DIGITAL PRESENTATION FOR ARCHAEOLOGICAL SITE PRESERVATION: THE CASE OF TEOS

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Approval of the Graduate School of Natural and Applied Science.

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We have read the thesis entitled “DIGITAL PRESENTATION FOR ARCHAEOLOGICAL SITE PRESERVATION: THE CASE OF TEOS” completed by IŞILAY ÜÇOK under the supervision of Yrd. Doç. Dr. Güzden VARİNLİOĞLU and we certify that in our opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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ARKEOLOJİK ALANLARIN KORUNMASINDA DİJİTAL SUNUM: TEOS ÇALIŞMASI

IŞILAY ÜÇOK

Mimarlık

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Türkiye'de arkeolojik alanların sunulması üzerinde yapılan araştırmalar ekonomik nedenler, planlamadaki aksaklıklar ve sunum olanaklarının eksikliği nedeniyle sınırlıdır. Arkeolojik alanlar ile ilgili koruma politikaları, plansız kentleşme, doğal afetler, toplumsal farkındalığın yetersiz olması ve ekonomik kaynakların kısıtlı olması nedenleriyle daha az sürdürülebilir olmaktadır. Dijital sunum teknoloji çağının önde gelen yöntemi haline gelmektedir. Dijital sunum yöntemleri, fiziksel sunum yöntemleri kadar önemli hale gelmektedir. Bu çalışma kapsamında, dijital sunum kültürel miras konusunda farkındalık yaratmak için bir araç olarak kullanılmaktadır. Seçilen mimari ve obje ölçeğindeki arkeolojik buluntular, katı modelleme ve fotoğraf temelli modelleme ile yeniden canlandırılmıştır. İki modelleme yöntemi, kalıntıların taşıdığı tarihi ve kültürel bilginin aktarımı ve bağlam ile ilişkilerinin doğruluğunu oluşturmak açısından karşılaştırılmıştır. Arkeolojik malzemenin katı modelleme ve fotoğraf temelli modellemeleri örtüştürülerek bir dijital koruma yöntemi önerilmiştir.

Anahtar Kelimeler: Teos, arkeolojik alan sunumu, toplumsal farkındalık, dijital miras, modelleme

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Presentation policies regarding archaeological sites are limited because of the limited economic resources, planning disruption, and lack of presentation methods. Presentation policies regarding archaeological sites are becoming less sustainable because of unplanned urbanization, natural disasters, lack of public awareness, and limited economic resources. Conventional presentation techniques alone have become inadequate whereas digital presentation becomes the forerunner method in the age of technology. Digital presentation methods become equally important as analogue presentation methods. Within the scope of the thesis, digital presentation is used as a tool to raise awareness for cultural heritage. A study on solid and image-based modeling of selected remains in both an architectural and object scale is reconstructed. These two modeling methods are compared in terms of transferring the accurate historical and cultural data and being context dependent. A digital preservation method is proposed by overlapping the solid models and image-based models of the remains.

Keywords: Teos, archaeological site presentation, public awareness, digital heritage, modelling

To my family

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LIST OF FIGURES

LIST OF TABLES

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

Cultural heritage archives past experiences of the human kind. In the age of technology where time advances rapidly, elements of cultural heritage keep an abstract character in their essence. How the memorials, building stocks, archaeological sites are kinds of cultural assets; the people who represent that period, the lives they lived, and the ideas they produced, and everything they involve is also the elements of cultural heritage hidden behind the built environment. Thus, cultural heritage holds values of past cultures and civilizations in need of preservation.

Preservation of cultural heritage, as an academic research area is established towards the end of the 19th century in Turkey. Later in the 21st century, with the widespread use of technology, digital tools are integrated in the archaeological preservation. Digital presentation methods of archaeological sites can augment presentation methods, such as media support, tour paths, landscaping, organizations and activities, maps, signs, info-panels, and brochures. In this context digital presentation methods are used as tools to educate, guide, and raise awareness for historical and cultural history and values (Derin, 2010; O'Coill & Doughty, 2004; Chang, 2004; Vibrandt et al., 2004). The thesis explores the potential of digital presentation of cultural heritage as a sustainable solution for preservation and dissemination.

Attempts of reconstructing archaeological sites in the digital environment provide the advantage for raising public awareness. The sustainability of preservation policies structured on archaeological sites, the inadequacy of public awareness, and the effects of analogue and geographical conditions affect the archaeological site preservation negatively. Digital

presentation methods can create a long-term solution. Thus, digital presentation methods can help to appeal wider masses simultaneously in a shorter time period.

A research is conducted upon the heritage preservation and presentation. Analogue presentation methods are limited; therefore, a study is conducted on an alternative way of archaeological site presentation. Furthermore, solid and image-based modeling[1] of archaeological remains are generated in this framework. The two digital methods are considered as an augmented method to analogue presentation methods. The shortcomings of the two digital presentation methods are discussed. Furthermore, a digital modeling method which can deal with these shortcomings is proposed.

Within the theoretical background and the methodology presented above, the thesis applies the proposed digital tools to Teos archaeological site. Teos is an ancient Ionian port city. The trade of sea and land has influenced it, and it has been directed with the civilizations promised by hosting the strongest political, cultural and economic civilizations of the time. Therefore, Teos is studied as a case to provide a digital method that has been sought to present today's structures of the ancient city to wider masses. With digital presentation, it is aimed to raise public awareness with presenting the historical, cultural significance of Teos.

1.1. Problem Definition

Turkey, with its strategic location, has been a host to many civilizations. As Hueber (1991, p.38) states, it is a rich country in terms of archaeological sites and remains that are the actual witnesses of thousand years of historical past. Although the traces of those civilizations still exist in the country, they are under constant threat and danger. Because of the incomplete excavation studies, economic and political problems, lack of planning and site

[1] Within the body of the Izmir University of Economics Scientific Research Project named as 'Digital Humanities Lab: Re-animation of TEOS Archaeological Site' which has been carried out since August 2016 under the coordination of Dr. Güzden VARINLIOGLU, has been benefited from. (Varinlioğlu, 2017)

preservation strategies, lack of public awareness, lack of presentations and organizational problems, archaeological sites are exposed to destruction. Today, some of archaeological sites are yet to be discovered and some are about to disappear.

Teos archaeological site is an ongoing excavation site. The excavation and presentation strategies started in the new period of excavation studies since 2010, under the directorship of Prof. Dr. Musa Kadıoğlu. Although the lack of economic sources slows down the excavations, the studies on presentation of Teos with analogue presentation methods were completed in 2016. Sign boards, information panels, tour paths, brochures, landscaping, resting terraces, ticket office, are among the implementations that are introduced to the site under the guidance of Prof. Dr. Kadıoğlu.

ICOMOS (1990) states that ‘‘the presentation of the archaeological heritage to the general public is an essential method of promoting an understanding of the origins and development of modern societies.’’ Therefore, presentation plays an important role on attracting the public to build public awareness. Presentation is a way of promoting an understanding of archaeological site preservation. Respectively, Derin (2010) claims that preservation of heritage can only be possible by raising public awareness. According to Eres (2016), there have been many implementations of various presentation approaches of the archaeological site. But these implementations such as the entrance signs, information panels and etc. are repeated in each site like a template, which is a problem. In case of Teos, in terms of archaeological site presentation, the developments on analogue methods are not sufficient for raising public awareness. In the thesis, the alternative methods to analogue presentation methods are explored.

In past two decades, the technological developments adapted to the fields of archaeology and applications are used as substantial presentation methods for archaeological sites. Although the analogue presentation is still used as an attractive method, they cost much, take much time and address only

the visitors. So without ignoring the analogue methods, digital preservation can be used in archaeology to sustain the presentation. In the thesis, solid and image-based modeling of Teos is discussed as the two digital presentation methods of archaeological sites. The digital reconstructed models of architectural elements facilitate the perception of 3D. Since modeling became a method of archaeological site presentation, 2D drawings and analogue methods become un-sufficient by themselves. However, they lack the traces of actual condition of the site. The image-based modeling is an efficient way of documenting the site, but it lacks the imagination of the full reconstruction. Thus, they both have constraints and in addition to analogue presentation methods, two digital methods are compared and contrasted and an alternative third integrated method is proposed.

1.2. Aims and objectives

The significance of cultural heritages with a spiritual value is discussed in the last few centuries. On one hand, ICOMOS (1990) suggests that ‘‘the archaeological heritage is common to all human society and it should, therefore, be the duty of every country to ensure that adequate funds are available for its protection’’. On the other hand, the involvement of public is essential for the efficiency of preservation (ICOMOS, 1987) as well as the adequate funds. As the historic and cultural backgrounds of humanities are unique and they need to be preserved carefully. The foundations ICOMOS and UNESCO are responsible to sustain the cultural heritage preservation policies. Therefore, to raise public awareness, attractive site presentation methods should be developed.

The thesis aims to develop a framework for the preservation of Teos by means of presentation. Analogue and digital site presentation methods are discussed on heritage preservation by referring to the historical and cultural significance of the site. It is expected to promote an understanding of the needs for its preservation by considering the analogue and digital presentation methods. Furthermore, as introducing the problem of limited implementations

of analogue presentation methods in Teos archaeological site, it is aimed to develop an augmented method to the analogue site presentation methods. The main concern is to reveal the role of raising public awareness on Teos archaeological site preservation by means of an augmented digital presentation.

1.3. Chapters in Brief

As a conceptual background, existing definitions of international organizations, and approaches to international and national literature are reviewed in the first chapter. In the second chapter, in the scope of conceptual background, definitions of cultural heritage, archaeological site, heritage preservation are examined in terms of creating a holistic understanding of the importance of archaeological site preservation.

The third chapter presents archaeological site presentation as a way of preservation by means of raising public awareness. What to present, why to present and how to present is discussed in detail to ensure the significance of site presentation. Following that, digital and analogue presentation methods are discussed regarding their shortcomings in the field of archaeological site presentation.

The fourth chapter Teos archaeological site is taken as a study area. The study is constituted of the implementations of analogue and digital archaeological site presentation of Teos ancient city, in particular, assessment of these methods in case of Teos. Furthermore, the roles of solid and image-based modeling presentation methods on preservation are discussed. Thus, image-based models and interpreted solid models in both architectural and object scales are produced in the digital environment. Finally, according to the shortcomings of these methods, an efficient presentation method is proposed for Teos archaeological site presentation.

A survey was conducted in the fifth chapter. The survey was carried out to 24 numbers of people with similar educational backgrounds and age by an online questionnaire. Two main data are targeted in the questionnaire. These are to test the effectiveness of the presentation of Teos with digital methods and to test the proposed method as an augmented method to analogue methods and to solid model and image-based model.

Finally, archaeological site presentation for preservation by means of public awareness is considered as a crucial topic with respect to the background researches. Moreover, with the survey, it is concluded that the proposed model is effectively setting up the shortcomings of the other site presentation methods.

CHAPTER 2

ARCHAEOLOGICAL SITE PRESERVATION

This chapter focuses on what, why and when should be preserved in the scope of archaeology. Further, defining the human and external factors of destruction is also an important issue for drawing a framework for possible applications in archaeology. The cultural heritage preservation is covered and applications on the archaeological sites are discussed under the cultural heritage. Accordingly, the natural and human factors in heritage destruction are explained to highlight the importance of human factors in archaeological site destruction. Therefore, the aim is to create a comprehensive understanding of the need of archaeological site preservation.

2.1. Definition of Cultural Heritage

Within the scope of cultural heritage preservation, in the international medium, starting with the Venice Charter (1964) there is now a range of literature on cultural heritage preservation. The Venice Charter (1964) provided a set of principles specifically for architectural heritage and site preservation, and it has been used as a reference for the developments of other international and national documents. The charter expanded the definitions of cultural heritage. UNESCO and ICOMOS are the two remarkable organizations that play an active role in the preservation of the cultural heritage. ICOMOS (1990) defines heritage as ‘‘heritage is a reality, a possession of the community, and a rich inheritance that may be passed on, which invites our recognition and our participation.’’ Therefore, ICOMOS place a significance of the role of the community participation and recognition. Additionally, UNESCO (1972) defines cultural heritages as the universal value from historical, aesthetical point of view which includes the works of men and

areas like archaeological sites. Khan Academy (2017) placed an emphasis on the crucial and representative value of culture heritage for society by mentioning that cultural heritage is ‘‘a shared bond, belonging to a community’’ and it ‘‘represents the past, present, and future’’. Following these international literatures, in Turkey, the Law of Conservation of Cultural and Natural Property (1983) defines cultural heritage as ‘‘cultural and historical value, which are related to science, culture, religion and fine arts belonging to prehistoric and historical periods or which have been subject to social life in prehistoric or historical periods.’’ In this definition, the law accepted the science, culture, religion, fine arts of the prehistoric and historic times and the social life of the community in those periods as the main subjects of cultural heritage. All definitions above mention the importance of both analogue and intangible value of cultural heritages. The community is one of the most important subjects of the science of cultural heritage. Cultural heritage must be transferred to the new generations, and the community builds up the history by sharing commons, represent a culture, and carry the culture to the following generations. Indeed, cultural heritage is in need of plans for raising public awareness to preserve the existing culture. To summarize definitions of cultural heritage, cultural heritage holds both intangible and tangible values of a society which are inherited from past generations and passing to the future generations.

Kiper (2004), emphasizes the decisive role of conveying past values to the future generations and the importance of preserving the heritage. What Kiper believes is that preservation of heritage is a way of keeping the heritage alive. The main aim of preservation is to create healthy living circles by integrating the cultural accumulation and the values with the values that are differentiated over time, without losing the originality they have carried to the present from the past. On the other hand, Madran and Özgönül (2005) see cultural heritages as a document that shows the level of technique that achieved in the past periods and represents the richness of the living culture. They also add that cultural heritages have multiple values to be preserved like

continuity, moment, originality, rarity, uniqueness, group, multiplicity, homogeneity, education and document values; historical, mythological, artistic and technical, economic, functional, traditional values in order not to be lost. Furthermore, Özdoğan (2006) contributes that it is necessary to convert the raw and undefined cultural heritage into knowledge and also add them to the social wealth of society. He defines three bases in cultural heritage preservation: Knowledge, re-introducing cultural heritages to society, and conveying cultural heritages to future generations. However, the triplication of Eres (2016) is more comprehensive: Knowledge, objects with or without artifacts, field. They both put a strong emphasis on the striking role of knowledge. Also, there is an agreement that the knowledge is the backbone that keeps the others alive. Özdoğan (2006) criticizes that, although the first and main base is the freedom of gathering knowledge, it has remained in the background as compared to the other two bases. Eres (2016) mentions the insufficiency of the knowledge. I believe that authorities started to place importance to the definition of the cultural heritage and seek for methods of preservations, which was quite an important step in our country for the heritage preservation in 1983. Knowledge is the key point for heritage preservation. It refers to the fact that gathering the accurate information from the site and preserving the heritage in accordance with the accurate information is highly based on knowledge.

As the question of why cultural heritage should be preserved, the definition of culture itself gains an importance. Culture is a value that deals with social, economic, political concerns of its time and it grows when all these concerns of various time periods put on top of each other. When the history and culture of a community are not preserved, then the economic, political, historical and cultural strength of the society will be limited. Culture is unique and repossess. Therefore, it needs to be preserved. To create healthy lives without disturbing the authenticity of culture, cultural heritage cannot be ignored. To have a cultural identity, to follow-up different cultures and to monitor the progress in the level of culture, to revitalize the historic

environment, to enlarge the national economy with tourism, and to pass people's past to future generation, cultural heritage preservation plays a crucial role. I believe, heritage preservation is a sign to have a strong public awareness and preserving cultural heritages without losing their originality, uniqueness, the pure essence that is hidden inside is a worldwide responsibility.

2.2. Archaeological Sites as Cultural Heritages

Heritage and preservation have become two significant terms in current discussions of last two decades. Since the term heritage began to be discussed in preservation field, archaeological sites started to be considered as one of the major types of cultural heritage. Cultural heritage can be divided into three types that are natural, intangible and tangible ones. First, anything that carries a cultural value from nature, including the flora and fauna is the elements of natural heritages. Second, any kinds of non-physical aspects of a culture like social values, language, beliefs, history, etc. Encompass the intangible cultural heritages. As the third, the built environment, monuments, architectural structures, urban sculptures, artistic objects etc. are the examples of tangible heritages. Tangible heritage is also divided into two subcategories that are immovable and movable cultural heritages. Painting, sculpture, ceramic products, codex, glass works, tile are the examples of movable cultural heritages. Natural sites, historical sites, urban sites and archaeological sites are the examples of immovable cultural heritages which can be protected on site.

Archaeological sites are the areas containing remains dating back to the end of the industrial revolution. According to ICOMOS (1990), archaeological heritage records the human activities of the past. ICOMOS (1990) attaches great importance to the essential value of archaeological heritage especially in the Charter for the Protection and Management of the archaeological heritage. In the charter, archaeological heritages are defined as a part of the material heritage in accordance to that archaeological methods provide primary information. All vestiges of human existence, places of human activity, abandoned structures, and all kinds of remains are accepted as archaeological

heritages. Furthermore, it is claimed that archaeological heritages are fragile and non-renewable cultural resources and they are the common heritage of all humanity.

> In addition, archaeological sites physically exist and refer to a culture of a community with its unique historic value. As well as tangible values they possess, they are also carry the inherent value of traditions, beliefs, social and religious ceremonies, festivals, visual arts, natural sources of resources, or any kind of local knowledge, skills developed in relation to traditional forms of production (Hawkes, 2001, p.3; UNESCO, 2003).

As mentioned above, it is a common responsibility of all humankind to preserve the cultural heritages. The main objective of preservation should be to preserve archaeological sites from loss and damage with respect to their unique historical and cultural values. Nida Naycı (2014, p.189) claims that archaeological sites that need to be preserved are alive cultural heritages that have tangible values as well as intangible values for communities. Similarly, Hawkes (2001) claims that the intangible values are as vital as tangible values of the archaeological site. The common understanding of the intangible values of archaeological sites requires a respectful consideration in its essence. Those sites need to be preserved as a respect to the life of past communities. To sum, archaeological sites are cultural heritages to be preserved following the characteristics covered in the first part of the chapter. According to Hueber (1991) all kinds of ruins under the ground, construction layers have the highest document and monument value. Thus, they must be preserved in the most attentive manner. Both the explored and unexplored, which is yet to be excavated, archaeological sites, have values at least with the reason of their existence. They comprise the ruins, the landscape that they have been located on and the overall urban life with politic, economic, social and communal aspects. They have to be consciously preserved and archaeological site preservation should be considered as a major concern of all; especially archaeologists, architects, urban planners, governmental institutions, local

administrations, institutions, private entrepreneurs. While public plays a significant role in the archaeological site preservation, it is also important to know the regulations in Turkey.

2.3. Historical Trajectory of Preservation in Turkey

It is important to know the historical context. In Turkey, efforts of setting regulations for preservation started with The Asar-I Atika regulation, which is the first law to preserve the archaeological sites in 1869. The law brought strict regulations for excavation studies. With this law, for the first time, it has been imperative to obtain permission from the state for excavation studies and the damage on the surface of the remains is prohibited. This law is updated in 1874, 1884 and 1906. The concerns related to archaeological excavations became important with the 1906 laws.

After the establishment of the Republic of Turkey (1923), the developments in the socio-economic structure of the country accelerated the efforts on preservation policy. Cultural property preservation approaches started in the beginning of 20th century. Naycı (2014, p.189) adds that before the 20th century, archaeological sites were defined as dead monuments - meaning ruins- whereas it has been understood that they are accepted as living spaces rather than dead monuments in different geographies as a continuation of cultures for centuries. Archaeological site preservation, organization, financing, excavations, and implementations should be set in accordance with the decisions needed to be controlled which required a necessity of laws, regulations, and associations. Although the initial efforts on excavation studies date back to 1860 and the first excavation in 1840s the efforts to make these regulations date as late as 1970.

Organizations in cultural and archaeological heritage preservation began to develop in the 1950s. Since 1951 to 1983 GEEAYK was continued to work with a committee of academicians related to the relic (*Eski Eser*) preservation. Archaeologists, historians, art historians, architects and architectural historians were the members of that committee that shows a step

by a multidisciplinary approach to the concept of preservation.

In 1973 Turkey started to adapt to the contemporary approach developed in the world. Eres (2010, p.83) also claims that this is the first time that situ (*sit*) is defined and an archaeological site was called as a subject of preservation. In 1975, the Association of Archaeologists was established. TAÇ was established in the next year, 1976, TAÇ was established. In 1983, Law on Conservation of Cultural and Natural Property was signed. With this law, the definition of the relic is replaced by the concept of 'Cultural property'. In 1983, Turkey signed up the Convention Concerning the Protection of World Cultural and Natural Heritage that was prepared in 1972 with the aim of protecting the common past of all mankind. Following that, the notion of preservation for global scale came to the forefront in Turkey. In 1960, DPT was established. In 1920, 'Directorate General of Foundations' was established. In 1990, ÇEKÜL Association was established in order to preserve the cultural fabric and transfer it to the future generations. In 1992, TEMA Association was established for the preservation and proper management of natural assets. In 1995, ASTAD was established with the aim of creating awareness about the transfer of cultural heritages to future centuries. According to Aygün (2011), the preservation of cultural heritage necessitates a multidisciplinary work. To sustain the preservation of archaeological sites it is significant to consider the planning and management approaches of both governmental and non-governmental organizations. In an international scale, ICOMOS, IMOS and UNESCO undertake the task. In Turkey, the concern on cultural property preservation is accelerated in the 20th century. Furthermore, the concept of preservation of the archaeological sites has been defined together with the legal regulations, non-governmental and governmental organizations in the 21st century. The professionalism on preservation policies and strategies reached a certain maturity. Archaeological remains in the country started to get its vitality in this age. There are several institutions and foundations established in the 21st century. In 2000, TKB was established with the aim to preserve the cultural heritage. In 2003, the Republic of Turkey, Ministry of Culture and

Tourism was established. In 2011, MMKD established with the aim of supporting museum as a profession in Turkey and taking an active role in the development of museums in line with the professional standards and ethical values determined by ICOM. In 2006, FOCUM was established with the aim of preserving the cultural heritages of Turkey and the world heritages in a possible armed conflagration, during and after the conflagration, and transferring them to future generations.

