

**Effects of Design Principles on Visitors' Perception in
Museum Spaces**

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ABSTRACT

Museums have changed through the time. Visitors have different expectations about museums. The roles of museums as educational institutions have been changed. Today visitors would not go to museums only for purpose of learning; they also go for spending time and entertainment. So interior spaces of museums should facilitate the establishing of a pleasant environment to satisfy visitors. One of important way in attracting visitors in museums today is design of interior spaces of museums. This process follows by a crucial need to define optimized design principles which allow for further changes in either internal or external architecture of museums. It is worth noting that the visitors' perception of a museum visit should be understood by the designers. This thesis investigates effects of design principles on visitors' perception which possess a significant role on the definition of interior space.

The methods used in this thesis is based on literature review for collecting data, observation to identify and analyze design principles used in museum spaces and also questionnaire method to ask visitors' opinions about the effects of these identified design principles. By comparing the result of observation and the questionnaire the final results would be obtained.

The purpose of the study is to identify design principles that have been applied for arranging and presenting objects and pictures and displays in museum spaces to investigate their effects on visitors' perception. This research would be helpful for further study to find out the correct way of design of museum spaces to create positive effects on visitors and make them interested in visiting museums.

Keywords: Visitors' Perception, Museum Space, Museum Design, Design Principles

ÖZ

Müzeler zaman içerisinde değişmişlerdir. Ziyaretçilerin müzelerden değişik beklentileri vardır. Teknolojinin gelişmesi ve internetin hızı sayesinde dünyanın birçok yeri hakkında bilgi almak çok kolay hale gelmiştir. Böylece müzelerin eğitim kurumu olarak rolü de değişme uğramıştır. Bugün insanlar müzelere sadece öğrenmek maksadı ile gitmemekte; aynı zamanda eğlenmek maksadı ile de gitmektedirler.

Bu yüzden iç mekan tasarımı ziyaretçilerin algısını olumunu yönde güçlendirmek ve bir ortam yaratmada etkili olmalıdır. Bu bağlamda iç mekan tasarımının ve mimari tasarım kararlarının tasarım ilkeleri çerçevesinde alınması bir ihtiyaç olarak ortaya çıkmaktadır.

Bu tezde kullanılan metod, müze mekanının tasarım prensiplerinin belirlenmesi ve analiz edilmesi için gözlemlenen ve ayrıca ziyaretçilerin tasarım prensiplerinin müze mekanının etkileri hakkındaki fikirlerini öğrenmek için "anket+çalışma" metodlarına dayandırılmaktadır. Gözlem ve anket yöntemleri karşılaştırılarak sonuçlar elde edilecektir.

Bu araştırmanın amacı, müze içerisinde sergilenen nesnelerin ve resimlerin sergilenmesinde uygulanan tasarım metodlarının etkilerinin ziyaretçilerin algılamaları üzerindeki etkilerini tanımlamaktır. Bu araştırma, müzelere daha çok ziyaretçilerin ve sürekli gelmelerini sağlayacak olan müze tasarımının doğru bir şekilde nasıl yapılacağı konusundaki ileride yapılacak olan çalışmalara yardımcı olacaktır.

Anahtar Kelimeler: Ziyaretçi Algı, Müze Mekan, Müze Tasarımı, Tasarım İlkeleri

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Chapter 1

INTRODUCTION

1.1 Background of the Study

One can list different aspects for a positive design process. It can increase comfort, satisfy the human beings' visual and psychological needs and at the same time give a meaning to the space. In addition to the positive process, the design can act to solve problems such as defining the path for users to get response from a space. The space reacts to the qualities enhanced by physical properties in order to respond. Technically speaking, interior design has the ability to act in a manner to identify the orientation of elements in a space (Edwards, 2010). As the users perceive the space, their behavior, as well as their perception, is directly affected. Rock (1975) defined the perception as a process during which the surrounding is perceived unconsciously by an individual and then he/she will start to recognize and define the environment consciously and then react toward the environment (Rock, 1975).

Perception of space is especially important for museums. Museums, like other public institutions are getting more concerned about interior space in order to develop their strength in learning fields and also to give a better feeling to their visitors. It should be noted that museums are not common public places. They carry a huge cultural heritage of the world behind themselves which should be applied to promote human culture. They are knowledge centers to inform visitors as well as to serve them comfortably. So, the museum curators and designers should plan to increase the number of audiences (Ambrose & Paine, 1993).

As museums progress, they should introduce new plans to motivate visiting and try to eliminate the reasons which cause less visiting. Visitor' perception about museum is critical. Visitors plan about what they visit in museum spaces, what they think, and how they behave there. If visitor perceive an object or issue is not interesting to him,

he will go to another object or information source. As a result, the museum should consider the certain aspects of perspectives of a visitor in related to objects in displays, spaces of museum to make museum more attractive for visitors (Loomis, 1987).

One important way in attracting visitors is design of interior space of museums. The way objects arranged in displays, the way displays are designed, decoration of museum spaces, circulation of spaces, and in overall design of museum spaces attracts visitors.

Several researches are done to investigate the interaction between the visitors and its surrounding environment in museums to evaluate precisely effects of design on the visitors' perception during the time he/she is discovering the built environment of museums. For example researchers have investigated the extent of relationship between the design of displays in art gallery and visitors' movement (Bourdeau & Chebat, 2001). And also how the designing of the labels can attract visitors in interior of museum (Taxen, 2003). Researchers have also investigated the extent of relationship between art pieces are designed and the experience of visitors to learn them (Bourdeau 2003, Johnston 1998, Bitgood 1993). Studies in UK have shown that it is not the collection factor which motivates the visitors to choose a museum to visit, but it is in fact the environment of museum which attracts them (Waltl, 2006). The effect of design on visitors' learning in science museum is investigated by Allen (2004). According to Falk and Dierking (2000), an "appropriately designed" exhibit has good physical and conceptual effects on visitors (Falk & Dierking, 2000).

So an attractive interior design in museums, prepare enjoyable experience for visitors and help them in process of learning in museums. As it is mentioned, there are many researches concerned about importance of design of museums. In this research, effects of design principles applied in design of interior spaces of museum on visitors' perception would be investigated.

1.2 Problem Statement

During recent years, museums have faced many problems in terms of number of visitors. Some people never come back to visit museums again because interior spaces of museums are not attractive for them.

The first reason is that most of museums are still serving the visitors in a traditional style. While the taste of the visitors has been changed a lot in recent years, the museums do not update the methods in which they present objects in displays. For example, although there might be some objects of great significance, they could be completely neglected because of bad design in presenting them (Bitgood, 2002).

So this implies that the museum designers should try to attract visitors, which is not easy to achieve, and they cannot be successful otherwise they employ creative methods to give the visitors a good experience. It is clear that changing the way the museums are designed could result in an increased number of visitors (Black, 2005).

1.3 Research Aim and Objectives

Knowing the extent of the importance, the designers should try to enhance the environment physically and psychologically because the interior space affects the visitors' perspective substantially. So the aim of this research is to investigate the

possible impacts of applied design principles in order to improve objects presentations in museums to catch visitors' perception.

In order to investigate how the design principles affect the perception of a visitor of interior space of museum, the research questions are constructed as below to be studied:

- What are the effects of design principles on visitors' perception in museum spaces?
- Which design principles are more effective in the design of museums environment?
- How design principles could be applied in interior of museum space to create positive perception for visitors?
- What is the reaction of visitors in related to design principles used in interior spaces of museums?

1.4 Limitation of Thesis

This study would investigate the influences of interior design principles on visitors' perception. There are many different types of museums, so in order to specify the field of study; historical re-used museums are evaluated in this research. In order to specify the field of study, this study is limited to museums located in North Cyprus. Four museums located in Girne and Famagusta and Lefkoşa in North Cyprus are selected as cases studies which have properly space arrangement. As it is mentioned, design effects on individuals physically and psychologically, again, for specification, this research only analyses physical effects of design principles on visitors' perception in these museums.

1.5 Methodology

There are several research methods, such as field study, interviews, questionnaire, focus groups, and video records could be applied in order to give the researchers a handful tool to evaluate data.

The methods used in this research are qualitative method of literature review, observation, and quantitative method of questionnaire.

Data collection is based on literature surveys. Literature survey is done for the theoretical background of research. It is obvious that one of the most useful research methodologies to evaluate museums is observation. Four historical re-used museums in North Cyprus are selected for analysis. In this research, there are three main spaces on which the observations should be based: “Entrances”, “corridors” and “main exhibition”. Based on observation, the design principles identified and analyzed in interior spaces of these four museums. From the observations, it becomes also possible to evaluate visitors’ reactions in specific displays. After gathering all observation, questionnaires are designed based on observation of each museum. As different design principles identified in each museum and each museum had different interior space arrangement and organization, questions designed for each museum are different from another one.

Questionnaires are constructed accordingly in order to investigate effects of identified design principles on visitors’ perception in these museums spaces. As most percentage of visitors has not academic information about these design principles and it is not possible to ask them directly about the effects of these principles, questionnaires asked in from visitors in their own language. In each museum, 20 visitors filled the questionnaires. Finally, by conducting a joint comparison between what observed and what visitors mentioned in questionnaires, possible implications or guidelines that could be applied in interior design of museum concluded.

To summarize, the first chapter introduces the purpose of the study and outlines the problem statement. Afterwards, it follows by a listing of the limitations of the study and finishes by describing methodology. Second chapter defines briefly what a museum is and continues with an investigation of the extent of which interior design of museums is important to visitors. Third chapter includes detailed explanations of interior space design elements and principles. It also describes how these principles could affect the individuals. Chapter four reviews the research methodology used in this study. In order to investigate the effects of design principles applied in internal designing of museums on the visitors' perception, a combination of observation and questionnaire has been applied in this study. And finally, Chapter five concludes based on the results given in observations and questionnaires.

