

The Role of Graphic Design and Visual Communication in Natural Heritage Sites of Jordan

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ABSTRACT

The main aim of the study is to show the considerable function that graphic design and visual communication can have in enhancing tourist experiences, maintaining the natural heritage and increasing the cultural value of Jordan. For the study, field observations were conducted at selected heritage sites such as Wadi Rum, Petra, Dead Sea and Dana Biosphere Reserve. These observations focused on visitor interactions, which helped identify the practical effectiveness of the graphic design and visual communication tools and how they influence visitor behaviour and learning experiences. Concerning secondary data, the findings of an extensive literature review and Reports from the Jordanian Tourism Department were analyzed to understand the current stage of heritage site promotion and the role of visual communication in Jordan. This study indicates the function of graphic design in the genuine recognition and protection of natural heritage through the tactics utilised in examples. Integrating regional art and culture in graphic design elements is essential for preserving and respecting the cultural significance of culture in Jordan. The study recommends integrating traditional themes, images, and narratives in design to increase authenticity and visitor attraction while respecting regional traditions and collaborating with local craftsmen. The research acknowledges how technology can transform natural heritage sites through immersive experiences. Augmented information, 3D reconstructions, virtual tours, and interactive installations via mobile phone applications and AR-VR are creative ways to engage visitors. This study has informed practical concepts for enhancing the tourist experience, incorporating regional culture and art, and utilising technology to provide interactive experiences.

Keywords: Graphic Design; Visual Communication; Natural Heritage Sites; Heritage Preservation; Interactive Design.

INTRODUCTION

Natural heritage sites are an integral part of any country as they exhibit and preserve the natural and cultural history, providing a look into the past and a vision of the future. Jordan, a country known for its rich history and splendid nature, has sites such as Petra, Wadi Rum, the Dead Sea, and more, which hold tremendous cultural and environmental value. These sites support sustainable tourism and contribute to the nation's economic development. The essence of heritage sites is communicated through transformed design and visual communication instruments to enhance visitor experience and understanding (Harland, 2021). Graphic design is a communication device and narrative path, making travel more accessible and engaging for diverse audiences. Hence, combining graphic design and visual communication enables an immersion of experience and delight in natural heritage environments (Lees-Maffei, 2022).

In the case of natural heritage sites, adding informative visual materials through graphic design means a nuanced response to each site's unique conditions—environmental, cultural and narrative (van Eeden, 2022). Jordan reflects on its historical landmarks, such as Petra, Wadi Rum, and the Dead Sea; the synergy of graphic design and visual communication is critical to the tourism and heritage of this place. Jordan's natural heritage sites have a rich history and cultural background, which, in turn, may need to be designed according to the

principles of graphic design and visual communication to shape the public perception regarding these sites, which can, in turn, increase their total value and attractiveness. The tourists' perception of a place and experiences are determined by the destination's branding and image (Harland, 2021). Hence, graphic design and visual communication are strategic tools regarding sustainable conservation and tourism management.

The study aims to explore graphic design and visual communication status in Jordan's natural heritage sites, evaluate their effectiveness, and identify the areas that require further development. The study seeks to offer and enhance existing solutions on how graphic design and visual communication may be effectively used to improve visitor experience and the conservation of these places. It would help the managers of the sites, the designers, the conservationists, and the tourism authorities to make well-informed decisions with respect to these sites. They can understand the role of graphic designing and visual communication art and their importance for the sustainable management and conservation of the natural heritage sites in Jordan to preserve the sites for future generations and to offer educational and engaging experiences to the current visitors (Aburamadan et al., 2021).

LITERATURE REVIEW

Overview of Graphic Design in Heritage Promotion

Concerning visual components in the marketing of Jordanian tourism destinations, "using regional cultural motifs in the design allows writers to both maintain and transmit their local history and offer enjoyment to tourists" (Shahateet & Partale, 2019). This illustrates the importance of graphic design in the promotion of natural heritage sites beyond that of ordinary marketing materials. Further, graphic designs, often rich in local cultural elements, preserve and promote the extensive history of the heritage and natural sites. When heritage sites use well-crafted designs on various mediums, such as interpretive materials, signs, books, and digital apps, they help reach and educate a greater portion of the general public about the ecological and historical importance of the places. Overall, these designs contribute to the increased promotion and appreciation of heritage sites (Pervolarakis et al., 2023).

