Journal of Tourism, Hospitality and Sports www.iiste.org
ISSN (Paper) 2312-5187 ISSN (Online) 2312-5179 An International Peer-reviewed Journal
Vol.35, 2018

Digital Models Used in Documenting the Mosaic Areas

Ahmad Farhan Alamaireh
Dean of Institute for Mosaic Art and Restoration-
Mdaba- Jordan
Mob- +962-7-77225772
E-mail: a.hrout@zuj.edu.jo

Ibrahim Kahlil Bazazo
Associate Professor. Dean of Tourism and
Hotel Management
Faculty of University of Jordan in Aqaba
Mob- +962-7-77224468
E-mail: Ibazazo@ju .edu .jo

Omar Mustafa Alomari
Associate Professor. Architecture Department Head,
Balqa Applied University, Salt, Jordan

Abstract

Digital models are considered the most important in documenting the mosaic floors tools. So, take advantage of the high capabilities in monitoring and documentation, analysis and manifesting required by the mosaic floors and murals. Also, these digital models dealing with large amounts of spatial and metadata. This means that the use of the large data that is collected from the mosaic floors and electronic transfers, which allows more than one user to access or manage and edit them to give wider dissemination horizon. Consequently, they contribute to the electronic documents for floors mosaic mural. This study shows that the numerical models can be used to perform various analyzes in documenting mosaic flooring.

Keywords: Geographic Information System (GIS), spatial support decision-making (SDSS), remote sensing (RS), digital modeling (DM), mosaic floors (MF)

1. Introduction

The documentation of mosaic floors is one of the important means of maintaining these sites. They are considered to be the most important aspects that can contribute to the documentation of their sites (Bazazo and Alananzeh, 2016; Adams, 2013). Mosaic floors reflect the history of the country, enhance the touristic image of the site (Chiu and Ananzeh, 2012), promote the product of the destination (Alananzeh et al., 2015; Masa'deh etb al., 2018), as well as an attractive education document for researchers, academician, an students (Alananzeh, 2014). However, The documentation of mosaic floors means more than just the process of documenting, they are databases of all that can be covered by these mosaic floors of information and data. More than that, other take different forms, such as tables, pictures, movies, documents written and cartographic. Therefore, these digital models are capable of documenting sites, a digital repository, as well as analytical capabilities unique to this data, provided by systems (Aberg and Lewis, 2013).

A GIS system is one of the first empirical studies used in the documentation of the mosaic floors (Bazazo, Alananzeh and Taani, 2016). Subsequently, it represents the latest GIS applied computer areas, which contribute to the consolidation of the studies contemporary means to document the mosaic floors. Also, the scientific studies which is based on the use of remote sensing and aerial photography are the most important in documenting mosaic floors. Therefore, they get the results of the utmost importance in the field of restoration and conservation of the floor mosaic, which contributes to help develop future plans that rely on the scientific sustainable plan. The universal signature system GPS is a collection of satellites composed of 24 industrialized moons for the purposes of navigation and positioning. However, the system (GPS) is a collection of satellites composed of 24 industrialized moons for the purposes of navigation and positioning. That distributed in 6 orbits each round containing (4) satellites and each satellite is going full cycle (12 hours) rising from the Earth's surface (20200) kilometer walk at a steady speed of (4) kilometers per second. This system relies on a network of 24 satellites, orbiting at altitudes around the globe (Zeiler, 2008). Consequently, it looks like an industrial (man- made

stars) are trying to replace the natural stars that were relied upon in navigation. Thus, the satellites are distributed at a specific time within their orbits and trajectories. Relevant studies are characterized of the traditional aspects of the documentation of the mosaic floors. Also, the studies on the use of digital documentation of the mosaic floor is still a few models (Horning and Audrey, 2001).

Documents related to ancient mosaics GIS are extensive, especially in the areas of mapping. It is known that the spatial information which represents the effects of scattered mosaic of each part of it to the private sector. As such archaeological maps of fish, the size, shape and color techniques, method of painting and the signing of spatial rules (Aldenderfer and Schieppati, 2011). Therefore, the selection fee scale archaeological map that allows the appropriate rules for the selection of colors that represent phenomena in the mosaic floors. It must be the knowledge of these techniques in documenting mosaic floors.