Chapter 2

MUSEUM

2.1 Museum Definition

Museums are non-profit institutions which are open to the public for purpose of serving the society and development of it. Museums are places for preserving and representing the historical, scientific, artistic collections, documents and materials for studying and educating purposes, and also enjoyment and entertaining (Boylan, 2004). The museums play an important role in developing cultural aspects of a society. Museum collections present what a country has achieved during the history and what historical developments have occurred in the country. The existence of a museum is vital for countries especially when they might experience enormous cultural changes. Hence they could refer to their heritage and connect past and future properly (Hooper-Greenhill, 1992).

Undoubtedly, it is not possible for a nation to go forward without the historical memory. That is why the museums are places in which the world's people memories, dreams and even hopes are being kept. Therefore, museum designers, curators and architects have great responsibility to protect that memory (Anderson, 2003).

2.2 Museum' Work

The museum's mission is that to consider objectives and physical requirements. Main headings of the work of museum should include the following sections:

- Function—definition of the type of museum and its organization; the mission, goals and objectives of the museum; the variety of its collections and the facilities that are going to be positioned; the style and characteristics and also brand of the museum.
- Collections— An explanation concerning for example the variety and type of the museum's collections; the level of importance about the collections; what

requirements for collections are there in space; display and storage requirements; protection and security considerations; and the way in which one can link between collections areas, visitor areas, museum management areas and service areas.

- Users– A description to clarify how to estimate numbers of museum users, taking into consideration users with special needs; museum working hours including opening times and patterns of use; and visitor facilities, including entrance, educational and research facilities, reception and information areas, toilets, rest areas and seating places.

- Museum staff–estimating accommodation requirements for management, staff, curatorial, education and administrative and staff facilities such as offices, restrooms, meeting rooms and toilets.

- Space requirements–planning for square and cubic forms for spaces; space hierarchies; the degree of flexibility in space, zones; layout; environmental cares; visitor flow patterns; security and consideration of later changes. For instance a museum has to provide the space(s) available. For example, 25- percent of space is considered for reception/visitor facilities; 25 percent for displays and exhibitions; 25 percent for collections storage; 25 percent for support services (Lord, 1991).

- In small- and medium-sized museums, the leading issue is that the space should be considered for temporary exhibitions rather than permanent ones. This concludes in use of the collections diversely and does not occupy space which might be needed for other priority events. In addition, it attracts the museum's audiences by encouraging them to revisit to the museum on a regular basis (Matthews, 1991).

All these works should be considered by museum curators and museum designers to attract visitors.

2.3 History of Museum

• Before Development of Museums

Just as other institutions, museums have experienced a long history and they have gradually changed. The fundamental character of a museum is an educational purpose which is established in order to collect and protect underlying objects of that purpose. Although the purpose is still the same, the appearance of current museums is completely different from its ancestors (Alexander & Alexander 1979).

There are evidences that even before the development of museums, some societies had discovered effective ways to protect and preserve their important collections of objects. For instance in India, Chitrashalas painting galleries was used for educational purposes and at the same time, they were a good source of enjoyment. They included information about art, history, and religion (Ambrose & Paine, 1993).

Similarly, in some parts of Asia valuable objects were often stored for protection in temples, while in Europe churches sometimes conserve not only the treasures, but rare objects also. In addition, important objects were usually designated caretaker or an elder person to keep and take care of them (Butcher-Youghans, 1993).

• Origin of Museum Word

In order to interpret the Latin derivation of this word, museum, it seems that it has been defined in Roman times mainly to places of philosophical discussion.

Therefore, the museum located at Alexandria, founded by Ptolemy I Soter in the third century BC, was indeed a primitive form of university rather than an institution to store and interpret material aspects of the cultural heritage (Edson & Dean ,1994).

● **Museums in middle Ages**

During middle ages, museums were places where the historical curiosities were stored and presented. Until the fifteenth century, two main ideas were existed according to the collection of precious cultural heritage:

- Religious items were collecting to protect due to religious believes.
- Individually-collected items which were popular among wealthy families for decoration purposes.

Similarly, the scientists were actively collecting different types of plants and stones for investigation purposes. The leading argument is that in all cases the people were not permitted to visit these collections (Burcaw, 1997).

● **Museum in Renaissance**

Lately in fourteenth century, a modern era has been emerged by the formation of a set of fundamental changes in human ideology. These widespread changes in all aspects of human life are known as renaissance.

All of these changes resulted in a different perception of cultural and artistic heritage. They were no longer some precious materials and in fact their artistic aspects had been started to promote. Consequently, societies started to establish some places to present artistic objects. Hence the word gallery was formed in this period and the art

of safekeeping and presenting them became a profession (Hooper-Greenhill & Dodd, Phillips & O'Riain, Jones & Woodward, 2003).

● **Museums in Fifteenth Century**

The word museum was reactivated in this century in Europe. It was used to depict the collection of Lorenzo de' Medici in Florence. In fact, the term carried the concept of comprehensiveness rather than a building name. Moreover, it was firstly in this century when the museums were introduced as important institutions to study nature and modern sciences. Pope Sixtus IV founded the first museum in 1471 in a way which is known today. So this first experience followed in Europe by Cesarini, Fonese, Afitzen museums in 1500, 1546 and 1581 respectively (Ambrose & Paine, 1993).

● **Museums in Seventeenth Century**

By the beginning of the seventeenth century, museums were being used in Europe in their modern form to depict collections of curiosities. There were some instances such as Ole Worm's collection in Copenhagen, John Tradescant's collection in Lambeth in England. Museum Tradescantianum, a rich collection of animals, plants, precious stones and jewelries, was collected by Tradescant and his son in 1656 (Alexander & Alexander, 1979).

Elias Ashmole bought the collection and in 1677 the collection was handed over to the University of Oxford. In order to keep this collection, a building was founded. In 1683, this building became publicly open to all visitors and named Ashmolean

Museum. It has been suggested that this is critical historical point when the private collection of countries and wealthy people started to become public institution which are known as museums today (Edson & Dean ,1994).

This museum has two characteristics which turns it to a unique institution compared to other similar ones. Firstly, this is the first museum which started to present the collections publicly with a fee. So the founder might be the first person who allowed other people to visit his collection by giving a fee. By the way, this is the first public museum in England. Secondly, the collections were accessible for scientists to investigate them in order to develop the science boundaries. So Ashmolean could be named the first natural science museum in all over the world (Impey & MacGregor, 1985).

● **Museum in Eighteenth Century**

The progressing developments in 17th century were followed by an important issue in 18th century which was the fast increase in the number of museums in different parts of the world. In the beginning of this century, Britain and Vatican museums were built in 1753 and 1756 respectively. The main core of the Britain was Sir Hans Sloane' collection consisted of 70,000 books, historical items, measurement tools, jewelries, coins and medals (Marjorie, 2002).

In 1750, the first museum was established in U.S. which was located in Harvard University. The museum was named Wonders Room. However this museum started to collect unusual objects, it is not known as the first formal American museum. Charleston Museum, founded in 1773 in South Carolina, is officially recorded as the first museum in U.S. Similarly, in Europe, William the 8th opened Kassel Museum in

1759. F.N.C act, 1792, also gave the French museums a public concept. The Louvre museum is a good example of that publicizing which became the foundation of the 19th century museums (Bragg, 1923).

● **Museums in Nineteenth Century**

During the 19th and most of the 20th century, museum was defined as a building for storing cultural materials to be presented to public. Later, as museums evolved to meet the people requirements, the importance of the building itself decreased.

The first half of the 19th century was completely influenced by the industrial revolution. The most important effect of industrial revolution felt by museums was the foundation of academic fields based on museums. The graduates of these fields flowed to the museums in order to research in their specialized field. This procedure resulted in a mutual relationship between museums and academics which helped to promote the position of museums in academic world (Hooper-Greenhill 1991).

Science and techniques museums were more common among all different types of museums existed in that era. An obvious instance is the science museum of London (1851). Technically speaking, these special types of museums developed because of the human concentration of inventing new technologies. Most of the significant world historical museums are founded in this period. In an interesting manner, children and teenagers were really motivated in museum visits. This huge attraction enhanced the position of a museum as a strong social media (Bazin1967).

● **Museums in Twentieth Century**

Modernism formed in the first half of 20th century. So, one could apparently follow the effects of modernism on the museums. This pattern is more visible in developed countries which are the origins of museology methods.

The 20th century museums have multifunctional aspects as well as many outcomes of modernism. Their functions greatly have affected social, cultural, political, economic and other issues in a society. The combination of this capability and other democratic potential aspects of developed countries have resulted in establishing a new form of museums which were not available previously. The most important ones are anthropology and social anthropology museums (Burcaw, 1997).

According to the scientific and technical developments, the traditional presentations were replaced by different arrangements. Similarly, the number of temporary and mobile exhibition increased significantly. Another example could be National Victoria Salon museum in Melbourne which is established greatly huge. However it has been design flexible and it is possible to change the walls, floor and ceilings textures within few hours (Anderson, 1984).

The museum management has been developed remarkably by the beginning of World War Two. By the beginning of electronic era, museum managers come up with a new theory: Let's bring the museum into contemporary people life. Post, army and geology museums are the outputs of applying this theory. Correspondingly, Solomon Guggenheim Organization founded in 1937 in order to increase international cultural cooperation between museums. The procedure of development permitted the governments to take into account the museum associations and start implicating them for educational purposes. Finally, ICOM (International Committee

of Museums) founded in 1946 and a new era in museology and museum has been started (Boylan, 2004).

2.4 Benefits of Museums

The present situation of most of countries today is highly based on the extent of importance they care about their cultural heritage. Nowadays, museums play a significant role in different aspects of a nation's life. This role is not limited and includes all social, cultural and economic aspects. Thus, museums supply some benefits to individuals and nations. The benefits should be identified carefully and then a framework must be introduced to implicate proper policies in order to support museums at all levels (Ambrose & Paine, 1993).