A crucial issue contemporary literature raises is how digital technologies have provided a new dimension for cultural heritage contextualisation, representation, and curation. Properly crafted graphic design and online media could potentially cause an overflow in the public towards heritage sites (Zarandona, Albarrán-Torres, & Isakhan, 2018). This opens doors to exploring and implementing new, exciting, and interactive ways in natural heritage sites; broadening the space by possibly conducting virtual tours can also expand reach by cultivating a large potential audience. Additionally, there is a growing appreciation for caring ecological type function needful style. While cultural heritage sites are being advertised and displayed, this should not result in incongruous pressure on the environment; indeed, any advertisement and demonstration design activity should have a visual relationship with preservation without effects scale or prime value (Ge-Stadnyk & Gretzel, 2018).

Importance of Visual Communication and its Impact on Tourism

Visual aspects, which can be still pictures, diagrams and films, "affect transit decisions" and impact decision-making (Alzubi, 2022). They provide interesting and informative insights into the advantages of compelling visual information which can be applied to Jordan. Another relevant question in the digital age concerns attitudes towards social media context as an antecedent to travel experiences. Destinations like Petra or Wadi Rum that want to attract tourists on social media, particularly Facebook and Instagram, have to use visual digital content smartly (Al Qur'an, 2019).

The second research theme concerns visual communication within heritage interpretation using interpretive signs and visual storytelling experiences in historical and natural sites (Staiff, 2016). This visual story is informative, educational, and emotional as it establishes a bond between the visiting individual and that place. The visual identity must be professional and attractive for a tourist destination. The impact of a unified visual brand strategy includes tourist marketing, colour schemes and logos that support destination identification by tourists (Muhammad, 2018). Similarly, individual branding becomes very important in Jordan because it can help showcase the various areas of interest and its exotic culture and scenery. Visual communication also impacts eco-friendly tourism (Harland & Xu, 2021). Concerning Jordan, Dana Biosphere Reserve is an eco-friendly place which uses cutting-edge scientific knowledge and state-of-the-art practical expertise to provide clear information to tourists on how to explore the reserve responsibly. On-site signage and interpretive panels, along with printed materials and digital platforms, the visit to the reserve is environmentally friendly (Figure 1).



Landscape of Dana Biosphere Reserve, Jordan © 2010 Bernard Gagnon, Licensed under CC BY-SA 3.0



View of Rummana Campsite in Dana Biosphere Reserve, Jordan © 2010 Bernard Gagnon, Licensed under CC BY-SA 3.0



Wind-carved sandstone in Wadi Dana, 2021 Martin O., Retrieved from <https://ammanjournal.wordpress.com/2021/03/21/dana-biosphere-reserve/>



Wadi Dana, 2021 Martin O., Retrieved from <https://ammanjournal.wordpress.com/2021/03/21/dana-biosphere-reserve/>

Figure 1. Visualization of the Dana Biosphere Reserve

Good graphic design could enhance the storytelling experience of historic places. The research focused on a broad concept, such as tourist materials, for example, brochures and pamphlets, interpretive signage, maps and guides, digital platforms, etc., that are thought to be effectively implementable across numerous heritage sites, including world-class sites in Jordan and cultural landmarks (Alzubi, 2022). Specifically, promoting the site approach by integrating modern graphic design with individual traditionally appropriate features can be one of the most successful methods. This combination of new and old could transform a tourist experience into a more genuine cultural experience (Tilden, 2009). It is a very valid procedure, particularly for Jordanian historical sites that have to maintain their cultures' truthfulness.

