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Title

The impact of digital scenography on the interior architecture of contemporary museums

1- ABSTRACT

*The contemporary era has witnessed remarkable developments in digital technology and artistic media, especially in the formation of collections for internal theatrical performances of contemporary museums. **This research addresses the problem** of the lack of a large number of people to attend museums, as they believe that they are boring and intended only for intellectuals. As a result, many museums remain closed to the public due to concern for the collections and their preservation, which hinders any trend towards renewal and modernization, and threatens the future of museums in light of the public's attraction towards entertainment venues. **The research aims to provide a proposal to develop the method of communication Inside the museum through museum media, represented by museum visitor halls as a medium, which is applied in some museums and technology fairs abroad. Current innovations include the technology adopted for their production, this is produced to achieve a new form of scenography and dramaturgy around the objects on display. It may be recommended that digital scenography has achieved an important place in the interior design of museums.***

Problem Statement:

The research problem arises from limiting the concept of interior space design to a specific discipline without attempting to integrate it with other fields in arts and architecture, so that digital scenography becomes a thought applied in the interior design of contemporary museums.

Aim:

Reforming the internal space of contemporary museums by connecting them with other fields of art, considering that scenography unites all arts together.

Objectives:

Reaching everything new and advanced through trends and design methods for museum spaces to achieve the best design solutions for this type of contemporary spaces that suit the nature of Egyptian architectural development.

Methodology:

The research is based on the **descriptive** and **analytical** method.

شهد العصر المعاصر تطورات ملحوظة في التكنولوجيا الرقمية والإعلام الفني، خصوصاً في تشكيل مجموعات العروض المسرحية الداخلية للمتاحف المعاصرة. يتناول هذا البحث مشكلة عدم إقبال عدد كبير من الناس على المتاحف، حيث يعتقدون أنها مملة ومخصصة فقط للمتقنين. نتيجة لذلك، تبقى العديد من المتاحف مغلقة أمام الجمهور بسبب القلق على المقتنيات والحفاظ عليها، مما يعيق أي اتجاه نحو التجديد والتحديث، ويهدد مستقبل المتاحف في ظل انجذاب الجمهور نحو الأماكن الترفيهية. يهدف البحث إلى تقديم اقتراح لتطوير أسلوب الاتصال داخل المتحف من خلال الوسائط المتحفية، متمثلة في قاعات الزوار المتحفية كوسيط، وهو ما يتم تطبيقه في بعض المتاحف والمعارض التكنولوجية في الخارج. تتضمن الابتكارات الحالية التكنولوجية المعتمدة لإنتاجها، هذا ينتج لتحقيق شكل جديد من السينوغرافيا والدراماتورجيا حول الأشياء المعروضة. وقد يوصي أن السينوغرافيا الرقمية حققت مكانة مهمة في التصميم الداخلي للمتاحف.

مشكلة البحث :

حيث أن تأتي مشكلة البحث في حصر فكرة تصميم الحيز الداخلي في تخصص معين دون محاولة الدمج مع تخصصات أخرى في الفنون و العمارة لتصبح السينوغرافيا الرقمية فكراً يطبق نظرياته في التصميم الداخلي للمتاحف المعاصرة .

أهمية البحث:

إعادة تشكيل الحيز الداخلي للمتاحف المعاصرة عن طريق ارتباطها بمجالات الفنون الأخرى باعتبار السينوغرافيا توحيد كل الفنون معا .

أهداف البحث:

التوصل إلى كل ما هو جديد ومتطور من خلال اتجاهات وأساليب التصميم للفراغات المتحفية للوصول إلى أفضل الحلول التصميمية لهذه النوعية من الفراغات المعاصرة التي تلائم طبيعة التطور المصري المعماري .

منهج البحث :

تقوم الدراسة على أساس المنهج الوصفي والتحليلي

2- Introduction:

The construction of the museum is considered a container of the heritage, experiences, and possessions we inherited from our ancestors through the ages, representing their way of life, customs, and traditions as a symbol of their achievements, and allowing us to understand the origin of things. Digital scenography has reached an important status in museum interior design, so the image is no longer a literal translation of the drama text. Its new features that appear in the digital scene change its form and function, alter its tools and language, replacing the event with images, actions, and symbols. The museum has become one of the most prominent architectural elements in the modern era after the 20th and 21st centuries, where architects and builders found a great opportunity to showcase their artistic vision and academic research in dealing with masses and facades. The architecture of the building has been adapted to suit the collection of exhibits, adding to what the technological era has achieved in terms of building materials, construction methods, and equipment used in display and lighting through the use of digital scenography technology. A cohesive mass and structure are formed that reflect the resonance of the museum's exhibits and harmonize with its style.

