthetic effect: The visual impact on space properties through color, texture, levels and design form.

* **wall:** They are the vertical elements that determine the degree of containment and closure in the space.

Functional effect: Visibility and privacy - weather resistance.

Aesthetic effect: The visual impact on space properties through color, texture, lighting, and design form.

* **Ceiling:** It is the surface that covers the void and determines its shape, size, and the extent of its impact on the user. It may be constructive or suspended.

Functional effect: Determining the scope of the space - the level of sound insulation - distinguishing one space from another - protection from weather factors.

Aesthetic effect: The visual impact on space properties through color, texture, lighting and design form [7].

3.3 Spatial Sequence

Architecture is distinguished from all the arts that deal with the three basic dimensions (length-width-height). It deals with the fourth dimension (time).

Architecture is a sculptural mass that man perceives and interacts with within an external and internal time sequence.

A visual sequence is known as a group of elements connected with each other in a time sequence to form a visual system of the building that affects the viewer and the sense of its external and internal spaces Fig. 4 [8].

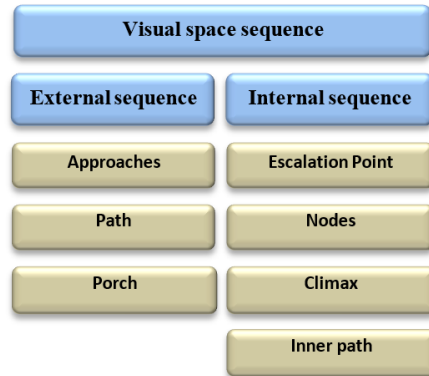


Fig. 4: Kinds of Visual space sequence

3.3.1 External sequence:

It is the result of the interaction of the building with the surrounding environment over time, the outer sequence consists of:

* **Approaches:** It is the movement line that leads to the building and allows it to be seen during this movement, this linear motion may be vertical, Diagonal, or spiral, it is necessary to balance the interest in the main building with interest in the external environment, as each of them complements the other.

* **Path:** It is the line of movement in the surrounding space that leads to the building, this path is characterized by its linear nature, which has a starting point, a space sequence, a peak point, and an endpoint. the types of this path (linear- radial- spiral- grid).

* **Porch:** It is the transitional space between the outer and inner sequence, it is the peak of the outer sequence. it is considered one of the most important elements that affect the visual image of the building

3.3.2 Internal sequence:

It is the spatial sequence that is realized inside the building.the internal sequence consists of:

Escalation point: It is the void formed in the entrance hall and from it the beginning of the movement to the other sub-spaces.

Inner paths: It is the internal movement network that connects the Stepping-up point and other sub-spaces.the path must be in one direction (linear, radial, spiral).

Nodes: the spaces formed by the intersection of the path with the view directions. it is considered a point of refraction in the path or points of change in space, movement, and scenes.

Climax: It is the end of the path (the main space to be reached).

4. VISUAL PERCEPTION:

It is a sensory-mental process that a person performs to give meaning to the surrounding elements, or it is a mental ability that organizes and Explains environmental inputs that we receive through sensations.

Perception is divided into several types (auditory perception - visual perception - tactile perception - kinesthetic perception), All kinds come together to form the general perception

Visual perception is what we have formed from a concept or idea as a result of visual environmental effects through the eyes.

4.1. Influencing Factors on Visual Perception

The following elements effect on visual perception Fig. 5 [9]:

* **Objective factors:** Specific to the perceived object (space- lighting-color-shape-texture- Transparency and porosity-material).

* **Subjective factors:** Specific to the perceiving person (gender - age - physical structure - culture - physical environment - environmental culture - psychological state - previous experience).

* **Viewing conditions:** viewing angle- viewing time- viewing distance

Influencing factors on visual perception		
Viewing conditions	Subjective factors	Objective factors
Viewing angle	Gender	Shape
Viewing time	Age	Lighting
Viewing distance	Physical structure	Color
	Environmental culture	Texture
	Psychological state	Transparency and porosity
	Previous experience	Material

Fig. 5: Influencing factors on visual perception

4.2. Perception of Form Phases

The most important putting explanation for the phases of perception of form is the Gestalt theory, which means in German language form or shape.