For example, in a legacy project researching the effect of digital technology on the practice of graphic design in heritage sites, blending traditional graphic design with the growth of augmented and virtual reality is important (Gottlieb, 2018). The new approach can attract the interest of more audience members and reveal the educational essence of heritage sites (Drucker, 2014). This can be done at major Jordanian tourist spots like Petra and the Dead Sea (Figure 2). Jordan's ancient sites need green marketing to promote environmentally friendly and sustainable graphic design. This would similarly apply to natural heritage sites in Jordan, including Wadi Rum (Aburamadan et al., 2021). Graphic design can be used to make the sites accessible. In terms of development, graphic design can be crafted to provide equal access to varied visitor populations—including visitors with disabilities (Agustín-Hernández, Vallespín Muniesa, & Fernández-Morales, 2020a). This implies that widespread implementation has the potential to significantly broaden Jordanian heritage accessibility and inclusivity.



The Jordanian shore of the Dead Sea, showing salt deposits left behind by falling water levels © 2002 Alexandermcnabb, Licensed under CC BY-SA 4.0



Dead Sea © 2014 La Rossa, Licensed under CC BY-SA 4.0



Dead Sea Bathing Instructions, 2011 Matt Long, Retrieved from <https://landlopers.com/2011/01/11/floating-dead-sea>



Dead Sea Swimming Instructions, 2010 Grethe Ulgjell / Alamy Stock Photo, Retrieved from <https://www.alamy.com/stock-photo-instruction-sign-for-swimmers-at-the-dead-sea-in-jordan-in-english-50264796.html>

Figure 2. Infographic Representation of the Dead Sea

METHODOLOGY

This research was aimed at studying the perception of the relationship between graphic design and visual communication in the context of how these two practices can make the experience of visiting natural heritage sites in Jordan better and help promote them. Throughout the study period, field observations were conducted at selected heritage sites such as Wadi Rum, Petra, Dead Sea and Dana Biosphere Reserve. These observations focused on visitor interactions, which helped identify the practical effectiveness of the graphic design and visual communication tools and how they influence visitor behaviour and learning experiences. Field observation supported the formulation of suggestions for the present study. With respect to secondary data, the findings of an extensive literature review and Reports from the Jordanian Tourism Department were analyzed to understand the current stage of heritage site promotion and the role of visual communication in Jordan. Online databases and digital archives of heritage sites were examined to gather examples of graphic design and visual communication tools used globally. This data provided a broader perspective on the trends and technologies shaping visitor experiences at natural heritage sites. The study additionally concerned the conceptual analysis of fundamental principles of graphic design in terms of their appropriation for interpreting natural heritage sites and marketing-related activities. Various visual communication strategies such as storytelling, application of cultural motifs, and digital media were evaluated across Jordan and other countries to understand their significance for depicting the historical and ecological value of protected natural areas and heritage sites in Jordan. The results obtained from the literature review, conceptual analysis and secondary data analysis were synthesized to offer the basis for a more integrated and solid approach towards how graphic design, as a vital element of visual communication,

could be used in natural heritage sites. The identified models and frameworks could be the basis for understanding the value of the selected approach in preserving heritage sites and ensuring visitors' further interest in Jordan.

FINDINGS

The State of Natural Heritage Sites in Jordan

The country of Jordan has a history and a culture that dates back to ancient times. Still, it also possesses many natural heritage sites which demonstrate the geological and ecological history of the region. Wadi Rum desert and Petra are also notable for exotic constructions and the complex of dams, water conduits system, and valley temples built in conjunction with a vast rock-cut architecture. Petra has been a UNESCO World Heritage Site since 1985 (UNESCO, 2021). Petra is “a place where human imagination and the forces of nature met to build a unique marvel in the apogee of the Arab civilization” (Aburamadan et al., 2021). These, combined with the site's natural features, red butt cliff and narrow canyons, give the site greater historical and cultural value.