The developments starting from 1869 is accelerated in the mid - 20th century. Additionally, in the beginning of 21st century, with the support of legal regulations, governmental and non-governmental organizations cultural heritage preservation gained a respectable importance. Also, the new information age requires the digital heritage preservation. However, regulations for digital preservation are limited in Turkey.

2.4. Factors of Archaeological Site Destruction

> …Beyond their role as historical documents, these areas embody the values of traditional urban cultures. Today many such areas are being threatened, physically degraded, damaged or even destroyed, by the impact of the urban development that follows industrialization in societies everywhere. (ICOMOS, 1987)

As architectural structures and cultural and natural sites are exposed to pollution, wars, overuse, organizational problems, traffic, urbanization and etc., archaeological heritages are under constant danger and threat. According to ICOMOS (1987), many of the cultural heritages are being physically degraded, damaged or destroyed because of lack of public awareness by means of unplanned urbanization, industrialization, etc.

Preservation principles and strategies carry a respectful significance on the safeguarding of physical heritage from destruction or even loss. In addition to that, as well as the physical value of archaeological heritage, the aesthetical and emotional values which are inspired by the memory and the behavior of

the culture affect the archaeological site preservation strategies.

Cultural heritage can be damaged or even completely lost due to the external influences and the dynamics of society. It is important to know the reasons to predict, reduce, and prevent potential destruction. The destructive factors (Table 1) in archaeological sites can be caused by the external and the human influences.

<table>
<tr><th colspan="6">FACTORS OF DESTRUCTION</th></tr>
<tr><th colspan="3">EXTERNAL INFLUENCES</th><th colspan="3">HUMAN</th></tr>
<tr><th>NATURAL DISASTER</th><th>SITE LOCATION</th><th rowspan="3">CHEMICAL, PHYSICAL, BILOGICAL DEGRADATION</th><th colspan="2">IN-SITE</th><th>OFF-SITE</th></tr>
<tr><td rowspan="2">. Earthquakes
. Floods</td><td rowspan="2">. Wheather
. Wind Speed and Direction
. Temperature
. Humidity Level
. Amount of Rain</td><td>OVERUSE</td><td>MISUSE</td><td>ORGANIZATIONAL PROBLEMS</td><td rowspan="2">. Heavy Traffic
. Unplanned Urbanization
. Air and Wheather Polution
. Political Concerns</td></tr>
<tr><td>. Cultural and Social Events
. Tour Path
. Tourism</td><td>. Environmental Pollution
. War
. Vandalism
. Fire</td><td>In-site Preservation Policies and Strategies</td></tr>
<tr><td colspan="6">LACK OF PUBLIC AWARENESS</td></tr>
</table>

Table 1 Factors of Archaeological Site Destruction

External influences are caused without human factors can be listed in to three subtitles. First, the problems related to the locations of the site are considered as the external influences. An archaeological site can be located on streambed, volcano or valley. There are variations in weather, the wind speed and direction, temperature, humidity level or amount of rain according to the location. For each condition, the physics and chemistry of the remains are affected differently, which in turn affect the destruction level accordingly. Second, the natural disasters, such as earthquakes or floods that are unpredictable and can also lead to destruction. Third, as Dolar and Yılmaz (2014) pointed out, even these organisms can cause physical, chemical and biological degradation and erosion over time. Therefore, soil organisms cause destruction.

Human influences are caused by the heavy traffic, unplanned urbanization, air and water pollution, political concerns, and also the human interactions with the archaeological site. There are three human interaction

causes of in-site destruction: overuse, misuse, and organizational problems. Regarding to overuse, in the tourism-oriented archaeological areas with the aim of profit, the number of visitors can exceed capacity. So, management and rising public awareness should avoid the damage of tourism. Additionally, there must be a balance achieved in between the tourist attracting and preserving archaeological sites from being damaged. Depending on the lack of public awareness over the sites, the destruction level increases in this situation. For a sustainable preservation approach, the tour routes and short-term cultural and social events need to be organized according to the capacity of the site. Concerning the misuse, environmental pollution, war, vandalism, and fire can cause destruction of archaeological sites. This is also caused by the lack of public awareness over archaeological site preservation. Finally, problems related to in-site preservation policies and strategies also affect the success of preservation, because these can increase the destruction level. In other words, the tour route, the information panels, trash bins and public events should be planned efficiently to minimize destruction caused by the visitors.

To sum, archaeological sites are subjects to be preserved as an important cultural heritage. They are unique, fragile, and non-renewable resources, as well as they, are vestiges of human existence. So, the urge to preserve is discussed in accordance to historical trajectory of regal regulations. The development process of the cultural heritage covered to emphasize that, especially since the mid-21st century by the help of legal regulations, governmental organizations, and non-governmental organizations, studies, and considerations on the heritage preservation has accelerated. However, there exist a variety of destruction factors.

It is considered that human-related destruction factors can be managed by raising public awareness and the public should be informed about the archaeological sites. The common archaeological site destruction factors caused by humans are the lack of organization and public awareness. As visitors start to understand the cultural and historical significance, they will give more respect to the site. To increase the level of public awareness, it is

necessary to find out a presentation strategy to create an understanding of archaeological site preservation on the public. This will sustain the preservation of archaeological sites. Thus the presentation of archaeological sites is considered as a useful tool to attract people and inform them about archaeological site preservation. The questions of what to present, why to present and how to present discussed on the bases of preservation.

CHAPTER 3

PRESENTATION AS A PRESERVATION STRATEGY FOR ARCHAEOLOGICAL SITES

> The presentation of the archaeological heritage to the general public is an essential method of promoting an understanding of the origins and development of modern societies. At the same time, it is the most important means of promoting an understanding of the need for its protection. (ICOMOS Lausanne Charter, 1990, Article 20)

Archaeological sites should be preserved for their uniqueness, historical and cultural significance. Accordingly, presentation facilitates an understanding of the historical, architectural, archaeological and cultural significance of archaeological sites. In this chapter, site presentation is considered as a method of preservation by means of historical context and raising public awareness based on the accurate data of archaeological remains. The questions of what should be presented, why should it be presented, and how should it be presented are discussed in the scope of the archaeological site. Context and accurate data are considered as the subjects of presentation. Context dependency of the presentation is related to increasing the public awareness on archaeological sites. Additionally, the presented remains or the archaeological site should be presented based on the excavation studies, existing literature, and interpreted reconstructions. Furthermore, to create public awareness, to reach a certain level of accurate interpretation and perception, and to sustain the site preservation process are the reasons of presentation. It is also stressed that analogue and digital presentations are the two cooperative methods emphasizing the alternative ways to raise public awareness.

Civilizations keep a record of their lives, experiences, inventions, and cultures. That means the presentation of archaeological sites is a tool on appreciating these records with all their historical and cultural values. Similar to Yurtsevenler (2013, p.2), a comprehensive presentation and documentation approach is not yet developed and sustained, although a holistic preservation can be achieved by providing adequate information on an archaeological site. Therefore, archaeological site presentation utilizes the importance of site preservation by promoting a comprehensive understanding of the needs for preservation. This chapter emphasizes archaeological site presentation by highlighting its role in promoting an understanding of site presentation, encouraging the public to preserve the site, and building a strategy for sustainable preservation. Thus, a presentation is considered as a sustainable preservation strategy for archaeological sites.

3.1. What to present?

> The presentation of the archaeological heritage to the general public is an essential method of promoting an understanding of the origins and development of modern societies. At the same time, it is the most important means of promoting an understanding of the need for its protection. (ICOMOS, 1990)

Heritage presentation is considered as a communication method between public and professionals of archaeology. Archaeological site presentation by the government, scholars, associations, local authorities is a way to inform academicians, scientists as well as visitors, and local public. The findings from excavations and historical, cultural, and archaeological investigations should present accurate data to people from different cultural backgrounds. Therefore, the data about the archaeological sites including the excavation studies, existing literature, and interpreted reconstructions accepted as the accurate sources should be one of the main subjects to be presented. The second subject is the context. The meaning of remains must be carried out to the new generations to sustain the preservation. In this manner, the context of

an archaeological site, or in particular, the context of an archaeological remain conveys the data to the public. Without presenting the context, the site becomes meaningless. So the context can be accepted as another kind of data source as well as the data gathered from excavation studies, existing literature, and interpreted reconstructions.

3.1.1. Accessibility

In the presentation of archaeology, accessibility to the accurate data is important. The physical access to an archaeological site provides also access to visual and contextual data. In the new age of technology, there are numerous methods to reach archaeological data. Nigro (2006) emphasizes on the concept of accessibility that has priority over presentation strategies. So, the characteristics of archaeological sites should be available to the public access and participation. Accessibility is one of the major strategies that directly affect the promotion of an archaeological site. Tuna and Erdoğan (2016) describe 'the feeling of arrival (*varış duygusu*)' as the feeling of coming from one place to another. They claim that this feeling is directly linked to the identity of the field. Furthermore, they also argue that in our country due to dysfunction of the welcome and information points for the visitor, the archaeological sites became illegible. They claim that the feeling of arrival raises the visual legibility of the field. To relate their discussions to archaeological sites, they mention the importance of the feeling that you come to a place which has significance in culture and history. They criticize that the archaeological site-specific road systems are not open to access and in terms of quality and quantity; the transportation lines are limited in Turkey. So, archaeological site presentation starts at a point when the access to the site from multiple locations is taken into account. For the access to the archaeological site, Tuna and Erdoğan's (2016) reach a certain point which is the critical significance of the entrance and exit points of the site for creating the feeling of arrival. Their discussions on illegibility of archaeological sites directly show the lack of importance given to the presentation strategies by means of physical access.

The in-site accessibility is as crucial as the physical access to the site. Tuna and Erdoğan (2016) also describe the ‘sense of orientation’ as the second principle, which is much more related to the activities held in-site of the archaeological sites. Therefore, walking paths, signs and so on are the elements that reflect the identity of the site. To present informative visit to the public, it must be considered that they need to be well oriented to not to be lost in the site and not to lose the data that can be gathered from the site. Rather than finding a way that takes the visitor to the other remains, they could have a chance and time to experience, learn the old historic city with its full potential, and they can be integrated more with the culture and value of the site. To stimulate the interest of the visitor, the site should be communicative in terms of the accessibility strategies.

Access to archaeological data carries great importance as physical accessibility to the archaeological remains by an understanding of human history. According to Kintigh (2006), there is a pressing need for an archaeological information infrastructure that will allow us to archive, access, combine, and mine disparate data sets. It is possible to access archaeological data with physical methods after the physical access to the archaeological site.

3.1.2. Context

Context is discussed as a data source that carries the historic data to the following generations. The context allows creating a meaning. Archaeological sites convey historical values to next generations by presentation and preservation. Archaeology concerns finding remains in different layers and context. ‘‘Clues as to its meaning are given by its context.’’ (Hodder and Hutson, 1991, p. 5) As Hodder and Hutson (1991) discuss the direct relationship between context and meaning, they show that context is an important base for understanding the historical and cultural importance of archaeological sites. So, the meaning and the historic data of these remains can be interpreted in their original contexts. Architectural remains should be presented within their context.

ARCHAEOLOGICAL SITE CONTEXT		
Physical Context	**Time-wise Context**	**Spiritual Context**
. Location	. Historic	. Memories
. Traffic	. Current	. Experiences
. Landscape	. Season	. Perception
. Environmental	. Year	. Entity
. Remains	. Month	. Senses

Table 2 Archaeological Site Contexts

Presentation of an archaeological site is also about presenting the meaning of the site which is context depending. The public can interpret the meaning behind the archaeological sites only with a holistic understanding. Table 2 is formed according to the relevant dimensions of archaeological context, which proposes a broader categorization with the explanations of the meanings. Considering the preservation of an archaeological site, people should learn about the thematic connections and for a better understanding of context and emphasize the importance of public awareness on archaeological sites; three categorizations of archaeological context can be considered.

First, physical context means the physical space that community uses. The physical space includes the location of the archaeological site, the identity of its landscape, environmental factors like the sun, wind, humidity level, layers and properties of the soil and etc., the effects of traffic at the site meaning that the sound, the air pollution, fumes, and the existing excavated archaeological remains. In particular, the features, and the identity of the flora and fauna, the locations of flora on the land, effects of various weather conditions on the archaeological remains, tour paths, signboards, tour routes and etc. is relevant to the physical context of an archaeological site.

Secondly, time-wise context dependent presentation is important in archaeological site preservation. Time plays a decisive role on archaeological sites. Time has an effect but not in the same way, it changes from season to season, year to year, month to month. The effects of time, the sense of the historic time period, and the current time changes are the ingredient factors of time context, which is a data source about the effects of time on the remains.

The spiritual context centers the perceptions and the spiritual understanding of archaeological sites. It changes from one person to another, although the archaeological site is the same. It depends on the entity, personal memories, previous experiences and the senses. The smell, the overall view of the place, the fabric and the tectonics of the site change according to the background. So the spiritual data should be presented to the public with a well-planned presentation method.

According to Wood and Johnson (1978) in the case of failing to record or misinterpreting the context of an archaeological site, interpretation of history is not properly done. Accordingly, a presentation should relate to wider social, cultural, historical and natural context. It is possible not to change but to orient or conduct a certain common understanding about the archaeological site context with information flow. As community reach a certain point of context-awareness and understand the meaning of archaeological site in a holistic manner, they would inevitably comprehend the importance of archaeological sites preservation.

3.2. Why to present?

> Interpretation and presentation should encourage individuals and communities to reflect on their own perceptions of a site and assist them in establishing a meaningful connection to it. The aim should be to stimulate further interest, learning, experience, and exploration. (ICOMOS, 2008)

The primary reasons of archaeological site presentation are discussed by means of public awareness, interpretation, and perception of the archaeological site and sustainability. The presentation is accepted as a method of addressing and attracting people by conveying accurate data to the public According to ICOMOS (2008) the charter on the interpretation and presentation of archaeological sites, the stimulation of the interest of the individuals and the communities should be the aim of the archaeological site presentation. The charter puts an emphasis on the role of the public interest. To encourage public, the public should be into account. Furthermore, to communicate with the values of an archaeological site, interpretation and perception play an important role. The potential of the site should be interpreted and the remains must be perceived as an integral part of the archaeological site. Presenting the accurate data in its original context can raise the potential of interpretation and perception in the field of archaeological site preservation. Finally, a presentation method whether it's analogue or digital should be sustainable and should sustain the preservation.

3.2.1 Public Awareness

> The preservation of the architectural heritage cannot be achieved only by legal restrictions and proposals. This success is directly related to the fact that each individual of the society has an integral part of the identity and identity of the nature of preservation. (ICOMOS, 2013)

Public ignorance and lack of public awareness are the main shortcomings of archaeological site preservation. To sustain the preservation there must be a consideration of the public awareness. (Fig.1) The archaeological site presentation can be used as a tool to encourage the public to learn the importance of historic cities. According to Ahunbay (1996), profit-oriented projects, the rapid growth in population, and public works create difficulties in archaeological site preservation. Destructions have wasted the cultural heritages. As Ahunbay (1996) states, population growth and profit-oriented projects are the main problems that caused destructions on the

archaeological sites. To get rid of those problematic developments in society, people should be aware of the cultural heritages.

The collaborative approach of the public plays a much more critical role than the competent institutions and organizations in regards to the archaeological sites preservation. Similar to Yurtsevenler (2013), archaeological sites are open to damage caused by human activities so that raising public awareness emerges as a necessity in preservation. As many of the researches like Ahunbay (1996) show the significance of human factor in the preservation process, the constant reason for the public ignorance through the heritages is the lack of information that they can gather from the sites. In the previous parts, it is discussed that the accurate data should be accessible and depends on the site context. In this section, it is mentioned that the lack of public awareness and public ignorance can be managed by the presentation of the accurate accessible and context-dependent data. As a result of this, as the accurate data is presented to the public, it is expected that the public awareness on the cultural and historical importance of the archaeological site and on its need for preservation will rise.

Today the sustainable community development and intellectual dialogues on heritage preservation depend on the level of public awareness. Eres (2016) called these shortcomings as “cultural insensitivity’’. She points out that today’s problem is the cultural insensitivity of the institutions, governmental bodies, and the public. Similar to Eres by means of cultural insensitivity is caused by the public themselves. So, public awareness can be raised by a collaborative work on-site presentation as well as preservation practices. First, the needs and expectations of public from cultural heritages and what do they want to know about archaeological sites should be considered. Following that, it is also necessary to consider how they want to be informed about current technology. The form of presentation strategy should be rooted according to these subjects for raising public awareness.

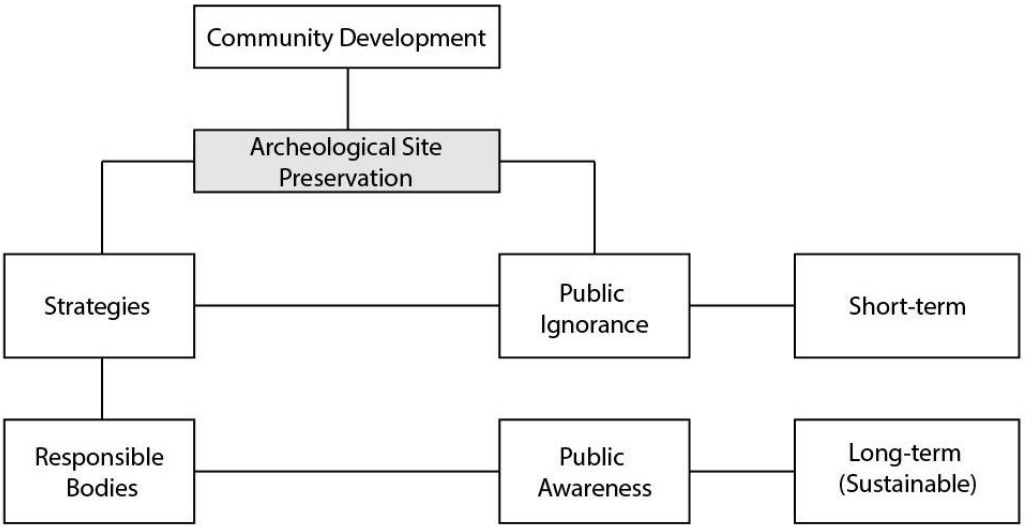

Figure 1 A Sustainable Archaeological Site Preservation Approach

According to ICOMOS (1999) ‘‘Increasing awareness within the public of this fundamental dimension of heritage is an absolute necessity in order to arrive at concrete measures for safeguarding the vestiges of the past.’’ Therefore, archaeological sites must be presented with respect to their historic and cultural significance. Also, Aktüre (1997) claims that the public awareness of the history is a major way of defining the level of development of the society and also the development level of individuals. She also talks about the growth in public awareness of Western societies during the period of modernization. The sensitivity of cultural heritage preservation is limited in Turkey and a greater understanding of the significance of cultural heritages must be presented by the society. Similarly, Aygün (2011) emphasizes the challenging process of archaeological site preservation in Turkey by meaning strategic, political, and also economic challenges. He claims that the method of those who are willing to preserve in the grueling preservation process should be to preserve the area, not to destroy it, and to designate the area as a preserved area.

The development of the community requires sensitivity to archaeological site preservation which can be formed by a re-consideration of existing presentation methods. If the strategies planned in order to raise the

level of public awareness, the presentation of archaeological sites can be considered as a long-term solution. As opposed to that, if the presentation strategies are not planned according to the needs of the public and if the data given to the public is not the accurate data and context-dependent, the public ignorance will be the inevitable result.

3.2.2 Interpretation and Perception

> The primary purpose of interpretation should be to communicate the values of cultural heritage sites. Effective interpretation should enhance the visitor experience, increase public respect and understanding of the significance of the sites, and should also communicate the importance of conservation. (ICOMOS, 2004)

Archaeological site interpretation is interwoven with site presentation. Interpretation is a way of assigning meanings to information, events, talks, and lives that have existed in the past. In the case of archaeological sites, the meaning should be assigned to the remains depending on the accurate data, context, and site. The presentation should also show substantial respect to the meaning. To interpret the meaning and to perceive the importance of the archaeological site, presentation methods should be considered. According to ICOMOS (2004), interpretation should be considered an integral part of the conservation process. Therefore, interpretation and presentation should not be considered independently. Archaeological sites are non-renewable resources. For this reason, site presentation should be organized based on the accurate interpretation. Risk (1994) claims that interpretation aims to enhance public awareness and understanding. Risk (1994) also takes the relationship between public awareness and interpretation into account.

According to ICOMOS (1987) ‘‘All urban communities, whether they have developed gradually over time or have been created deliberately, are an expression of the diversity of societies throughout history.’’ Therefore, the histories of all urban communities are the values that must be interpreted based on the presentation. Every individual who belongs to the society interprets the

existing knowledge and values differently. The way people interpret the archaeological site defines the perception of the whole ancient city. Although there is not a variety of literature showing the relation between archaeological site interpretation and presentation, ICOMOS has many charters that address archaeological site interpretation in a broader perspective.