Gestalt is a school of thought that originated in Germany in the early twentieth century and developed a theory to explain visual perception through the idea that (the whole is more than the sum of its parts). the theory states that perception passes through three stages:

* **Gross perception:** The whole shape is perceived first without looking at the details, where the shapes of the parts isolated from each other have no meaning.

* **Analytical perception:** Realizing the relationship between the parts and analyzing the different shapes that make up the whole.

* **Back to the Gross perception:** A recombination is made between the parts to return to the overall view so that the form can be understood as a whole unit [10].

4.3. Gestalt laws

The theory explains the different ways of visual perception Fig. 6 [11]:

* **Continuity:** The eye tends to follow something until it encounters something else. So the broken shapes can be completed.

* **Symmetry:** Eye numbness seeing similar shapes as elements of a homogeneous group (part of a general formation).

* **Closure:** The eye tends to see the completed shape even if there is a cut-off part of it or there are gaps between the objects.

* **Convergence:** When a group of similar shapes converges, the eye tends to see them as one shape, whether similarity in shape, color, texture, size...etc.

* **Form and background:** The eye tends to separate the form from the background to distinguish it from the surroundings.

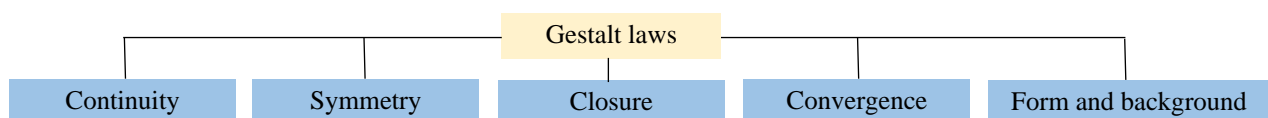


Fig. 6: Gestalt laws

5. THE EFFECT OF VISUAL PERCEPTION ON THE SPACE SEQUENCES

As mentioned previously, internal spatial succession is a time-sequential space, and the spaces are formed from walls, ceilings, and floors. these spaces are affected by the factors that constitute perception [12].

5.1 Material

The material must fulfill two factors (safety - functional suitability).

- In floors: Soft floors are avoided and anti-slip is used.
- In walls: Use of moisture, acid, and alkali-resistant materials.
- In roofs: It has no conditions in the material, but it uses materials for the formal effect on the nature of the place.
- In aquarium: Transparent materials such as glass and water pressure resistant.

5.2 Color

Color is one of the important elements affecting the perception of space.

- In floors: Neutral colors that do not reflect light.
- In walls: Quiet, homogeneous colors with the aquariums so as not to distract attention.
- In roofs: Light colors to show the ceiling higher.
- In aquarium: Nontoxic natural colors.

5.3 Texture

It is the degree of visual contact between the space and other spaces.

- In floors: Use soft, non-slip floors such as vinyl.
- In walls: The use of natural or synthetic materials that are processed to mimic nature.
- In roofs: The use of different effects serves the nature of the void.

- In the aquarium: The facade is smooth and transparent, but inside the aquarium, there are natural or artificial materials that mimic nature.

5.4. Transparency and porosity

Surface textures are felt through their interaction with light.

- In floors: Transparent floors such as glass can be used if safety and non-slip are achieved.
- In walls: It is used to achieve lighting, ventilation and visual connection.
- In roofs: Giving a sense of visual connection with the sea environment.
- In aquarium: Achieving visual connection between the aquarium and the surrounding spaces.

5.5. Lighting

It is the main factor in achieving the museum's function, and the lighting is either natural or artificial

- In floors: Using them to direct the scenes and understand the levels is preferable.
- In walls: It is not preferable to use side lighting so as not to distract the viewer from the exhibits.
- In roofs: Basic lighting is in the ceiling for all spaces except for the basins.
- In aquarium: Indirect lighting simulates the natural life of fish.

5.6. Shapes

Completing the shape of the void with its various elements in the mind of the viewer begins to realize the dimensions and proportions of the void, Also, this shape must achieve the required function and aesthetic at the same time.

- Function perception: Realizing the function of the building and the ease of access to it.
- Aesthetic perception: Achieving the aesthetic interaction between the environment and the building in a temporal sequence that allows the viewer to interact visually.