One of the UNESCO World Heritage Sites, Wadi Rum is an iconic desert with large rock formations, arches, and caves, many of which are preserved under the national park (UNESCO, 2021). Unique in its Martian-like landscape, the place attracts thousands of tourists and has become known internationally as the shooting location for several movies. This implies that the natural sites must be protected. In turn, the Jordanian government, as well as other international bodies such as UNESCO, have established rules to protect nature (Veghe^ÊTM, 2019) (Figure 3).

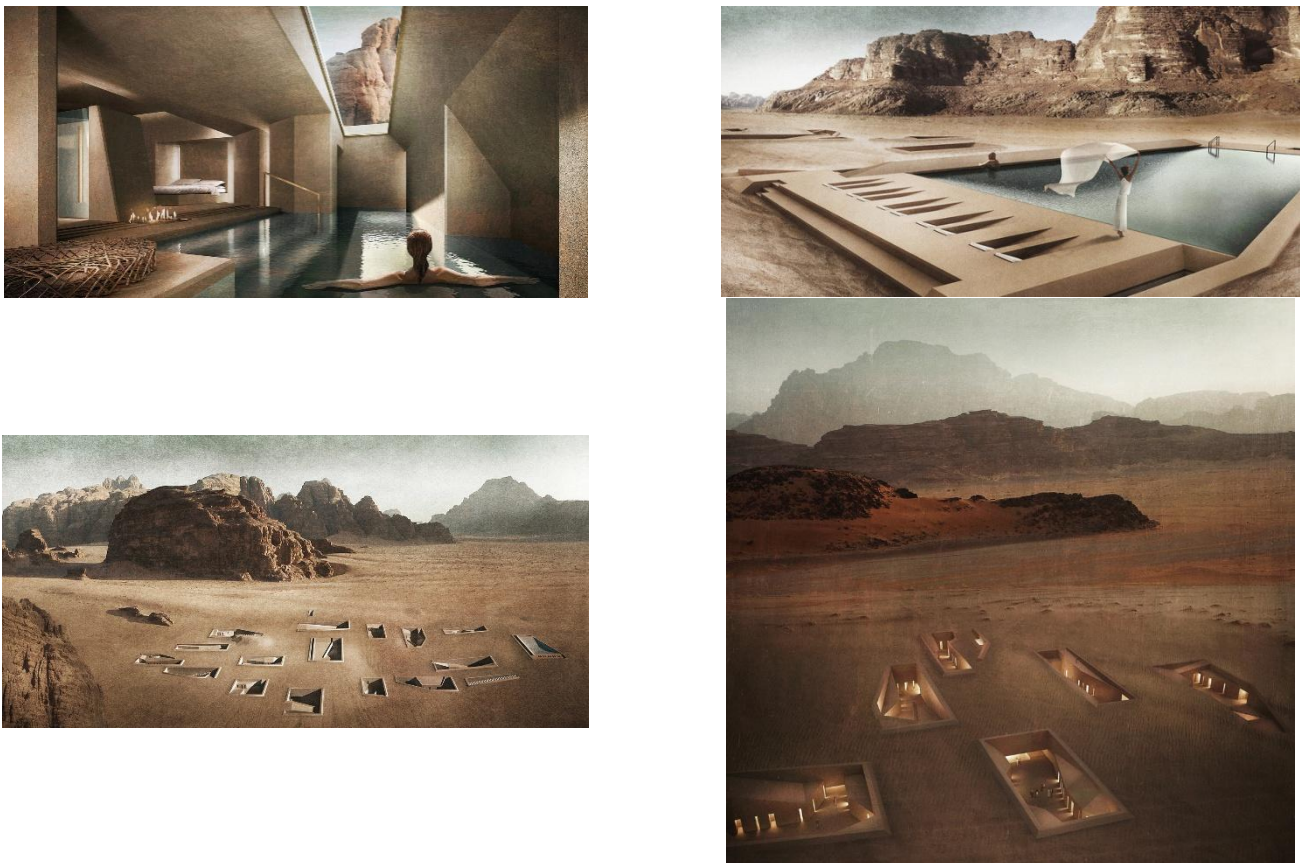


Figure 3. Visual Journey within the Sanctuary of Wadi Rum. © 2015, Rasem Kamal

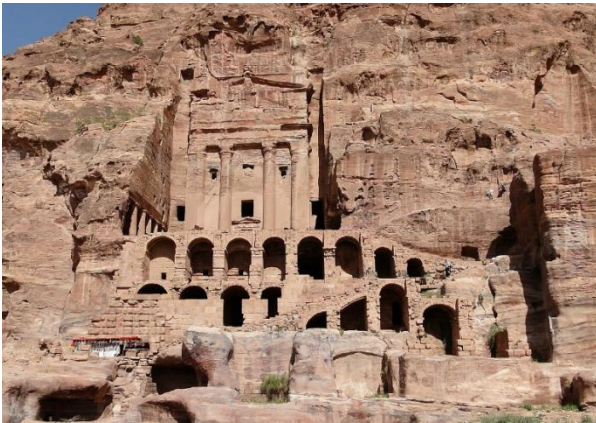
Despite all these efforts, Jordan is still challenged due to its natural heritage sites. Most importantly, the threats to the environment are due to an increased presence of tourism and humans. The most basic direct impacts are overcrowding, litter and erosion due to the increased number of people visiting these locations. Climate change is another major hurdle as unstable climatic conditions create an increased risk to the natural landscapes in Jordan, impacting their ecology and tourism equilibrium (Nelson, Anggraini, & Schlüter, 2020). Natural heritage monuments in Jordan indicate the country's cultural and historical nature (Harvey, 2001). The monuments are tools to save the past and guarantee a sense of pride for Jordanians. Furthermore, they are

essential for the local economy, especially for the regions with tourism as the main source of income.

The graphic design of Jordan's heritage sites performs narrative and interpretation functions. Interpretive signs, educational pamphlets, and exhibit design are effective visual communication methods employed at Jordan's heritage sites. Their purpose is to tell a story that binds the visitor to the sight and educates him on the area's history and ecology (Bakri, Ibrahim, Ahmad, & Qamaruz-Zaman, 2015). This argument