Interpretation refers to the full range of potential activities intended to heighten public awareness. It also defines the cultural heritage site. These can include professional and popular publications, public lectures, on-site installations, formal and informal educational programs; community activities, and on-going research, training, and evaluation of the interpretation process itself (ICOMOS, 2006).

Tilden (1957; p.41) says ‘‘It is far better that the visitor to a preserved area, natural, historic or prehistoric, should leave with one or more whole pictures in mind, than with a mélange of information.’’ So site interpretation leads the visitor to an understanding that the site should be preserved. The presentation is an aspect of interpretation. Yurtsevenler (2013) discusses the importance of ‘‘effective interpretation’’. She claims that ‘‘effective interpretation can be possible by achieving the desired goal(s).’’ People can only adapt and preserve what they understand the value of. In Turkey, ‘‘visiting heritage buildings and sites are generally seen as a leisure activity’’ (Şimşek, 2006) But archaeological sites should mean more than historic places that are just used to waste time. According to Şimşek (2006), it is important to insert new functions into heritage sites to identify memories of shared experiences.

ICOMOS (2006) claims that interpretation deals with the activities which aim to enhance public awareness in archaeology. It is possible to direct the interpretation to the field of public awareness together with the presentation management of the archaeological site. Furthermore, there are much more than professional and popular publications, public lectures, on-site installations, and so on as interpretative presentation methods and they can be listed as follows;

- Talks on the historic and cultural value of archaeological sites and their preservation strategies.
- Organizations and performances organized in and out of the historic cities for raising the level of public engagement to the site.
- Meetings, to discuss more the historic value of the site.
- In-site presentation techniques like information panels, maps, signs, brochures, photographs to enhance the understanding of the historic and cultural value of the site.
- Digital presentation techniques like simulations, 3D models, web sites, as new methods in the age of technology.

These methods of presentation mentioned above are mostly of the tangible heritage. Additionally, there are intangible heritages. According to ICOMOS (2004) the spiritual traditions, music, dance, theatre, stories, cuisine and so on should be included in heritage interpretation. These intangible elements of archaeological sites should also be included in the presentation as well as the tangible, physical values of these sites. However, the information given by these both intangible and tangible methods of site presentation should not be indirect and confusing.

With management of site presentation; planning and considering new presentation applications of the information age as well as the analogue presentation approach. As Risk (1994) mentions that the relations between understanding and interpretation, and also the intendancy of moving visitors from an understanding of appreciation are crucial in the scope of heritage sites. Therefore, understanding the importance of site will inevitably affect the interpretation and perception of archaeological sites. To perceive the site, visitors should communicate with the site. As they experience and communicate, the level of interest in archaeological sites will increase and it will also lead to an awareness of archaeological site preservation. As people learn and see, gather much about an archaeological site, the interpretation approaches will be accurate. Following that, with accurate interpretation, archaeological sites became places not only used for leisure time activities but

also places with their historic, cultural and scientific values. Aygün (2011, p.203) claims that the idea of preservation should be worked with the public rather than being against to them.

In conclusion, the lack of public awareness and interpretation are caused by the lack of information gathered from the archaeological sites. To have an effective interpretation and perception strategy, it is necessary to develop alternative presentation methods to analogue methods. The reason is that presentation should encourage the community to reflect the perceptions of the site. Also, it stimulates the establishment of meaningful interpretation by providing insights.

3.2.3 Sustainability

In this part, the focus is on the role of presentation in sustainable archaeological site preservation. ‘‘The sustainability of cultural heritage can be achieved primarily through the preservation and transfer of heritage to society’’ (Tuna, A. and Erdoğan, E., 2016). Exploring an understanding of -sustainability- as it applies to archaeology and archaeological presentation is a crucial approach. According to Carman (2016), ‘‘the notion of sustainability is central to the idea of preserving the historic environment.’’ He emphasizes the importance of the concept of sustainability in preserving the archaeological site. Following Carman’s approach to the relation between sustainability and preservation, sustainability by means of presentation is also a core point of archaeological site preservation. Similar to Tuna and Erdoğan (2016), the awareness in contemporary societies is based on the sustainability of sites. As Tuna and Erdoğan (2016) claim sustainability can be also achieved by transferring the heritage to the public. Therefore, a sustainable presentation plan should be developed so that sustainable preservation can be provided.

In Turkey, since the late 20th century, in-site presentation methods started to be re-considered according to sustain the preservation of archaeological sites. According to Alpan (2005), ‘‘besides the extension in the definition of the heritage, in the 1990s, the historical process of conservation

reached to the concept of sustainability of cultural heritage.'' Tekeli (2004) states that ''conservation centered discourse 'was' replaced by a sustainability cantered one.'' Therefore, sustainable preservation practices became the core of the preservation practices, if not even more important than preservation practices. Although sustainability started to take place in the archaeological site preservation, as Aygün (2011, p.199) discusses, sustainable and balanced development of preservation practices especially due to the economic support is not sufficient in Turkey. He claims that the archaeology sector is not able to benefit from economic support, though this is a crucial factor for sustainable archaeological site preservation. Sustainability is discussed and considered specifically through archaeological site preservation by Alpan (2005), Tekeli (2004) and Aygün (2011), additionally, the sustainability of presentation practices important as much.

Boccardi and Duvelle (2013) explain the reasons for the importance of sustainability principles as globalization, declining economic resources, increased social conflict, and tension, changing environmental conditions. As Boccardi and Duvelle (2013) mentioned, the main problems of the sustainable archaeological site preservation are caused by the pressure from economic and population growth. Because of the inadequacy of the economic resources, the need for a self-sustaining preservation strategy emerges. Regarding the population growth, there is a great need to create a public awareness which leads the community to become concerned, to consider carefully, and to be more sensitive about archaeological site preservation.

Figure 2 Sustainable Presentation Strategies

There should be sustainable presentation strategies, practices for archaeological sites. Presentation practices can sustain preservation in terms of not only the budget, but also the quality, time, and access. The quality of presentation means the visual, audial and literary comprehensibility of presentation. Moreover, developing a time context dependent presentation method is important. Therefore, developing a presentation strategy, which is accessible in any condition to the public, is also significant. These four basic items considered as interrelated in a sustainable presentation, thus figure 2 is formed accordingly. There needs to be an approach that can create its own economic resources. To have a sustainable presentation methodology of an archaeological site, public awareness, site interpretation, perception and presentation methods are reviewed, considered and discussed as decisive factors.

3.3. How to present?

Methods of presentation following the developments in the information era are discussed in terms of how to present the archaeological sites. The presentation is the transmission of information gathered from the archaeological excavations to the wide public. According to Eres (2016, p.140) site presentation implementations of different approaches became important for archaeological site preservation in recent years. She claims that thanks to the ‘‘efforts of excavation teams, various governorships, local governments’’ presentations can be carried out. As the site becomes well presented it also means that the site starts to communicate with its visitors. For the visitor, it is inevitable that as they start to communicate with the importance of the site, they become aware of the value hidden in the stones and hidden in the history. If the level of awareness rises, then they become responsible for its preservation.

According to Hueber (1991), archaeological excavation areas are discovered and destroyed after they are discovered. Therefore, with the management of presentation methods based on the considerations of time,

quality, budget and access, the level of destruction can also decrease. Moreover, site presentation methods can be categorized into two: analogue presentation methods and digital presentation methods.

3.3.1 Analogue Presentation Methods

The value of an archaeological site is determined by the cultural and historical meaning of the site. Therefore, the excavation studies carry great importance in terms of gathering accurate information about the site. Information panels, brochures, maps, signs, tour paths, landscaping, organizations, and activities are the traditional techniques of site presenting, recording and analyzing the site. With this technique of presentation, visitors can access accurate information from the site. With this method of archaeological site presentation; the descriptive information about the history of the site, 2D reconstruction drawings of remains, photography of remains can be displayed in the historic showcase. This method is practical and affordable so that offers a long-term presentation.

3.3.1.1. Information Panels and Brochures

Information panels and brochures are two essential methods for analogue archaeological site presentation. These two conventional presentation methods commonly used to carry the historical data i.e. names, locations, and importance of the remains and 2D visual data to the public. Brochures are paper products, while information panels are the self-standing panels that inform visitors about the historic background, organization and remains from the excavations in archaeological sites. The location of the info-panels or the way of serving brochures to the visitors should also be in the center of presentation planning. According to Timoney (2008), ‘‘the aim of the interpretive panel should be to capture the imagination whilst simultaneously informing the visitor’’ therefore the access to the info panel and brochures should not disturb the visitor’s flow of the trip. Timoney (2008) claims that hierarchy of information affects the visitors level of interest. Necessary

images, titles, subtitles, photographs, narratives and 2D drawings should be planned according to encourage and inform the wide public in archaeological site preservation.

3.3.1.2. Maps and Signs, Tour Paths and Landscaping, Organization and Activities

Maps and signs in archaeological sites function as guides for visitors. For site orientation, maps are the 2D graphical representations which show the whole archaeological site, including the location of the remains and landscape. Walking paths, which connect of one group of remains with others, can be clearly interpreted from the 2D maps. Signs are also panels guiding the visitors to the places that they want to experience. Both maps and signs make an archaeological site legible to its users. As the visitors become better oriented, they can fully appreciate the site, gather historical importance without data loss. It raises overall understanding of the importance of site preservation.

Developments on the tour paths and landscaping raise the appreciation of the public. Tour paths and landscaping studies are directly related to the access to the data which is one of the most important subjects to be presented and preserved. Excavation team works with the head of excavation together for defining the paths in the archaeological site. Depending on the excavation processes of the remains and the site, the tour route is considered in accordance not to disturb the tour flow but to let the visitor be integrated with the historic city. The pavement material, the width of the path, shading elements and trees should be decided according to the needs of the public without forgetting that public also includes people from the variety of age range and within public there exist disabled people with wheel chairs or who have a visual impairment. Landscaping and tour paths affect the success of the place. For having a sustainable approach to the site preservation, the need of making the visitor enjoy the landscape and site comes first. Most importantly, to make it easier to get the accurate data, these two analogue presentation methods play a critical role.

For the presentation of archaeological sites, locals and tourists should understand the importance of it and use the site appropriately. Therefore, organization and activities in archaeological sites have gained a respectable importance. The memory of the spirit of the remains should also be reflected in the presentation strategies in this context. To promote this approach, activities have been organized over many years in the archaeological sites in Turkey. One of an important study is Çalışkan's (2014) thesis on Reusing Bouleuterion of Teos. Çalışkan (2014) organized a classical music concert in existing Hellenistic - Roman building Bouleuterion. She states the whole organization is a recall for public awareness.

Çalışkan (2014, p.8) emphasizes that events should avoid destruction in the historic structures. Therefore, activities are used as a presentation method which has a direct relationship with sustainable preservation of the site. The organizations should be planned sensitively to minimize the possibilities listed below;

- The risk of the unexpected population that uses the ancient structure that the event takes placed in.
- Problems related to the misuse of the structure.
- Problems of using the ancient structure in a way that it does not overlap with the previous function.
- Visitor damage to the surrounding area should be considered.
- Air and noise pollution.
- Communication problems with the person or team organizing the activity.
- The whole event made without respect for the spirit of the place.
- Lack of public awareness of cultural heritage sites.

When a number of visitors increase, the destruction of the remains increases accordingly. This means that, as mentioned in the previous sections of the chapter, although there are external influences like natural disasters or the negative effects of humidity level, the wind, and sunlight, human-related

factors play a significant role in the sustainability of archaeological site preservation. The lack of public awareness, including overuse, misuse, and the organizational problems at the sites, all raise the level of destruction. This can be alleviated by education and careful planning. However, there need to be efforts to create a sustainable preservation strategy, both for economic reasons and also for the unexpected human-related destruction on site.

Similar to Yurtsevenler (2013, p.104), creational approaches in archaeological site presentation should be planned by using innovative technologies. According to Eres (2016), the expectations of the Ministry of Culture and Tourism is a problem for the presentation of archaeological sites, where visitor centers and standard entrance signs are created as 'template' for each excavation site, creating a uniform presentation strategy. Eres is too critical of the 'template like' presentation technique that Ministry of Culture and Tourism have created. However, there should be two approaches to presentation strategies. The first is the methods of template like strategies which the Ministry of Culture and Tourism implies and also discussed in detail above (brochures and info-panels, maps and signs, tour paths and landscaping, organizations and activities). Secondly, in line with the ideas of Yurtsevenler, there should be the consideration of innovative - digital - methods for archaeological in-site presentation to be able to sustain the site preservation by sustainable presentation strategies.

3.3.2. Digital Presentation Methods

> Where traditional techniques prove inadequate, the consolidation of a monument can be achieved by the use of any modern technique for conservation and construction, the efficacy of which has been shown by scientific data and proved by experience. (The Venice Charter, 1964)

Digital 3D modeling has a primary role in presenting archaeological sites. It also could be an effective method for identification, monitoring, documentation, and presentation. Augmenting 2D presentation techniques in archaeology, presentation through 3D digital modeling is becoming the

forerunner of the era. Digital technology is not only used to provide tools for documentation but also for site presentation. Referring to the Venice Charter (1964), the conventional methods of preservation and presentation became inadequate. However, by the use of modern techniques following the needs of the age of technology for presenting archaeological sites, the accurate data flow to the public will be succeeded.

Today, the increase in technological developments has increased the use of virtual media tools in various academic disciplines. In past two decades, the archaeology in Turkeys started to adapt new technologies. Preserving cultural heritage in the virtual environment has similarities to in-situ preservation. While in-situ preservation methods cost much because they cannot resist the damage caused by the public, the preservation policies implemented in the virtual environment reach wider masses in a shorter time and at lower costs. Digital heritage also allows access to more users from all around the world including the disabled people, children, and elders. The stopped excavation studies are one of the major problems caused by the lack of economic support. Time, space, and easy accessibility of the technology, especially for archaeological conservation policies, provide an economic, time-saving, and accessible presentation to the public.

> ‘‘The growing interest in digital media and real-time visualization within the heritage industry has given rise to a whole new field of activity known as ‘virtual heritage’. (O’Coill and Doughty, 2004)’’

There are various conceptual and technically feasible methods available like digitalization of cultural and historical artifacts and the creation of multimedia data archives, presentations of valuable artifacts in virtual museums, galleries and digital libraries, 3D virtual realities, that present history and culture. As the two common examples of digitalization techniques, the thesis is focusing on solid and image-based modeling can help the presentation, restoration, documentation, and preservation of archaeological remains.

3.3.2.1. Solid Modeling

Solid modeling is an augmented method to the analogue archaeological site presentation methods. Rather than a presentation method, it is also considered as a reliable and sustainable documentation method. 3D digital modeling is the reconstruction of landscape, architecture, remains in the digital environment. It can be applied to the reconstruction and visualization of the archaeological site using the data driven from the excavation studies.

Referring to Boeykens (2011) ‘‘the use of digital tools has become a tremendous aid in the creation of digital, historical reconstructions of architectural projects.’’ It is a common real-time visualization technique especially focusing on archaeological heritage sites. It facilitates the perception of 3D real-time remains of historic cities. Since 3D modeling programs have been released, they have become an alternative method of archaeological site presentation to 2D presentation methods. Modeling in the digital environment is a way of reconstructing the existing object. Furthermore, 3D reconstructions in the computer programs create a possibility of access to the object from all around the world.

As Richards (2002) states the crisis in publication and archiving the data of archaeological sites in Europe, this is also a problem for Turkey, too. Richards also mentions ‘‘Computerized data are more fragile than paper archives but also more accessible via the Internet.’’ Therefore, 3D digital modeling methods are long lasting data archiving methods used for archaeological documentation problem in Turkey.

Modeling aims visualization of a 3D object. According to Gomes et al. (2014), 3D reconstruction refers to capturing the visual data of an object or scene. Particularly, in archaeology, by 3D modeling methods, it is possible to interpret the visual data of archaeological remains. However, 3D architectural historical reconstruction models provide more than just visualization. It aims virtual heritage presentation, preservation which requires a faithful consideration of architectural and historical value on archaeological remains.

Knowing that solid and image-based modeling are two digital archaeological site presentation methods. The two methods are also the methods of documenting and archiving the existing archaeological field data in the digital environment. In comparison to the paper documents, modeling in the digital environment is long-lasting, low cost and easily accessible and sustainable documentation and presentation. So the functionality of modeling in archaeological site presentation, preservation and documentation cannot be replicated on conventional methods. Due to various saving formats, digital preservation has its own disadvantages.

Even if modeling archaeological and architectural remains in the digital environment has many advantages covered above; there is one paradox in 3D reconstructions. To reach an accurate geometry of the architectural remain forming up a 3D reconstruction model is a sustainable and successful method. However, while considering the accuracy, solid modeling has shortcomings in terms of the visual data quality. Although during the last two decades, there have been many improvements in the software programs; digital archaeological reconstructions still do not represent the accurate material quality with the perfection of smoothest models. For other fields, perfection and visual quality might come first but for archaeology, it is important to show the reality without adding new approaches. 3D models are good for understanding the whole structure and geometry to have an idea about the past for visitors but it is not enough for presenting and archiving the actual pieces of archaeology.

Solid modeling is used as a tool to present and document the archaeological data. It is also aimed that the method can be used as a presentation tool to attract public attention. As mentioned above, for archaeological site presentation, raising public awareness is a significant approach. With this digital presentation method, the visual data will raise the interest by means of public awareness. Therefore, the method can be used as an archaeological site documentation and preservation, as an augmented method to the analogue presentation methods.

3.3.2.2. Structure from Motion

> Archaeology is becoming increasingly digital. In the last ten years the use of new technologies for the 3D documentation and reconstruction of cultural heritage has changed the way to approach the archaeological survey. The use of 3D laser scanners and photogrammetric methods is well established now. One of the main reasons for this development is the possibilities that these techniques give to digitally preserve the information through time. (Galeazzi, 2014)

In this part, the image-based modeling which is also called photogrammetry is considered as a digital way of transmitting accurate knowledge to the public. According to Boeykens (2011, p.494), photogrammetry is a technique that currently used for heritage literature and research. With this digital presentation method, it aims to both inform the public about historical and cultural data and to attract people. The method conveys and archives the accurate historical and visual data. According to American Society of Photogrammetry (1980), photogrammetry is the art, science and the environment for recording, interpreting and measuring images. Diverse applications of photogrammetry can be found in industry, archeology, architecture, and aerospace engineering (Jiang et al, 2008). Similar to Jiangle et al. (2008), there exist several fields of photogrammetry. As the American Society of Photogrammetry (1980) states that with the support of photogrammetry it is possible to gather reliable information about the remains of archaeological sites. Photogrammetric techniques and 3D software used in archaeological site presentation have become the backbone of cultural heritage preservation. Knowing that the accuracy of the information is the most significant part of archaeological site presentation, with the help of photogrammetry technique, reliable information can be gathered.

Duran and Toz (2002) discuss that documentation and preservation of historical structures is a common problem. Regarding the documentation and achieving the data gathered from the archaeological sites, the interest in archaeological 3D documentation has greatly accelerated over the past decade

(Fröhlich and Mettenleiter 2004; Koch and Kaehler 2009). Today 3D models enable architects, archaeologists, and other professionals to visualize the hypothetical reconstructions of historical remains. As Suveg and Vosselman (2000) state, ‘‘…with the development of digital techniques, photogrammetry has become a more efficient and economical method of documenting…’’ As Suveg and Vosselman put an emphasis on that this digital technique creates an economic medium for archaeological data documentation and site preservation. Photogrammetric methods differ from solid modeling in terms of its low cost, and labor extensive, quick and easy solutions.

According to Grussenmeyer, et al. (2002), Remondino (2011) “photogrammetry is considered as the best technique for the processing of image data gathered with digital cameras. It is able to deliver at any scale of application accurate, metric, and detailed 3D information.” The image-based modeling method enables the professionals to document the excavation studies. Over the past two decades, interest in archaeological site documentation has accelerated. This method of digital presentation can be used as a reliable source of accurate data collection and convey the data to the public. Therefore, it is aimed that with an image-based modeling approach, the accurate and reliable data can be transferred to the wide public.

In conclusion, the historical and cultural data should be preserved due to its uniqueness and be presented to inform public for raising public awareness. Two digital modeling methods are considered as digital presentation and documentation method. Augmenting the possibilities of the analogue site presentation methods, the image-based and solid modeling methods have several advantages to disseminate the information to the public. In the scope of archaeological site preservation, the accurate data and the context should be presented in accordance to raise awareness, give accurate information and perception, and sustainable presentation on archaeological site preservation.

CHAPTER 4

A STUDY ON PRESERVATION OF TEOS ARCHAEOLOGICAL SITE WITH DIGITAL PRESENTATION METHODS

4.1. History of Research on Teos

Turkey has hosted several civilizations by its geographical location and its mild climate. (Akurgal, 1998; p. 58; Lloyd, 2008) Among these civilizations, Teos is an important city, one of the 12 Ionian cities located in Southwest of İzmir in the Seferihisar District. Inhabited since 11th century BC, the city has been influenced by the trade of the sea and land, and by strongest political, cultural and economic civilizations of the time.

4.1.1. Importance and Context

The ancient port city of Teos was built on a small peninsula. The ancient city was built from the Acropolis located towards the south of the Teos. The Acropolis is located on Kocakırtepe in the middle of the peninsula. (Kadıoğlu, 2012) The two ancient ports, located in the south and north, names Teos as a port city. The relatively smaller port is on the north, served as a military port. The larger one, South Port was the center of the sea trade. The city map illustrated in Figure 3 shows that the city was surrounded by 4 km long Hellenistic City Wall. Within the walls located between the Acropolis and the South Port, important architectural buildings are located such as Temple of Dionysos, Theater, Bouleuterion, Agora, Agora Temple.