2.4.1 Social and Cultural Benefits

As mentioned above, social and cultural benefits provided by museums are undeniable. They help to provide educational facilities and at the same time they serve community requirements. Accordingly, museums act effectively in hands of a community to understand their past identity (Lowenthal, 1985).

2.4.2 Economic Benefits

Museums provide a handful tool to improve economic environment in urban or rural areas. So by attracting tourists, museums help to local economy. The more the tourists' visit the museums, the more the local economy would be activated (Lumley, 1988).

2.4.3 Political Benefits

A museum could act effectively to promote the sense of local pride and protect cultural values. This task is usually done by the local government. Thus, museums are handful tools for local governments to maintain cultural heritage and let the people know their community roots (Walsh, 1992).

2.5 Museum Types

Museums can be categorized in several types in a country. The most well-known ones are science, history, and art museums. However in some museums these types might be found combined (Hooper-Greenhill, 1992).

• Art Museums

Art museums usually store collections consisted of paintings, photographs, drawings and sculptures. In addition to art collections, they might maintain ceramic, stone, cloth and gold or silver artifacts from different cultural communities (Figure 2 and 3). They also schedule extracurricular activities to provide educational programs for public. For instance, weekly or monthly lectures in galleries are appropriate options for adults while there are some drawing workshops for teenagers (Morris, 1962).



Figure 2. Richmond Art Museum (URL1)



Figure 3. Boise Art Museum (URL 2)

● History Museums

History museums are usually located in old buildings in order to provide an environment for the visitor to travel in time and discover the lifestyle of the past (Figure4). Agricultural artifacts, antiques and documents could be probably found in a historic museum. These items depict the local history of the region. Furthermore, in some historic museums a research library is provided for visitors. The library usually has a good source of old newspapers or genealogical materials (Hooper-Greenhill, 1992).



Figure 4 .National Museum of Natural History (URL 3)

● Science Museums

Science museums have evolved to locations which provide a great environment for both adults and children to get involved in learning process. These centers are

properly designed and try to attract more people. Consequently, People simply understand how science is tied to each aspect of their life. In order to achieve this goal, science museum plan different engaging activities for people to participate. On-site exhibits, theatrical performances, scientific classes and innovative contests are among these activities. In addition to on-site programs, most of science museums offer off-site programs for schools of their community. Similarly, scientific centers are proper places for schools to plan class fieldtrips (Burcaw, 1997).



Figure 5. Museum of Science and Industry (URL 4)

● Other Types of Museums

It is worth noting that all above mentioned types are common types but not all. One recently populated one is wax museum (Figure 6 and 7). Many tourists are attracted to these museums. Moreover, hall of fame and national museum, and music are also other possible types (Burcaw, 1997).



Figure 6. Musical Museum (URL 5)



Figure 7. Paris Wax Museum (URL 6)

2.6 Museums' Collections

The museum collections stand for a long history of achievements in a country's history. Private collections are available for many reasons such as: social or political status, academic or scientific interest, commercial benefits and finally for personal interests. One might collect a collection irregularly and this collection would not follow any order. However it has a specific meaning for the collector. On the other hand, the collections might follow an organized manner. In this case, they depict a specific point of intellectual argument. They might follow a 'systematic' collecting method in which collections are constructed in an extensive method among disciplinary approaches. Technically speaking, anything that academics provide by

collecting, it would greatly affect the development and philosophy of museums (Messenger, 1989).

Collections in a museum could be divided into different disciplines such as decorative arts, fine art, natural sciences, social history or technology, archaeology (Figure 8), and anthropology. These disciplines give a particular impression to academic training to the subject. In addition to all this classifications, collections could be categorized according to their composition as stone, wood, feathers, leather, bone, ceramics or metals (De Torres, 1990).



Figure 8. Archaeology Collection in Antalya Museum, Turkey (URL 7)

Dr. Alma Wittlin defines a classification framework for different types of collections based on their collectors' motivations: economic hoard collections which is included a pirate's treasure; magic collections included the bones of saints located in churches; collections such as football trophies in the high school lobby for expressions of group loyalty; collections that result from passion such as painting, sea shells (Figure 9), stamps and etc as means of emotional experience; social prestige collections included the art collection belonged to a newly rich family; collections such as the tools and

clothing belong to primitive tribes for purpose of stimulating curiosity and inquiry (Wittlin, 1970).



Figure 9. Phuket Sea Shell Museum (URL 8)

It is suggested that the museum staff should be well aware of the importance of collecting process and its effect on the development of museum as well as historical heritage. So, they would be very helpful in relation with the visitors. Similarly, a basic knowledge of types of collection and their development process is a vital necessity for their work (Anderson, 2004).

2.7 Types of Visitors

Molly Hood (1981) suggests that there are three types of museum visitors: frequent visitors, occasional visitors and non-museum visitors. The first group is frequent visitors who are a large proportion of the annual attendance at museums but they are the smaller part of the total population in a region. The second group is occasional visitors who visit a museum once in a while. So they are very similar to the third group, non-museum visitors, in terms of attitudes. Non-visitors have been never visited museum (Hood, 1981).

● Lighting in Museum Spaces

Lighting plays important role in perception of space and objects specially in exhibition areas and museums spaces. As natural lighting is not too much applicable in museum and exhibition and it damages the objects and pictures. Using natural lighting makes difficult to see the objects clearly so, applying artificial lighting is necessary in exhibition and museum spaces.

Artificial lighting includes indoor and outdoor lighting. Indoor lighting that uses for interior spaces has been classified in different types that have been explained blow:

- **General Lighting**

This type of lighting is ambient lighting for illuminating workplaces or traffic zones that includes wide beam light distributed in space that is shown in figure 10 (URL 9).



Figure 10. General Lighting (URL 9)

- **Accentuation**

This type of lighting shown in figure 11 includes narrow beams of light and emphasizes and concentrates on objects. Applying this lighting in dark spaces attracts visitors' attention on important objects (URL 9).



Figure 11. Accentuation (URL 9)

- **Wash Lighting**

This type of lighting that can be seen in figure 12 includes wide beams of light and it is applied for lighting of spatial zones or illumination of large objects (URL 9).



Figure 12. Wash Lighting (URL 9)

- **Wall Washing**

This type of light (Figure 13) includes vertical luminance that structures and defines spatial situations. The effect of this brightness gives feeling of security to visitors (URL 9).



Figure 13. Wall Washing (URL 9)

- **Projection**

Projectors are applied for projecting signs, and images (Figure 14). This type of lighting applies for creating light effects and pattern by using different lens and gobos (URL 9).

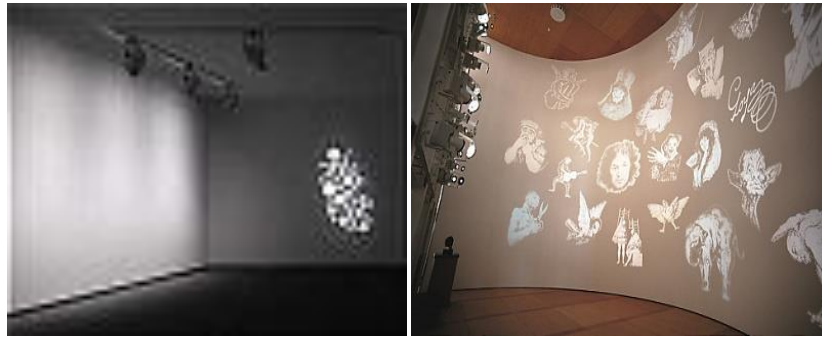


Figure 14. Projection (URL 9)

- **Orientation Lighting**

This type of lighting that can be seen in figure 15, helps in perception of space by applying light point along pathways and during stairs to give visitors direction on their movement (URL 9).

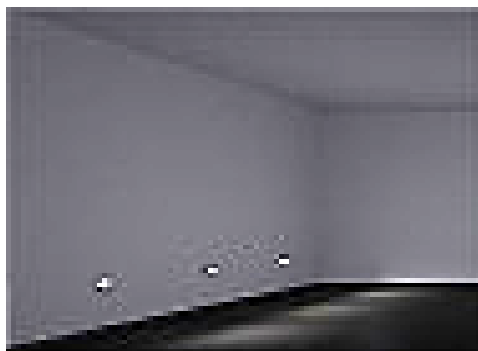


Figure 15. Orientation Lighting (URL 9)

2.10. Summary of Chapter 2

Reviewing all mentioned about the important effects of design of museum' environment on visitor' behavior, it should be emphasized that designers should design museum space with consideration of visitors' opinions.

Despite the fact that visitors have different perceptions; a designer could apply specific methods in order to give a positive feeling to viewers (Baudisch, Decarlo, Duchowski, & Geisler, 2003).

Successful design of a museum is strongly tied to the proper identification of public's interests and concerns. Today museums must actively be involved in improving design features in order to be competitively an entertaining museum as well as an educational space (Macleod, 2005).

In designing museums spaces, the interaction of environmental settings and objects with visitors should be considered. In summary it could be mentioned that one of way of attracting visitors is design of interior spaces of museums. Therefore, proper application of design elements and principles play important role in museum spaces. Design elements and principles would be introduced in next chapter.

Chapter 3

PERCEPTION OF DESIGN ELEMENTS AND DESIGN PRINCIPLES

In this chapter first about design of interior spaces and how human perceives interior spaces will be discussed and then design elements and design principles will be introduced and investigated.

3.4.1.1 Space Organization

As mentioned in the previous section, space organization would get a great extent of importance as a designer is going to enhance the users' perception. Ching in his book " Architecture, Form, Space, and Order" defined a classification for organization of space that has been explained below:

- **Centralized Organization**

Central type is usually employed where there is a large space available and the designer could consider many secondary spaces (Figure 18). The outcome of this kind of organization might be either a symmetrical organization with regular geometrics or an asymmetrical one with irregular geometrics that have harmony with their surrounding environment. Since this form organization is non directional, the entry should be considered by condition of site and one of secondary spaces should be selected as entrance.