6. SUGGESTING AN EVALUATION MODEL FOR THE RELATIONSHIP BETWEEN VISUAL PERCEPTION AND SPATIAL SEQUENCE IN THE AQUARIUM MUSEUM

Through the research, the elements related to the relationship between visual perception and spatial sequence in the Aquarium Museum were identified as Shawn Table (1);

- Influencing factors on visual perception: viewing conditions (viewing angle - viewing time – viewing distance) - Perceived object factors (shape- color- texture-light-material- transparency and porosity).
- External space sequence: approach – path – entrance.
- Internal space sequence: Escalation point - nodes- climax- spatial organization

These elements were formulated in the form of a model to measure the relationship between visual perception and the spatial sequence in aquarium museums

The model consists of 111 main measurement points, the evaluation is based on four values: 0 no effect - 1 weak effect - 2 moderate effect – 3 strong effect, the highest measurement value in this model is 333 degrees.

Table 1: Evaluation model for the relationship between visual perception and spatial sequence in the Aquarium Museum

influencing factors on visual perception		viewing conditions			Perceived object factors						project data		
		viewing angle	viewing time	viewing distance	shape		color	light	texture	Transparency and porosity		material	
					Function	aesthetic							
space sequence	external space sequence	approaches	perpendicular										
			Diagonal	3	3	3	3	3					
			spiral										
		path	straight										
			radial	3	3	3	3	3					
			spiral										
		entrance	grid										
			floors				3	3	3	3	3	3	3
			walls	3	3	3	3	3	3	3	3	3	3
		ceiling				3	3	3	3	3	3	3	
	internal space sequence	Escalation point	main lobby	floors				3	3	3	3	3	3
walls				3	3	3	3	3	3	3	3	3	
ceiling							3	3	3	3	3	3	3
nodes		sub-tanks	floors				3	3	3	3	3	3	
			walls	3	3	3	3	3	3	3	3	3	
			ceiling				3	3	3	3	3	3	3
climax		main-tank	floors				3	3	3	3	3	3	
			walls	3	3	3	3	3	3	3	3	3	
			ceiling				3	3	3	3	3	3	3
spatial organization		central											
		linear											
		radial	3	3	3	3	3						
	spiral												
	grid												

0 no action 1 weak 2 average 3 strong

7. THE ANALYTICAL STUDY (PROVING THE VALIDITY OF THE EVALUATION MODEL)

The purpose of the analytical study is to test the validity of the proposed standard model on samples from aquarium museum projects, which will prove correct if it achieves 75% of the total value of the model.

Sample conditions

Contemporary- Globally classified - Existing and not under construction.

Three samples were selected for analysis according to the available information.

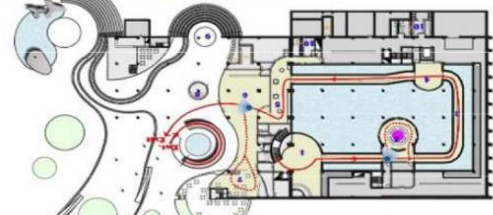


- Sample (1): blue planet aquarium- Copenhagen, Denmark- 3XN architects-2013 Table (2).
- Sample (2): Antalya Aquarium - Antalya, Turkey- Bahadir Kul Architects -2013 Table (3).
- Sample (3): Istanbul Florya Aarium - Florya, Turkey Ocean Projects- 2010 Table (4).

Table 2: Evaluation model for blue planet aquarium (sample 1) – arch daily.com.