The ancient city has a strategic location and geography for the sea trade. It is also an important city of high taxes. 6th century BC, the city was in commercial relations with Ancient Egypt and other Greek cities. In terms of its

historical significance, the city deserves a good preservation strategy to transfer the historical importance to the new generations.

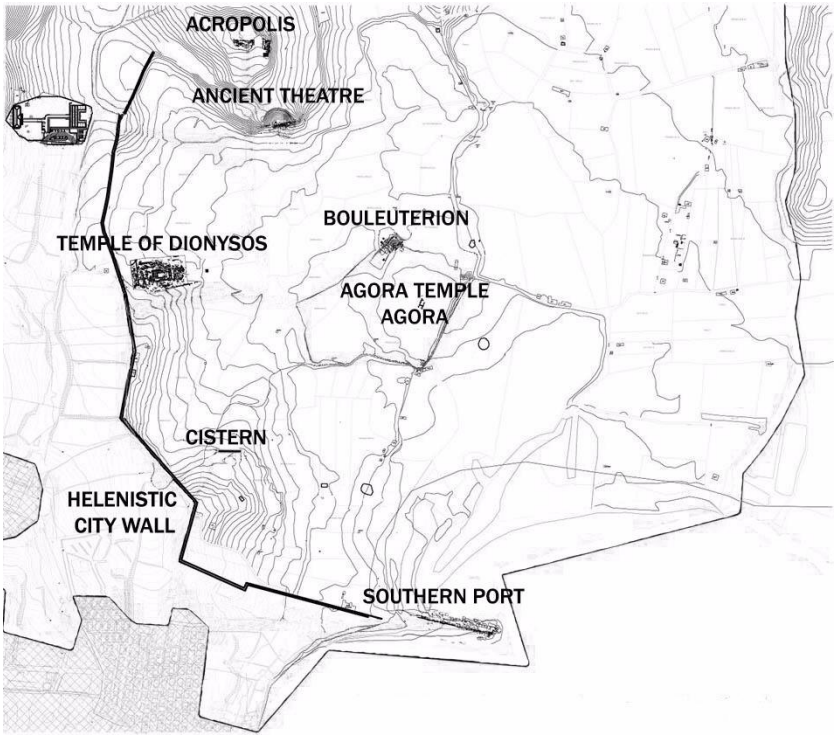

Figure 3 The Ancient City Map of Teos

4.1.2. Excavation and Survey Studies

The Society of Dilettanti first made studies on the architectural remains of Teos antique city and other archaeological findings in 1862. Due to political conflicts and wars, the excavation studies were stopped until the beginning of the 20th century. The French archaeologists continued in 1924. Although French archaeologists worked on excavations, due to limited storage capacities of the excavated materials and economic constraints, the documentation of Teos archaeological site was limited. (Uz, 2013) Between 1964 and 1967, Turkish archaeologists, Prof. Dr.Yusuf Boysal and Prof. Dr. Baki Öğün studied Teos. This was the first time that the excavation studies are conducted by Turkish scientists. Although the excavations were stopped in 1967, the studies restarted in 1980 and continued until 1992 by Architect Duran Mustafa Uz. Between the years 1993-1995, Prof. Dr. Numan Tuna continued to work on the

ancient city after the death of Mustafa Uz. Excavation, documentation and restoration studies started again by Prof. Dr. Musa Kadıoğlu at the Department of Archaeology, the Faculty of Language History and Geography at Ankara University with the permission from the Ministry of Culture and Tourism in 2010. The excavation studies started by preparing a digital city plan using measuring tools, GPS and Total Station. (Kadıoğlu, 2011) In an architectural scale, the first documentation studies started in the Temple of Dionysos. To protect and exhibit all immovable and movable cultural assets was the priority. (Kadıoğlu, et al., 2010) To be nominated as an archaeological site open to the public, ticket office, storage, museum, information center, cafeteria, observation terraces, tour routes, resting areas and excavation house are constructed following a landscape project of the ancient city of Teos. Within the limited time of 6 years, from 2010 to 2016, all these constructions are completed. (Kadıoğlu, et al., 2016)

4.2. Documentation of Studied Architectural Remains of Teos

ICOMOS (1990) defines archaeological heritage as a ‘‘delicate and non-renewable cultural resource.’’ A good documentation of an archaeological heritage should be assessed as a part of preservation as lack of documentation may result in loss of information. Since 2010, the excavation studies are meticulously maintaining in Teos. The archaeological remains are systematically and regularly studied and protected in accordance with the conservation plan. The studied remains can be categorized as building at architectural scale and small findings at object scale.

4.2.1. Architectural Scale

At architectural scale, four historically significant remains are the Theatre, the Temple of Dionysos, Cistern, and South Port are the subjects of the thesis. Existing literature related to these ancient buildings are reviewed to document their location, scale, as well as their historical significance. To archive the current conditions of the remains, aerial photos are taken.

Ancient Theatre

The ancient theatre (Fig. 4) of the city leans on a natural slope in the southeast of the Acropolis It dates back to 2nd century AD. The structure follows Ancient Greek architectural style, having some traces from the Roman period. The theatre is composed of the *cave, orchestra*, and *scene*. *Cavea* has two parts; the lower and upper ones. The lower part has the features of roman period and it is built on a substructure with an arch and a vault. The stage building is 42 m long in east-west direction and 11m in the north-south direction. There is no other information than the ones about the area where the stage is located.

The excavations were conducted from *cavea* towards the *Orchestra*. The lower eight rows were well protected. Also, only *prohedria* and *klimakes* were protected other than the eight sitting rows of *cavea*. The vaults carrying the upper *cavea* are severely damaged. It is known that the top step level is 19 m higher than *proskenion*. The restitution hasn't conducted on *proskenion* yet; however, lots of ornamental architectural blocks that belong to the platform located on the *cavea* face of the stage has been found with the excavations.

Temple of Dionysos

According to Vitruvius, Hellenistic period architect Hermogenes built Temple of Dionysos located in the west of the Hellenistic city wall. Although there is no historical and archaeological information about the early periods of the Temple, it is known as the biggest Temple of Dionysos in Anatolia. It was started to be used in the 2nd century BC according to Prof. Dr. Akurgal and 3rd century BC according to Prof. Dr. Boysal and Prof. Dr. Öğün. Even if D. M. Uz (2013) claims that the structure belongs to Augustus (27 BC-14 AD) and Hadrianus Periods (117-138 AD), the structure was dated to Hellenistic period as the excavated remains date back to the Hellenistic Period. The structure consists of Ion styled 3 parts in terms of its architecture. The six columns constitute the short edge and eleven the long edge of the structure which has a rectangular plan of 24m x 40m. The Temple is 18m high; the *tenemos* wall's dimensions are 120m x70m x 7m and the wall with stoa is 9m high.

Figure 4 Aerial Photographs of the Ancient Theatre (a), Temple of Dionysos (b), Cistern (c), South Port (d), Teos, 2017

Within the context of studies in 2010 and 2011, the building survey project of the Sacred Area of Dionysus Temple is completed. (Kadıoğlu, 2012) Within the context of 2011 studies, the conservation of the Western *temenos* wall was completed. The documentation studies in the sacred area were completed in 2011. The relief drawings of the Temple are still being studied. Today, preservation and restitution studies of the Temple of Dionysos still continue.

Cistern

The city cistern (Fig. 4) belonging to the Roman period is located in the west of the city and the south of Temple of Dionysos. Architecturally, the structure has a rectangular plan of 45,5m x 6,85m x 5,42m measurements. Being built of dry rubble masonry, there are 16 blind arches in total in the structure. The 2 of these are in the Eastern part and the 16 of them in the Northern part. Since the northern front is 3,5m lower in the land that the structure is located, it was detected that the northern front is buried in the land. There is a water tank inside of the structure and it is possible according to the existing remains that it might be used as a fountain as well as it was used as the cistern for a period.

South Port

The South Port (Fig. 4) of Teos is located in the south part of the city. The South Port of Teos is the best well-preserved ancient port in all the Anatolian coasts. (Kadıoğlu, et al., 2011) Furthermore, it has undertaken an effective commercial role in the entire Mediterranean basin. The port built by bringing rectangular blocks together. It dates back to the Roman period. The port's length is 155m and width is 10,5m. The stones that the rings tie down are located with a repetition of 3,5m.

The ancient period ships and boats were tied to in the coastal side can still be seen and are still used by the local fishermen. The pierced rocks to which ships and boats are connected in the ancient period; today is still used by local fishermen. The excavation studies in the south port show the traces of

ancient harbor. The south port also includes a basilica of the byzantine period. A master thesis on the basilica by Görkem Yenice (2015) is completed. The ancient harbor is currently studied by Emrah Köşgeroğlu, a Ph.D. candidate at Hacettepe University. The underwater surveys for possible shipwrecks were conducted in 2014-15. However, the studies are still in progress.

4.2.2. Object Scale

At object level, this chapter covers and document seven historically significant remains an architrave, a Corinthian capital, pediment, an Ionic capital, a shaft and base, and an inscription. The description of remains, their functions, where it was found, measurements and where they are exhibited today is particularly documented. Also, current photography of each remain is taken.

Architrave

The architrave is the lowest of the three main parts of an entablature that rests on the abacus of a column. It is an architectural element in classical architecture. It functions as a load-bearing element an architectural structure. The architrave (Fig. 5) is found at the North end of the altar of Temple of Dionysos. (Kadıoğlu, et al., 2015) The detailed hand drawings and digital drawings with the measurements completed in 2016. The architrave is documented in 61cm width, 127,5 cm length, and 33,5cm height. The studies on the remains are still being worked on, therefore it is still unknown which historical period it belongs to. Today, it is exhibited next to the Temple of Dionysos.

Corinthian Capital

The Corinthian order is the third of classical orders after Doric and Ionic orders developed in Greek architecture. The name comes from the old Greek city ‘Corinth’. Though it is ornamented like a decorative architectural piece, it also functions as a capital. The selected capital (Fig. 5) is found in Seferihisar. The studies on the capital still continue, so the hand and digital

drawings are not completed yet. It is still unknown and hard to find out which historic period and archaeological structure that it belongs to. Today it is exhibited in the open air museum that is located in between the excavation house and storage.

Figure 5 Photographs of an Architrave (1), a Corinthian Capital (2), a Pediment (3), an Ionic Capital (4), a Shaft and Base (5), and an Inscription (6), Teos, 2017

Pediment

In classical architecture a pediment is a low-pitched gable crowning a portico or facade, often containing sculpture. The selected pediment (Fig. 5) is found at the middle axle of the altar of Dionysos in 2015. It belongs to the left end of the altar. The inventory number is ADK2. Thus the pediment was found on the surface; the historical period that it belongs to is not known and documented. The works on the hand and digital drawings still continue. So the measurements are not documented yet. Today it is exhibited on the North side of the Temple of Dionysos.

Ionic Capital

Ionic capital is one of the thinnest and smallest one of three classical orders. The spiral scroll is used symmetrically on it. It stands on a base of the stacked disk. It's the capital of Ionic column. The Ionic corner capital (Fig. 5) was found on the surface at the South West side of Acropolis. The technical drawings not completed yet, but the studies on it are continuing. Therefore, the measurements are not documented yet. Thus, it is not found with excavations studies, the historical period that it belongs to cannot be interpreted. Today, the Ionic capital is exhibited at the open air museum of Teos.

Shaft and Base

Shaft and base are two portions of a column. The base is the lover portion of a column that the column settles on. The shaft is the body of a column or pilaster between the capital and the base. The shaft and base (Fig. 5) were found during 1962-1967 excavation studies. It is the fourth column from the North side of the Temple of Dionysos. (Teos Excavation Team, 1962-1967) The excavation team still works on technical drawings. For this reason, the measurements are not documented yet. Today, the portions of columns are exhibited in its exact location in the Temple of Dionysos.

Inscription

An inscription is a historical, religious or other record cut, impressed, painted or written on stone, brick, metal or other hard surfaces. The inscription was found in 2010. The list of winners of a musical agon (a musical competition) is inscribed on it. The measurements are 49 cm x 87 cm x 38 cm. It belongs to B.C. 2nd century. Today, thus it is unknown which architectural structure of Teos that it belongs to, kept in the excavation storage.

The brief introduction on architectural buildings and objects allows us to understand the existing conditions of the remains. As described above, the Teos city is highly disturbed by natural and human factors. The scientifically and carefully studies by Prof. Dr. Kadıoğlu shows how much more information can be revealed in the future. However, the historical significance of the site cannot be easily understood by the public. As the remains are so scattered in the site and the objects are disturbed, 3D restitution studies are needed. 2D illustrations used as presentation tools at the site; however, I believe that 3D digital tools will augment the presentation.

4.3. 3D Modeling of Teos Archaeological Site

According to Boeykens (2011; p.494), modeling for heritage preservation requires the construction of accurate geometry, faithful to the historical context. There is a variety of modeling methods for archaeological heritage presentation purpose. For digital archaeological 3D reconstruction and presentation purposes, the main focus should be on the accessibility to the accurate visual and textual data by considering the physical, time and spiritual context of the Teos archaeological site. Some efforts are spent to better present the site.

Analogue presentation methods are useful particularly for in-situ presentation. The studies on Teos site presentation with analogue presentation methods there have been many developments like brochures, maps, constructions of information panels, tour paths, resting terraces, signs and etc.

in the new period of excavation studies since 2010. Since 2010, the presentation studies are planned, studied, developed, renewed, and already been completed in 2016.

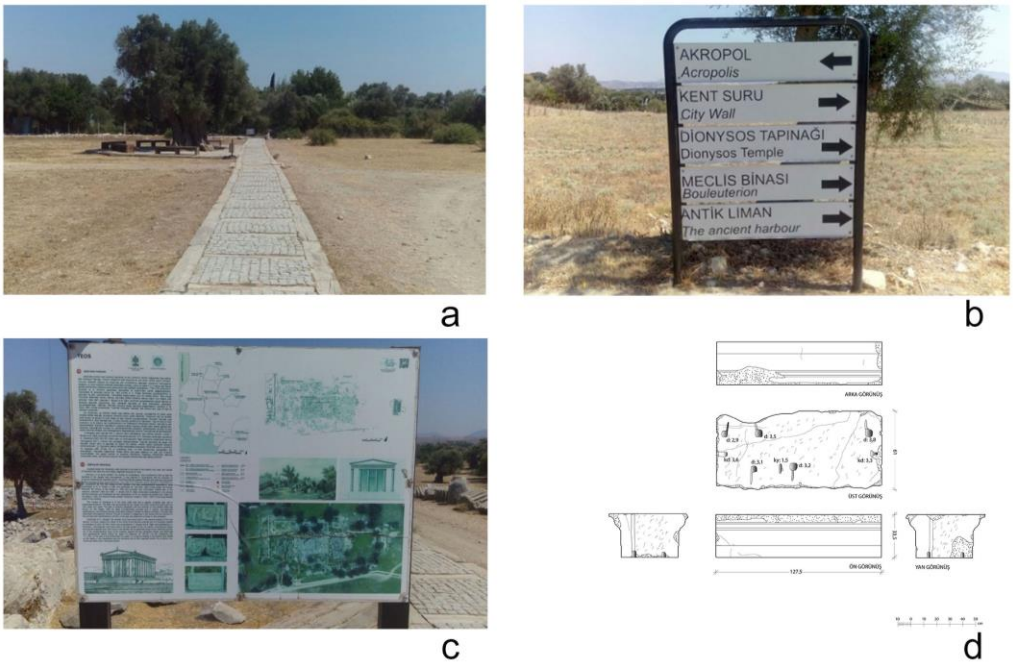

Figure 6 Examples of 2D Representation Method; Tour Paths and Resting Terraces (a), Sign Boards (b), Information Panels (c), 2D Drawing by Excavation Team (d), Teos, 2017

The Digital Teos project started with an effort to explore several digital tools and methods for a better representation of the archaeological remains. Based on the existing data provided by the Kadıoğlu's excavation team, and with additional support from the Izmir University of Economics, the project explored digital reconstructions, virtual reality, and digital fabrication of the archaeological buildings highlighted above. Within the scope of this thesis, the restitution models of the Digital Teos project are used to provide a better understanding of the size and scale of the buildings. The author, to document and present the existing conditions of the remains in the digital environment, develops the image-based models. In this part, a variety of remains of Teos are studied by solid and image-based modeling methods as an augmented method to the existing developed analogue presentation methods of Teos archaeological site documentation and presentation. The remains of Teos in an architectural scale and object scale listed in the previous part are modeled in

the digital environment by solid and image-based modeling methods. Moreover, by comparing the two methods in terms of the context dependency, accuracy of the data that they present, their attractiveness, sustainability, public awareness and interpretation and perception, an alternative digital presentation method is proposed.

4.3.1. Solid Modeling

Solid modeling is considered as an effective method of producing 3D interpreted reconstructions of remains in the digital environment to publically present the current developments. In the Digital Teos project, the modelers[2] used 3D solid modeling tools to complete the 3D interpreted-reconstruction models in a digital environment. They followed the methodology highlighted in Guidi, Russo, Angheleddu (2013), diagram (Fig. 7) a graphical representation of how the 3D digital modeling process works. The interpretation of the diagram to Teos the process has three main steps: data acquisitions, interpretation based on the feedback of the head of the excavation, and finally using the tools to transfer the data to the digital environment. During the data acquisition process, modelers referred a variety of data sources to obtain accurate data about the remains of Teos ancient city. To ensure accurate data was gathered about the existing remains and their current conditions on an architectural and object scale, the following data sources and studies were used during the Teos modeling process.

- Literature reviews through national and international sources particularly on these four architectural remains.
- In-situ surveys.
- Review of restitution drawings of the Theatre of ancient Nysa historic city, made by the head of excavation.
- Excavation reports published since 2010.
- Architectural-Technical drawings.

[2] Mert Sartık was studied on ancient theatre and the Temple of Dionysos and Furkan Sinan Üğütmen was studied on cistern and South Port of Teos.

- Spatial analyses made by excavation team.
- Photographs.
- Official web site of Teos 'Teos Archaeology Project 2010'.

The modeling process was followed by an iterative interaction between the team of Teos archaeologists and digital modelers. During the modeling process, from the beginning to the generation of the complete models, Prof. Dr. Kadıoğlu checked each steps to ensure the accuracy of the data presented in the models. When he considered there was a need for changes or improvements, modelers revised the steps without interrupting the process of the study. Also, the accurate and interpreted data allowed, 3D solid models, to be generated in the software. The crucial point is to get the accurate data about the remains of Teos ancient city. Because excavation and documentation studies are still continuing at Teos, was challenging for the modelers to gather data about the site.

The studied models in each scale were evaluated in terms of the accuracy of data, context, public attraction, interpretation, and sustainability. In the following parts, these models are also discussed in terms of their documentation and presentation.

Architectural Scale

In this part, the focus is particularly on the context and visual, historical and cultural reliable data presentation together with other architectural subjects such as measurements, structures, materials, and construction techniques. In this context, four architectural solid models were generated by the modelers. The digital presentation of ancient theatre, Temple of Dionysos (Kadıoğlu, et al., 2010; 2011; 2013), Cistern (Uz, 2013), and South Port of Teos through generated models aimed to give the public an accurate impression based on data. The head of excavation's support for the data gathering process allowed the interpretation of the unknown data. Therefore, the data presented by solid modeling method of the studied remains were interpreted by modelers.