3- The concept of digital scenography within museum interior design:

3.1- Introduction to Digital Scenography in Museums:

Digital scenography in museums refers to the use of digital technology, multimedia, and interactive installations to enhance the visitor experience, engage audiences, and create immersive environments that showcase exhibits and collections. This modern approach to museum design has evolved over the years and has been adopted by many institutions around the world, offering numerous benefits to both museums and their visitors.

The primary function of the museum is to collect, preserve, research, and exhibit.

"Theory and Practice. It refers to the basic functioning of museums that relates to the exhibition. It indicates the need for the content to be examined, refers to the presentation of artefacts and specify the means by which the content can be displayed." . "(Dean, 2002)

3.2- What is digital scenography?

Digital Scenography is the use of digital technology in designing theatrical and visual

scenes, and it is considered part of the digital transformation in visual and performing arts. This transformation began in the late twentieth century and accelerated in the twenty-first century thanks to technological advancements.

The term "skenographia" can be traced back to Aristotle's "Poetics" in the fourth century BC. The Greek origin of the term "scenography" refers to "skêne-" in reference to the theater, and "grapho" - meaning processes of representation such as writing/drawing. (Palmer, 2017).

As the archaeological museum explains, the exhibition in Compton here recreates the Roman era for displaying objects. The repeated materials, along with digital means, create effects that produce an environment of how museums have changed their approach to display. They have adopted new spatial and visual means to represent the content. There are many display methods that evolve over time. In the given examples, the variable approach is viewed either as a means to illustrate something, in the form of a graphic representation or a three-dimensional model that imitates/repeats a place or elements. Figure 1



Figure 1 The National Maritime Museum can present archival texts, documents, maps, or display items of historical/archaeological significance .)BRÜCKNER(۲۰۱۱ ,

Definition of the museum in ancient and modern times :

The museum is a system dedicated to helping people understand and appreciate natural or cultural history, or to record humanity's achievements in art and science and to understand and comprehend human

knowledge in various fields. In museums, aesthetic, historical, or scientifically valuable pieces are collected to be displayed and cared for with the aim of general education and knowledge advancement or to document a unique event or a specific historical period. The true value of museums lies in the numerous valuable and intangible benefits they offer; they preserve religious and national identities, as well as the local identity of each city. Museums have the unique ability to reflect both stability and continuity in civilization with the aim of protecting cultural and natural heritage, while highlighting the advancement of human imagination and the progress of natural science. Today, there are museums in almost every major city.

The concept of the museum has changed for its visitors. In the past, the museum left a negative impression and only provided traditional visual images such as dusty hanging exhibits, along with mental images of the building like the high grand staircases and the memorial entrance, among others. However, recently this concept has changed with the evolution of the museum's activities and content. The museum now offers opportunities for interaction between visitors and exhibits, as well as spaces for various activities. It also considers the relationship between the museum's design, the exhibits, and the movement scenario within the space. All of this has left a positive impression and has begun to attract many different categories of visitors. The need for museums has existed since the dawn of history, stemming from humanity's desire to preserve its cultural identity and social, political, and economic achievements.

3.3-

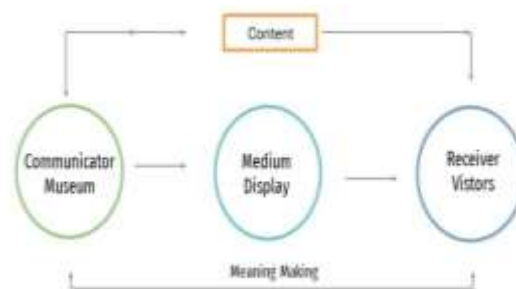


Diagram 1 The presentation illustrates communication as a means in museums. Communication is defined not as a step but as a continuous process. The diagram illustrates that visitor receive knowledge in the form of content, and through the process of meaning-making and interpretations, they return to museums.