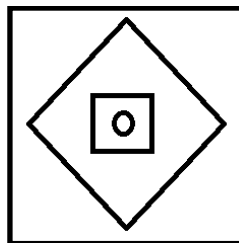


Figure 18. Centralized Organization

- **Linear Organization**

This type of organization is consisted of a series of spaces that can be link to each other directly or a separated linear space links them to each other. The repeated spaces along the sequence could be similar or different in form and size but in both position all spaces have an exterior exposure (Figure 19). Linear type is a more flexible one. The designer could apply a set of related forms in context. A linear organization could be for instance a wall which separates the space along its length.

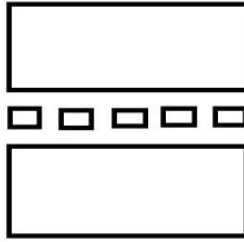


Figure 19. Linear Organization

- **Radial Organization**

By combining linear and centralized organizations, new type could be defined which is called radial organization. This makes a dominant space at center (Figure20).

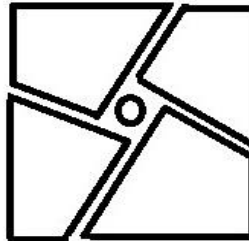


Figure 20. Radial Organization

- **Cluster Organization**

Cluster organization, as its name implies, refer to grouping of space (Figure 21). This type of organization shows the importance of the situation in which a group of spaces should be organized.

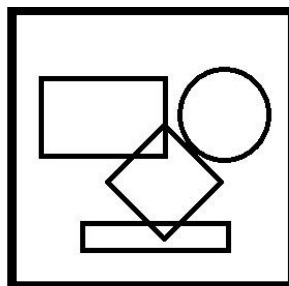


Figure 21. Cluster Organization

- **Grid Organization**

The last type is grid organization that has grid structure organization (Figure 22). The set of intersected visual objects causes the spatial continuity to be modified.

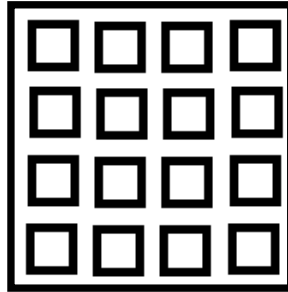


Figure 22. Grid Organization

It is worth noting that all organization types would work in accordance with interior design elements. So the outcome of each would result in completely different perceptions on users. Users' perception of a space is affected by different aspects of space. Therefore, a designer should be aware of the importance of organization of space (Ching, 1979).

3.4.2 Line

Line could be defined as Points located close together. Lines could be classified as thin or thick, straight or curved lines, horizontal, vertical, or diagonal lines.

3.4.3 Form/ shape

- **Shape**

Shape is a closed line. Shapes are geometric such as squares and circles or Organic shapes such as natural and free shapes. Shapes are two dimensional and flat and can be defined by length and width.

- **Forms**

Forms are three-dimensional shapes expressing length, width, and depth. Balls, cylinders, boxes, and pyramids are forms.

Each space needs to be properly designed in order to be attractive for users. This procedure could be implicated by forms of architecture.

As Kubba (2003) stated form and space are totally relying on each other. Furthermore, it is worth noting that forms, no matter three or two dimensional, are a positive part of the space. They play different roles in interior design. While some forms could be applied to fulfill the decorative requirements to enhance the displays, they could also be employed to clarify a definition symbolically. They could also act functionally in the space (Kubba, 2003).

Forms could be categorized as: form of furniture or objects, form of fixture/built-in furniture and form of space, Similarly, Stewart (2002) classified forms of space as curvilinear, cubic or irregular and etc that could be seen in figures 23, 24, and 25.



Figure 23. Form of furniture in Furniture Museum of the Shaanxi Rich (URL 11)



Figure 24. Form of Fixture in Victoria and Alberto Museum (URL 12)



(a)

(b)

(c)

Figure 25.a Curvilinear Form of Space, Hanoi Museum (URL 13)

Figure 25.b Cubic Form of Space, Our Gallery (URL14)

Figure 25.c Irregular Form of Space, Art Gallery of Alberta (URL15)

As Ching (2007) stated, it is the ability of the designer to combine design elements in order to establish a proper design for interior or exterior space. Forms are born naturally. They have surrounded human beings and they can be withdrawn by analyzing nature and society. Hence, the designer should find them and communicate via them. Clearly, the result of picking a proper form is the satisfaction of users' perception (Ching, 2007).

3.4.4 Color

One of the most impressive design elements is color. It is highly potential and can affect the design effectively. Color of a space introduces what the designer would intend to transfer to the observers (Birren, 1989).

Each user gets a different message from the color. The reason is that the users' perceptions vary greatly due to many factors. The designers apply different themes by colors in order to motivate the users' emotions and then attract those. Hence colors affect human sensations via different channels. As one enters a space, the color causes him/her to experience a sudden psychological and physiological discovery. This experience could be intensified and finally reaches the state that the designer would have in mind. Obviously, it is also so important for a designer to know how he/she should apply the proper color in order to become successful to imply the exact meaning (Grimley & Love, 2007).

Color is not only the color of the object itself, but it could be also the background color of the object. So proper color selection should result in proper presentation of the object importance (Benya & Karlen, 2004). In figure 26, applying white color of wall as background of pictures has been made pictures more visible. In addition, has been made the space to be perceived bigger.



Figure 26. White Color Walls in Pace Gallery (URL 16)

It has been argued by researchers that different color stand to represent distinctive moods, feelings, cultures and etc (Benya & Karlen, 2004).

Blue is known as a peaceful and relaxing color which gives a feeling of security. Red is attached to excitement, love or any strong feeling while yellow is associated with bright and sunny tendencies. Green incites the users to perform at their high levels of energy, and the feeling of power or loyalty could be applied by purple (Grimley & Love, 2007). In figure 27, it is clearly observable that using warm colors has given a warm feeling to the space.



Figure 27. Applying warm colors walls in Harold Golen Gallery (URL 17)

Each color carries a unique perception. So designer should know effects of colors well and apply them correctly.

3.4.5 Light

Nothing is visible without light. The visibility of the objects is dependent on the light which would be allowed inside the environment. A single space might be perceived differently if the lighting changes. Furthermore, light is one of the characteristics of a space which lets the user to differentiate between experiences (Katerina Maniaa, 2005).

Lighting in interior may be natural or artificial. Although sunlight is the best choice to create a healthy ecological interior, but the absence of light cannot be rejected in

the absence of sunlight at night and therefore increasing the quality of artificial lighting will be as important as capturing the day light in interior environment (Potter, 1856).

The leading argument here is the fundamental differences between lightness and darkness. Wherever the light enters, it is accompanied with accessibility, clearness, consciousness. On the other hand, a number of negative feelings are attached to darkness such as mystery, depression, fear and etc (Gorden, 2003).

Light in space could be applied either naturally or artificially. Undoubtedly, the best source of light is sun. However there would be some situations that there is not any access to the sunlight (Figure 28).



Figure 28. Using Skylight and Artificial Light in Taubman Museum of Art (URL18)

Lighting is a powerful tool in hands of a designer to direct the observers' attention and make them to concentrate. An object is distinguished in the environment by the direction of light. Moreover, it is feasible to employ lighting to show the extent of importance of a space and attract the users' perception such as in exhibitions, waiting rooms and other similar areas (Benya & Karlen, 2004).

The degree of the luminance also plays an important role in the whole process of perception. Different levels of light represent different experiences for the users. Color is also a crucial visual factor which its existence has a direct relationship with light (Figure 29).



Figure 29. Visitors' experience of light and color at the Museum of Art (URL19)

The arrangement of light sources enables a designer to enhance the attractiveness of an interior design.

3.4.6 Texture

The first layer of any object is its texture. Texture is the first thing that a user perceives so it influences his/her experience of that space (Lauer & Pentak, 1995). Architecturally speaking, a user's perception on texture could be categorized in two groups: visual and tactile. The visual texture is what the user perceives by visual sensations. The tactile texture is a specially-interpreted definition of any specific individual of that item (Zelanski & Fisher, 1996).

Human beings have different perception of textures whether it is smooth, rough, soft and etc. The space designer could manage to use the ability of texture to give a different feeling to the users. For instances, using a texture which implies roughness

could make the atmosphere of an environment warm while smoothness might imply coldness (Evans & Thomas, 2004). As it can be seen in figure 30, although the polished marble cladding in part a has visually lighter weight than the timber stack panels in part b, the reality is completely in opposite.

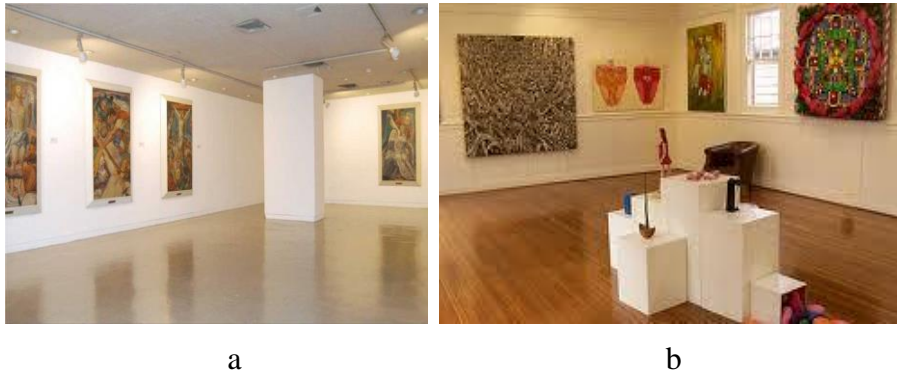


Figure 30.a Rough Texture Floor, Pictures Gallery (URL 20)

Figure 30.b Smooth Texture Floor, Gloucester Gallery (URL 21)

So the underlying concern is how a designer should choose the proper texture in order to supply the right feeling to give the intended message to the user.