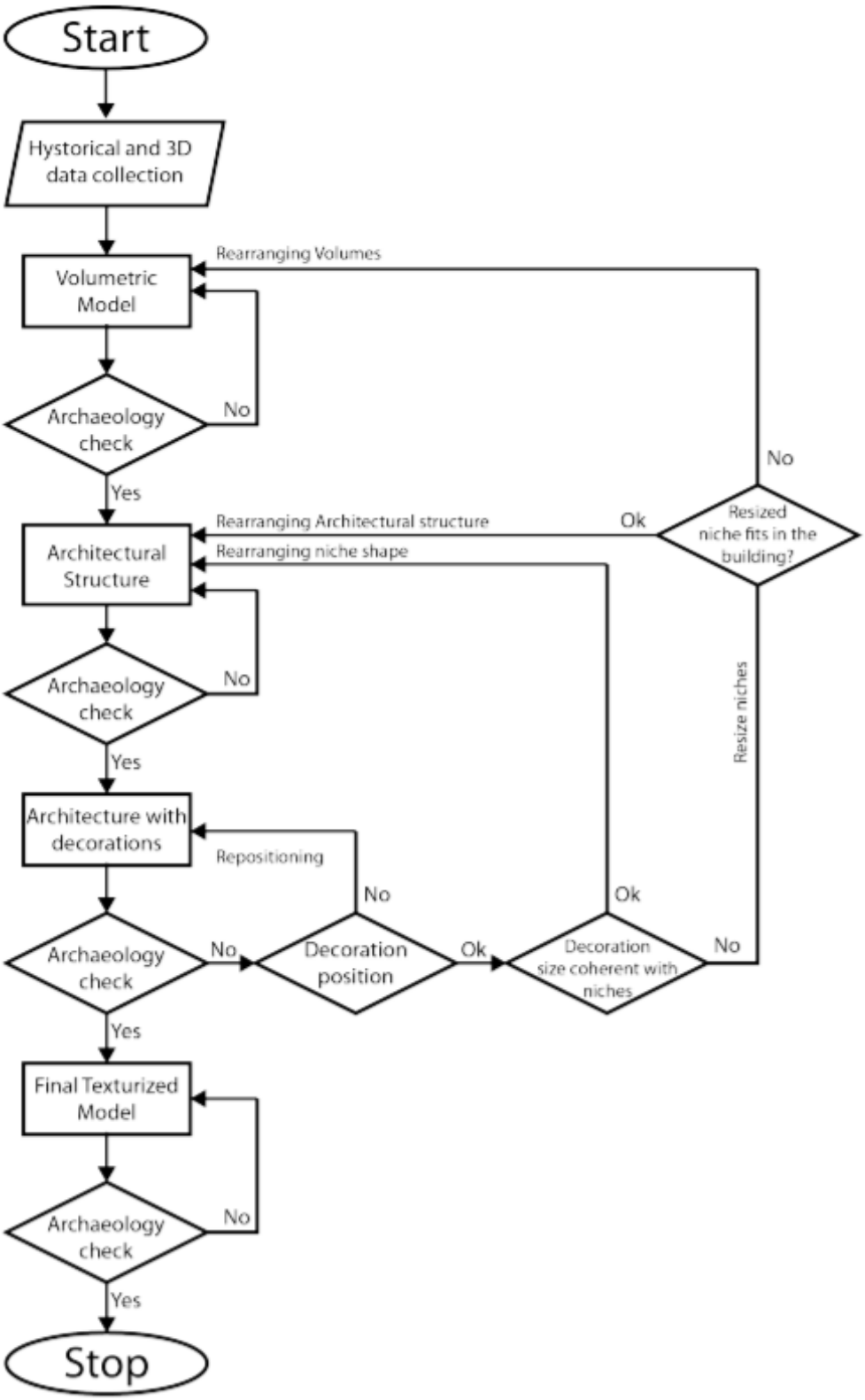

Figure 7 Flow Diagram Describing the Reconstruction Process based on the Interaction between Historical Sources and 3D Data, Guidi, G.Russo, M. Angheleddu, D., 2013

Solid modeling in this scale provides the differentiation between the existing data and current condition of the buildings. The effects of the physical conditions such as the landscape, location, wind, and the sun on these architectural remains of Teos was interpreted according to the data gathered from the site, through the solid modeling process. Although it is possible to adjust the settings in the digital environment, the physical conditions of all four solid models, such as the smooth surfaces, trees, sky, landscape and so on, are also interpreted. However, to obtain accuracy, data should be presented and documented with its unique physical context, without any need for interpretation. Moreover, time context should also be documented and presented. In this scale of solid modeling, the historical time period to which these four models belong can be understood by the visitors. However, as the second shortcoming, these models cannot convey accurate historical time-dependent data such as season, month, and year. The reason is that the time context also was interpreted in these smooth solid models. Furthermore, it is important to present the spirit of an archaeological site, particularly for Teos. The spiritual context is revealed in terms of the fabric, and tectonics of the remains, which create a sense of history. In the case of these four architectural scale solid models, the reliability of the spiritual context level is considered as low, which is the third shortcoming.

To provide sustainability in the presentation and documentation of Teos archaeological site, architectural models should be generated based on the data showing the developments in the excavation studies. Because of these solid models are interpreted, they are the reconstruction of the historical buildings. In other words, the missing data was constructed through modelers' interpretations. Despite these shortcomings, this digital modeling method is very valuable in raising public awareness.

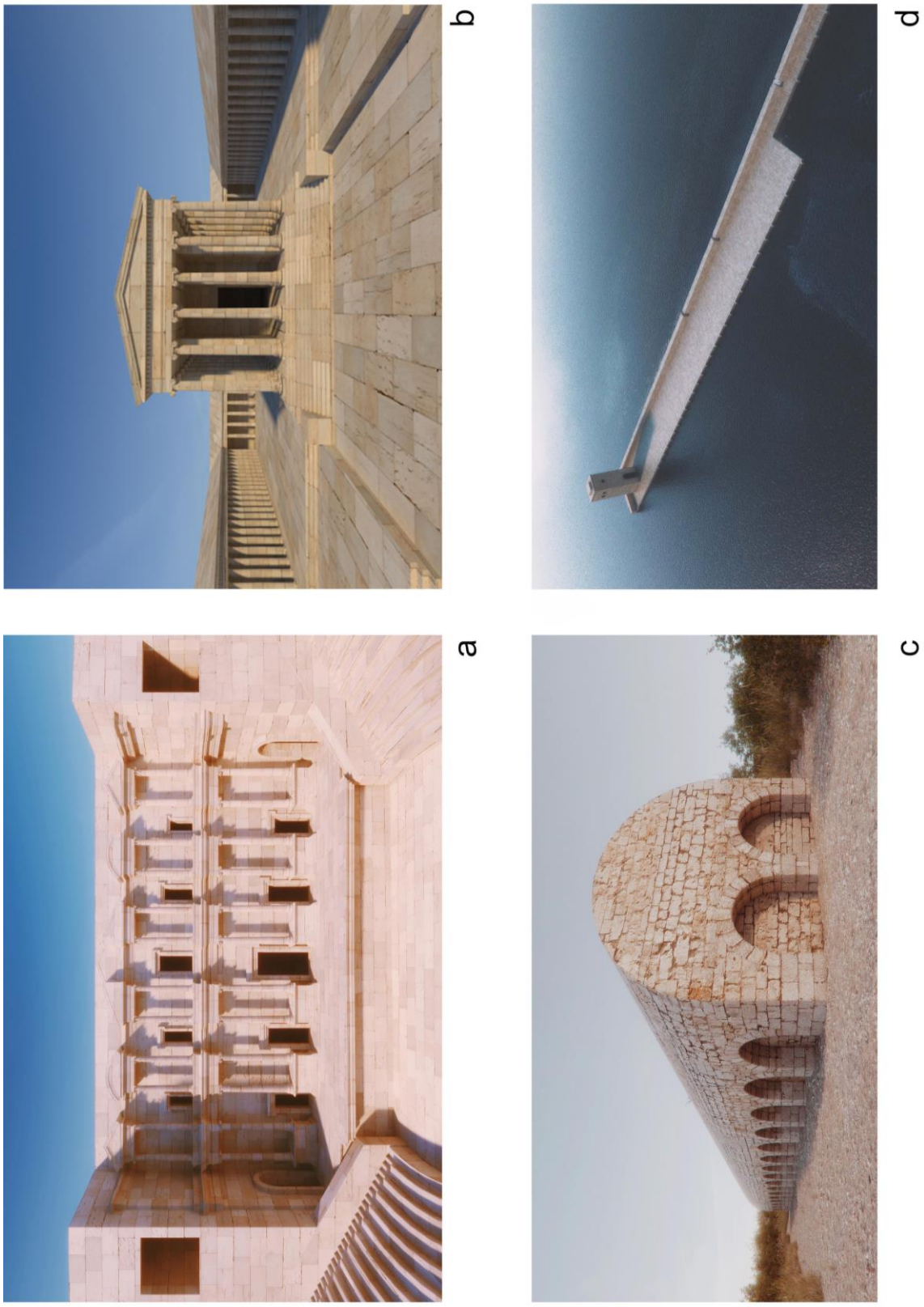

Figure 8 Solid Model of Theatre (a), Temple of Dionysos (b), Cistern (c), South Port (d), Digital Teos Project, 2017

Object Scale

In the object scale, the architectural elements that are an Ionic capital, a drum and base, a Corinthian capital and a pediment, modeled with the solid modeling tools. In this scale of the presentation, modeling the architectural details is important. Similar to the solid models in architectural scale, during the modeling process, because of missing data, the known accurate data is combined with modelers' interpretations.

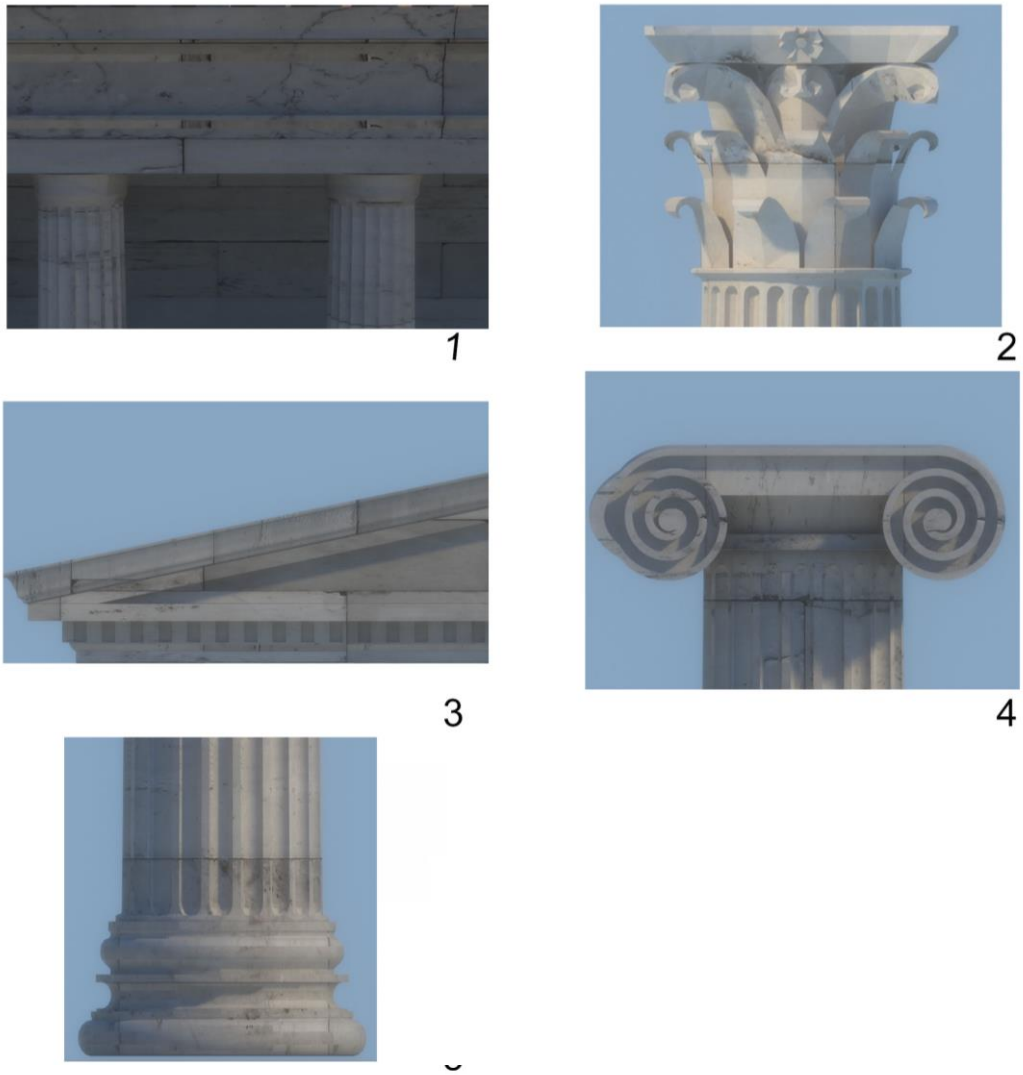

Figure 9 Solid Models of an Architrave (1), a Corinthian Capital (2), a Pediment (3), Ionic Capital (4), a Shaft and Base (5), and Digital Teos Project, 2017

In object scale, physical, time and spiritual context cannot be considered simply as hard data to be presented to the new generations. It is harder to reflect the physical contextual data in this scale of presentation in comparison to the architectural scale. Instead, these models are idealized into

their complete forms and smooth surfaces, thus these models need to be interpreted. Therefore, they are independent of the time and spiritual context. However, it is possible to reconstruct the parts of these remains with solid modeling method. With an interpretative approach, the missing the remains can be constructed to give an impression of their original appearance. Publicizing the reliable data is important in the presentation of Teos. For this reason, although this method can be used as an attractive tool for raising public awareness, it should not be used to document or present accurate archaeological data.

4.3.2. Image-Based Modeling

Advances in image-based modeling in the field of archaeology, mean that low coast stand-alone software such as Agisoft Photoscan can generate high-quality 3D models in the digital environment. It is based on multi view 3D reconstruction technology. Furthermore, it is possible to generate 3D models with photogrammetric modeling of digital images and it supports multi-view camera projects. For the image-based modeling of the remains in both architectural and object scale of Teos, Photoscan produces quality and accurate results. The software allows image orientation, and easy export to a variety of formats. In this study, for image-based modeling of the remains of Teos, Agisoft PhotoScan professional edition was used to document the accurate real-time data in digital environment at low cost and in a reasonable timeframe.

Architectural Scale

The architectural remains of Teos were documented and presented using the image-based modeling method. The accuracy of the data, context dependency, sustainability, reconstruction, interpretation, public attraction, and public awareness are discussed in detail in the following section.

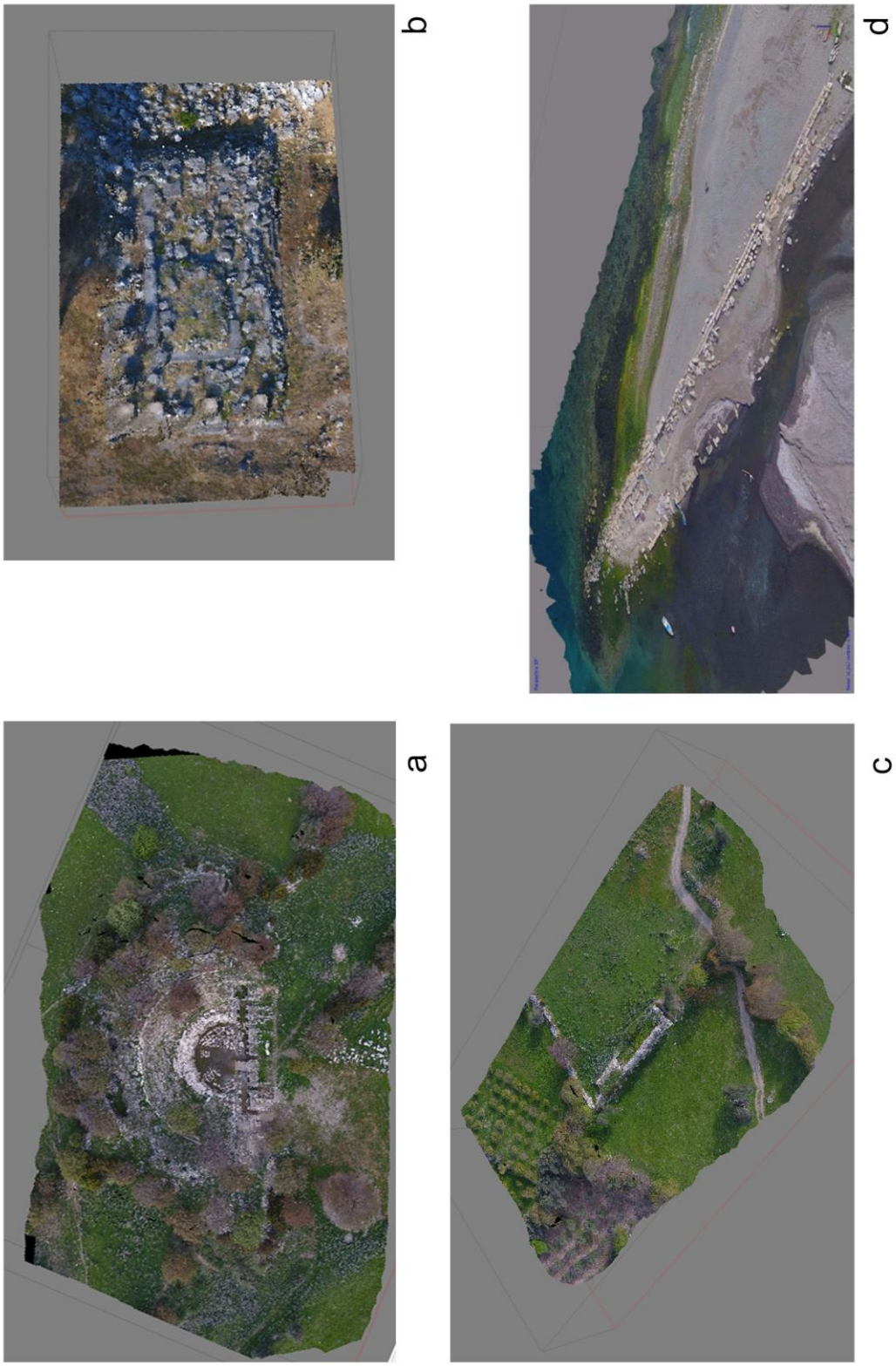

Figure 10 Image-based Models of Theatre (a), Temple of Dionysos (b), Cistern (c), South Port (d), Digital Teos Project, 2017

The models generated by image-based modeling technique, provide direct access to the existing condition. Photographs record the existing data at the site. These architectural models are produced from photographs, which allow the current developments in the excavation studies to be presented and documented.

Regarding the context, with this method of presentation, the landscape, location, the level of destruction due to the physical conditions affecting the site can be presented directly without any need for interpretation. Also, the effects of time can be seen by this presentation method. Furthermore, in the spiritual context, this method is considered as a sustainable presentation and documentation technique. This is because it allows access to accurate contextual data without any need for interpretation. So it is possible to sustain the documentation and presentation process with the use of the image-based modeling method. However, these models have two shortcomings: first, they are not as attractive as the solid models in terms of visual quality, and second, it is not possible to generate a reconstruction model with this digital modeling method, which makes it difficult to interpret the architectural remains.

Object Scale

In the object scale, the following architectural elements are generated by image-based modeling method: an architrave, a Corinthian capital, a pediment, an Ionic capital, a shaft and base, another base, and an inscription.

Images based models on of Teos in object scale are used to present and document the physical and time context, while it is not possible to effectively convey the spiritual context to the visitors. An important shortcoming of this method in object scale is that the reconstruction of these architectural objects cannot be generated by the program.

Figure 11 Image-based Models of an Architrave (1), a Corinthian Capital (2), a Pediment (3), an Ionic Capital (4), a Shaft and Base (5), and an Inscription (6), Teos, 2017

4.4. Proposed Model

In the thesis, several studies in both architectural, and object scales are conducted in order to create a holistic approach to the effective digital site presentation of Teos. Solid and image-based modeling are considered as the two most effective methods of archaeological site presentation and documentation, but these both have multiple shortcomings. However, rather than using one digital method, an overlapped model is proposed as an augmented method to overcome their shortcomings. By overlapping the two digital presentation methods, it is possible not only to present and document the accurate data, and follow the developments on the excavation studies, but also present the physical, time and spiritual context, show the historical showcase by means of reconstruction, attract public by means of raising public awareness, and also produce high-quality smooth models in their exact location. Consequently, it is expected that by overlapping these two modeling methods, the presentation and documentation of archaeological sites, and in particular, of Teos, will be more effective in overcoming the challenges.

Architectural Scale

In the architectural scale, there have been two studies prepared with the proposed overlapped model: the overlapped model of the Temple of Dionysos, and the South Port.

This method of the presentation made it possible to gain a coherent understanding of the structure without losing the context. The solid model and image-based model of Temple of Dionysos was generated as the first study.

The second study is the overlapped model of the South Port. Although texture and render configurations in 3D reconstructions prepared precisely at a long period of time, the surface quality of the remains from the field cannot be totally conveyed in terms of visual accuracy. In contrast, the models generated are able to convey the exact textural, formal and spatial values of the three real-time remains of Teos.

Regarding the context, the proposed models make it possible to present and document the accurate physical, time, and spiritual data in an attractive way. Because accurate data can be conveyed to the public, the presentation and documentation of these remains will be sustained accordingly.

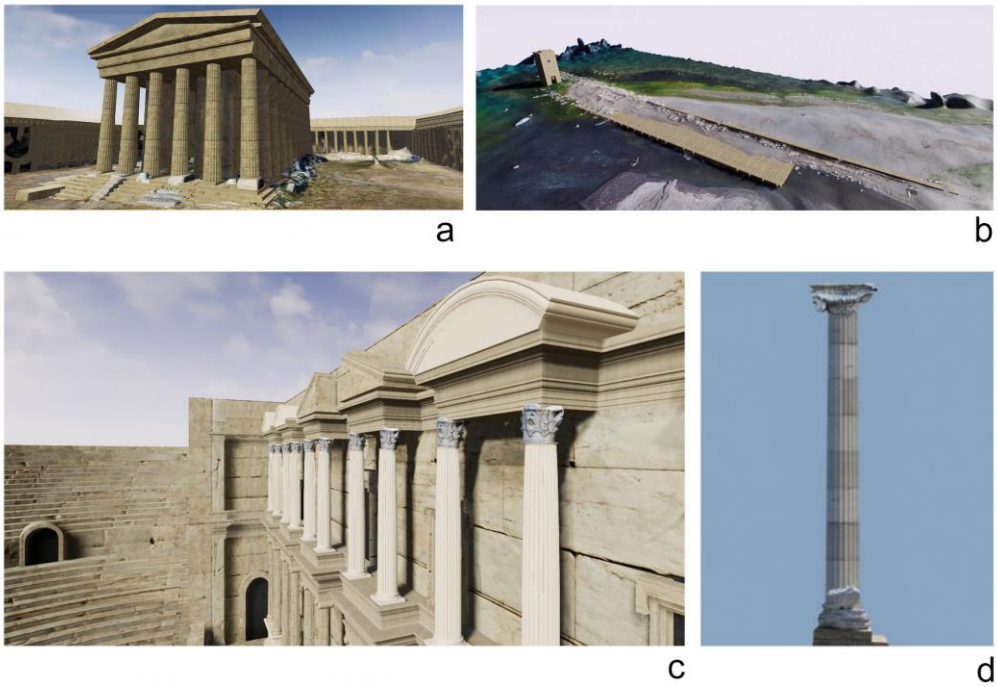

Figure 12 Overlapped Models of Temple of Dionysos (a), South Port (b), a Corinthian Capital (c), an Ionic Capital and Shaft and Base together (d)

Moreover, one shortcoming of the image-based modeling is that the software generates models from the taken photos, therefore it can only construct the images of remains taken from the site rather than generating reconstruction model. However, by following the instructions, the ancient theatre, Temple of Dionysos and South port can be re-constructed with their historic and complete forms in digital environments.