Therefore, the geographic information system is one of the most important documents used by digital models in the mosaic floors (DeMers, 2009). The applied studies that document the ground operations of the mosaic on the sources of diverse and overlapping information. In terms of the analysis of the information that represents the latest application of GIS in the areas of computer.

This analysis, contributes to the consolidation of the studies and documentation of mosaic floors, tummy tuck, to provide a mechanism to analyze the spatial information and data. Also, by providing a mechanism to analyze the spatial data methods after linking descriptive data, give a variety of results enhances the draw, and support contemporary applied studies in the field of documenting mosaics. GIS is characterized as combining the investigation and query their own databases operations with the possibility of viewing, analysis, visual processing and geographic data from satellite images and aerial photo maps. A feature that distinguishes it from the usual information systems and makes them available to many public and private applications for the interpretation of events, the calculation of the indicators and develop strategies (Conyers, 2003).

The concept of geographic information systems (GIS) is an integrated systems-based inventory, storing, reviewing, processing, analysis and presentation of data. This means that rely on geospatial systems that coordinate their positions on the ground (Alananzeh, Maaiah, Al-Badarneh and Al-Shorman, 2017). As a result, the application of GIS in the field of processing and analysis of spatial information in accordance with the goal of applied computer technology is based on the human and electronic functions with outstanding efficiency pattern. There are a number of concepts related to geographic information system (DeMers, 1997), which are:

1-According to Smith and colleagues (1987), defined that GIS as (a database containing the spatial arrangement of the information that contains the implementation of a set of processes to answer questions on this phenomenon).
2. Also, GIS has been stated by the ministries of environment and energy to the British in 1987, is an integrated system of existing stock, store, review, processing, analysis and presentation of data that depend on spatial coordinate systems on earth.

Moreover, the usual information rules are different from the rules of spatial information. Therefore, the first move towards the same thing, while the second place, it connects information (location). It is the basis of the information center, stored and analyzed, and that is the only way to reach them. This is the way to gain access to spatial information consisting of data GIS databases. Therefore, it is necessary to have the definition by highlighting the system to which it belongs and operates through its mechanism.

Defining the problem

This study shows the importance of digital models in documenting mosaic floors, through database management and planning building. For that to assist in the management and conservation of these paintings for achieving a holistic document. According to multiple applied fields used that rely on differing views on the identification and classification of the application of its objectives within the following questions:
1- How corroborate mosaic floors using digital models?

2- How can the use of digital models in the management and development of the areas that is spread by the mosaic?

The importance of studying

The importance of the study is to:

1. take advantage of the numerical models in documenting mosaic floors.
2. design a practical model for the application of numerical models in documenting mosaic floors.
3. keep the mosaic floors by providing outstanding comprehensive data on a sustainable basis.

2. Literature Review

Studies that have documented the mosaic flooring in studying the traditional aspects of this process are characterized. Also, these studies on documented mosaic floors using digital models is still a few. According to Mohammed bin Khalidi study (2013), entitled "digital prototyping applications in documenting areas archaeological in Tunisia ". This means that this study dealt with how to take advantage of the numerical models in documenting archaeological areas. Consequently, the study yielded the following results: the importance of digital models in the archaeological documentation, as well as the possibility of using these systems to perform various analyzes.

Also, the studies conducted by researchers (Gonizzi et al, 2013) on the digital models in documenting archaeological sites applications, the researchers did not find sources or studies documenting mosaic floors using numerical models. Thus, the most important goal of this research is to motivate those interested in the importance of the use of digital systems and technological documentation processes mosaic floors.

3. Geographic Information Systems (GIS)

Types of geographic information used in documenting the mosaic flooring systems are:

First: GIS mosaic floors uses linear or nonlinear vector data to represent the three types of systems (Clarke, 2010). In this study, Clarke (2010) developed Raster data: localized phenomena are represented by points (X .Y) do not have the length and width dimensions of space, and is the expression of these phenomena using topical groups codes figurative expressionism and engineering.

2. Written statements: phenomena extend in the form of lines do not have space, the beginning and end of the two terminals.

3. Spatial data: phenomena occupy a certain area of the mosaic floor in the form of a series of connected lines together constitute a certain space.