3.5 Design Principles

In order to build an effective environment to communicate, the design elements should be arranged properly. Design principles are the basic rules which help the designer to put the elements effectively (Brainard, 1998).

It is difficult for the principles to be separated just as for the elements. Given that they are working all together dependently, choosing the way in which they should be arranged is totally in hands of the designer.

There are different classifications for design elements and design principles from different researchers. Steven Bradley in the book *Seven Component of Design* stated that to have good design, designer should be aware of these components: Unity, Gestalt, Space, Dominance, Hierarchy, Balance and Color (Seteven Bradley, 2010). The other researcher, McClurg-Genevese, has been grouped design principles to Balance, Rhythm, Proportion, Dominance, Unity (McClurg-Genevese, 2005). Guillermo Cedillo has defined only four design principles of balance, emphasis, rhythm, and unity (Guillermo Cedillo, 2011). David A. Lauer and Stephen Pentak in their book *Design Basics* have been grouped design principles to Emphasis and focal point, rhythm, balance, unity, scale and proportion. Francis D.K.Ching in the book “*Architecture, Form, Space, and Order*” has introduced ordering principles of axis, symmetry, hierarchy, rhythm, repetition, Datum, and transformation (Ching, 1979). Lucy Lamp in her report has grouped design principles to Repetition, Pattern, and Rhythm, Balance, Contrast, Proportion and Scale, Directional Force, Unity and Variety, and Emphasis and Subordination (Lamp, 2013). Inside from different types of classification, in this research design principles which are more common in design have been selected for study and explained in table below:

Table 2. Selected Design Principle in This Research

Author	Classification of Design Principles
“Design Basics” by David A. Lauer and Stephen Pentak	Emphasis, Contrast, Rhythm, Scale and Proportion, Balance, Harmony, Unity
“Principles of Design” by J. Paul Getty Trust	Emphasis, Movement, Pattern, Repetition, Rhythm, Proportion, Variety, Unity
“Architecture, Form, Space, Order” by Francis D.K.Ching	Scale, Proportion, Axis, Symmetry, Hierarchy, Rhythm, Repetition, Datum, transformation, Order
Selected Design Principles in this Research	Emphasis, Contrast, Rhythm, Repetition, Scale, Proportion, Hierarchy, Harmony, Order,

Design principles could be listed as following:

- Contrast
- Emphasis
- Proportion and Scale
- Repetition and Rhythm
- Order
- Harmony
- Unity
- Balance
- Hierarchy

3.5.1 Contrast

Where there is an obvious difference between two adjoining parts in a space, most probably contrast would exist. Contrast could be used to emphasize an object in a space. Therefore designers employ the differences in size, shape, mass, color, texture, pattern, lighting and other elements to bring contrast to their design and make it visually distinguished (Brainard, 1998). Contrast of color between two similar chairs could be seen in figure 31.



Figure 31. Contrast of Color in Victoria and Albert Museum (URL 22)

It is crucial to apply contrast in some areas as well as directions, colors and textures in order to attract the users' attention. Undoubtedly, contrast should exist in a proper design to emphasize that a special part of the space has more importance compared to its surrounding environment (Lauer & Pentak, 1995). In figure 32, the contrast of color between black picture and white pictures has been made more emphasis on black picture.

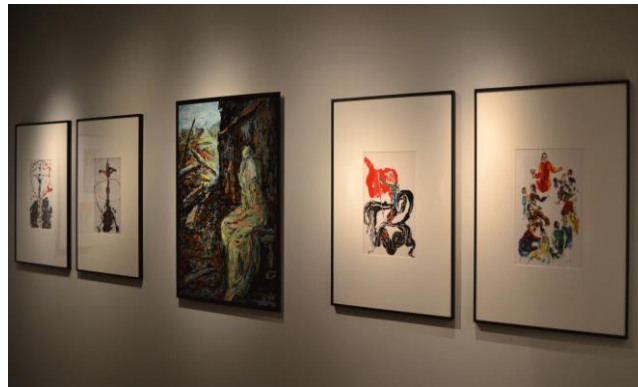


Figure 32. Contrast of color between pictures in museum of Russian art (URL 23)

A well-organized design provides the visitor a concentrated environment and makes it easier to follow the process of “using and reading” the space. On other hand, lack of contrast could cause a space to be appeared boring and uninteresting (Salyan &

Thapa, 2000). As it can be seen in figure 33, there is a high contrast between white statue and its dark red display and it makes the statue to be more visible.



Figure 33. Contrast of color of statue and its background in Bach-Museum. (URL 24)

In figure 34, there is contrast of form between new and old part of building. Contrast of material, texture, color, and light also could be seen in this building



Figure 34. Contrast between old and new parts of building (URL 25)

So it should be noticed carefully that the design contains the proper level of contrast because it is just the accurate level which attracts the visitor. A visitor follows the contrast applied in light and dark areas, wide and thin lines and then compares them. Unbalanced levels of contrast could result in a state of confusion.

3.5.2 Emphasis (Dominance)

Emphasis is another design principle that helps designers to make a focal point or discontinuance in the frame of a design (Lauer & Pentak, 1995) (Figure 35). In other words, it tries to catch the visitor's attention to what is significant. If it is employed properly, it would get the visitor gaze (Bevlin, 1994). This catching process is the only way which could help to start the communication within the display. In the absence of emphasis no communication would be possible (Stewart, 2002).

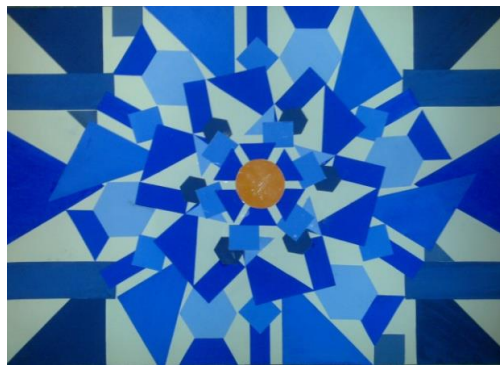


Figure 35. The orange circle is as focal point of this art piece (URL 26)

It distinguishes the positions in what is composed and how most strongly it is possible to draw the visitor's attention. Technically speaking, designer provides a focal point on a specific element of the design. There might be a distinctive contrast between that part and the others. For instance, there might be contrast between shape, color, texture or size (Bevlin, 1994). In figure 36 and 27, the statues have been emphasized in this space by using different position and decoration. Big scale of statues also has made emphasis on them.



Figure 36. The statue is as focal point in Art Museum and its Origins (URL 27)



Figure 37. Emphasis in the Rijks museum. (URL 28)

Any element which might be different in comparison with the overall composition would be perceived by visitors as a focal point, a distinguished element which catches our attention. Repetition could also create emphasis by attracting the visitor to the repeated element. For instance when a color would be repeated through a map, the positions where certain colors gather closely could attract the attention. Separation of an element from the others according to its position in space could also cause emphasis as it can be seen in figure 38 (Lauer & Pentak, 1995).



Figure 38. The Man shown in Rectangle is Focal Point of This Art Piece (URL 29)

The designer employs emphasis to attract the visitor to something, or to alter the composition in a way which could keep the viewers' interest by visual "surprises" (Faimon & Weigand, 2004).

3.5.3 Proportion

Proportion indicates a seen equality or ratio between elements of design. Proportion helps to the designer to construct a stable set of visual relationships among individual components, the components to the whole building and between the whole composition and its context (Salyan & Thapa, 2000).

The use of proportion might be evolved to catch a greater effect. In this regard, the concept of proportion might be more linked to intended function rather than to compositional elements. Proportion directly affects human feelings. Finding the proper proportional relation between the sizes in the building is of great importance in each design. (Lauer & Pentak, 1995).

In figure 39, walls are built in different height; the skylight is separated from walls by applying different color and the interior of building has been built in different

levels. These ratios between different levels has been made visitors wouldn't feel the long height of building and to feel more comfortable. The proportional divisions have been space aesthetically more pleasant.



Figure 39. Proportion in Orsay Museum, Paris (URL 30)

In order to discuss about proportion, it is worth noting that its concept is combined with its effective use and they would help the architect to design aesthetical compositions. The outcome would be a proper sense of order, unity, harmony, and emphasis meaning linked to the design. Proportion can create visual weight. The design that is out of proportion gives negative feeling to viewer.

3.5.4 Scale

Scale as a design principle is linked closely to proportion. In this regard, proportion indicates the relationships between sizes of elements in the composition, whereas scale points out the size relationship of the element itself compared to a standard. It should be noted that scale is defined as the real size of the element and the proportion is defined as the ratio between elements (Lauer & Pentak, 1995).

In order to use scale principle effectively, there is a crucial need to a common standard. Human form is accepted widely as a standard (Lauer & Pentak, 1995). Figure 40 shows building built based on human scale and figure 41 shows architecture in very big scale in comparison with human scale.



Figure 40. Human-Scale Architecture (URL 31)

Figure 41. Inhuman –Scale Architecture (URL 31)

Scale as a design principle concerns about the relation among architectural motifs, such as doors, windows or mounding and then links it to the human figure. Designers should be responsible to users' requirements. For instance, doors should be built large enough to walk through comfortably but not so huge which makes them impossible to close (Salyan & Thapa, 2000). In figure 42, big size of the entrance door in comparison with human size makes sense of fear.

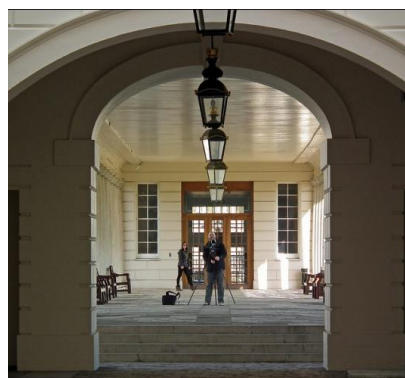


Figure 42. Big Scale Entrance Eoor in Greenwich Maritime Museum (URL 32)

Scale might be assumed to enhance the emphasis on objects. In figure 43, the statue built in an extremely large scale in order to give the feeling of overpowering. The goal of this scale was meant to praise the unbelievably excellent power of Pharaoh on the contrary to the sense of being "small" as a human.