These efforts on rendering do not mean that the finalized models are a close approximation of the original appearance of the remains. The detailed and finalized models are not as visually accurate as the image-based models of these three architectural remains.

With this method, it will be possible to reveal the overall complete form and geometry, combined with the interpretations of the modelers of the Temple of Dionysos and South Port of Teos archaeological site. Unfortunately,

it is not possible to transfer the real-time visual appearances of these two remains to the digital environment with solid models. However, an image-based modeling program generates a reconstruction model. Therefore, it is expected that an overlapped approach will be able to provide an accurate and complete documentation of form, and its presentation in digital environment.

Object Scale

In the object scale, the image-based models of a Corinthian capital, an Ionic capital and a shaft and base are integrated into the reconstruction of column, in the Ancient Theatre. Similar to the studies conducted on the architectural scale, this approach generates an effective method of presentation by displaying both the archaeologist's interpretation and the existing conditions. However, unlike the architectural scale, the focus is on archaeological details, such as ornaments, texture, preservation status, etc.

The image-based model of Corinthian capital that is not found in the ancient theatre of Teos is puzzled back to the theatre in the digital environment to test the proposed model. The first study is the implementation of the Corinthian capital into the solid model of ancient theatre, and the high level of visual accuracy provides an excellent opportunity for both the virtual and on site visitors to compare and contrast the interpreted reconstruction in terms of its form and structure.

Transferring the real-time 3D remains into digital environment is a method of digital presentation. It offers the opportunity for those who are not able to visit in person, such as the disabled, or those far from the site to learn about the Teos archaeological site. People will be able to experience physical real-time spaces and geometries of architectural remains through these image-based, solid models. With these methods of presentation, it is expected that the public awareness will increase by means of attracting public. However, both digital presentation methods have shortcomings; thus, an overlapped model is proposed as an alternative method.

CHAPTER 5

USER ANALYSIS AND EVALUATION

To test the proposed presentation method, the author conducted a survey on the efficiency of the digital presentation for site preservation. The author explores the effect on the public awareness of presenting the site using the analogue presentation tools as well as the digital presentation methods. Depending on the groups' approach about the effects of the digital presentation methods to the preservation of archaeological sites, selected architectural structures are presented to the group by two basic digital modeling methods: solid and image-based modeling. Furthermore, the overlapped model is evaluated alongside the two digital models within subsets such as context, sustainability, access to information, and interpretation. The survey explores two main data. First, it explores the efficiency of the digital presentation for the site preservation. Second, it questions whether the proposed presentation and archiving methods can be alternative methods to the solid model and image-based model.

5.1. Research Group and Users

This survey is conducted with 24 academics who are working at the Fine Arts Faculty of the İzmir University of Economics with the aim of presenting the Teos Archaeological Site using the digital based-modeling method and testing whether it raises public awareness regarding the preservation of the archaeological site within this context. Among the 24 participants, the age distribution is 54,2% of the respondents within the age range of 31-50, 25% between the ages of 18-30, and the remaining 20,8% at the age of 50 and above. It was required to have a certain level of knowledge; the respondents were carefully selected from people with a higher education.

5.2. Process

The survey consists of three parts: Preservation, presentation, and cultural significance of Teos. The first part emphasizes the necessity of the preservation of the archaeological sites for enhancing the influence of public awareness. The second part focuses on the "presentation" for gauging the sufficiency of presenting the sites with the analogue and digital presentation methods and their effects on preservation of cultural heritages. The third part focuses on evaluating the digital presentation methods within the Teos context.

The survey form is created online. It has been spread via e-mail to the volunteer participants. The survey was active between 6 days in August and it has been shared with 30 people, in which 24 of them have responded.

5.3. Findings

The data collected have been analyzed by using statistical methods. While evaluating results of the research, the first stage was to evaluate the background of the participants. Afterwards, the effect of cultural awareness, the adequacy of presentation, the effectiveness of solid and image-based modeling, the efficiency of the recommended presentation method has been evaluated in this particular order.

NO	ASSESSMENTS	ANSWERS	PERCENTAGE
1	Archaeological Site Visit	More than 3	83,3%
		3	8,4%
		2	8,3%
2	The Frequency of Archaeological Site Visit	Once every 6 mounth	29,2%
		Annually	37,5%
		Once every 3 year	16,7%
		More than 3 year	16,7%
5	Archaeological Site Visit in Turkey	YES	100%
		NO	0%

Table 3 Background Information on Archaeological Sites

The 1st, 2nd, and 5th questions explore the past archaeological experiences of the survey participants: how many archaeological sites they have been to, how often they visited these sites, and whether they have been to an archaeological site in Turkey. Table 3 displays personal interests of the participants to visit archaeological sites. Furthermore, the participants visit at least one archaeological site in Turkey.

It is seen that 82,6% of them have visited these sites more than 3 times. Moreover, it can be seen that 66,7% of them visit them at least once a year. Also, all of the respondents have visited an archaeological site in Turkey at some point. Overall, the participants have background information on archaeological sites.

NO	ASSESSMENTS	ANSWER	PERCENTAGE
3	The Necessity of Archaeological Site Preservation	YES	100%
		NO	0%
4	Reasons Behind The Importance of Archaeological Site Preservation	They are cultural heritages.	100%
		They represents the life of past communnities.	73,9%
		They are non-renewable.	52,2%
		They are places of human activity.	37,5%
		They are fragile.	33,3%
6	Sufficiency of The Preservation Methods in Turkey	Not Sufficient	17,4%
		Somewhat Sufficient	39,1%
		Sufficient	34,8%
		Very Sufficient	8,7%
		Extremely Sufficient	0%

Table 4 Preservation of Archaeological Sites

The questions 3, 4, and 6, explore the necessity of the preservation of the archaeological sites, the reasons behind the preservation, and the adequacy of the preservation in Turkey. As it can be observed in table 4, all of the respondents think it is necessary to preserve the archaeological sites. The facts

that they are cultural heritages and they are representing the lives of past civilizations are the reasons they felt important. However, they do not think the preservation methods in Turkey are adequate.

NO	STATEMENT	ANSWER	PERCENTAGE
7	The Impact of The Lack of Public Awareness on The Archaeological Sites in Turkey	No Idea	0%
		Somewhat	4,3%
		More or Less	8,7%
		Quite	69,6%
		Extremely	17,4%
8	The Importance of The Raising Public Awareness in Archaeological Site Preservation in Turkey	Not Important	0%
		Somewhat Important	4,2%
		Important	4,2%
		Very Important	12,5%
		Extremely Important	79%

Table 5 Public Awareness on Archaeological Site Preservation

In questions 7 and 8 the respondents were expected to answer questions regarding the effects of the lack of public awareness in the destruction of the archaeological sites in Turkey and the importance of raising this awareness regarding the preservation of the sites. Moreover, the impact of the lack of public awareness on archaeological site preservation is quite important. Therefore, raising public awareness is extremely important for archaeological site preservation.

According to the results of the research that has been made, the effect of the lack of public awareness is quite high in the destruction of the archaeological sites and the 78,3% of the participants think that for preservation, it is highly important to raise awareness.

NO	STATEMENT	ANSWER	PERCENTAGE
9	The Effectiveness of The Presentation to Promote an Understanding of The Need for Archaeological Site Preservation	Not Effective	0%
		Somewhat Effective	8,7%
		Effective	39,1%
		Very Effective	26,1%
		Extremely Effective	26,1%
10	Subjects of Presentation in Archaeological Sites	Visual Data	87,5%
		Historical Data	83,3%
		Cultural Data	95,8%
		Physical Context	79,2%
		Time Context	70,8%
		Spiritual Context	50,0%
11	Reasons for The Presentation of Archaeological Sites to The Public	To raise public awareness.	87,5%
		For reliable interpretation and perception.	62,5%
		To sustain archaeological site preservation.	70,8%
		To preserve the sites.	58,3%

Table 6 The Efficiency of Archaeological Site Presentation

In the questions 9, 10, 11, and 12 the respondents were expected to give answers regarding the effect of presentation in the preservation of the sites, the subjects that need to be presented, and why they should be presented. The aim of these questions was to put forward the view of the respondents of the concept of "the presentation of the archaeological sites". Overall, presentation is an effective method for promoting an understanding of the need for archaeological site preservation. The visual, historical, cultural data and physical, time and spiritual context are the presentation subjects. Archaeological site presentation is important to raise public awareness, to explore reliable interpretations and to sustain archaeological site preservation.

When the results are examined in table 6, it can be seen that in regards to the effects of presentation for the preservation of the archaeological sites, 40,9% of the respondents found it effective, 27,3% found it very effective and the 22,7% found it extremely effective. With the light of these results, it can be said that the presentation is highly effective in the preservation of the archaeological sites. In the question that has been asked about the subjects that should be presented, since the respondents were given multiple choices, the percentages are close to each other and in high numbers. When asked about the reasons for the presentation of the archaeological sites, to raise public awareness is at the top of the list with 87%. The other reasons following that one is, to sustain archaeological site preservation, for reliable interpretation and perception, and to preserve the site.

NO	STATEMENT	ANSWER	PERCENTAGE
13	Adequacy of Analog Presentation Methods	Inadequate	0%
		Somewhat Adequate	25,0%
		Adequate	29,2%
		Very Adequate	33,3%
		Extremely Adequate	12,5%
14	Usefulness of Digital Presentation Methods	Not Useful	0%
		Somewhat Useful	0%
		Useful	12,5%
		Very Useful	46%
		Extremely Useful	42%

Table 7 Presentation Methods

For the presentation methods, which are another subject of the research, the questions 13 and 14 are asked. They are about the adequacy of the analogue methods and the usefulness of the digital methods. In these questions, the aim is to test whether digital methods can be used as augmented methods to analogue methods. Furthermore, digital presentation methods became very useful.

According to the results of the research that has been made, the 47,8% of the respondents think that digital methods for archaeological site presentation are very useful, while, the 43,5% thinks that it is extremely useful. On the other hand, the 34,8% of the respondents think that analogue presentation methods are adequate, while the 13% of them think they are extremely adequate.

NO	STATEMENT	ANSWER	PERCENTAGE
15	Idea About Teos Ancient City	No Idea	8,3%
		Somewhat	33,3%
		More or Less	37,5%
		Quite	16,7%
		Extremely	4,2%
16	Preservation of Teos Archaeological Site	Not Effective	18,2%
		Somewhat Effective	18,2%
		Effective	59,1%
		Very Effective	4,5%
		Extremely Effective	0,0%
17	Presentation of Teos Archaeological Site	Not Effective	21,7%
		Somewhat Effective	30,4%
		Effective	39,1%
		Very Effective	4,3%
		Extremely Effective	4,3%

Table 8 General Approach to Teos

In questions 15, 16, and 17, the respondents are asked about how much they know about the Teos Ancient City and what is the level of preservation and protection of Teos. The aim for these questions is to reveal the thoughts of the respondents regarding Teos.

According to the results of table 8, participants do not seem to have much information about the ancient city of Teos. In addition to that, the 61,9% of the respondents think that the preservation of Teos archaeological site is effective, while, the 40,9% of them think that Teos archaeological site presentation is effective.

Lastly, 10 assessments have been given to the respondent to compare the solid, image-based, and the recommended presentation method overlapped modeling, and it has been asked them to the rate them from 1 to 5 in the two scales that are architectural scale and objects scale. Every point is given a percentage. The results are calculated by taking the average of the given answers.

According to this, on the topic of access to the accurate data and the progress of excavation studies; whilst the solid takes 65% in both scales, the image-based takes 70%, and overlapped modeling is around 90%. When the physical context is examined, it can be seen that solid is 51,66% in both scales, image-based is around 70%, and the overlapped modeling is around 78%. According to the concept of time context, the solid model is 55% in both scales, the image-based is around 68%, and the overlapped modeling is 79.16%. According to the spiritual context; the solid is around 55% on both scales, the image-based is 72,5%, and the overlapped modeling is around 80%. According to the sustainability; the solid is around 57.5% in both scales, the image-based is around 73%, and the overlapped modeling is around 78.5%. In the topic of current progress on excavation studies; the solid is around 45% on both scales, the image-based is around 69%, and the overlapped modeling is 78.33%. According to the reconstruction; the solid is around 65% on both scales, the image-based is around 57.5%, and the overlapped modeling is 85.83%. In the topic of supporting excavation studies; the solid is around 58% on both scales, the image-based is around 75%, and the overlapped modeling is 81.66%.

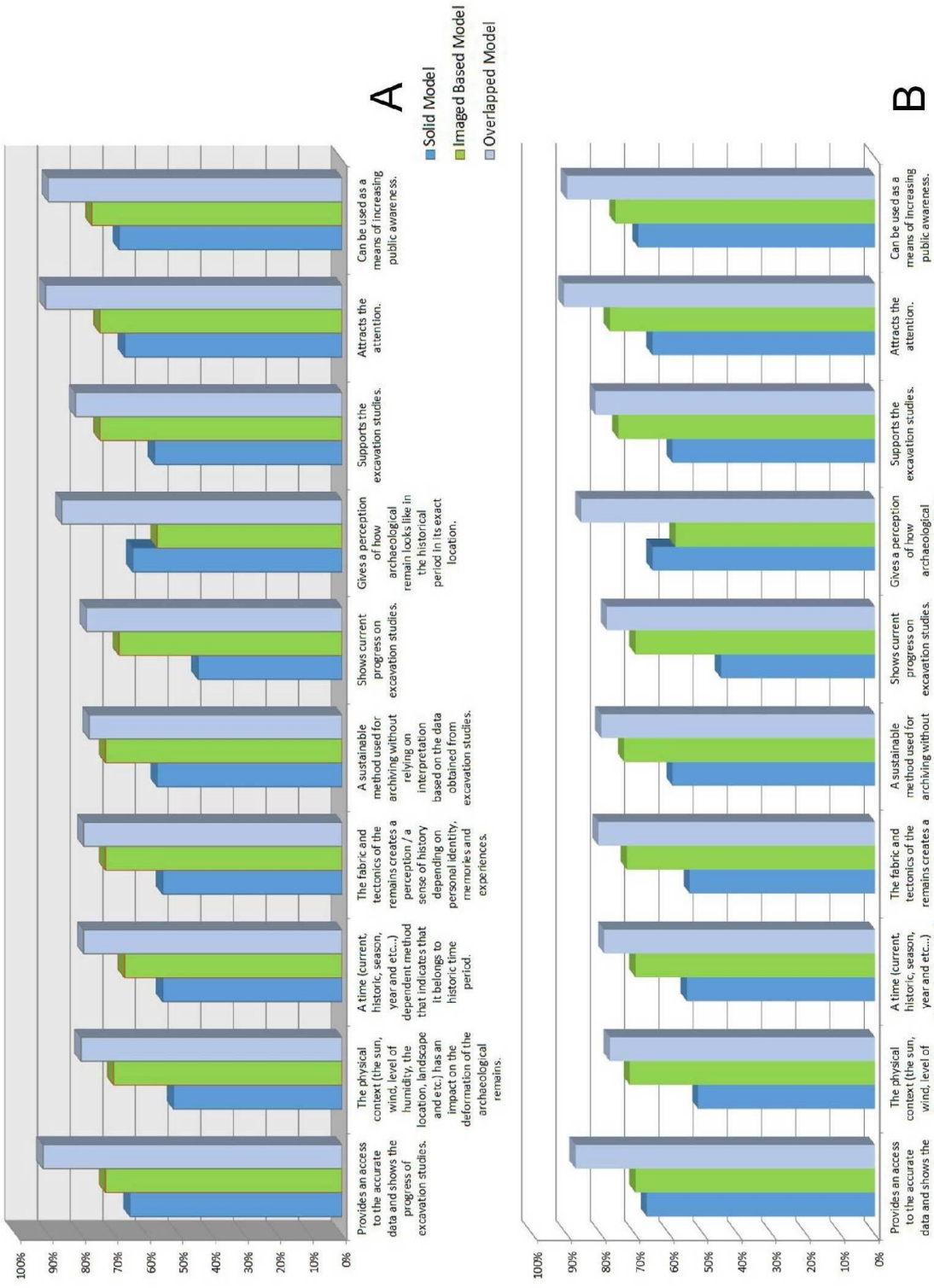

Figure 13 The Effectiveness of Digital Modeling Methods in Architectural Scale (A) and Object Scale (B)

5.3. Results and discussion

The survey aims to explore two main data sets. The first one is testing the effects of the presentation by the digital methods to the preservation for raising public awareness. Second is testing the replacement of conventional presentation methods by digital presentation and documentation methods.

The results show that most of the respondents are visiting archaeological sites regularly. However, the results show also that preservation methods are inadequate. The lack of public awareness of archaeological site preservation in Turkey causes the destruction of the archaeological sites. For raising public awareness, the presentation of the archaeological sites is seen as an effective method.

The survey explored “preservation” of cultural heritage by two methods: analogue presentation and digital presentation methods. Based on some sample presentations with both methods, it is observed that the digital presentation methods are more efficient in creating public awareness than the conventional presentation methods. Questions on the background knowledge on Teos of the respondents showed that they are not well versed on the subject. Thus, the preservation and presentation methods in Teos archaeological site have limited impact on people. To better test the results of a new proposed presentation method, solid and image-based modeling have been compared at architectural and object scales. Thus, the participants of the survey rated three types of digital modeling methods. Figure 13 shows that the ten sections with the assessments and evaluations of the survey.

The first section explores the accessibility of accurate data on the excavation studies. The survey shows that since the overlapped models in both architectural and object scales are the combination of the solid and image-based models, these overlapped models in both scales are the most effective presentation method that can direct the excavation studies.

Second of all, the respondents evaluate the physical context dependency of solid, image-based and overlapped models. The factors such as sun, wind, level of humidity, location etc. have no effect on the physical

structure of the solid model. On the other hand, the destruction caused by these factors can be observed by image-based models. The survey explores that these overlapped models in each scales effectively shows the level of destruction on the remains. So, overlapped models can effectively present the current physical appearance of these remains in the digital environment.

The third section explores that these solid models in both architectural and object scales are not presenting the historic time period that these remains belong to. However, these image-based models in each scales show the historic time period. Furthermore, the overlapped models can present the time context better than these image-based models.

The fourth section shows the spiritual context dependency of these remains in both architectural and object scales according to the respondent's evaluations. Since the overlapped models imitate the effect of seeing the architectural structure or the object in their location, the survey explores that this modeling method is a lot stronger than both solid and image-based models regarding the subject of spiritual context.

The fifth section displays the sustainability of these three digital presentation methods. Since solid modeling is open to interpretation, it cannot present the accurate data. Therefore, the survey explores that this method is not a sustainable presentation method. However, these image-based models in architectural and object scales are generated with the currently existing data; therefore, they can be a sustainable archaeological site presenting and archiving method. Since overlapped modeling method is created by completing the current data with the interpreted data, not only it is a sustainable presentation method, it is also a sustainable documentation method.

The sixth section evaluates the current progress on excavation studies. Since solid modeling is open to interpretation, it has no contribution to the excavation studies. On the other hand, since image-based and overlapped models consist of actual conditions of the remains, they are adequate to show the current progress in the excavation studies.

The seventh section explores the reconstruction models that give the impression of the historical appearance of the remains. Solid modeling is a method of reconstruction. Therefore, solid models in both architectural and object scales create the perception of how the archaeological site looked like in its time. On the other hand, since image-based models are not reconstruction models, they generate models from images and only show the current situation. Moreover, when the overlapped models are examined, they lead to the most effective and accurate conclusion.

The eighth evaluation subject explores the models that support the excavation studies. Solid modeling method is inadequate in supporting the excavation studies since it generates the interpreted data. On the other hand, the image-based models in both architectural and object scales are generated based on the accurate data. Therefore, the image-based models can support the archaeological studies on remains. Furthermore, overlapped modeling can be used as an effective documentation and presentation tool for archaeological sites.

The ninth subject, the public attention is evaluated. Since solid modeling creates a smooth image without relying on the current data, it is an effective presentation method to raise public interest. The image-based modeling is based on photography; therefore, it is identical to the real remains. The expectation was that it would be less effective compared to the solid modeling. However, the survey explores that solid modeling had a higher percentage than the image-based modeling in terms of public attraction. Furthermore, the overlapped modeling is the most effective solution in this subject.

The last subject is the usage as a means of public awareness. The survey evaluates that digital presentation is an effective method of raising public awareness. The expectation was that the solid modeling is superior to the image-based modeling in terms of richness of visual quality. Therefore, it was also expected that solid modeling is more effective than image-based modeling in raising the public awareness. However, the survey results show the opposite. Moreover, the overlapped modeling is seen as a perfect solution.