influencing factors on visual perception			viewing conditions			Perceived object factors							project data		
			viewing angle	viewing time	viewing distance	shape		color	light	texture	Transparency and porosity	material	blue plant aquarium- Copenhagen , Denmark- 3XN-2013		
						Function	aesthetic								
space sequence	external space sequence	approaches	perpendicular												 <p>external space sequence: using perpendicular approach, spiral path and emphasis the entrance through the form,transparent walls and floor color. The form expressed the function and the composition was inspired by the idea of the water vortex</p>
			Diagonal	3	3	3	3	3							
			spiral												
		path	straight												
			radial	3	3	3	2	3							
			spiral												
		grid	grid												
			entrance	floors				2	3	3	3	2	2	2	
				walls	3	3	3	2	3	2	3	3	2	2	
	ceiling					2	2	3	3	3	2	3			
	internal space sequence	Escalation point	main lobby	floors				2	3	3	2	2	1	2	
				walls	3	3	3	2	3	2	2	2	2	2	
				ceiling				2	2	3	3	3	1	3	
		nodes	sub-tanks	floors				3	3	2	3	2	2	2	
				walls	3	3	3	3	3	2	3	2	2	2	
				ceiling				3	3	3	2	3	2	2	
		climax	main-tank	floors				3	3	2	2	3	3	2	
				walls	3	3	3	3	3	2	2	3	3	3	
				ceiling				3	3	2	2	3	3	3	
		spatial organization	central												
			linear												
			radial	3	3	3	3	3							
			spiral												
			grid												
 <p>internal space sequence: The centralization of the main foyer - the interaction of the space elements to emphasize the path and the secondary tanks - the use of the radial path to organize the spaces - the path ends with the main basin whose space has been expressed efficiently.</p>															
total 287															

0 no action 1 weak 2 average 3 strong

Table 3: Evaluation model for Antalya aquarium (sample 2) – arch daily.com.

influencing factors on visual perception			viewing conditions			Perceived object factors							project data	
			viewing angle	viewing time	viewing distance	shape		color	light	texture	Transparency and porosity	material	Antalya Aquarium - Antalya , Turkey - Bahadır Kul Architects -2013	
						Function	aesthetic							
space sequence	external space sequence	approaches	perpendicular											
			Diagonal	3	3	3	2	2						
			spiral											
		path	straight											
			radial	3	3	3	2	2						
			spiral											
		entrance	grid											
			floors				3	3	3	3	3	3	3	
			walls	3	3	3	3	3	3	3	3	3	3	
	internal space sequence	Escalation point	main lobby	floors				3	3	3	3	3	3	
				walls	3	3	3	3	3	3	3	3	3	
				ceiling				3	3	3	3	3	3	3
		nodes	sub-tanks	floors				2	2	2	2	2	2	2
				walls	3	3	3	3	3	2	3	2	2	2
				ceiling				3	3	2	2	3	2	2
		climax	main-tank	floors				3	3	3	3	3	3	3
				walls	3	3	3	3	3	3	3	3	3	3
				ceiling				3	3	3	3	3	3	3
		spatial organization	central											
			linear											
radial	3		3	3	3	3								
spiral														
grid														
   <p>internal space sequence: The centralization of The main foyer is a ramp to the first floor with skylights- the interaction of the space elements to emphasize the path and the secondary tanks - the use of the radial path to organize the spaces</p> <p>The path ends with main tank- the main basin is the longest tunnel basin in the world</p>														
total 314														

0 no action 1 weak 2 average 3 strong

7.1. Results of The Analytical Study

One of the most important results that can be drawn when using the evaluation model on any sample is the extraction of strengths and weaknesses, whether at the overall or detailed level.

7.1.1 The Overall Model Result

- **Total result:** By comparing the total proportions of the average samples and the proportion of the standard sample, we find that it has achieved 81% of the total standard sample, and this result indicates the success of the proposed model in measuring the relationship between visual perception and the spatial sequence in aquarium museums as shown in Fig. 7.
- **Comparison between samples:** One of the results of this model is also that it is possible to compare the totals of samples, and therefore this model can be used during the design phase in determining the best proposal, When comparing the samples, we find that the best of them is Antalya Aquarium, where it got 94%, and the least is Florya Aquarium, where it got 62% as shown in Fig. 8.

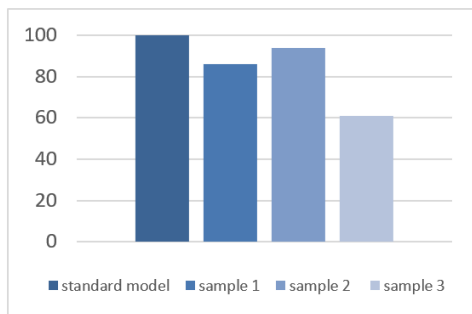
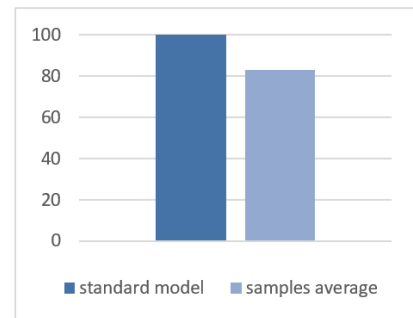