Second: Geographic information systems mosaic floors by the space that is concentrated in the importance of this type of data, which consists of small units cadastral treatment called Pixel square shape. This information shall consist of aerial photo or satellite visuals which often are entered into the computer by the scanner devices. Thus, these systems that deal with this type of information are called processing visual images or satellite systems. Also, these systems are considered the oldest age of geographic information systems, which has increased its importance since the success of the air image processing by computer.

GIS Components

GIS consists of five basic elements of spatial information and descriptive, computers and application software and manpower (labor) and curricula that are used for spatial analysis.

First: Spatial and descriptive information geographical data:

There are several ways to get the spatial information, including spatial data of all forms of private data flooring mosaics, which are linked to certain coordinates. Therefore, each mosaic floor must be defined in a specific manner may be in the form of coordinates (X. Y), or three-dimensional (X. Y. Z). It may be the representation of the mosaic floors relative way, in the sense that the site is attributed to something else. Thus, it can be a special data collection for mosaic floors through:

1- Preliminary information that can be collected by the floor area, aerial photography, remote sensing and global positioning system (GPS).

2- Secondary data that can be collected by using a scanner, or plate numbering, or follower of automatic lines.

Data is different from information. The data is worked as raw materials, consisting of tables and statistics that have not been addressed. Information is considered to be the data results after processing, tabulation, coordination and assembled.

Therefore, the geographic data contains many of the key features that characterized does not have any dimension of spatial data. They are either digital data (quantity), such as: length of the space and the size of the mosaic flooring, or other high-quality digital data such as old mosaic floors.

GIS software

Arc GIS software is characterized as a GIS software, its ability to link data in non-spatial database with spatial data. Then the base has manufactured relations in the geographic information system. This can ask many questions concerning the phenomena of spatial and non-spatial characteristics to be able to get information about the mosaic flooring on the map. This information can connect with map Link to Graphics, which provides an important tool in the management process and the development and restoration of mosaic floors. Arc GIS software is characterized as a geographic information system software, its ability to link data in non-spatial database with spatial data. Then the base has manufactured relations in the geographic information system. This can ask many questions concerning the phenomena of spatial and non-spatial characteristics to be able to get information about the mosaic flooring on the map. Therefore, this information can connect with map link to graphics, which provides an important tool in the management process and the development and restoration of mosaic floors.

Fourth: Manpower labor (User Programs) are considered human power and an important factor in the central part of geographic information systems. Thus, it is characterized by geographic information system at their Technology Co- Ltd., if without the individuals who manage the system in finding plans to apply to the reality problems. However, users of geographic information system of technical specialists are graded who design and develop the system to those who use it in the performance of their daily works.

Fifth: The curriculum which uses spatial analysis and statistical analysis. Consequently, GIS is usually associated with the rules of information management systems and through DBM complete for answering questions adoption of SQL compositional language of Investigation operations. The help of geographic information systems in the investigation of the spatial relationships in several areas can harness GIS to serve in documenting mosaic floors such as analyzes that rely on the time and place factor (land-use change in the locations that are spread out over time mosaic floors). Moreover, the identification of new mosaic floors that help the rules of spatial information to derive statistical summaries, or derivation through statistical tables using tabulation of spatial characteristics data for the geographic systems.

3. Analysis Method

a- Geographical information system applications in documenting mosaic floors

The traditional methods used in the authentication process of the mosaic floors and limited capacity in the processing and analysis process characterized. They rely on the installation of printed paper maps, which take a lot of time and effort in planning and management. Therefore, these traditional methods of authentication scheme do not enable the restorer of taking all natural limitations in mind. Also, they do not give a sufficient number of options and alternatives of planning that can be implemented using readily geographical information system (Clarke, 2012). Therefore, through the study of applied cases for the use of the geographical information system in documenting mosaic floors that have addressed many of the drawbacks and disadvantages resulting from traditional work. They are working to save time and effort and give the possibility of changing the characteristics and objectives more flexibly. Moreover, they offer a lot of alternatives and options rapidly with the availability of accurate results. But at the same time, they need to combine documentary mosaic floors of thought and experience in the use of computers. Also, the ability to use geographic information system software, in addition to the availability of material resources for the purchase of software and equipment.