Figure 43, Big Scale Sculpture in British Museum (URL 33)

Scale must be taken into consideration according to its surroundings. It is noted that scale could enhance emotional and perceptual aspects of a building's interior space.

If a designer applies this principle properly, he/she could help to give the intended nature of the design to the visitor more easily.

3.5.5 Repetition

Repetition has mostly its foundation on resemblance. It greatly helps a designer to unify the final outcome effectively. There is a meaningful relationship among all elements which have the same visual appearance (Figure 44 and 45). Moreover, repetition could be visible in repetition of many similar elements such as line, shape,

color, value or texture, or it is a direction, an angle or even the size (Lauer & Pentak, 1995).



Figure 44. Repetition by Similar Size of Pictures (URL 34)



Figure 45. Repetition of Similar Columns (URL 35)

The interesting point about the repetition is that it gives the visitors a feeling to analyze where the order is going to. Consequently, repetition affects the visitors' perception visually. Human 'eye finds the repetition element and follows it to catch the next. So this would be the direction of repetition (Arntson, 1998).

3.5.6 Rhythm

Rhythm is a cyclical happening of elements which in the context of architecture is defined as a regular happening of elements which usually have the same effects (Lauer & Pentak, 1995). So when a design is characterized by repetitive elements,

the designer has used a rhythm to catch the eye attention. Hence, he/she directs the eye from one space to another in a specific order (Salyan & Thapa, 2000).

This procedure allows the human mind to take into account the rhythm and then it can easily understand what is going on. So it is worth noting that in the existence of rhythm it would be much easier for the space users to catch the consistent meaning of the design (Figure46).

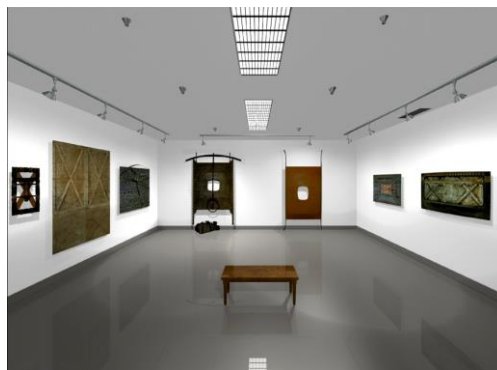


Figure 46. Rhythmic Arrangement of Pictures (URL 36)

In a design, rhythm could be also perceived through a sense of enhanced energy or the sense of movement in the space. Rhythmic arrangement also gives a direction on individuals' movement in the space (Jefferis & Madsen, 1986). (Figure 47).

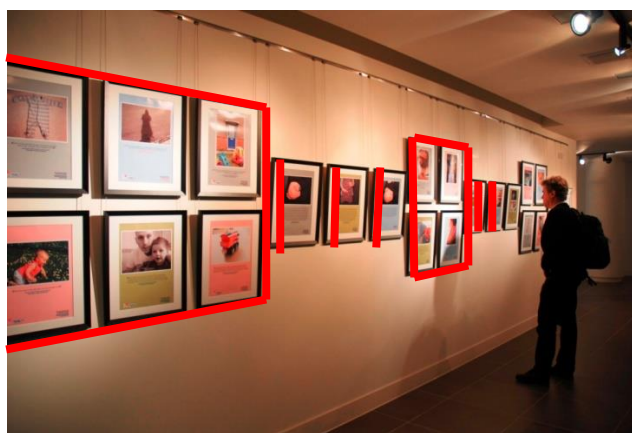


Figure 47. Rhythm of Art Pieces in Art Gallery (URL 37)

There are different types of rhythm. Three types of rhythm are defined by Steven Bradley:

- **Regular Rhythm**

This type of rhythm crates when elements are similar length or size or intervals between them are similar. As can be seen in figure 48, the similar size of windows and intervals has created regular rhythm. Figure 49 shows that the color, pattern, shape are repeated in a regular interval and have been designed in a linear path.



Figure 48. Regular Rhythm (URL 38)



Figure 49. Regular Rhythm (URL 39)

Applying same elements makes this kind of rhythm boring. To makes this kind of rhythm more interesting, the interval (the space between repeated elements) could be varied or the characteristic of elements could be changed. For example, changing the color of elements during the rhythm while shape and size and shape are constant or changing the size while color and shape kept constant (Bradley, 2012).

- **Progressive Rhythm**

In progressive rhythm, a repeated element changes, transforms more in each sequence. During the progressive steps, the repeated element changes in form or shape or size over an interval. The characteristic of element would increase or decrease gradually and makes eye to follow the elements one after another. As it can be seen in figure 50, the size of wooden ladders and space between them is gradually decreasing and is created progressive rhythm. This progressive rhythm is created focal point at end and directed the viewer' eye (Bradley, 2012).



Figure 50. Progressive Rhythm (URL 39)

- **Flowing Rhythm**

This type of rhythm happens when the elements are organic or intervals are organic and natural. The following rhythm creates sense of movement. The elements that creates this rhythm over each interval, are unique and similar though the same to each other or not. The good example of this type of rhythm could be seen in skin of zebra (Bradley, 2012). As figure 51 shows the arrangement of grass has created following rhythm.



Figure 51. Flowing Rhythm (URL 39)

Disruption of rhythm can be used as a technique to create emphasis on the specific element. This emphasis control the way viewer 'eye flows through the rhythm. It makes the eye pause on emphasized element before continuing. In figure 52, rhythm is disrupted to emphasis on importance of entrance (Bradley, 2012).

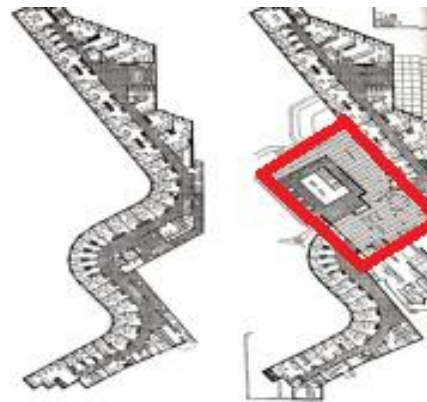


Figure 52. Creating Emphasis by Rhythm (URL 40)

Figure 53 shows that the rectangle pattern has been repeated during the facade. The gray windows and entrance has been emphasized at center of building.

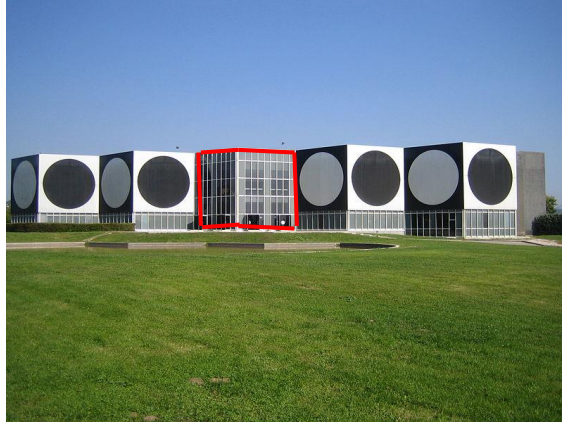


Figure 53. Creating Emphasis by Rhythm in Museum Fondation Vasarely (URL 41)

While a designer would apply a rhythm, he/she should control this principle properly. There has to be very careful investigations of space' requirements in order to use rhythms effectively. Applying too much rhythm in design, would result the sense of chaos in the space.

3.5.7 Order

Order creates by arrangement of elements in repetition form, or hierarchy or juxtaposition. Order creates from regularity arrangement of elements. Order creates unity in space. Order is logic and predictable (Ching, 1979). The repetition arrangement of windows and table has been created order in figure 54.



Figure 54. Creating Order by Rhythm (URL 42)

3.5.8 Harmony

Arrangement of similar elements in the way all elements to be in relation with each other and to create sense of completeness in entire composition. Harmony is opposite of design principle of contrast. Harmony in design creates unity. Elements in design have harmony with themselves or harmony with the context of design. The composition can be in harmony (Bevlin, 1994). The harmony between form and color of windows and whole building could be seen in figure 55.



Figure 55. Harmony in Building (URL 43)

As it can be seen in figure 56, there are harmony between vertical and horizontal elements in exterior and interior of buildings and also there are harmony between color and material of between elements and their surroundings.



Figure 56. Harmony in Exterior and Interior Space (URL 44)

3.5.9 Unity

Supported by other principles, unity is known as the essential principle in designing (Evans & Thomas, 2004). Unity, as its name implies, provides an united framework in which it brings all other elements in order to promote the design (Brainard, 1998). It is argued that a successful design is a unified design (Bevlin, 1994).

Unity establishes its foundations on the gestalt theory of visual perception, which declares that a unified design is more productive compared to the sum of its parts because the design will be visited firstly as a whole, and then the individual elements are investigated (Arntson, 1998).

It can be mentioned that after visiting a space, a viewer in fact looks for a link between the elements in order to organize them in mind. That is nothing except the unity. As it is obvious in figure 57, the pictures have been unified together and perceived as a whole.



Figure 57. Unity of Pictures in Vladimir Kush Gallery (URL 45)

Unity suggests that there is harmony in the entire design. Unity creates a sense of oneness to a visual image. If unity prevails, all the trivial parts must be kept in their places and be made simply to assist the major units in the roles, which they are to

play in the development of the structure (Gilbert, 1992). Figure 58 and 59 shows that buildings with similar form and material could be seen as a unified complex.



Figure 58. Unity of Buildings (URL 46)



Figure 59. Unity of Separated Buildings. (URL 47)

When a design is under creation, arrangements are done on all the unrelated parts then they would bring into an appropriate relation to each other in order to give a good sense of satisfaction to the visitor (Evans & Thomas, 2004). Unity simply states a basic fact that there is accordance in the entire design. It causes that the design looks united in one body. So, all trivial parts have to be kept in their positions in order to help the major units (Lauer & Pentak, 1995).