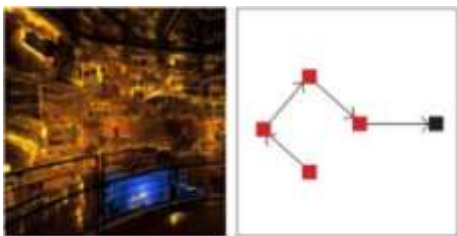

tal scenographic communication within museums:

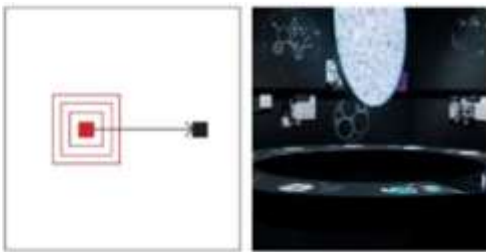
Performance :

It can be said that museums give equal attention to display as well as creating experiences. As a result, the role of exhibition display is expanding to include spatial planning, lighting effects, 3D visuals, integrated environments, interactive technologies, and more. Therefore, the exhibition no longer serves as a passive backdrop for displays but rather as “**a unique medium for transformative aesthetic, visual, auditory, and kinetic communication.**” (Lord, 2001)

3.4- Modes of Display the Scenographic Theatrical

Table 1 It illustrates the patterns and forms of display within the scenographic museum.

<p>١-٤-١ <u>Didactic Mode:</u></p>	<p>The educational context is when the presentation is based on content classification to provide factual information. Classification criteria can be derived from object data such as material, type, shape, size, age, event date, manufacturing process, etc.</p>	 <p>Figure 2 Illustrates the Didactic Mode inside The Troy Museum in Chankkale, Turkey.</p> <p>)xarabista(٢٠٢٢</p>
<p>٢-٤-١ <u>Narrative Mode:</u></p>	<p>The narrative context defines the objects/content in terms of the general subject. It does not present an object in isolation with the necessary information, but rather defines it in relation to other objects to produce meanings. It becomes a means of conveying information in the form of storytelling by providing context.</p>	 <p>Figure 3 Illustrates the Narrative Mode inside Museum of Sikhism in India (KHOSA, 2023)</p>
<p>٣-٤-١ <u>Aesthetic Mode:</u></p>	<p>The visual representation of content focuses. It is highlighting the object by identifying its importance or emphasizing the specific content. The display enhances the special features of the object, such as its properties, shape, material, and manufacturing techniques, and allows for the visitor's appreciation. The</p>	 <p>Figure 4 Illustrates the Aesthetic Mode inside The German Hat Museum (ATELIER BRÜCKNER, n.d.-b)</p>

	aesthetic mode presents the content in a more perceptible form. This helps visitors connect emotionally with the exhibition.	
<u>٤-٤-١</u> <u>Interactive</u> <u>Mode:</u>	The interactive mode takes the form of a content demonstration using multimedia tools and interactive technologies. It allows visitors to have a hands-on experience that provides practical demonstrations. The content is presented through advanced physical and mechanical devices such as touch screens, objects, integrated media, sound effects, and so on. This redefines the way visitors access content in a typical scenario.	 <p><i>Figure 5 Illustrates the Interactive Mode inside The Medicine Nobel Museum</i></p> <p><i>(ATELIER BRÜCKNER, n.d.-c)</i></p>

3.5- DIORAMAS :

Since the last century, museums have used dioramas to create a real context. It ranges from constructing different historical eras to depicting cultures and ecosystems... (Stogner, 2011)

“Museums utilize dioramas to create an artificial environment that generates a cognitive and emotional coection with artefacts and objects on display”

The contemporary perspective considers that the diorama creates "believable" environments with illusory effects. (Siddiqui, 2017). These constructed scenes take the form of complex representational images that depict all the details. Either as large-scale miniature models recreating a real environment or as a full-scale model after the landscapes and objects have been drawn. This approach to creating context deals with recreating the actual context by replicating the original. It helps stimulate curiosity and interest by representing "how it could have been." It primarily deals with creating a natural environment using landscapes, scenic paintings, models, theatrical lighting, etc., with varying levels of detail from fine to minimal.