When building a geographical information system to document the mosaic floors are required to identify the core business, which aims to automate technical tasks carried out by the specialist operations documentation manually takes a lot of time and effort scale. In the sense that the system is designed to automate the work of art, which deals with geographic data from maps, satellite images and aerial schemes. In addition, the ability that works to connect the metadata of spatial data on the maps, which is one of the functions of the most prominent geographic information system in the documentation of the mosaic floors for:

1. Effecting ranges frontier areas (Buffers) on the adjacent ground phenomena of areas infested by the mosaic floors.
2. Building on the operations of documenting mosaic floor models.
3. Flexibility in adding other layers updated and brought into the documentary database.

4. Ordering alternatives that are planning mechanism based on mathematical weights.

From the above, it can conceptualize about the importance use of geographic information system in the documentation of the mosaic floors. So that can deal with endlessly of data, which has the ability to link their positions of metadata geographical. Also, they carry out analysis of the elements of the earth and to identify the ground positions that contain mosaic floors. Therefore, it can be summed up the basic steps and stages to build geographic information documenting special operations mosaic flooring in the system following steps:
1- Define the study area and the definition of its coordinates
2- Laying the groundwork and planning standards
3- Input System
4- System design
5- Building applications
6- Presentation and evaluation of results

Justifications use for the geographical information system in documenting mosaic floors as follows:
1. Possibility of using geographical information system with high efficiency in documenting the mosaic flooring, which is documented in these floors by connecting all the metadata about them, such as the place, date, size.
2. The spatial data are required to be entered in the database, which specializes in mosaic flooring linked to specific geographical locations and is specific to GIS.
3. High efficiency of these systems in the analysis of the mosaic floors process.
4. High potential for geographic information system to deal with several types of data, such as reports, statistics, tables, maps, and it makes a kind of precision and accuracy on your system output operations documentation.
5. adopt the desired results from the system, the geographical analysis operations for specific sites, which is strongly available in the geographic information system.
The importance of special operations closer mosaic floors using geographic information systems in the studies:
First: The scientific side, where is the scientific significance of the study in the area to take advantage of the geographical information system applications in documenting mosaic floors.
Second: the practical side through the design of a practical model for the application of geographical information system in the electronic documentation for mosaic floors process.

b- Remote sensing applications in documenting mosaic floors

Therefore, the scientific studies that rely on the use of remote sensing and aerial photography is one of the most important works in the present time in documenting mosaic floors. Accordingly, it can get the results of the utmost importance in the field of restoration and conservation of the mosaic floors, which contributes to help develop future plans that rely on accurate of sustainable scientific planning. Sensor associated remote measuring electromagnetic energy reflected and emitted by the objects. This is the interpretation, analysis and use of this information in different applied fields, including studies relating to archaeological documentation (Aldenderfer, and Carolyn, 2012). Since the beginning of the era of space exploration in 1957, picking up the first visible satellite to the surface of the Earth by the spacecraft explorer-6 in 1959. Thus: human interest began to focus on the use of satellites and put them in a large number of scientific fields, such as documenting mosaic floors; in order to provide a successful way in the sustainable restoration and conservation of the mosaic flooring operations. However, it may reach the level of complexity in terms of the analysis of that information, as in the remote sensing data for the space, which is difficult to analyze with the naked eye. Therefore, because the satellite data is depending upon specialized analysis software.

1. Stereo vision in documenting mosaic flooring applications

Stereo vision is a human phenomenon, which had to be studied to see the materials of the three dimensions. So, several types of modeling devices are used when analyzing satellite images. Nevertheless, stereo vision is applied on the satellite images available if the cover up to 60% of the images called stereoscopic pairs. Remote sensing in the development of methodology contributes by: using visuals satellite that allows follow-up seasonal dynamic quarterly, annual ecosystem and biodiversity in the spread of mosaic floors sites. In this type of studies, the most prominent supporting means for the application of remote sensing techniques is in the availability of all documents relating to the mosaic floors (images and

digital maps).

Therefore, the processing and analysis of satellite visualizations during intervals spaced contribute to the follow-up to the most significant changes that affect the mosaic floors. These satellite visuals are based on to highlight and track dynamic biochemical changes, which are considered the most important trends of this change and its impact on the mosaic floors. Also, digital processing depends upon classifications for land use during successive time intervals. The monitor for all indicators of pollution and the deterioration in the spread of mosaics areas and categorized levels allowing the improvement of knowledge in these areas. Thus, it contributes to put an observatory to track changes that affect the mosaic floors over time.

