

Interior Design Solutions for Islamic Monuments

Heritage Identity & Future Needs

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Abstract—The paper discusses the means to reusing historic buildings while providing an opportunity to the community that leads to a better quality of life. When dealing with these buildings – which represent nonrenewable heritage – we need to take in consideration two aspects. The first is to adopt a sustainable developmental approach to keep the value of the buildings well-preserved, and the second is to create a positive impact on the community. The role of interior design here is massive; enabling people to use the building in its new function, while keeping the identity of the place and maintaining its authenticity which has been always linked to its existence.

Keywords—component, Museums, Interior Design, Islamic Monuments, Adaptive Reuse

I. Introduction

Historic monuments are important to the world nations in general. To the locals, their value comes from their being part of a nation's history. For years, communities have dealt with such historic monuments as antiques to watch, or treasures they couldn't benefit from, while searching for some initiative that enhances their quality of life and a place to host that initiative. The idea is to reuse those monuments to be part of the national development of the countries and communities where they are located (see figures 1,2). For such a change of function, we would need to have a creative solution to balance between the identity of the property and the future needs for the new function of the building.



Figures 1,2: Up: Manial Palace Museum
Down: Islamic Museum
Both buildings used now as museums - Source: Researcher

The reuse of historic buildings needs an intervention to the original interior design; to adapt the buildings to their new usage. This gets complicated in case of Islamic monuments because of the religious considerations involved in the sacred civilizations where religion formulated all design basics of the various historic buildings. On the other hand, and according to what was mentioned in the UNESCO convention in 1972, the new function of the building must represent a developmental activity; enabling heritage to play a role in the lives of the communities.

II. Research Methodology

A quantitative analysis is used for studying the interior design for the two main categories of museum buildings, where the first features monuments that are adapted to become museums; and the second features new buildings designed originally as museums. The goal is to measure the general museum interior design solutions side by side with the heritage identity represented in the historic buildings. The study includes subjective and objective measures that will be shown in analysis through a proposed checklist that is based on the general criteria of interior design as well as museum design.

III. Research Question

Do the interior design solutions used in museums change in case of new buildings versus in the case of adapted historic buildings? How can we reuse Islamic monuments while maintaining balance between the past role and identity on one side, and the future needs of the new function on the other? To answer these questions we should put both categories of buildings on the same parameters and measure the design solutions according to the general interior design principles and those specific to museum design.

IV. Research Hypothesis

Historic sites can be introduced as museums with the condition that they should be adapted under the standards of both heritage adaptive reuse and museum design. We can thus achieve balance between past identity and future needs; through the sustainable development of monuments.

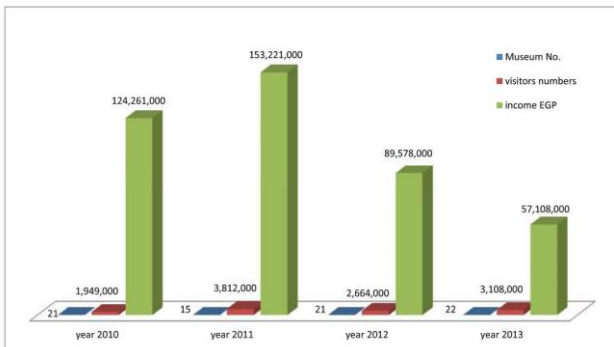
v. Research Objective

To create integrated interior design guidelines that should be used when adapting Islamic monuments for new use.

vi. Criteria for selecting cases of study

According to the information on the official website of the Egyptian government¹, there are 30 museums in Cairo which we can include in our study; that is if we follow the number on the website. But it isn't actually the real number; there are repeated items and subdivisions under the same item (as in the case of The Citadel Museum). This is added to the presence of a conflict between the website and the governmental statistics of the Central Agency for Mobilization and Statistics (CAPMAS) as examined through four annual reports² (see figures 3,4). Also, the relation between the number of visitors and the annual income doesn't make sense; as in the year 2010 when we had 21 operating museums, the income was EGP 124,261,000 with 1,949,000 visitors; whereas with the same number of museums in the year 2012 when the visitors increased to 2,664,000 the income actually decreased. However, this could be the impact of the fees difference between foreign and Egyptian visitors.