The exhibition can also consist of very few items, such as the personal belongings of war survivors. In order to convey the dark phase of oppression and death that people suffered,

as in the Museum of the Second World War in Gdańsk, Poland, the exhibition creates a backdrop of stacked suitcases against the display of items. This refers to the number of people who lost their lives and to the survival stories during the war. Figure 6&7



Figure 6 Illustration of Museum of the second world war in Gdank, Poland
Imitates real materials to provide a natural context.
(Machcewicz, 2017)



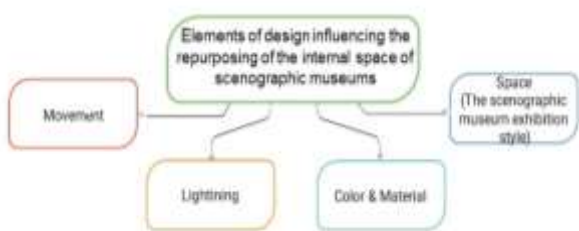
Figure 7 Illustration of Museum of the second world war in Gdank, Poland
The museum here is trying to recreate a scenario of post-war effects and their impact on the city.
(Heritage, 2017)

4. The process of the foundations and design elements influencing the repurposing of the internal space of scenographic museums:

4.1- The design process and the factors affecting it:

It is difficult to provide an accurate definition of the design process due to the existence of many different methods and models, as well as various architectural design teaching approaches. However, all these methods share a common fundamental goal, which is to create a successful architectural product at all levels and for all parties involved in the architectural design process. All participants in the design process, whether they are architects, architecture students, or architecture professors, work to increase the impact of the architectural designer. This is achieved by encouraging the architect to think deeply about the aspects of the design process and organizing and presenting that process,

Diagram 2 Design elements influencing the



which is no longer solely the architect's domain; it has become one of the important and significantly influential elements on the user of the architectural product. (White, 1994), Digram 2

4.2- Movement as a central element within the interior architecture of scenographic museums:

One of the most important elements in designing the museum building is studying the movements and paths of visitors within the building to maximize the functional efficiency of the exhibitions, which is the most distinguishing feature of the museum's location. The planning of exhibition halls, whether closed, connected, or open, is fully integrated with travel paths and corridors, and is not only considered in the architectural plan but also in the selection of exhibition locations. Then we adjust them to achieve the connection between the exhibition location and the audience movement. (الوهاب، 1999)

Table ٢ Types of movement paths within museums

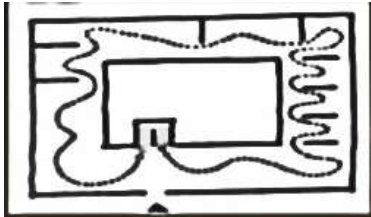
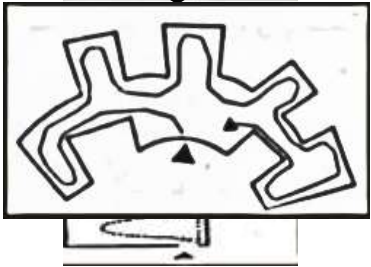
٣-٢-٢ Cadena	٢-٢-٢ Peine	١-٢-٢ Arterial
<ul style="list-style-type: none"> Where it moves along the sides of the show in irregular curved paths. 	<ul style="list-style-type: none"> Called it the punitive path where the path moves sharply from both sides of the exhibition hall. 	<ul style="list-style-type: none"> Regarding the movement of blood within the veins, where the starting point is the same as the endpoint.
		

Figure 8 Illustrate types of movement paths inside museums

4.3- Color and material and their impact on the interior design of scenographic museums::

The scenographic color in museums plays an important role in enhancing the visitor experience, as well as preserving and displaying the artwork. The use of color can create a sensory environment that not only draws attention to the exhibits but also helps establish a cohesive and mysterious atmosphere within the museum. One of the main purposes of scenographic color in museums is to highlight and emphasize the displayed art. By using complementary or contrasting colors, museums can create an environment that visually highlights and draws the viewer's attention to specific pieces or sections of the exhibition. And this technique can be particularly effective in contemporary art museums, where the artwork itself often features bold and vibrant colors.