2. Applications of GPS for the supervision and monitoring in mosaic areas

There are two main positioning using GPS are:
(1). The absolute determination of the sites that is spread by the mosaic
(2). Relative identification of areas which is spread by the mosaic
This modern existing technical help document the mosaic areas of operations to perform tasks more quickly and with greater accuracy. Thus, it will provide electronic maps showing them on track toward the goal. Also, it offers accurate information base and vessels utilized in the management and control of the mosaic areas over 24 hours via satellite networks. Because of technological progress and technological development, especially in the information gathering devices worldwide.
The GPS system has penetrated in various aspects of electronic documentation processes for areas mosaic and expanded its applications to include several areas (Clemmer, 2013), which are:
1. These techniques are tool to achieve full-scale control for all land that spread out mosaics.
2. All the data represented by natural and cultural elements of the mosaics are convert to the digital format, through networking mosaics and sensors to work together for maps system.
3. GPS is used more broadly in the Technical site management tasks that are spread by the mosaics, the ongoing activities practiced in areas where mosaics and operations control system.
4. These techniques provide an integrated, real-time data that benefits based on electronic authentication process areas mosaic.
5. The digital photography of mosaic floors and wide areas of these numbered data include both altitude and topographical information and holographic images.
The digital photography of mosaic floors and wide areas of these numbered data include both altitude and topographical information and holographic images.

3. Research Methodology GPS in documenting mosaic floors

Phase I: Planning: - Initiation of using the GPS system in the study, the determination of the technical requirements and specifications are based on the objectives of the study (Banning, 2006). It is necessary to answer the following questions, which are:
1. What is the nature of which has a floor mosaic mural?
2. What are the main GPS discriminatory tool in terms of capacity and specifications efficiency?
3. What is the status of the user of the device during the monitoring process in a steady state or movement?
4. Is the user needs a digital map of the device during the monitoring process of the mosaic areas?
5. What amount and the volume of data that must be monitored by the economic feasibility of the project evaluated?
6. How much of the technical, financial and administrative support for the work until it is done?

Phase II: Implementation

First: the establishment of an integrated data representing the mosaic areas in the form of data base dictionary that must create the data dictionary before starting field work at the sites, which is spread by the mosaic. Therefore, it should designate characteristics required to collect data such as length, type and number. Also, it will record height in meters or feet or centimeters for these types of data values. So, the form of this dictionary as a rule used in the geographical information system. The spatial data which coordinates the phenomenon of tariff codes and characteristics of metadata (Bowden, 2005).

Second: The second step includes loading the data dictionary to a GPS, with the possibility to download maps, aerial photographs and satellite data visualizations that connects the sites that is spread by the mosaic.

Conclusion:

This study showed the importance of the adoption of digital models and their impact on the accuracy and quality of the final output in documenting mosaic floors. Thus, it resulted in an increasing need to create a digital map, to share data and digital information, get rid of duplicate data, increasing the spatial and descriptive data accuracy (Brewer, 2005). Also, it was able to build a support system for decision-making spatial high-efficiency to take advantage of the geographic database in documenting mosaic floors simultaneously. Accordingly, the range of features and benefits that can be accessed through a directed several government institutions working in the field of protection of monuments around the acquisition of geographic information systems as follows:

1- Creation digital map to collect document and update the social, economic, natural, environmental and urban data that spread out the mosaic areas easily.

2- The ability to meet the needs of documenting archaeological sites of the spatial representation of the elements that represent different phenomena under study.

3- Archaeological analyzes is necessary for any archaeological site.

4- The proposed system outputs is that result from the display boards, presentations, reports and high-quality output professional image.

5- Endorsing the officials and decision-makers to supported for caveats and recommendations resulting from realistic analysis of problems, including contributing to the decision-making appropriate public benefit in the documentation processes and the preservation of the mosaic.

Recommendations:

1. The need to establish a centralized geographic database at the global level include all the mosaic floors. Therefore, the necessity of core sector data, which produces knowledge institutions. Also, the government bodies that are available by (maps space bodies, bodies Geological Survey maps and atlases, Department of Statistics and Information data ... etc.). So that the update is to prevent duplication of effort, reduce the time and cost incurred by the archaeological documentation to accomplish its projects databases.

2. Creating a digital model 2. Creating a digital models center of mosaic floors, provided by the institutions of digital maps and descriptive information.