year	Museum No.	visitors numbers	income EGP
year 2010	21	1,949,000	124,261,000
year 2011	15	3,812,000	153,221,000
year 2012	21	2,664,000	89,578,000
year 2013	22	3,108,000	57,108,000



Figures 3, 4: Annual record of museum numbers, visitors, and income
Source: Researcher – Central Agency for Public Mobilization & Statistics (CAPMAS) - Annual reports on cultural activities 2010, 2011, 2012 and 2013

The listed museums were arranged on the government website as follows: Om Kalthom, Gezira, Hassan Heshmat, Gamal Abdel Nasser, Mostafa Kamel, Effat Nagy and Saad El Khadem, Clay and Sculpture, Citadel Museum (Including: Citadel Prison, Police Museum, Al Jawhara Palace and Garden Museum), Egyptian Post, Hunting Museum, Enjy Aflaton which is located inside Mamluk Palace of Prince Taz 3, Qasr El Ainy, El Haram Museum, Beit El Oma, Abdien, Science Museum, Gayer Anderson (Keretliah House), Markabat Bolaq, Markabat Citadel Museum, Child Museum, Islamic Art, Coptic Museum, Mohamed Ali Palace, Manial Palace, Egyptian Geology, The Egyptian Museum, Army Museum, Modern Arts,

Islamic Clay and finally the National Museum of Egyptian Civilization (NMEC).

vii. List Overview

Many conflicts were discovered in the governmental records of museums especially between those in the reports of CAPMAS and those on the government website. Since CAPMAS doesn't mention the names of the museums in their publication, the researcher decided to take the official information about the museums from the government website which had many conflicts in itself. For example, upon clicking the link of Gezira Museum, you'll find information on Mohamed Mahmoud Khalil (MM Khalil) Museum in Giza. Gezira Museum, on the other hand, is located on the grounds of The Opera House in Gezira and is not operating anymore (see figure 5).



Figure 5: Conflict between the name of the museum and the data provided
Source: www.sis.gov.eg

Another example is how Effat Nagy and Saad EL Khadem Museum as well as Hassan Heshmat Museum are listed on the website without addresses by only a mention that they are located in El Zaitoun and Ain Shams districts respectively; which are really vast areas. As for El Haram Museum, it is actually the same as The Army Museum which means it is repeated twice on the list (see figure 6). The researcher took the initiative to visit most of museums listed on the website, however in case of The Clay and Sculpture Museum at The Arts Complex in 15th of May Town, it was not found on any online maps and thus was not reached by the researcher. As for the Citadel Museums, they were all visited except for Al Jawhara Palace which was closed due to its dangerous structural status. The Hunting Museum was also closed but the researcher had made an earlier visit and thus the study was done based on the information taken from the earlier visit.



Figure 6: Army museum open display
Source: researcher

According to the information on the website, The Science Museum is actually the same as The Museum of Medicine at El Qasr El Ainy, and The National Museum of Egyptian Civilization (NMEC) is under construction and does not contain any collections. However, the researcher collected information on the museum based on the design drawings acquired from the consultant (see figures 7, 8).



Figure 7: NMEC building

Source: researcher

Figure 8: proposed interior design for Nile Gallery at NMEC

Source: Arata Isozaki, museum display consultant

VIII. Design Principles of Islamic Architecture

The Muslim architect reflected his religion on the Islamic architectural buildings he designed. He used symbolic means of expression to present his work depending on his ability to use Islamic architecture both as an art form and as a belief paradigm. Two ways were followed in designing Islamic monuments:

The First: Direct Expression: Like creating a cross plan to teach the fourth Islamic ideologies which showed directly in most of the mosques designed after The Fatimid Era during the quests to eliminate the Shia Ideology (see figure 9). Taking this as an example, we can declare that every single element of Islamic Architecture has a meaning behind it; a meaning that must be considered when dealing with these monuments.