For example, at the Dior Museum in Paris, the scenography of the exhibition showcases the materials that make up the display. This

Table 3 It explains that color is determined by three main attributes.

epic site-specific installation, created by Vascellos (the exhibition artist), integrates floral textiles inspired by the house's archive... This massive installation in the form of stitched fabrics looms over the visitors. (Vasconcelos, 2023),figure 9 & 10



Figure 10 Illustrates The Denver Art Museum (DAM) , Paris . (Media Advisory: Denver Art Museum Extends Closing Date for Dior: From Paris to the World / Denver Art Museum, n.d.)

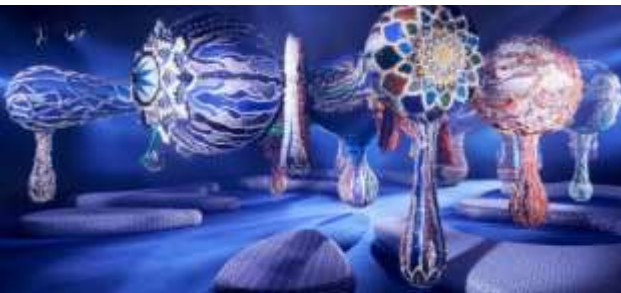


Figure 9 The scenography of the Dior Museum exhibition in Paris manages to showcase the materials that constitute this unique epic installation On-site. Bickersteth and Bickersteth (2024)

- 3-4-2 Saturation:

It is the property or characteristic that indicates the purity of the color, meaning its saturation level, and the saturation of the color is related to its purity, which is the extent to which it is mixed with neutral colors..



- 2-4-2 Value:

The value of a color is the degree that characterizes the color and helps us identify it, whether it is light or dark. For example, in the case of German colors, if we add water to them, we change their value but not their essence.



- 1-4-2 Hue:

It can be defined as the origin of color, and through this characteristic, we differentiate between one color and another. The essence of the color can be changed by mixing it with another color. (Giggster, n.d.)



Lighting as a defining element of the internal space of the scenographic museum:

visitors while providing a sense of balance and harmony within the exhibition space.

The scenographic lighting for museums is a specialized technique used to enhance the visual experience of exhibitions and artifacts in museums. It plays a crucial role in creating an attractive and immersive atmosphere for

Table ٤ Lighting techniques inside the scenographic museum

١-٢-٣ Daylight Lighting	٢-٢-٣ Artifitial Lighting
<ul style="list-style-type: none"> 1-1-2-3 Daylight overhead lighting : Nineteenth-century museums (especially in Europe) resorted to this type of lighting, covering a significant portion of the ceiling area, up to 50% of the total area, to overcome the prevailing clouds in those regions for most of the year, before the development of artificial lighting. This method of overhead lighting was suitable for museums during this period due to its compatibility with the high ceilings and its placement outside the visitors' line of sight to avoid visual disturbances caused by seeing the light source and to reduce reflections on the exhibits. <div data-bbox="245 1178 735 1518"> </div> <p><i>Figure 11 It shows the layout and various sections for penetrating the upper natural light from above.</i></p> <p><i>Elatta (2023b)</i></p>	<ul style="list-style-type: none"> 1-2-2-3Direct Lighting : And it is the one that directs from the light source to the display directly without reflecting on the surface. Whether this lighting is natural, overhead, or side lighting, or artificial, it is characterized by creating a clear contrast between areas of shadow and light. It is quite suitable for three-dimensional exhibits such as sculptural artworks and relief carvings. In the case of using artificial lighting, it is often focused and can be controlled to a great extent to illuminate only the exhibit without the background, as previously mentioned. We find that the entire light output of the bulb is directed downward, as shown in the figure, and it appears in its polar curve. <div data-bbox="861 1160 1335 1485"> </div> <p><i>Figure 12 The light source from the luminous flux for direct lighting. Farag (2015)</i></p>

٢-١-٢-٣ Daylight Side Lighting (walls):

- They are commonly used in all buildings, but they require some precautions in museum buildings, either through traditional windows at distances proportional to the exhibit or through openings in the upper part of the wall that extend along its length. These windows can be placed at the eye level of visitors or above eye level, depending on the type and nature of the exhibits, or by using glass curtain walls that cover the entire lateral surface of the building. And when using this type of lighting, it is important to make good use of its advantages, which we will present.