Fig. 7: The overall model result

Fig. 8: The overall model result for each



7.1.2 Total Results of The Effect of Visual perception on the Space Sequence

- **Total result:** When comparing the total averages of the samples in the external sequence with the standard model, we find that it got 83%, and when comparing the total averages of the samples in the internal sequence with the standard model, we find that it got 79%.
This means the convergence of interest in the building at the level of the spatial sequence, whether external or internal as shown in Fig. 9.
- **Comparison between samples:** When comparing the samples at the external sequence level, we find that the best of them is Antalya Aquarium, where it got 98%, and the least is Florya Aquarium, where it got 66%, When comparing the samples at the internal sequence level, we find that the best of them is Antalya Aquarium, where it got 93%, and the least is Florya Aquarium, where it got 60% Fig. 10.

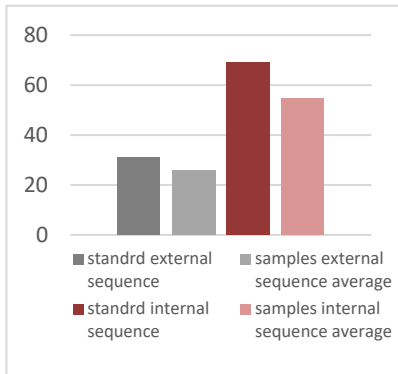


Fig. 9: The overall model results on of external and internal space

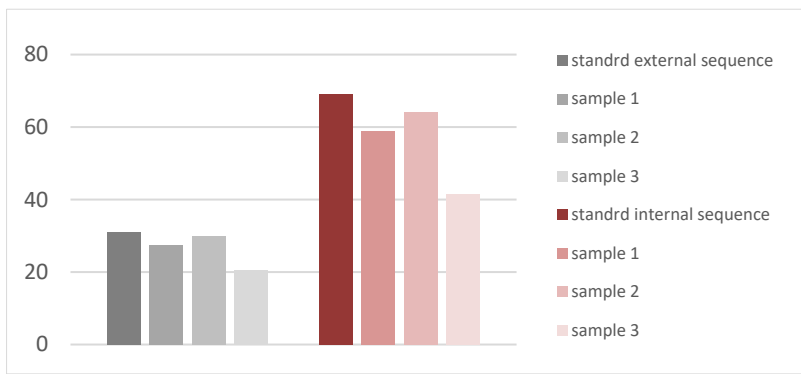


Fig. 10: The overall model results on of external and internal space sequence for each sample

7.1.3 Detailed Results of The Effect of Visual Perception on The Space Sequence

- Implementing the external sequence of visual perception factors:**

In this analysis, at the average level of the samples, we find that the elements of the external sequence met the view conditions for the perception process, with 91% from the standard model, and the elements of the external sequence met the perceived object factors for the perception process, with 81% from the standard model. In this analysis, This gives the impression of the need to pay attention to the perceived object factors Fig. 11.

From the comparison of the samples, we find that the sample that achieves the most perception factors is the Atlanta Museum Fig. 12.

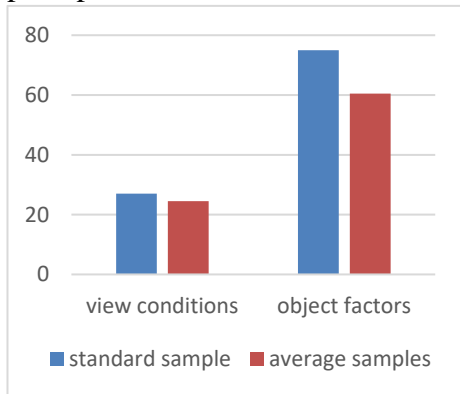
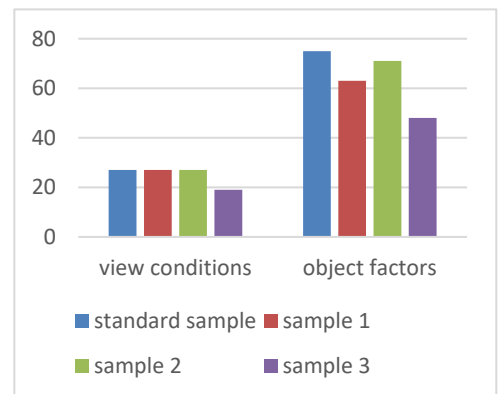