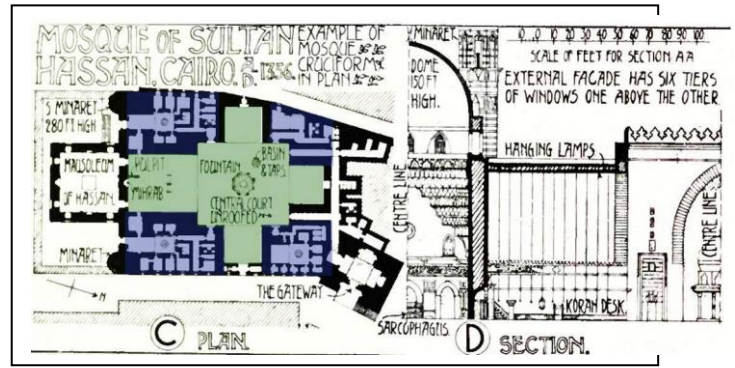


Figure 9: Plan of Madrasat El Sultan Hassan, a Mamluk religious building, demonstrating:

In green: the cross plan to teach the four ideologies

In blue: the students residences

Source: Fletcher B., A History of Architecture on the Comparative Method, 5th Ed., 1905 -Architectural Press, p. 638, 1996

Second: Symbolic Expression: By using a sign or the meaning behind the shape or even by being inspired by a religious idea (see figures 10, 11, 12, 13)⁴.



Figures 10, 11, 12, 13: Islamic architectural features with symbolic meanings:

Minarets as a call to pray to Allah - The dome as a reminder of death
Building roofs uniformity referring to the idea that all Muslims are equal
Source: Gabalawy K., Record of Symbolic Egyptian architecture after Islam, p. 27, 2009

Through research, we are able to see how Islamic architecture demonstrates the elements of a good interior design as defined on a universal scale :

- Equitable use: the design is useful and marketable to people with diverse abilities
- Flexibility in use: accommodating a wide range of preferences
- Simple & Intuitive Use: use of the design is easy
- Perceptible information: communicating necessary information effectively
- Tolerance for error: minimization of hazards
- Low physical effort: using the building efficiently and comfortably with minimum fatigue
- Size and space: providing appropriate size and space for approach and use⁵

IX. Interior Design Principles

When scientists came up with the interior design elements and principles, they clarified that there was a design vocabulary that must be used; encompassing form, shape, color, texture, and light. Through different arrangements, this vocabulary formulates the design principles of proportion, scale, balance, harmony, unity and variety as well as rhythm and emphasis. We follow these principles while creating interior designs, utilizing elements such as floorings or ceilings; where no element should be used independently. In addition to that, these principles of design usually act as guidelines to create a design pattern and so when those principles are not considered, it may be very hard to spot a pattern in the design (see figures 14, 15). Indeed it differs between a designer and another in how he would show the arrangement of the design vocabulary and what would be the dominating design principle, so we will find a variety of patterns, but a pattern should still exist.⁶



Figures 14, 15: The Egyptian Museum missing design pattern in exhibition display
Source: Researcher

X. What is the definition of a museum?

“The museum is a building housing cultural material to which the public had access”, and the idea of adapting a historic building as a museum is to design in a way that does not harm the authenticity of the building. The type of heritage guides the direction of adaptive reuse with the condition that it should not affect the authenticity of the following elements⁸:

- a) Form and design
- b) Material and substance
- c) Use and function
- d) Tradition and techniques

- e) Location and setting
- f) Spirit and feeling

According to the Venice Conservation and Restoration charter published by The International Council of Monuments and Sites (ICOMOS), the conservation of monuments is always facilitated by making use of the monuments for some socially useful purpose⁹. Using historic buildings doesn't mean ignoring the authenticity of heritage; especially with Islamic monuments since they have a religious character that should be preserved. Accordingly the new use of these monuments must be carefully chosen. We can refer here to the manuscript of Sultan Mo'ayed as a reference to the rules of construction ownerships in the Islamic era; which stated that "who changed the use carried the guilt"¹⁰, hereby explaining why the reuse is always a hard decision to be made.

Any modification needed for the interior or exterior design for a historic building must comply with the preservation laws, regulations, charters and conventions¹¹. The heritage site management committee should be selected with the capability to differentiate between heritage conservation and museum maintenance. All of the staff should be trained first on how to deal with a monument, then on how to deal with a museum building and its collections.¹²

XI. Principles of Museum Design

The success of a museum experience could be easily measured by the number of visitors, the objects displayed, and the quality of the building; according to the well-known architectural expression "the power of the space".