also supports the claim that graphic design in a historical place constitutes a means of storytelling by involving visitors in the information surrounding them (Harvey, 2001). In Petra, the graphic design sheds light on the local tourists' understanding of the culture and archaeological context (Figure 4).

Graphic design is critical in promoting Jordanian heritage sites and places of interest. Brochures, the internet, and digital media use graphic design to promote these heritage sites to people across the globe. These tourism promotion materials should appeal to tourists to create a lasting impression (Agustín-Hernández, Vallespín Muniesa, & Fernández-Morales, 2020c). Graphical and visual means of communication promote tourism while also significantly contributing to the level of visitors' pride in the country and culture (Wincott, Ravenscroft, & Gilchrist, 2020). Natural heritage monuments in Jordan, such as Petra, AR, and VR, have become increasingly popular tools (Aburamadan et al., 2021). Graphic design has become more effective at representing natural sites when these elements are used, making viewing the sites more appealing to a wide range of people. Some design elements encourage visitors to use an AR app and explore geological and historical features present on the site interactively.

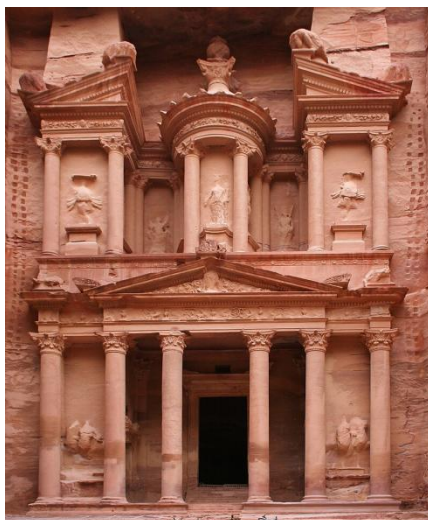
Another need for graphic design in heritage sites is accessibility and wayfinding. Innate and easy to understand universally for every visitor, signs and explanation kiosks will help the visitor navigate often large and complicated topographies such as Petra or Wadi Rum (Figure 3 and Figure 4). Inclusive design is particularly important for visual communications since many people can access these websites, including people with diverse disability categories (Ababneh, Darabseh, & Aloudat, 2016). In such designs, it is necessary to maintain the authentic feeling of the place while updating the presentation (Hasouneh & Abu Alzeat, 2020).