Fig. 11: The effect of perception factors on the external sequence

Fig. 12: The effect of perception factors on the external sequence for each sample



It is also possible to extract the effect of perception factors on the external visual sequence for each element separately and compare it with the standard model. The most efficient elements in use are color, lighting, and texture, then aesthetic and function follow, and the least used are transparency and materials Fig. 13.

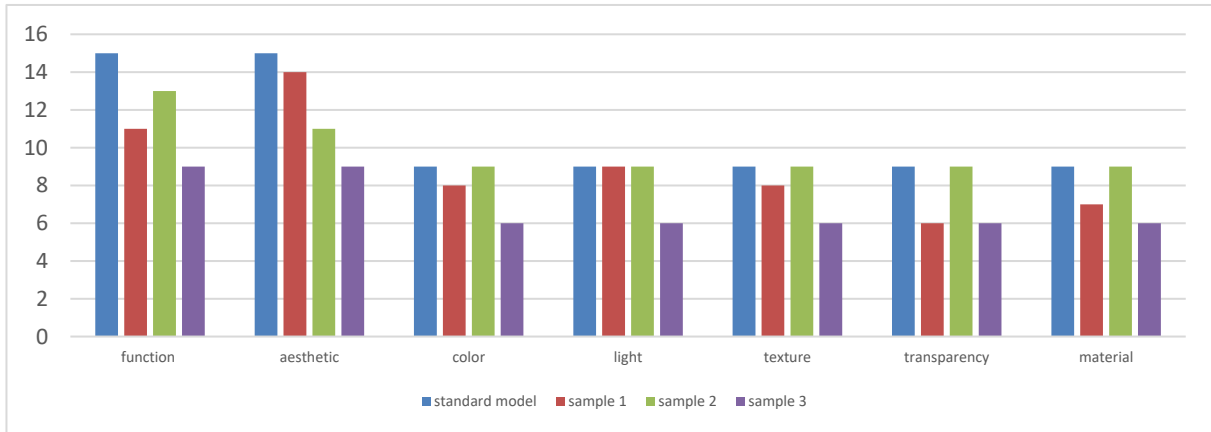


Fig. 13: The influence of Perceived object factors on the external sequence for each sample

• **Implementing the internal sequence of visual perception factors:**

In this analysis, at the average level of the samples, we find that the elements of the internal sequence met the view conditions for the perception process, with 92% from the standard model, and the elements of the internal sequence met the perceived object factors for the perception process, with 77% from the standard model. In this analysis, This gives the impression of the need to pay attention to the perceived object factors Fig. 14.

From the comparison of the samples, we find that the sample that achieves the most perception factors is the Atlanta Museum Fig. 15.

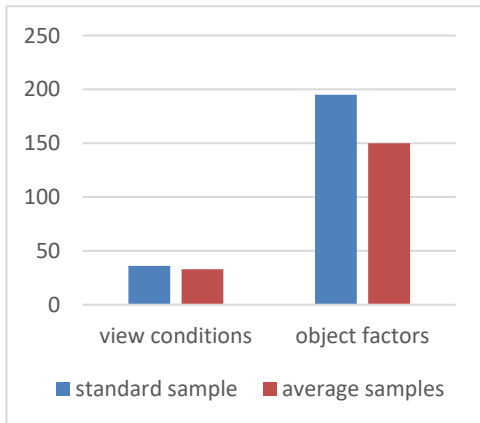


Fig. 14: The effect of perception factors on the internal sequence

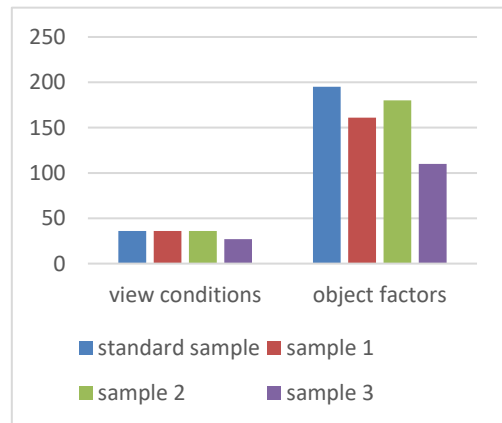


Fig. 15: The effect of perception factors on the internal sequence for each sample

It is also possible to extract the effect of perception factors on the internal visual sequence for each element separately and compare it with the standard model. The most efficient elements in use are function, aesthetics, and texture, then color and light follow, and the least used are transparency and materials Fig. 16.