The research mainly seeks the improvement of historic buildings, which have been adapted as museums, by studying the differences between the design features in case of a new museum building and in case of adapting an old one¹³ (see figures 16, 17).



Figures 16, 17: Museum of Modern Art featuring free lines of design since the building was originally designed as a museum
Source: Researcher

Considering how most of the museum visitors are well-educated, which is clear from museum visitors profiles all over the world, this actually guides the level at which information is presented inside museums¹⁴. The design principles of a museum are defined as “the art and science of arranging the visual, spatial, and material elements of an environment into a composition that visitors move through”. These elements are: value, color, texture, balance, line, and shape; where value means the quality of lightness and darkness, and color refers to whether the spaces are colorless, monochromatic, or multi-colorful. Texture specifies how much the interior elements such as floors, ceilings, and walls are rough or smooth; while balance is defined as the quality of visual weight distribution. Line is the quality of how linearity shows through the interior design, whereas shape is the physical containment forming the internal and external surfaces of composition. There are also some design constraints that should be considered in museum design, such as:

- Human factors in exhibition design: considering the size, weight and dimensions of human adults and children
- Behavioral tendencies: respecting visitors' and users' preferences as they usually turn to the right after entering from the left hand side, and also how people prefer shortcut routs, square corners, and so on
- Methodologies and design strategies: using see-through panels, landmark objects, and transitional spaces
- Traffic flow approaches: guiding the visitor to a pre chosen route in one way or separating the visit circulations (see figure 18)

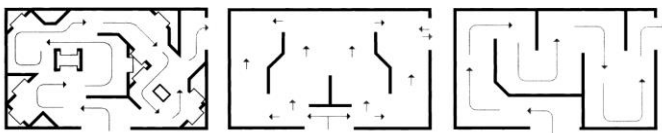


Figure 18: ways to guide the flow inside a museum
Source: Dean D., Museum Exhibition: Theory and practice, 1996

- Objects arrangement: creating the exhibition scenario and delivering a message to the visitors. Objects should be arranged to add to visitors' knowledge in a scenario that is set according to timeline, or size, and maybe by materials; with the condition that the arrangement reflects the importance of each object
- Special considerations: for the handicapped; an integration between visual, hearing, movement, and mental activities should be studied
- Presenting design ideas: by using models, information panels, guided and self-guided museum presentations¹⁵



Figures 19, 20: Left: Police Museum – Right: Citadel Prison Museum
Both museums have a timeline scenario using models
Source: Researcher

XII. Case Studies Analysis

A checklist is used to study the designs of both adapted historic buildings and new museum buildings originally designed as museums, followed by an analysis for the record created. This checklist is based on a combination between the general design principles of interior design and those of museum design; using different design elements as measurement parameters. The approach is partly objective when dealing with the existence of design elements and partly subjective when measuring their moderate – or lack of – existence. In this checklist, existent elements are represented in black, moderately existent elements in red, and non-existent elements in white.

Analysis Elements	Interior Design principles							Museum Design Standards													
	Proportion	Scale	Balance	Harmony	Unity and Variety	Rhythm	Emphasis	Value	Color	Texture	Balance	Line	Shape	Human factors in exhibition design	Behavioral tendencies	Methodologies and design strategies	Traffic flow approaches	Object arrangement	Special considerations	Presenting design ideas	
Historic Museums																					
1- Om Kalthom Museum																					
2- El Geziera - M M Khalil																					
3- Citadel Prison Museum																					
4- Police Museum																					
5- Citadel Garden Museum																					
6- Egyptian Post Museum																					
7- Hunting Museum																					
8- Enjy Aflaton Museum																					
9- El Qasr El Ainy Museum																					
10- Army Museum																					
11- Beit el Oma Museum																					
12- Abdien Palace Museum																					
13- Gayer Anderson Museum																					
14- Markabat Bolaq Museum																					
14- Markabat Citadel Museum																					
15- Islamic Art Museum																					
16 - Mohamed Ali Palace																					
17- Manial Palace Museum																					

Figure 21: Researcher's checklist for historic buildings adapted as museums
Source: Researcher