3.5.10 Balance

Any design is composed of different elements any of which has a visual weight. If they are equally distributed in space, it can be said that the design is balanced (Lauer & Pentak, 1995). Human eyes propose an imaginary vertical axis and compare each design with that to check whether they are balanced or not. In this procedure, a design is balanced if it is weighted equally on the two sides of the axis. Therefore, the visitors might feel uncomfortable when the elements are not well distributed around the axis (Faimon & Weigand, 2004).

In order to keep the visitors interested, a space should be designed well-balanced to attract their attention. There is always a request in nature to catch the order. So by balancing a space, this will be satisfied and harmony would be found in surrounding environment.

- **Symmetrical Balance**

Symmetrical balance, also known as formal balance, presents a two-sided symmetry. To create a symmetrical balance, it is enough only to repeat the design on the opposite side of the vertical axis to catch a mirror image (Stewart, 2002).

In figure 60 and 61, similar elements have been repeated on two sides of visual vertical axe and have been made visual symmetrical balance in these spaces.



Figure 60. The Symmetrical Balance in Augustinian Museum (URL 48)

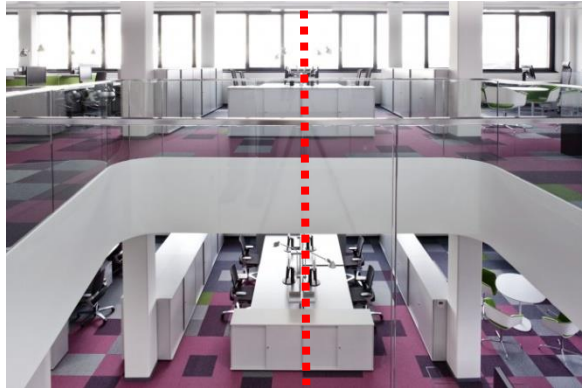


Figure 61. The Symmetrical Balance (URL 49)

It has been studied that the perception which would be reached out of a symmetrical balance is that the space has great stability, formality, arrangement and solidity (Bevlin, 1994).

- **Asymmetrical Balance**

Another type of balance strategy is called asymmetrical or informal balance. It exists where different elements are arranged across a vertical axis and the elements are weighted equally. Although they are equally weighted, they are not identical. So the designer should be well aware of equitable weights in opposite sides (Myers, 1989).

In figure62, pictures and objects that have been arranged on two opposite sides of imaginary vertical axe are not the similar but overall visual weight of them in each side is equal with other side.



Figure 62. Asymmetrical balance in Ober gallery. (URL 50)



Figure 63. Asymmetrical balance. (URL 51)

The following items affect greatly the visual weights:

- Size- The larger item would be perceived heavier.
- Shape- more complicated shapes perceive heavier than simple-shaped ones (Arntson, 1998).
- Position- The more distance of an element from the center, the heavier it would be perceived; so, when a large object is positioned near the center it could be balanced by a smaller object positioned near the edge (Lauer & Pentak, 1995).
- Value – The darker is the heavier
- Texture – More complicated textures seem to be heavier and fewer complex and no texture seem to be light (Faimon & Weigand, 2004).

- **Radial Balance**

Sometimes, all elements spread out from a central point. This would result in radial balance (Lauer & Pentak, 1995). Similar to other balancing strategies, radial also follows the equal visual weight distribution (Brainard, 1998). In figure 64, 65, and 66 elements with equal visual weight have been arranged toward center of space.



Figure 64. Radial Balance in 'Parallel Dreams' Exhibition (URL 52)



Figure 65. Spiral Balance Established in Vatican Museum (URL 53)



Figure 66. Spiral Balance (URL54)

The outcome of this type is a centrally focused design which is strongly attractive. Usually this kind of balance is not common among designers because of human beings' nature of living. However it could be found in nature very often.

3.5.11 Hierarchy

How to communicate with users is the purpose of each design. The way to organize and prioritize design elements conveys different message (Figure 67). Visual hierarchy helps to convey message and guides visitors through the story of design (Bevlin, 1994). Hierarchy is useful for understanding the differences in the design. The figure 68 shows the differences in design of the two facing up and down domes.



Figure 67. Hierarchy (URL 55)

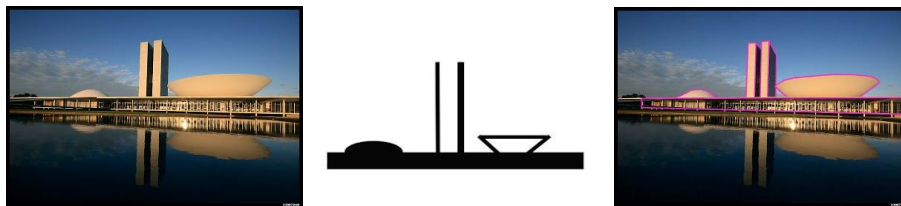


Figure 68. Hierarchy. (URL 56)

In summary could be said that designers should apply these principles properly in their design to create positive effects on users. For understanding how to use these principles properly, designers have to know what the effects of these principles on users are. In the next chapter, the effects of design principles on visitors' perception

would be investigated in four museum spaces. The summary of design principles explained in chapter three shown in tables below:

Table 3. Overview of Design Principles

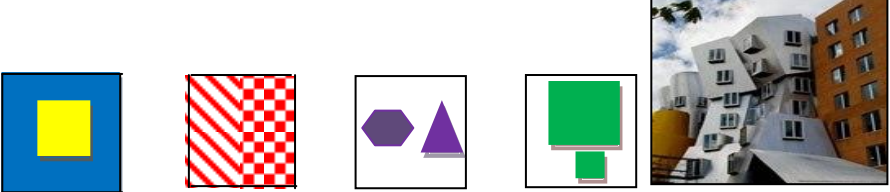
Contrast	
Definition	<p>Contrast is an obvious difference between two adjoining parts.</p> <p>Contrast could be created by different color, texture, shape, form, and size.</p>
Effects	<p>Contrast attracts attention to separated parts.</p> <p>Contrast makes it easier to follow the process of “using and reading</p> <p>Contrast creates emphasis.</p>

Table 4. Overview of Design Principles

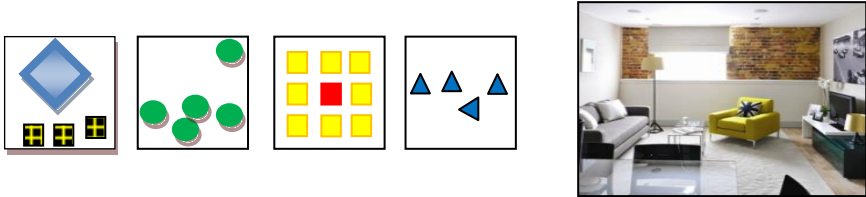
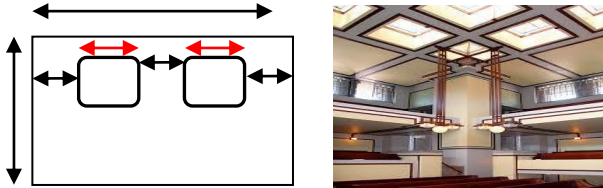
<p>Emphasis (Dominance)</p>	
<p>Definition</p>	<p>Emphasis indicates on one element in composition or entire composition from surrounding.</p> <p>Emphasis could be created by contrast of shape, color, texture, size.</p> <p>Different position of one element in comparison with other elements could create emphasis on that element.</p> <p>By isolation, similarity and placement could create emphasis.</p>
<p>Effects</p>	<p>Emphasis attracts visitor' attention on emphasized object.</p> <p>Emphasis creates focal point in design and attracts visitor' eye.</p>
<p>Proportion</p>	
<p>Definition</p>	<p>Proportion indicates on ratios between elements.</p> <p>Proportion creates visual relationships between elements, elements to the whole and between the whole composition and its context.</p>
<p>Effects</p>	<p>Proportion creates order in design.</p> <p>Proportion makes visual weight in design.</p> <p>Proportion creates space aesthetically pleasant and directly affects on human feelings.</p>

Table 5. Overview of Design Principles


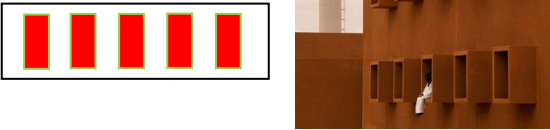
<p>Scale</p>	
<p>Definition</p>	<p>Scale defines the size relationship of the object itself compared to a standard. This standard could be human scale, scale of objects compared to its real scale, scale of object in comparison with other objects, scale of object compared with scale of space located on it.</p>
<p>Effects</p>	<p>Scale affects on human' feeling.</p> <p>For example very big scale space in comparison with human scale makes human to feel greatness of that space.</p>
<p>Repetition</p>	
<p>Definition</p>	<p><i>Repetition</i> is related to repeating one element or object or shape with constant distant.</p> <p>Repetition could be visible in repeated similar elements such as line, shape, color, value or texture.</p>
<p>Effects</p>	<p>Repetition gives the visitors a feeling to analyze where the order is going to. Repetition gives direction on movement.</p> <p>Repetition creates unity in design.</p>