The survey concludes with three background questions regarding the main subject of the research after it evaluates the scope context, sustainability, access to information, interpretation of the solid and image-based modeling, as well as the recommended overlapped modeling method. The respondents were asked if they agreed or disagreed with the statements of whether the digital presentation methods of archaeological sites are useful for preservation, the proposed overlapped model will effectively present the archaeological site, and the proposed overlapped model will effectively document the accurate archaeological data. The percentages show highly successful results in every statement.

It is important to note that the limited number of participants gives us an important insight into the effectiveness of the methods presented, but further research is needed with more participants and people of different backgrounds. This study is just the introductory effort to further explore new digital methods for raising awareness. In future, the survey needs to be repeated to see how sustainable these digital presentation methods are to more participants from a variety of backgrounds.

CHAPTER 6

CONCLUSION

The thesis considers the archaeological sites as one of the most important types of cultural heritages to be preserved. In Turkey, the archaeological site preservation practices began to develop in the 1950s, although the Western countries already consider the importance of heritages in 1840s. Thus Turkey was a century late to consider and develop the academic discipline of archaeological site preservation. To catch the western countries, Turkey is in need of developing the sustainable site preservation methodology through effective presentation, interpretation, and perception of heritage sites to raise public awareness.

Cultural heritages are values to be understood, preserved and respected by the public. The rapid transformation process through unplanned urbanization, the destruction caused by natural disasters, and limited economic resources for public awareness affect the archaeological sites negatively. Thus, a need for sustainable preservation method is emerged to prevent damage caused by the public.

In the 21st century, archaeological site preservation is defined by legal regulations, non-governmental and governmental organizations. Preservation strategies reached a certain maturity. Archaeological sites are struggling from overuse, misuse, and organizational problems. To deal with these problems, the presentation is the key factor for site preservation. Presentation can include both analogue presentation methods such as brochures, info-panels, maps, signs, organization of the tour paths, landscaping, organizations, and activities, and also the digital presentation methods such as solid and image-based modeling are presentation methods.

Teos is one of the most important Ionian cities by its political, cultural and historical connections with other cities through maritime trade. The ongoing excavations in the ancient city of Teos show how much more this site needs a presentation strategy. The thesis discusses the limitations of analogue presentation methods on archaeological site preservation. Teos in particular, there is the risk of loss of archaeological data. Together with the existing analogue presentation methods, the two different methods of digital presentation methods; solid and image-based modeling are discussed with their advantages and shortcomings.

In the past two decades, the technological developments are adapted to archaeology and its applications are used for presentation methods. Although the conventional presentation methods are in use, they are costly and time-consuming for in-situ visitors. Since modeling became a method of archaeological site presentation, 2D drawings and traditional methods became insufficient. So being aware of the advantages of conventional techniques, the digital presentation can be additionally used to further develop a sustainable preservation. The thesis discusses both solid and image-based modeling as methods of digital presentation and documentation of the accurate archaeological data.

There are a variety of digital presentation and documentation studies conducted in Teos. The thesis discusses the similarities and differences the solid models in both architectural and objects scale. Furthermore, the image-based models have generated also in these two scales. These two techniques have shortcomings in terms of context, accurate data transfer and achieve reconstruction, sustainability, and public attraction. To deal with these limitations, modeling by an overlapping method is proposed.

A survey is conducted to explore two data. First, the survey explores to the preservation in the context of Teos by testing the effects of digital presentation. Second, the overlapped method of solid and image-based modeling can help to augment the conventional presentation. Consequently, the proposed model is an effective method to present and document the accurate data in the archaeological sites. This will be a more interpretative and

sustainable approach to raise public awareness of archaeological site preservation.

The thesis structured on reconstruction and documentation of archaeological sites. Within the limited time period of the thesis, the survey is conducted to a limited number of participants. However, with more participants of various backgrounds, it is aimed to explore the research. Although the two digital archaeological site presentation methods limit the structure, this was the first step of layering system of archaeological visualization. The first layer is the image-based models generated from the actual images of the remains. The second is the hypothesis. The third is reconstruction models which leads to the fourth layer; imagination. Therefore, it is aimed to develop a more comprehensive study to consider each layer of archaeological visualization system.

ABBREVIATION LIST

2D: Two Dimensional

3D: Three Dimensional

ASTAD: Anatolian Art Historians Association

ÇEKÜL: The Foundation for the Protection and Promotion of the Environment and Cultural Heritage

DPT: State Planning Organization

GEEAYK: High Council of Immovable Monuments and Antiquities

ICOM: The International Council of Museums

ICOMOS: International Council on Monuments and Sites

FOCUM: Friends of Cultural Heritage

MMKD: Museology of Society of Turkey

TAÇ: The Foundation for Conservation of Turkey's Monuments, Environment and Tourism Assets.

TEMA: The Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats.

TKB: The Union of Historical Towns

UNESCO: United Nations Educational, Scientific and Cultural Organization

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APPENDICES

Appendix 1 – Questionnaire

The Place of Digital Presentation Techniques in Teos Archaeological Site Preservation

Selected archaeological remains are prepared and presented with solid modeling and image based modeling methods which are the two basic digital presentation techniques. In addition, the proposed overlapped model is combined with the other two digital models following the principles (context, sustainability, data flow, data accessibility, interpretation, etc...) of archaeological site presentation. Two main data are targeted in the questionnaire. These are the testing of the effectiveness of the presentation of remains with digital methods and the improvement of public awareness, and testing proposed digital presentation and archiving method as an augmented method to analog presentation methods.

Glossary of terms:
Solid Modelling is a 3 D digital reconstruction Method that is generated depending on both the accurate data and interpretations of the Modeller image based modelling is a 3 digital modelling Method that is generated by images.

The survey can not take more than 10 minutes.

PRESERVATION

1) How many archaeological sites have you been visited?

- ○ 0
- ○ 1
- ○ 2
- ○ 3
- ○ More than 3

2) How often do you visit archaeological sites?

- ○ Once every 6 month
- ○ Annually
- ○ Biyearly
- ○ Once every 3 year
- ○ More than 3 year

3) Do you think that archaeological sites should be preserved?

- ☐ YES
- ☐ NO

4) If yes, what are the reasons of archaeological site preservation?
Mark all of the available ones.

- ☐ They represents the life of past communnities.
- ☐ They are non-renewable.
- ☐ They are cultural heritages.
- ☐ They are fragile.
- ☐ They are places of human activity.
- ☐ Other.....

5) Have you been in any archaeological sites in Turkey?

- ☐ YES
- ☐ NO

6) How much sufficient do you think the preservation methods in Turkey?
1-Not sufficient 2-Somewhat sufficient 3-Sufficient 4-Very sufficient 5-Extremely sufficient

	1	2	3	4	5	
%0	○	○	○	○	○	%100

7) How much of destruction caused by the lack of public awareness in archaeological sites in Turkey? (Overuse, misuse, organization problems, pollutions, political concerns, etc...are the problems caused by people.)
1-No idea 2-Somewhat 3-More or Less 4-Quite 5-Extremely

	1	2	3	4	5	
%0	○	○	○	○	○	%100

8) How important is the raising public awareness in archaeological site preservation in Turkey?
1-Not important 2-Somewhat important 3-Important 4-Very important 5-Extremely important

	1	2	3	4	5	
%0	○	○	○	○	○	%100

PRESENTATION

9) How much effective is digital presentation methods in promoting an understanding of the need for archaeological site preservation?
1-Not effective 2-Somewhat effective 3-Effective 4-Very effective 5-Extremely effective

	1	2	3	4	5	
%0	○	○	○	○	○	%100

10) What should be presented in archaeological sites?

- ☐ Visual data
- ☐ Historical data
- ☐ Cultural data
- ☐ Physical context
- ☐ Time context
- ☐ Spiritual context
- ☐ Other.....

11) Why should archaeological sites be presented to the public?

- ☐ To raise public awareness.
- ☐ For reliable interpretation and perception.
- ☐ To sustain archaeological site preservation.
- ☐ To preserve the sites.
- ☐ Other.....

12) How should archaeological sites be presented?

Yanıtınız

13) Brochures, info-panels, maps, signs, tour paths, landscaping, organizations and activities are the examples of analogue archaeological site presentation methods. Do you think that, these analogue methods are adequate to promote an understanding for archaeological sites?

1-Inadequate 2-Somewhat adequate 3-Adequate 4-Very adequate 5-Extremely adequate

	1	2	3	4	5	
%0	○	○	○	○	○	%100

14) Dou you think that digital presentation methods (solid modelling, image based modelling) are useful method for documentation and presentation of archaeological sites?

1-Not useful 2-Somewhat useful 3-Useful 4-Very useful 5-Extremely useful

	1	2	3	4	5	
%0	○	○	○	○	○	%100

TEOS

15) How much do you know about Teos ancient city?

1-No idea 2-Somewhat 3-More or Less 4-Quite 5-Extremely

	1	2	3	4	5	
Low	○	○	○	○	○	Much

16) What do you think about preservation of Teos archaeological site?

1-Not effective 2-Somewhat effective 3-Effective 4-Very effective 5-Extremely effective

	1	2	3	4	5	
No idea	○	○	○	○	○	Well - preserved

17) What do you think about presentation of Teos archaeological site?

1-Not effective 2-Somewhat effective 3-Effective 4-Very effective 5-Extremely effective

	1	2	3	4	5	
No idea	○	○	○	○	○	Well - presented

1) Provides an access to the accurate data and shows the progress of excavation studies.

Interpret the assessment for two different modelling scales separately.

Solid Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Solid Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

2) The physical context (the sun, wind, level of humidity, the location, landscape and etc.) has an impact on the deformation of the archaeological remains.

Interpret the assessment for two different modelling scales separately

Solid Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Solid Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

3) A time (current, historic, season, year and etc...) dependent method that indicates that it belongs to historic time period.

Interpret the assessment for two different modelling scales separately

Solid Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Solid Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

4) The fabric and tectonics of the remains creates a perception / a sense of history depending on personal identity, memories and experiences.

Interpret the assessment for two different modelling scales separately

Solid Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Solid Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

5) A sustainable method used for archiving without relying on interpretation based on the data obtained from excavation studies.

Interpret the assessment for two different modelling scales separately

Solid Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Solid Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

6) Shows current progress on excavation studies.

Interpret the assessment for two different modelling scales separately

Solid Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Solid Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model
Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model
Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model
Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

7) Gives a perception of how archaeological remain looks like in the historical period in its exact location.

Interpret the assessment for two different modelling scales separately

Solid Model
Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Solid Model
Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model
Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model
Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model
Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model
Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

8) Supports the excavation studies.

Interpret the assessment for two different modelling scales separately

Solid Model
Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Solid Model
Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model
Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model
Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model
Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model
Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

9) Attracts the attention.

Interpret the assessment for two different modelling scales separately

Solid Model
Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Solid Model
Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model
Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model
Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model
Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model
Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

10) Can be used as a means of increasing public awareness.

Interpret the assessment for two different modelling scales separately

Solid Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Solid Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Image Based Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Southern Port Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Overlapped Model

Interpret the assessment according to Ionic Column Model

	1	2	3	4	5	
%0	○	○	○	○	○	%100

Answer the questions according to your interpretations above?

Do you think that digital presentation methods of archaeological site is useful for its preservation?

- ○ YES
- ○ NO

Do you think that the proposed overlapped model will effectively present the archaeological site?

- ○ YES
- ○ NO

Do you think that the proposed overlapped model will effectively document the accurate archaeological data?

- ○ YES
- ○ NO

Personal Information

AGE

- ☐ 18 - 30
- ☐ 31 - 50
- ☐ 50 +

OCCUPATION

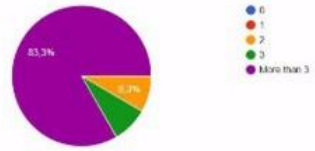
Yanıtınız

Appendix 2 – Results

PRESERVATION

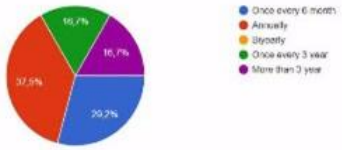
1) How many archaeological sites have you been visited?

24 yanıt



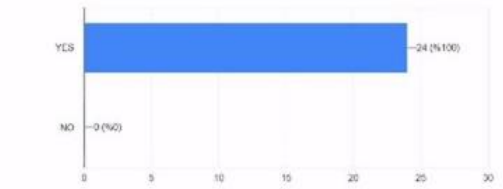
2) How often do you visit archaeological sites?

24 yanıt



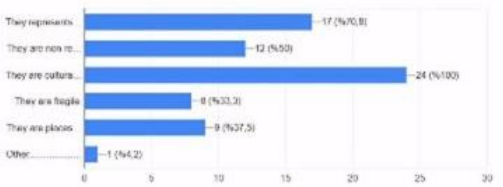
3) Do you think that archaeological sites should be preserved?

24 yanıt



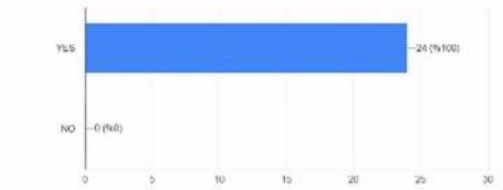
4) If yes, what are the reasons of archaeological site preservation?

24 yanıt



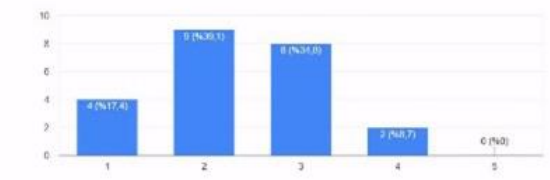
5) Have you been in any archaeological sites in Turkey?

24 yanıt



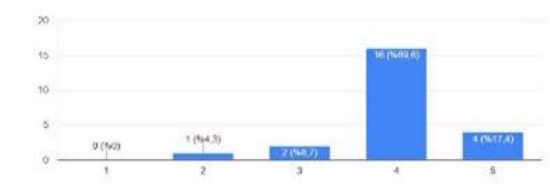
6) How much sufficient do you think the preservation methods in Turkey?

23 yanıt



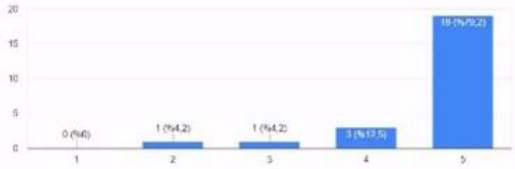
7) How much of destruction caused by the lack of public awareness in archaeological sites in Turkey? (Overuse, misuse, organization problems, pollutions, political concerns, etc...are the problems caused by people.)

23 yanıt



8) How important is the raising public awareness in archaeological site preservation in Turkey?

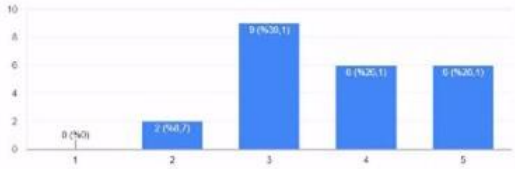
24 yanıt



PRESENTATION

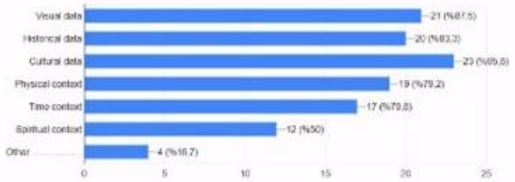
9) How much effective is digital presentation methods in promoting an understanding of the need for archaeological site preservation?

23 yanıt



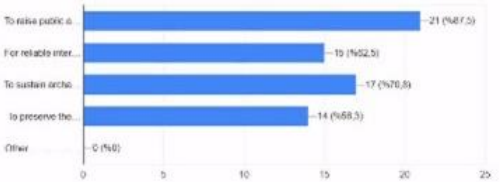
10) What should be presented in archaeological sites?

24 yanıt



11) Why should archaeological sites be presented to the public?

24 yanıt

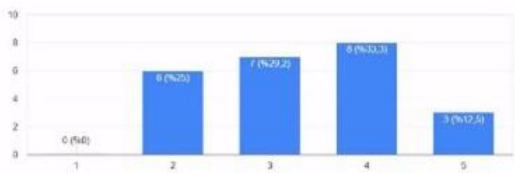


12) How should archaeological sites be presented?

I think digital presentation methods are more effective.
by the help of accurate/scientific understanding of preservation and larger investments
kültürel değerimiz olduğuna, tarihsel kalıcısına vurgu yapılan reklam ve tanıtım filmleriyle, çocuklara da bu bilinci aşılayacak şekilde çizgi filmv animasyonlarla, kültür ve tarih gezileriyle (okullarda vb.)
Digital and analogue presentations
Digital reconstruction, time-lapse images, scale models
tüm digital ve analog kanallar kullanılabilir
with analogue and digital archaeological site presentation methods
with visual documentation as maps, videos..
in situ if possible
By using all the hard (analogue) and soft (digital) media possible and available
Through advanced digital techniques combined with the site

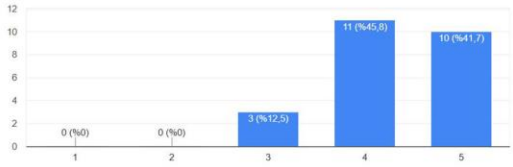
13) Brochures, info-panels, maps, signs, tour paths, landscaping, organizations and activities are the examples of analogue archaeological site presentation methods. Do you think that, these analogue methods are adequate to promote an understanding for archaeological sites?

24 yanıt



14) Dou you think that digital presentation methods (solid modelling, image based modelling) are useful method for documentation and presentation of archaeological sites?

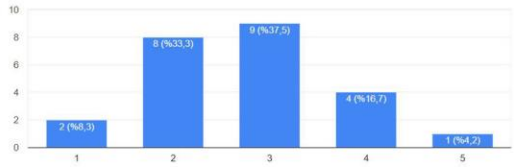
24 yanıt



TEOS

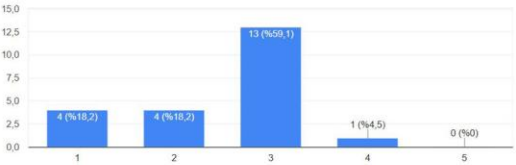
15) How much do you know about Teos ancient city?

24 yanıt



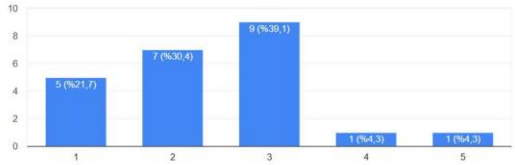
16) What do you think about preservation of Teos archaeological site?

22 yanıt



17) What do you think about presentation of Teos archaeological site?

23 yanıt

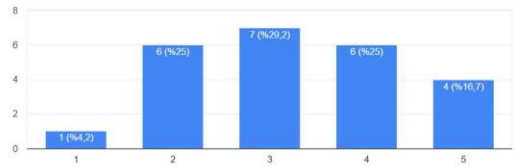


Interpret the assessment according to three modelling methods that are indicated in the following images.

1) Provides an access to the accurate data and shows the progress of excavation studies.

Solid Model

24 yanıt



Solid Model

24 yanıt

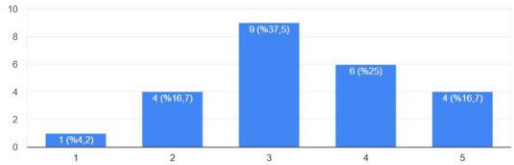


Image Based Model

24 yanıt

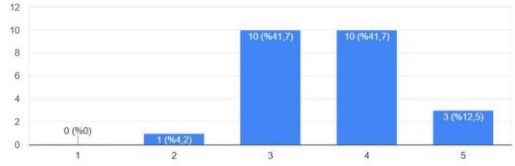
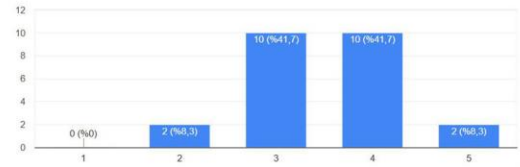


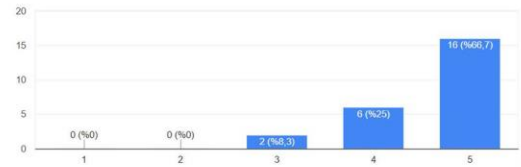
Image Based Model

24 yanıt



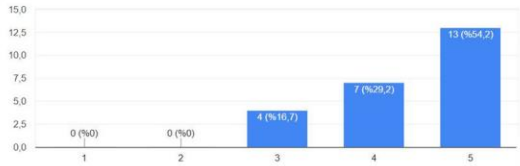
Overlapped Model

24 yanıt



Overlapped Model

24 yanıt

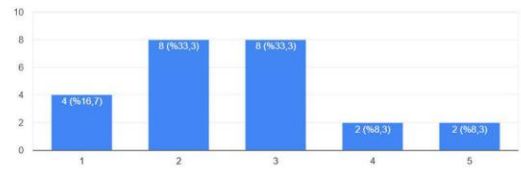


Interpret the assessment according to three modelling methods that are indicated in the following images.

2) The physical context (the sun, wind, level of humidity, the location, landscape and etc.) has an impact on the deformation of the archaeological remains.