Analysis Elements	Interior Design principles							Museum Design Standards													
	Proportion	Scale	Balance	Harmony	Unity and Variety	Rhythm	Emphasis	Value	Color	Texture	Balance	Line	Shape	Human factors in exhibition design	Behavioral tendencies	Methodologies and design strategies	Traffic flow approaches	Object arrangement	Special considerations	Presenting design ideas	
New Museums																					
1- Hasan Heshmat Museum																					
2- Gamal A Nasr Museum																					
3- Mostafa Kamel Museum																					
4- Effat & Saad Museum																					
5- Clay & Sculptures Museum																					
6- The Child Museum																					
7- Coptic Museum																					
8- Egyptian Geology Museum																					
9- Egyptian Museum																					
10- Modern Art Museum																					
11- Islamic Clay Museum																					
12-NMEC Museum																					

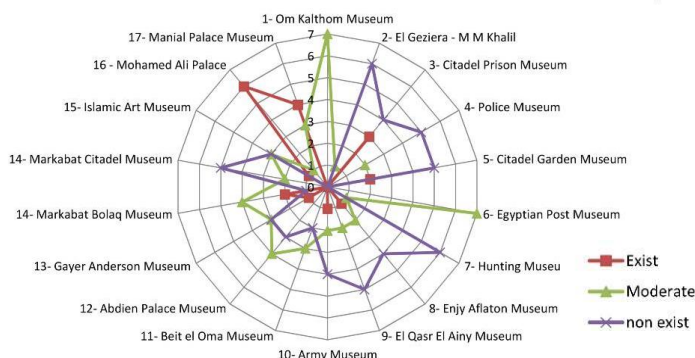
Existent
 Moderately Existent
 Non Existent

Figure 22: Researcher's checklist for buildings originally designed as museums
Source: Researcher

XIII. Discussion and analysis

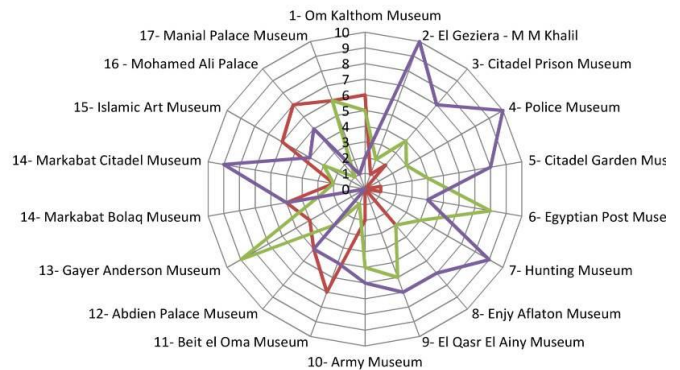
The previous checklist is used here as a tool to measure the two categories of historic buildings; those adapted as museums and those which are originally designed as museum buildings. The checklist analysis is based on two groups of parameters, the first featuring interior design principles and the second featuring museum standards. The analysis came out with the following results (see figures 23-38).

interior design principles Rates for Historic Museums			
museums	Exist	Moderate	non exist
1- Om Kalthom Museum	0	7	0
2- El Geziera - M M Khalil	0	1	6
3- Citadel Prison Museum	3		4
4- Police Museum	0	2	5
5- Citadel Garden Museum	2		5
6- Egyptian Post Museum	0	7	0
7- Hunting Museum	0	1	6
8- Enjy Aflaton Museum	1	2	4
9- El Qasr El Ainy Museum	0	2	5
10- Army Museum	1	2	4
11- Beit el Oma Museum	0	3	2
12- Abdien Palace Museum	0	4	3
13- Gayer Anderson Museum	1	3	3
14- Markabat Bolaq Museum	2	4	1
14- Markabat Citadel Museum	0	2	5
15- Islamic Art Museum	1	3	3
16 - Mohamed Ali Palace	6	1	0
17- Manial Palace Museum	4	3	0