Figure 13 It illustrates the use of treated glass surfaces. (Sabbagh, 2022)

٢-٢-٢-٣ Non- direct lighting :

- Light coming from above through inverted reflectors is a distinctive method that allows for good light distribution and eliminates the white glare emitted by the bulb. The light beam from the bulb is directed entirely upwards, and the light reflects off the ceilings and the upper part of the walls, diffusing and minimizing shadows to their lowest extent . (اللطيف، 2010)



Figure 14 The light source from the luminous flux of indirect lighting. (Concealed Light Fittings, n.d.)^١

4.4- Scenography of museum exhibition halls for visitors:

Museum theater refers to the use of techniques and theatrical performances within the museum environment to engage and educate visitors. It is a form of interpretive programming aimed at bringing history, art, and culture to life through live performances, interactive experiences, and storytelling. Museum theater can take various forms, including costumed interpreters portraying historical figures, performances written based on museum exhibits, interactive workshops, and immersive experiences that allow visitors to participate in the storytelling process. Figure 15& 16.

4.5- Scenographic Arts and Technology:

If we look back at years of art history, the evidence is there to show that artists have always sought new artistic forms and unconventional means to express their art.



Figure 15 The Colored Museum Show illustrates many benefits for both museums and visitors. For museums, it provides a way to activate exhibits and collections by presenting them in an engaging manner.. (Mellema ٢٠٢٠ ،)



Figure 16 A theatrical exhibition at the Bristol Old Vic Museum between 2017 and 2019, exploring the history of the Bristol Old Vic (the longest continuously operating theater in the English-speaking world). Greg (2020)

Considering that we, as the millennial generation, are more accepting of new and unique forms of art, the initial shock and lack of integration do not exist when we refer to art and technology. And in some ways, it has become a standard. And some may wonder when the artist does not try to incorporate some kind of digital elements into their work . (ANAITTE, Art and Technology , 2022)

4.6- Contemporary Digital Arts:

Digital art is a general term for a collection of artworks and practices that use digital technology as an essential part of the creative process or presentation. It can also be called cyber arts or internet arts (Cyber) Arts, meaning the arts produced with the help of computer programs and devices, often with interactive multimedia. It is also called Computer Arts, which refers to any art where computers play a role in the presentation. This art can be an image, sound, animation, video, or video game, among other various forms of art. Digital technology has transformed various activities such as painting and sculpture, while new forms, such as internet art, digital installation art, and virtual reality, have become recognized artistic practices.

4.7- Applications of digital scenography in museums enhance



the exhibits:

Diagram 3 It illustrates the applications of digital scenography in museums.

For example, in the Tokyo Road Museum, the museum uses digital scenography technology to illustrate the grueling path from Pearl Harbor to Tokyo Bay through New Guinea, Southeast Asia, the Himalayas, Burma, the Pacific Islands, China, India, and Alaska. Figure 17&18.



Figure 17 Illustration of Road to Tokyo Museum Exhibit The museum is being restored using digital scenography technology. (Road to Tokyo / the National WWII Museum / New Orleans, n.d.)



Figure 18 The authenticity of the materials used to fabricate the exhibition was crucial to the museum. Each gallery needed to look. (The National WWII Museum: Road to Tokyo Pacific Theater Galleries,

5. Recommendations:

- Utilizing digital scenography techniques to create immersive environments that enhance the historical or cultural narrative of the exhibits and provide a unique visitor experience.
- Implementing interactive technologies such as light shows and augmented reality techniques to make museum content more dynamic and engaging.
- Using scenography as a means to enhance continuous interaction between exhibits and visitors, with a focus on aesthetic and educational values.

- Designing visitor pathways to be clear and easy to navigate, thereby enhancing the operational efficiency of the exhibitions.
- Using Dioramas to recreate historical or cultural contexts, enhancing the realism and appeal of the exhibits.

6. Results:

- Achieving successful and innovative designs for the integration of design concepts in museum interior architecture.
- Opening a new horizon for the scenographer to innovate and add successful relationships and designs using digital technology for scenography.
- The possibility of merging the interior design aspect with the expressive aspect.
- Digital scenography contributes to a radical transformation in museum design by adding a dynamic and attractive character to the exhibits.
- Digital technology helps in presenting exhibits in innovative ways, such as historical simulations and interactive displays.

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