Table 6. Overview of Design Principles

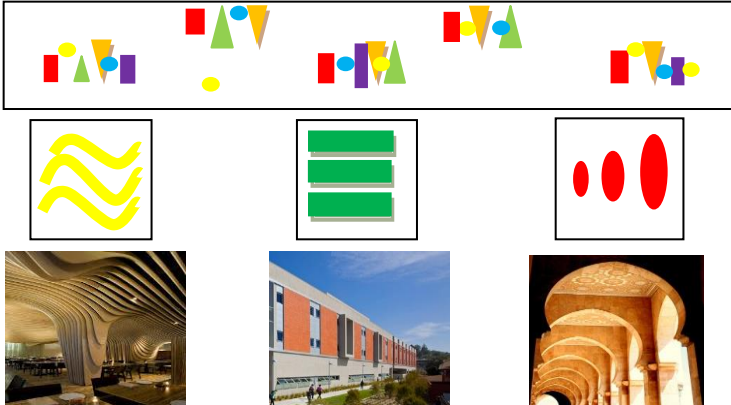
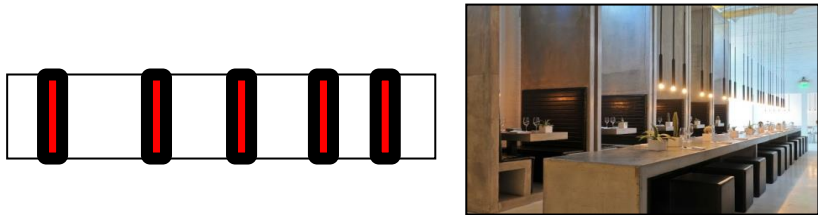
<p>Rhythm</p>	 <p>Progressive Following Regular</p>
<p>Definition</p>	<p>Rhythm is a combination of elements or objects while repeating with variations in their arrangement.</p>
<p>Effects</p>	<p>Rhythm helps user' mind to understand what is going on and to catch the consistent meaning of the design easier.</p> <p>Rhythm catches the eye' attention to follow objects one after another</p> <p>Rhythm gives visitors direction on their movement.</p>
<p>Order</p>	
<p>Definition</p>	<p>Order creates by arrangement of elements in repetition form, or hierarchy or juxtaposition.</p> <p>Order creates from regularity arrangement of elements.</p> <p>Order creates unity in space.</p>
<p>Effects</p>	<p>Order is logic and predictable.</p> <p>Order make visitors' eye to follow the order arrangement of elements</p> <p>Order give visitors better feeling in space.</p>

Table 7. Overview of Design Principles

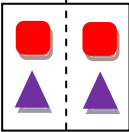

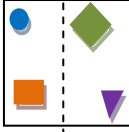

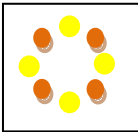


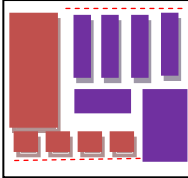
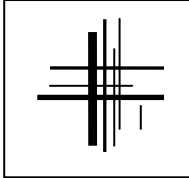
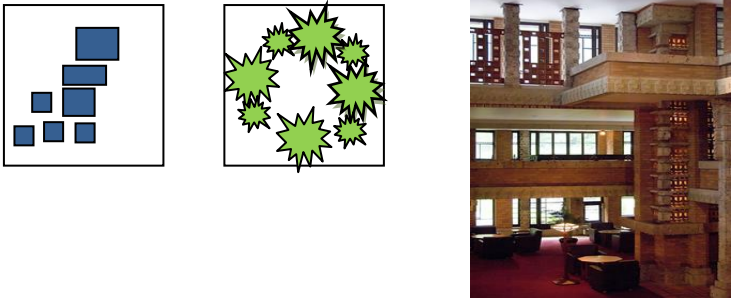

<p>Balance</p>	<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">   <p>Symmetrical Balance</p> </div> <div style="text-align: center;">   <p>Asymmetrical Balance</p> </div> <div style="text-align: center;">   <p>Central Balance</p> </div> </div>
<p>Definition</p>	<p>Any object in space has different visual weight.</p> <p>Equal distribution of objects with different visual weight creates visual balance in space.</p>
<p>Effects</p>	<p>Balance makes space more pleasant and comfortable.</p> <p>Balance makes attention to order of arrangement in overall space.</p>
<p>Unity</p>	<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;">   </div> </div>
<p>Definition</p>	<p>Unity would be created if all the trivial parts are relationship with each other and with the whole composition.</p> <p>Unity happens between parts together and between parts with whole composition.</p>
<p>Effects</p>	<p>Unity creates when all elements to give sense of pleasant to design</p> <p>Unity creates a sense of oneness to a visual image.</p> <p>In unity, all unrelated parts work together in order to give a good sense of satisfaction to the visitor.</p>

Table 8. Overview of Design Principles

<p>Harmony</p>	
<p>Definition</p>	<p>Harmony is relationship between elements while elements complete each other and complete context of design.</p> <p>Harmony could be in color, texture, shape, and form of elements in a composition.</p>
<p>Effects</p>	<p>Harmony is arrangement of elements that give feeling of completeness and unity in entire design.</p>
<p>Hierarchy</p>	
<p>Definition</p>	<p>Hierarchy could be created by arrangement of form, size, color, or shape in different steps.</p>
<p>Effects</p>	<p>Visual hierarchy messages visitors through the steps of design.</p> <p>Hierarchy gives storyline and meaning to design.</p> <p>Hierarchy creates focal point at end.</p>

Chapter Four

EVALUATION OF SELECTED MUSEUMS IN NORTH CYPRUS IN TERMS OF USES OF DESIGN PRINCIPLES

As it was said before, first method used in this research was literature review. In chapters of literature review talked about museums and importance of design elements and principles in design of interior spaces especially interior of museum spaces. In this chapter, effects of design principles on visitors' perception in museums spaces will be investigated based on observation and questionnaire methods. Four museums in North Cyprus selected as cases study in this research that will be explained.

4.1 History of North Cyprus

Cyprus has been well known because of its location on one of the best areas in the Mediterranean Sea (Figure 69). It has connected west to east and this characteristic has made Cyprus a widely diversified country during history. Cyprus closest surrounding countries are Turkey, the nearest with only 75Km distance, and Syria. Geographically, it can be named a southerly country because it is located in the 35th parallel. According to its natural resources and strategic location, Cyprus has faced lots of different invasions, conflicts and governing communities. European and Asians were effectively among the residents during centuries. For instance, during 8th century it was under Assyrian Empire control. Then, the Babylonian took control over this island which was followed by Egyptians' rulers. In addition, Persians were

also in governance for some years. Similarly, Romans captured the island in 58 BC. It was no longer than the third Crusade period when Richard the Lionheart was there. Afterwards, the island was sold to the Knights Templar and Guy de Lusignan bought it later. The Lusignan ruling power was available until 1489 when the Venetians occupied the island. The Venetians did not also last long and Ottomans were replaced. They were ruling the island from 1571 to 1878 and finally they had to lease the island ownership to British (URL57).

Cyprus announced its independency in 1960 which in a short time came to an end by 1974 Greek military coup. In the meanwhile, Turkish army forces entered to the island to save the Turkish Cypriots. Subsequently, the Turkish Republic of North Cyprus declared formally in 1983. UN obligated both parties to recognize a line across the city which is known as “Green Line”. This line separates the island into two parts, Greek and Turkish, and is running from eastern parts to western parts measured 112 miles (URL58).

There are lots of historical monuments remained forms numerous historical periods and ancient civilizations in North Cyprus. One has widely divergent paths to investigate the island’s history. Among all ways available, visiting the museums is so common to get some precious information about the island history. The museums are scattered around the cities. In addition, some of the museums are also put up in the old historical buildings (URL 58).



Figure 69. North Cyprus Map (URL 59)

4.2 Selected Museums in North Cyprus

Four museums in North Cyprus selected for case study of this research:

- Canbulat Museum in Famagusta
- Tomb-Finds Museum in Kyrenia
- Shipwreck Museum in Kyrenia
- Dervish Pasha Museum in Lefkosa

The selected museums been evaluated according to applied design principles in interior spaces of them. Two methods of observation and questionnaire were used for analyzing these museums spaces. Based on observation of each museum spaces, design principles applied in design of theses museums were identified, the schematic plan of each museum were drawn, the photographs were taken and information about the history and important objects of each museum were gained. To support own observation, the questionnaires designed to ask visitors about what they observed. So questionnaires applied to check and control observed findings. As each museum was

designed with different design principles, different questionnaires planned for each museum. In questionnaires, the effects design principles that identified in each museum investigated. Since design principles such as emphasis, rhythm, contrast and etc were unfamiliar for most of normal visitors, questions asked in their own language. 20 questionnaires filled in each museum. Questionnaire filled in populated time of museums (between 13-16 PM) during one month. Each museum visited between three-four times for distributing questionnaires between visitors. Answers of questionnaires analyzed by SPSS software. In this chapter, findings gained based on observation and questionnaires in these museums spaces will be analyzed. The location of these museums in North Cyprus are shown in figure 70.



Figure 70. Location of Museums on Cyprus Map

4.3 Evaluation of Sample Museums

4.3.1 Canbulat Museum in Famagusta

- Famagusta which is located in the east coast of the island has been one of the most significant ports during the Mediterranean region history. Historically, this city is originally founded in the eleventh century BC. If one intends to introduce some examples of medieval architecture, Famagusta would definitely be among the examples.

Moreover, Famagusta is housed densely by different kinds of historical places including Salamis Ruins, museums, cathedrals, ancient churches and etc. Canbulat museum located in Nicosia-to- Famagusta road is one of the famous museums in this city (URL 60).

- Canbulat Museum, named after Canbulat (the Bey of Kilis, an Ottoman governor), is in the old city of Famagusta. In 1573, when Ottoman forces were striking to capture Cyprus, he was in their forces. As he was really helpful during this mission, Ottoman army laying siege to Famagusta was given to him.

As he is believed to have been killed in the vicinity of the Arsenal Bastion his tomb is under this bastion. The bastion was restored in 1968 and was used as ethnographic and archaeological museum. Recently been refurbished, re-opening in 2008. In the new museum, as well as the tomb of Canbulat, items relating to the Ottoman in Cyprus could be seen there. It is believed that he has been killed in the neighborhood of the Arsenal Bastion and that is why his tomb is placed under the bastion. The museum has been repaired in 1968 initially however it has been refurbished in 2008.

The new form of museum represents not only the Canbulat tomb but also it represents some items found from the Ottoman period in Cyprus.

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