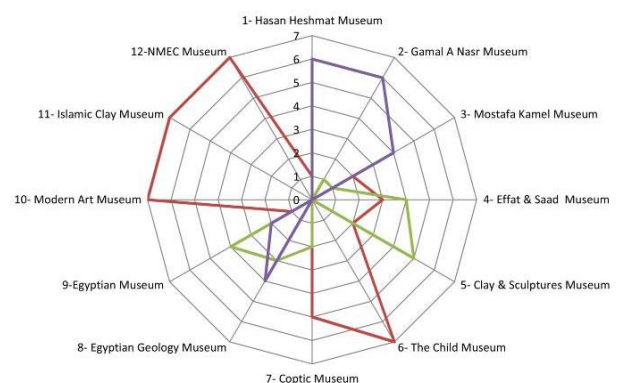
Figures 23, 24: calculations taken from the checklist to measure the existence of interior design principles in every Historic building adapted as a museum
Source: Researcher

Museum Design Standards Rates for Historic Museums			
museums	Exist	Moderate	non exist
1- Om Kalthom Museum	6	5	2
2- El Geziera - M M Khalil	1	2	10
3- Citadel Prison Museum	2	4	7
4- Police Museum	0	3	10
5- Citadel Garden Museum	1	4	8
6- Egyptian Post Museum	1	8	4
7- Hunting Museum	0	4	9
8- Enjy Aflaton Museum	3	3	7
9- El Qasr El Ainy Museum	0	6	7
10- Army Museum	2	5	6
11- Beit el Oma Museum	7	1	5
12- Abdien Palace Museum	5	3	5
13- Gayer Anderson Museum	4	9	0
14- Markabat Bolaq Museum	5	3	5
14- Markabat Citadel Museum	2	2	9
15- Islamic Art Museum	6	3	4
16 - Mohamed Ali Palace	7	1	5
17- Manial Palace Museum	6	6	1



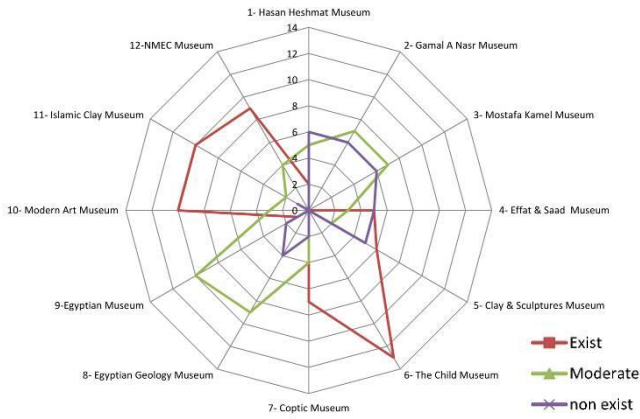
Figures 25, 26: calculations taken from the checklist to measure the existence of museum design standards in every Historic building adapted as a museum
Source: Researcher

interior design principles Rates for Museums New Buildings			
museums	Exist	Moderate	non exist
1- Hasan Heshmat Museum	1	0	6
2- Gamal A Nasr Museum	0	1	6
3- Mostafa Kamel Museum	2	1	4
4- Effat & Saad Museum	3	4	0
5- Clay & Sculptures Museum	2	5	0
6- The Child Museum	7	0	0
7- Coptic Museum	5	2	0
8- Egyptian Geology Museum	0	3	4
9- Egyptian Museum	1	4	2
10- Modern Art Museum	7	0	0
11- Islamic Clay Museum	7	0	0
12-NMEC Museum	7	0	0



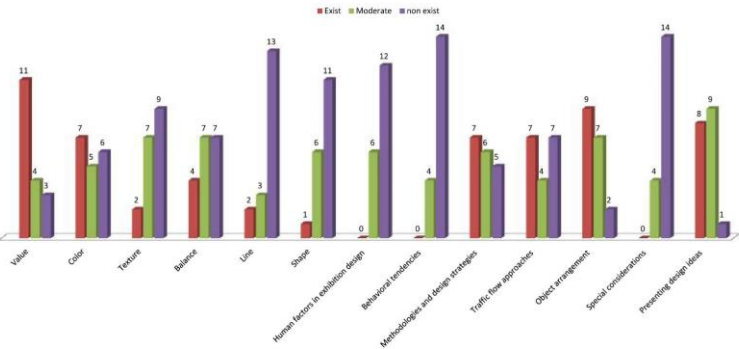
Figures 27, 28: calculations taken from the checklist to measure the existence of interior design principles in every new building originally designed as a museum
Source: Researcher