3. The use of digital models on a larger scale in the IT and documentation of the mosaic sites operations.

Digital modeling of mosaic floors

Satellite imagers used in the preparation of the floor of a three-dimensional model. This means the work of a three-dimensional digital elevation maps (contour maps) through which to examine all the mosaic floors and the factors influencing them. The possibility of helping the transparent structure of map layers that contain analytical information in different areas, which are spread by the mosaic floors in the work rules Information Reference. This becomes the possibility of planning and decision-making going effectively. Maintaining the mosaic flooring within its success and sustainability. Determine the indiscriminate use of helpful resources operations. Modeling work is intended to simulate reality and create simplified models of the real world in order to reach generalizations about the behavior of phenomena in it. By building a model to understand the specific position, or predict future outcomes resulting from an activity. This model is a set of steps and rules, including rules for spatial geographic information system.

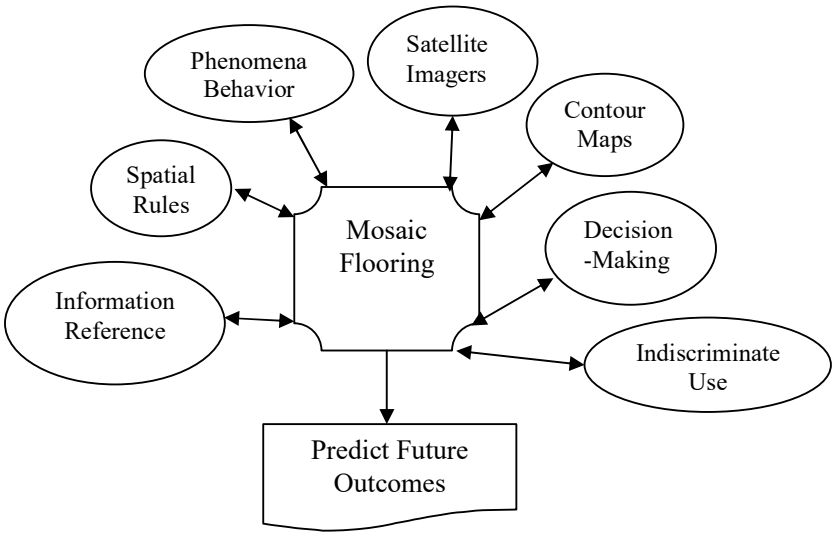

Figure 1: Digital Modeling of Mosaic Floors

Future suggestions

Digital models used in documenting the mosaic areas of a three-dimensional digital elevation maps, for examining the mosaic floors and the factors influencing them.

1- This research study aims at maximizing and strengthening the global digital modeling mosaic floors.

2-This model frame study can be used globally.

3-A unique type of a tangible scientific research study for the first time of its kind.

4- Adoption of this study is to satisfy the customers in the organizations, simulates the global digital modeling of mosaic floors.

References

Aberg, A., & C. Lewis, eds. (2013). The Rising Tide: Archaeology and Coastal Landscapes (Oxford: Oxbow).

Adams, Robert McC. (2013). Heartland of Cities: Surveys of Ancient Settlement Systems and Land Use of the Central Floodplains of the Euphrates. (Chicago: University of Chicago Press).

Alananzeh, O.A. (2014). Exploring the factors influencing students in enrolling tourism and hospitality management colleges in Jordan: A case study in Aqaba economic zone. Journal of Management Research, 6(2): 11-23.

Alananzeh, O., Ma'aiah, B., Al-Badarneh. M., & Al-Shorman, A. (2017). The geographic distribution of conferences in Jordan from 2014 to 2016 using predictive GIS modeling. Journal of Convention & Event Tourism. DOI: 10.1080/15470148.2017.1406832

Alananzeh, O., Amyan, M., ALghaswyneh, O., Shatnawi, H., & Jawabreh, O. (2015b). Managing promoting tourism product of the golden triangle in Jordan. International Journal of Humanities and Social Science, 5(9): 197-207.

Aldenderfer, Mark S., and Carolyn A. Hale-Pierce (2012). The Small-Scale Archaeological Survey Revisited, American Archeology 4(1): 4-5.

Aldenderfer, Mark S., and Frank J. Schieppati (2011). To Be or Not To Be: The Small-Scale Archaeological Survey and Archaeological Research, American Archeology 4(1): 49-53.