Solid Model

24 yanıt



Solid Model

24 yanıt

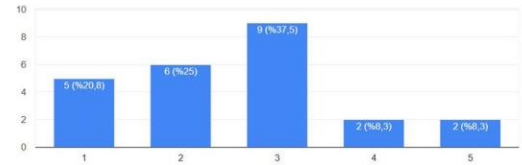


Image Based Model

23 yanıt

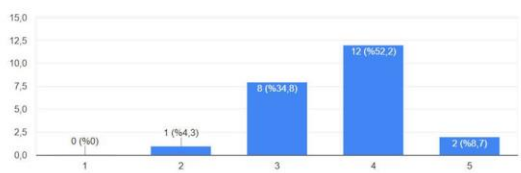
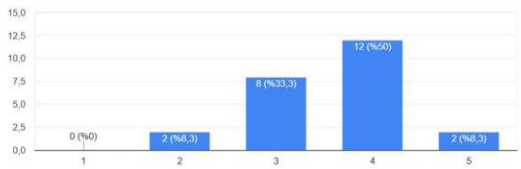


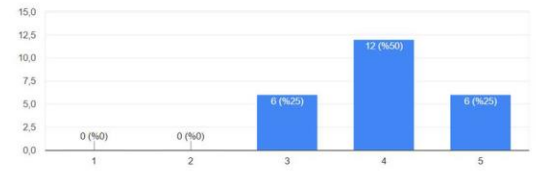
Image Based Model

24 yanıt



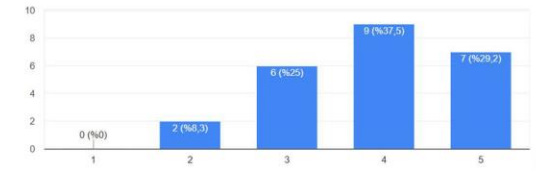
Overlapped Model

24 yanıt



Overlapped Model

24 yanıt

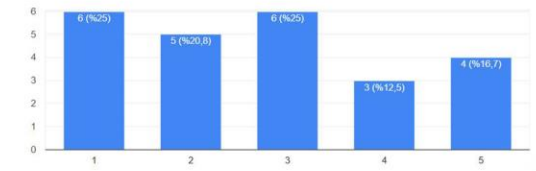


Interpret the assessment according to three modelling methods that are indicated in the following images.

3) A time (current, historic, season, year and etc...) dependent method that indicates that it belongs to historic time period.

Solid Model

24 yanıt



Solid Model

24 yanıt

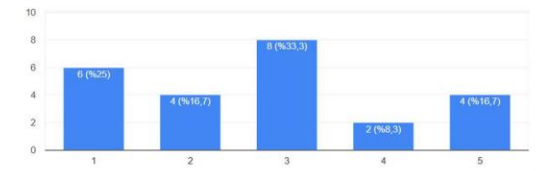


Image Based Model

24 yanıt

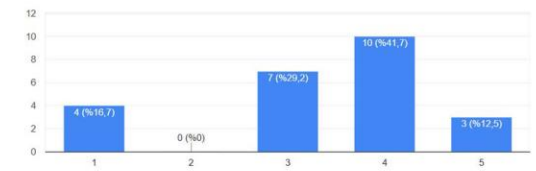
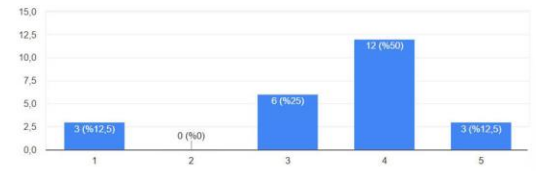


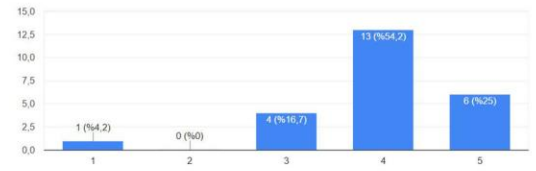
Image Based Model

24 yanıt



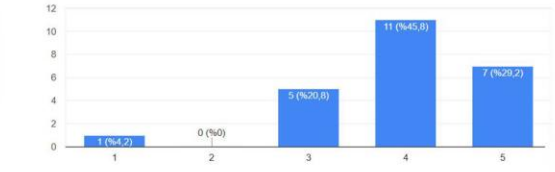
Overlapped Model

24 yanıt



Overlapped Model

24 yanıt

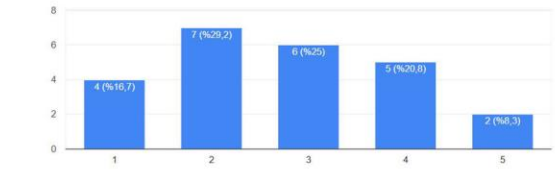


Interpret the assessment according to three modelling methods that are indicated in the following images.

4) The fabric and tectonics of the remains creates a perception / a sense of history depending on personal identity, memories and experiences.

Solid Model

24 yanıt



Solid Model

24 yanıt

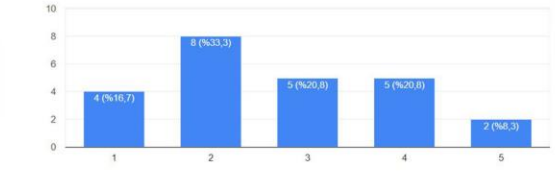


Image Based Model

24 yanıt

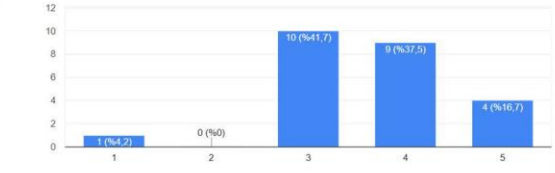
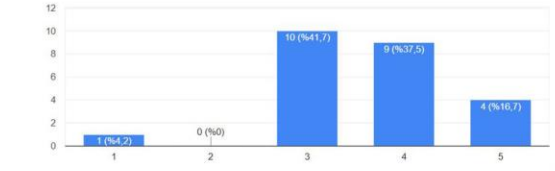


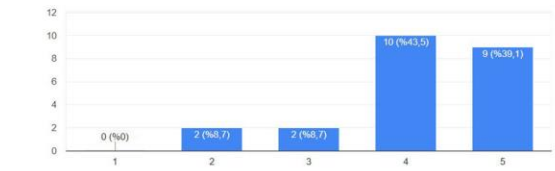
Image Based Model

24 yanıt



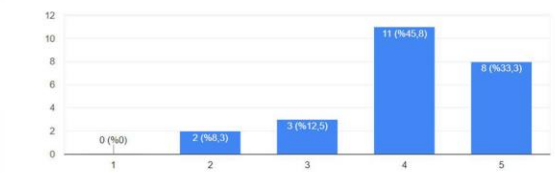
Overlapped Model

23 yanıt



Overlapped Model

24 yanıt

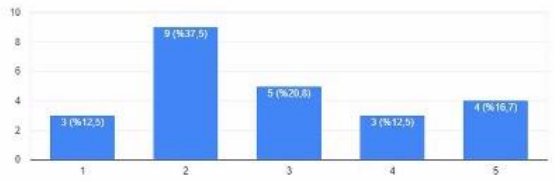


Interpret the assessment according to three modelling methods that are indicated in the following images.

5) A sustainable method used for archiving without relying on interpretation based on the data obtained from excavation studies.

Solid Model

24 yanıt



Solid Model

24 yanıt

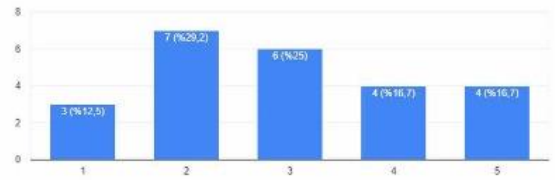


Image Based Model

24 yanıt

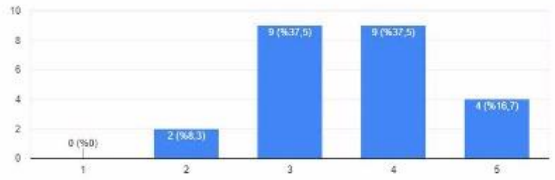
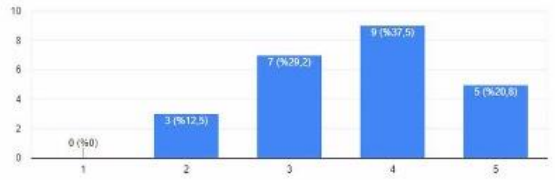


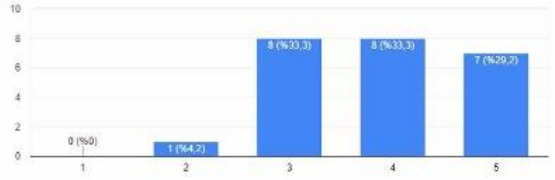
Image Based Model

24 yanıt



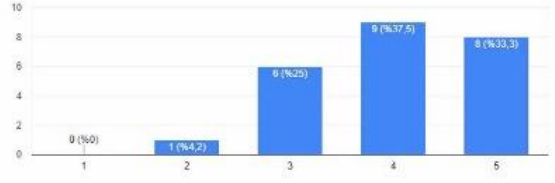
Overlapped Model

24 yanıt



Overlapped Model

24 yanıt

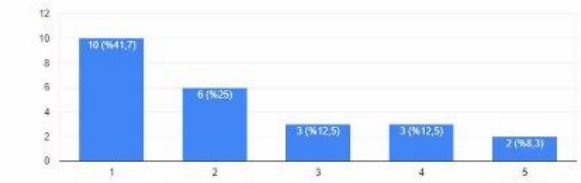


Interpret the assessment according to three modelling methods that are indicated in the following images.

6) Shows current progress on excavation studies.

Solid Model

24 yanıt



Solid Model

24 yanıt

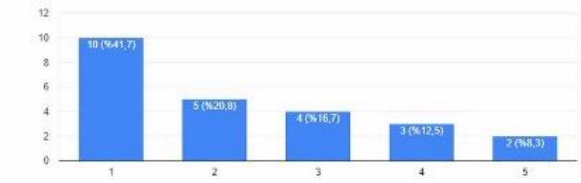


Image Based Model

24 yanıt

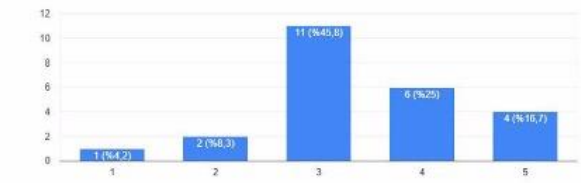
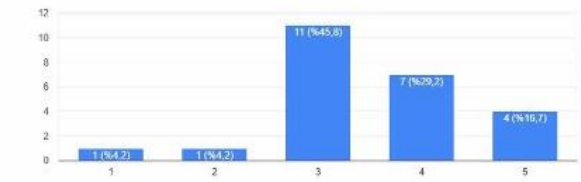


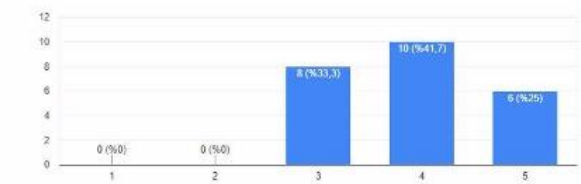
Image Based Model

24 yanıt



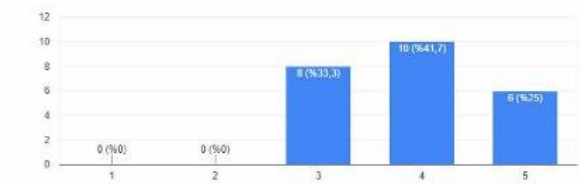
Overlapped Model

24 yanıt



Overlapped Model

24 yanıt

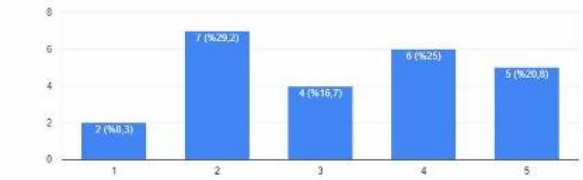


Interpret the assessment according to three modelling methods that are indicated in the following images.

7) Gives a perception of how archaeological remain looks like in the historical period in its exact location.

Solid Model

24 yanıt



Solid Model

24 yanıt

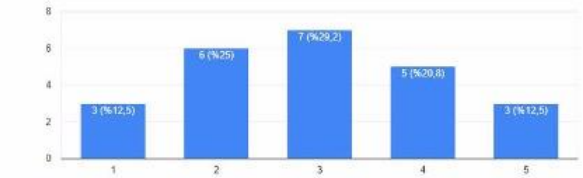


Image Based Model

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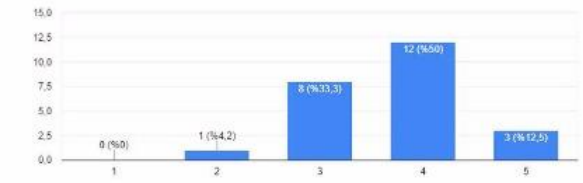
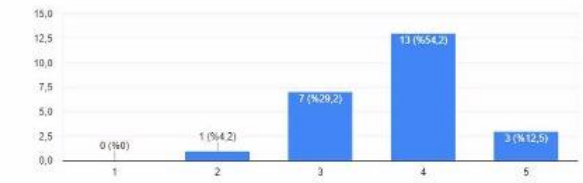


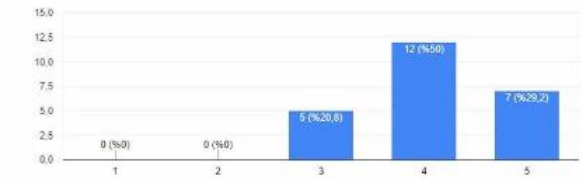
Image Based Model

24 yanıt



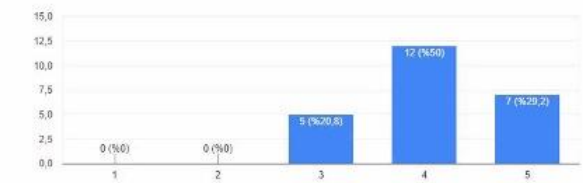
Overlapped Model

24 yanıt



Overlapped Model

24 yanıt

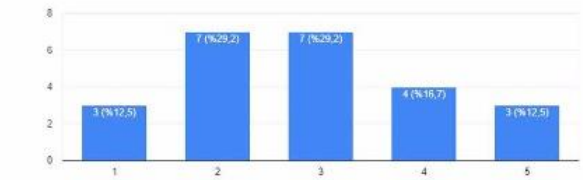


Interpret the assessment according to three modelling methods that are indicated in the following images.

8) Supports the excavation studies.

Solid Model

24 yanıt



Solid Model

24 yanıt

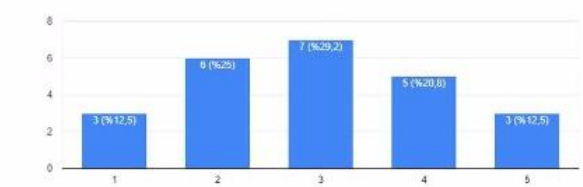


Image Based Model

24 yanıt

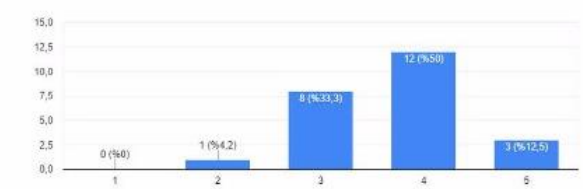
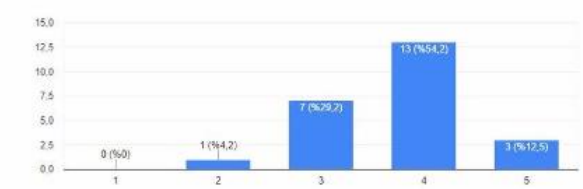


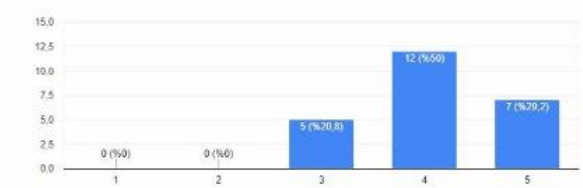
Image Based Model

24 yanıt



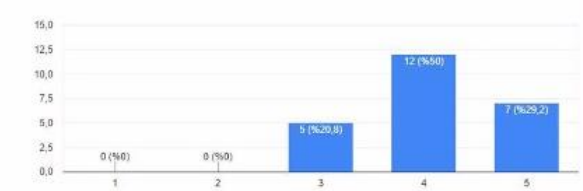
Overlapped Model

24 yanıt



Overlapped Model

24 yanıt

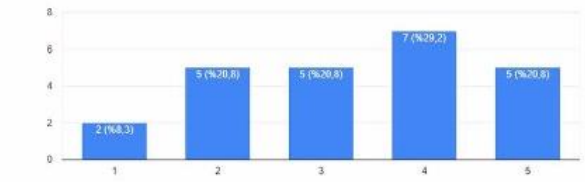


Interpret the assessment according to three modelling methods that are indicated in the following images.

9) Attracts the attention.

Solid Model

24 yanıt



Solid Model

24 yanıt

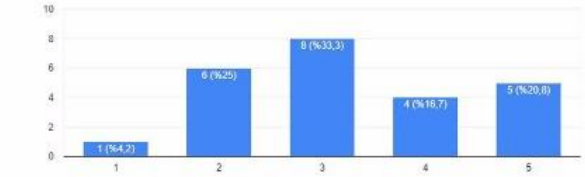


Image Based Model

24 yanıt

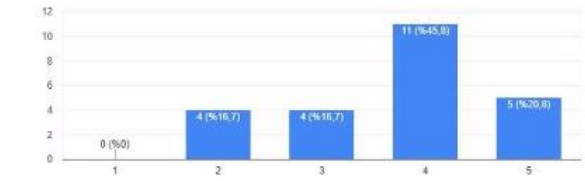
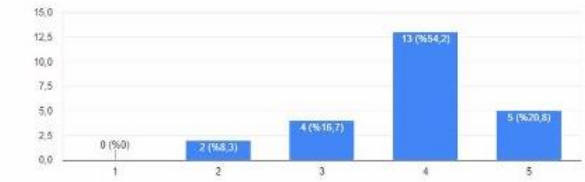


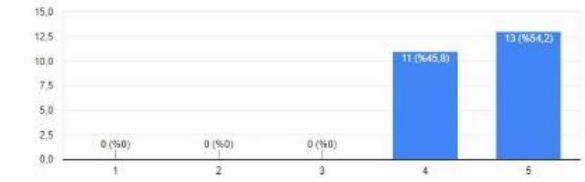
Image Based Model

24 yanıt



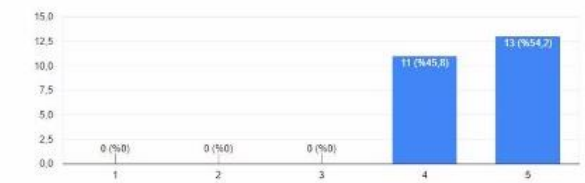
Overlapped Model

24 yanıt



Overlapped Model

24 yanıt

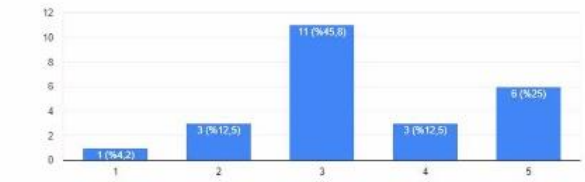


Interpret the assessment according to three modelling methods that are indicated in the following images.

10) Can be used as a means of increasing public awareness.

Solid Model

24 yanıt



Solid Model

24 yanıt

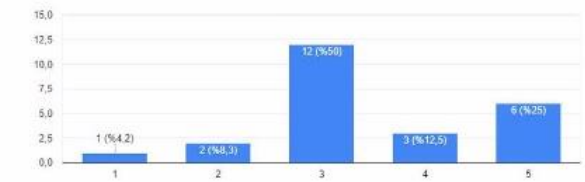


Image Based Model

24 yanıt

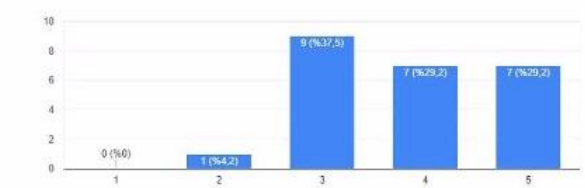
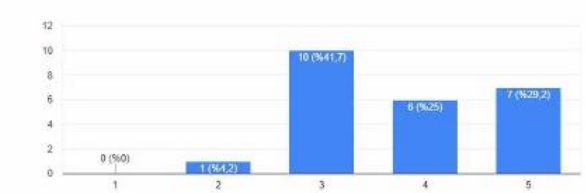


Image Based Model

24 yanıt

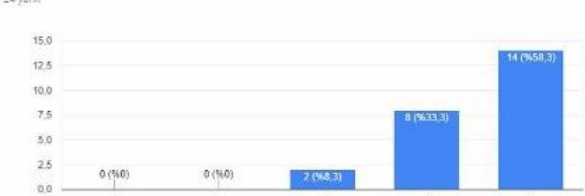


Overlapped Model

24 yanıt

Overlapped Model

24 yanıt



Answer the questions according to your interpretations above?

Do you think that digital presentation methods of archaeological site is useful for its preservation?

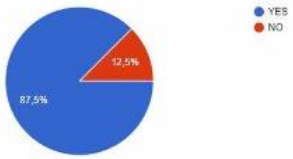
24 yanıt

Do you think that the proposed overlapped model will effectively present the archaeological site?

24 yanıt

Do you think that the proposed overlapped model will effectively document the accurate archaeological data?

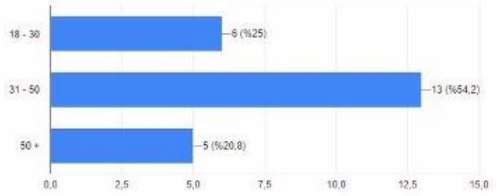
24 yanıt



Personal Information

AGE

24 yanıt



OCCUPATION

22 yanıt