Museum Design Standards Rates for Museums New Buildings			
museums	Exist	Moderate	non exist
1- Hasan Heshmat Museum	2	5	6
2- Gamal A Nasr Museum	0	7	6
3- Mostafa Kamel Museum	0	7	6
4- Effat & Saad Museum	5	3	5
5- Clay & Sculptures Museum	6	2	5
6- The Child Museum	13	0	0
7- Coptic Museum	7	4	2
8- Egyptian Geology Museum	0	9	4
9- Egyptian Museum	1	10	2
10- Modern Art Museum	10	3	0
11- Islamic Clay Museum	10	2	1
12-NMEC Museum	9	4	0



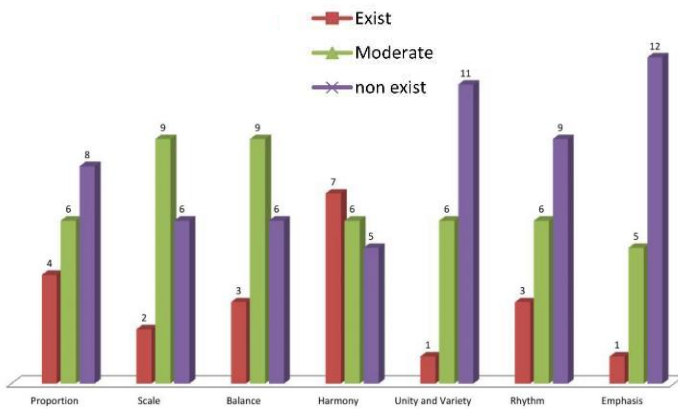
Figures 29, 30: calculations taken from the checklist to measure the existence of museum design standards in every new building originally designed as a museum
Source: Researcher

From the previous analysis, it's very clear that in historic buildings that are adapted as museums, most of the interior design principles and museum standards are hardly represented, due to the strict instructions on monuments which hold back the designers from following the international standards of design. On the other hand, in the new buildings which are originally designed as museums, both of the interior design principles and the museum design standards are either moderately or highly existent.



Figures 33, 34: calculations taken from the checklist to measure museum design standards in historic museums
Source: Researcher

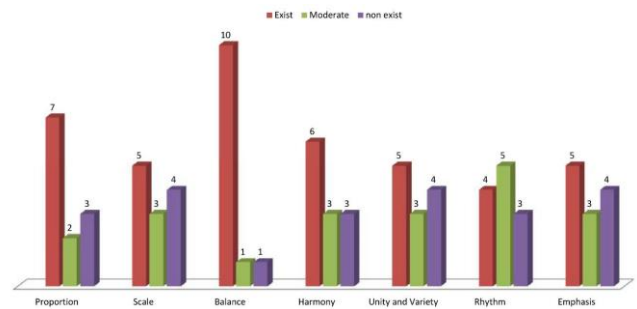
Interior Principles	Exist	Moderate	non exist
Proportion	4	6	8
Scale	2	9	6
Balance	3	9	6
Harmony	7	6	5
Unity and Variety	1	6	11
Rhythm	3	6	9
Emphasis	1	5	12



Figures 31, 32: calculations taken from the checklist to measure interior design principles in historic museums
Source: Researcher

As we overview the interior design principles in historic museums, we find that most of the elements are moderately - or non - existent; especially in the cases of emphasis or unity and variety; referring to the fact that monuments have limits to modifications. On the other hand, and due to the rich background of the historic buildings, the harmony and proportion principles acquired high records.

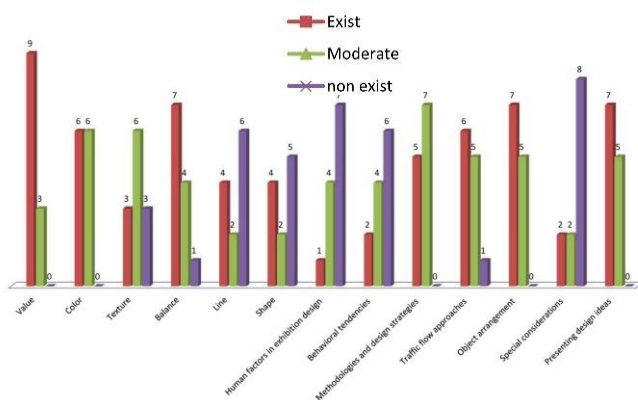
Interior Principles	Exist	Moderate	non exist
Proportion	7	2	3
Scale	5	3	4
Balance	10	1	1
Harmony	6	3	3
Unity and Variety	5	3	4
Rhythm	4	5	3
Emphasis	5	3	4