Banning, E. B. (2006). Archaeological Survey. (New York: Kluwer Academic/Plenum).

Bazazo, I. B., & Alananzeh, O.A. (2016). The Effect Of Electronic Tourism In Enabling The Disabled Tourists To Communicate With The Touristic And Archaeological Sites Case Study – Jordan. European Scientific Journal, 12(5), 11-128. doi 10.19044/esj.2016.v12n5p111 URL:http://dx.doi.org/10.19044/esj.2016.v12n5p111

Bazazo, I. B., Alananzeh, O.A., & Taani, A.A. (2016). Marketing the Therapeutic Tourist Sites in Jordan Using Geographic Information System. European Journal of Business and Management. Vol.8, No.30, 29- 39.

Bowden, M., ed. (2005). Unraveling the Landscape: An Inquisitive Approach to Archaeology (Stroud: Tempus).

Brewer, Cynthia A.(2005). Designing Better Maps: A Guide for GIS Users. ESRI Press, 2005.

Chiu, L. K., & Ananzeh, O. A. (2012). Evaluating the relationship between the role of promotional tools in MICE tourism and the formation of the touristic image of Jordan. Academica Turistica -Tourism and Innovation Journal, 5(1): 59-73.

Clarke, Keith C.(2010). Getting Started with Geographic Information Systems, 3rd ed. Upper Saddle River, NJ: Prentice Hall, 2010.

Clarke, & Keith C. (2012). Concepts and Techniques of Geographic Information Systems. Upper Saddle River, NJ: Prentice Hall, 2012.

Clemmer, G.(2013). The GIS 20: Essential Skills, 2nd Edition, ESRI Press, 2013.

Conyers, LawrenceB. (2003). Introduction, in Ground Penetrating Radar: An Introduction for Archaeologists, pp.11-21 (Walnut Creek: Alta Mira Press).

Delle, James A. (2000). "A Good and Easy Speculation": Spatial Conflict, Collusion, and Resistance in Late 16th-Century Munster, Ireland, International Journal of Historical Archaeology 3(1): 11-35.(Francis).

DeMers, Michael N. (2009). Fundamentals of Geographic Information Systems 2nd Edition . New York, NY: John Wiley & Sons, Inc, 2009.

DeMers, Michael N.(1997). GIS Modeling in Rasters. New York, NY: John Wiley & Sons, Inc, 1997.

S. Gonizzi Barsanti a, F. Remondino b, D. Visintini c. (2013). 3D Surveying and Modeling of Archaeological Sites - Some Critical Issues -ISPRS Annals of the Photogrammetric, Remote Sensing and Spatial Information Sciences, Volume II-5/W1, 2013 XXIV International CIPA Symposium, 2 – 6 September 2013, Strasbourg, France

Horning, Audrey. (2001). Of Saints and Sinners: Mythic Landscapes of the Old and New South, in Myth, Memory, and the Making of the American Landscape, ed. by Paul A. Shackel, pp. 21-46. (Gainesville: University Press of Florida).

Margaret Rouse,.(2016). How has GPS technology impacted your enterprise? WhatIs.com, TechTarget's IT encyclopedia and learning center. TechTarget network of technology-specific websites. UK

Ra'ed Masa'deh, Omar Alananzeh, Ali Tarhini, Oroub Algudah, (2018) "The effect of promotional mix on hotel performance during the political crisis in the Middle East", Journal of Hospitality and Tourism Technology, Vol. 9 Issue: 1, pp.32-47, https://doi.org/10.1108/JHTT-02-2017-0010

Mohammed bin Khalidi .(2013). "Digital Prototyping Applications in Documenting Areas Archaeological in Tunisia ". Mohammed Bin Khalid Generations School, Private Primary School, Arabic, UAE, Islamic Arabic, UAE, Islamic, MOE, co-ed, KG-G6.

Ormsby, Tim.(2010). Getting to Know Arc GIS Desktop, 2nd Edition Updated for ArcGIS 10. ESRI Press.
Tomlinson, Roger. Thinking About GIS, Third Edition: Geographic Information System Planning for Managers. ESRI Press.

Zeiler, Michael.(2008). Designing Geodatabases Case Studies in GIS Data Modeling. ESRI Press, 2008.