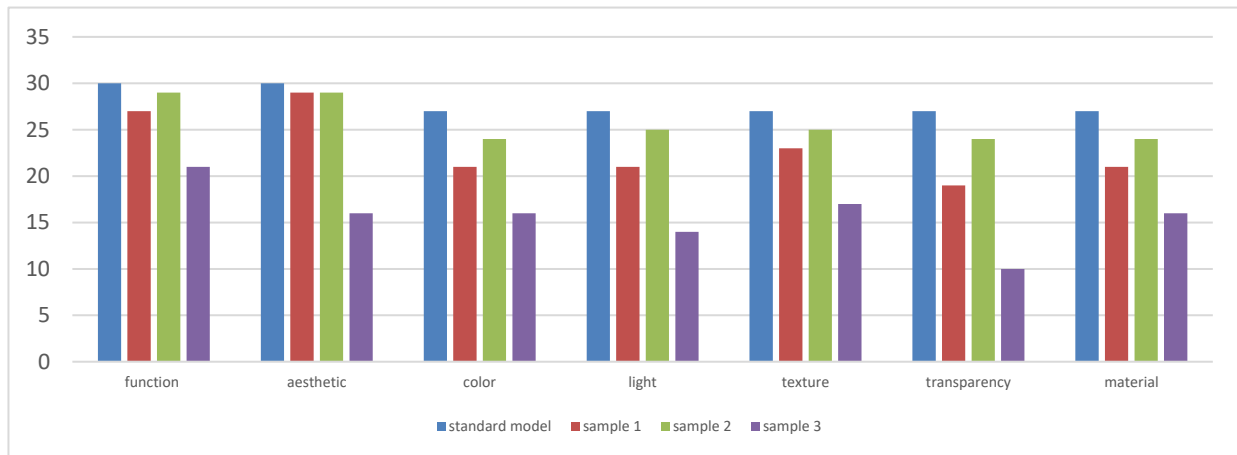


Fig. 16: The influence of Perceived object factors on the internal sequence for each sample

SUMMARY AND CONCLUSIONS:

1- The research hypothesis has been proven that an evaluation model can be made to measure The Effect of visual perception on the spatial sequence in the Aquarium Museum, This is done by using the model in analyzing some Contemporary, Globally classified, and existing museums and obtaining an average of 81% of the standard model.this makes the model suitable for application, whether during design or on existing buildings.

2- The model enables us to identify the elements of strength and weakness in the sample being analyzed, and thus reformulate the design to avoid weaknesses.

3- Aquarium components are (Industrial lighting- Heater- Filter- Protein skimmer- Aeration- Pump).

4- Aquarium classification according to (water type- type of fish- habitat regions- aquarium size- technique).

5- The external sequence consists of (Approaches- Path- Porch) and the external sequence consists of (escalation point- nodes- climax- spatial organization).

6- Influencing factors on visual perception are (viewing conditions- objective factors- subjective factors).

7- Perception of form phases (Gross perception- Analytical perception- Back to the Gross perception).

RECOMMENDATIONS

1- Suggest the use of the proposed standard model in evaluating the existing aquatic museums in Egypt to determine the strengths and weaknesses in perceiving the visual sequence, so that a plan for development can be proposed.

2- Using the proposed standard model to compare the design alternatives for aquarium museums to choose the best.

3- A suggestion for future studies is to research the rest of the perception types which affect on a spatial sequence in the aquarium museum in order to make a comprehensive view of the perception process for aquarium museums.

4- Applying the same idea of the standard model to the rest of the types of architectural buildings.

5- A proposal to convert the proposed form into a computer program so that all proposals for current and future possible solutions to the research problem can be developed.

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