Figures 35, 36: calculations taken from the checklist to measure interior design principles in the new buildings originally designed as museums
Source of Figure: Researcher

As we overview the application of interior design principles in new buildings that are originally designed as museums, we find that most of the principles exist in a clear way as there were no design constraints; which gave the designer the opportunity to integrate the building with the general interior design principles. This is clear from the high record of the balance and proportion principles, but on the other hand; the moderate rate of the rest of principles guide that a development in design is strongly recommended.

Museum Design Standards Rates for Museums New Buildings			
Museums Standards	Exist	Moderate	non exist
Value	9	3	0
Color	6	6	0
Texture	3	6	3
Balance	7	4	1
Line	4	2	6
Shape	4	2	5
Human factors in exhibition design	1	4	7
Behavioral tendencies	2	4	6
Methodologies and design strategies	5	7	0
Traffic flow approaches	6	5	1
Object arrangement	7	5	0
Special considerations	2	2	8
Presenting design ideas	7	5	0



Figures 37, 38: calculations taken from the checklist to measure museum design standards in the new buildings originally designed as museums
Source: Researcher

As we overview the application of museum design standards in new buildings that are originally designed as museums, we find that most of the standards are applied, especially the systematic group of standards (value, color, texture, and balance), while the other group of standards partly need revision, such as the human factors in design and the special considerations.

XIV. Results

Design revisions are seriously needed through many levels across the museums in Cairo. However, the status of the new buildings is better than the adapted ones due to the necessity of the presence of a set of guidelines that can balance between the original design of the monuments and their reuse function as museums. As a result of all previous analysis, the following points are intended to formulate those mentioned guidelines:

- The monument original design should be considered during the creation of the museum scenario

- Not every monument can be adapted to be a museum, so a good selection process accompanied with a revision of the function requirements may help
- Interior design principles can be considered in historic buildings but in integration with the components of the historic building. The goal is to design interior features and select display objects that harmonize with the decoration of the historic building in terms of proportion, scale, balance, harmony, unity and variety, rhythm and emphasis
- When adapting a monument, international standards should be considered; such as human factors and behavioral tendencies, as there are no exceptions when it comes to those standards due to the entity of the monument since those standards are already applied worldwide
- Traffic flow approaches should be reviewed along with the building carrying capacity to prevent unplanned traffic inside historic buildings
- In objects arrangement, we shouldn't hide the heritage layers; and so transparent showcases and light structures will be useful, while the big objects better be exhibited in open areas or in the museum gardens
- Both the representation of methodologies and design strategies as well as the design idea are only moderately existent in historic buildings adapted as museums. This is caused by the lack of implementation procedures for these methodologies, and accordingly trained staff need to be involved in all stages

XV. Recommendation

- Revision is needed for most of the adapted museum buildings in order to keep the character of the building while applying the design standards of interior design and museum design
- Preservation of the past, present, and future should be taken into consideration; the past being the monument, the present represented in the visitors' facilities and the future represented in the museum collections which need to be preserved for the coming generations

XVI. Conclusion

A question was proposed as to whether interior design solutions of museums vary in case of new buildings versus in the case of adapted historic buildings. The answer was proven to be yes; design considerations must differ between both cases. This is because we deal with a big object – the monument itself – which needs to be considered side by side along with the museum collections. According to world

charters and conventions, heritage should perform a role in the lives of the communities and a well-planned adaptive reuse approach can enable a useful investment in historic buildings. However, a unique approach has to be adopted; to reach the required level of adaptation without harming the authenticity of the monuments. A team of collaborative historians, designers, and users can achieve the balance mentioned in this hypothesis.

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Adaptive reuse of historic buildings must represent a developmental activity; enabling heritage to play a role in enhancing the lives quality of the communities.