Urn Tombs, Petra © 2010 Bernard Gagnon, Licensed under CC BY-SA 3.0



En-Nejr Theatre, Petra © 2006 Douglas Perkins, Licensed under CC BY 2.0



Al-Khazneh (Treasury), Petra © 2011 Graham Racher, UK derivative work: Mr Pany Goff, Licensed under CC BY-SA 2.0



Qasr al-Bint Temple, Petra © 2004 Dennis G. Jarvis, Licensed under CC BY-SA 2.0

Figure 4. Illustration of Petra – A Natural Heritage Icon

Graphic Design and Visual Communication Strategies in Jordan

Graphic Design in Interpretive Signage and Exhibits

In the natural heritage sites of Jordan, one of the most common uses of graphic design is the presentation of interpretive signage and exhibits. At these sites, this signage, or sign system, often consists of visual and textual graphic presentation types, such as maps, photos, and illustrations. Interpreting signage systems “communicates with people visiting the historical, cultural, and ecological sites” other things than just information on something (Al Rabady, 2013). The signage employs graphics that portray the signs and structures of archaeology, which may serve as visuals for other verbal descriptions. Interpretive signage involves selecting appropriate typography, colour schemes, and layouts that enhance readability and attract the attention of visitors. Its effectiveness combines concise, informative text with compelling visuals. The incorporation of traditional motifs, colours and symbols reflects and enhances the site’s heritage and cultural sensitivity. To ensure an international appeal of Jordanian heritage sites, interpretive signs are integrated seamlessly into the design, maintaining visual consistency and clarity across different languages. Exhibits at heritage sites have a cohesive theme, such as artefacts, photographs and informational panels. Modern exhibits include interactive elements such as touchscreens, digital displays and AR which make sightseeing more fascinating. Some exhibits have an aesthetic integration of graphic elements which create an immersive environment for the tourists. Similarly, educational visuals such as infographics, diagrams and 3D models enhance the educational value of the exhibit. Both interpretive materials and exhibits add an interactive dimension to the graphic design of conventional interpretive sign systems, encouraging the visitors to spend more time exploring and learning (Abu-Khafajah, 2010). Thus, when creating interpretive materials, one should consider and apply graphic design types that would improve the understanding and accessibility of the information at the site. When creating exhibits or signs, the most important thing is to make these exhibits or signs fully accessible to people who will be given the information, including those with special needs (Zarandona et al., 2018). This means making contrasts on the signs right, placing tactile or visual aids, and applying simple fonts that are easy to read, which is crucial in natural heritage sites.

In Jordan’s natural heritage sites, Wadi Rum and Petra, graphic design enhances tourist engagement and knowledge in interpretive signage and exhibitions. Signs in Petra include maps of the site, historical timelines and images of artefacts of ruins, making it easier for visitors to grasp the historical context. A well-developed interpretation of materials makes enigmatic historical and cultural tales more enlightening and intriguing for tourists (Abu-Khafajah, 2010). The resources, typically a composite of maps, diagrams, pictures and other illustrations, are synthesized to create a complete site presentation. Significantly, the interpretive materials reflect the site’s culture, especially regarding the visual appearance. For a site’s graphic design to be complete, it must represent the historical nature of a site and include the local artistic works and cultural features (Harvey, 2001).

Promotional Materials: Brochures, Websites, and Digital Content

The use of visual images by a tourist in any given place adds a certain point, making the images and the authors more attractive. Brochures and web materials create an attractive visual experience for potential visitors and help to identify cultural places (Drucker, 2014). These printed materials include high-quality images, detailed maps, and informative content about the site’s history, significance and visitor amenities. Along with captivating photographs of key attractions and historical facts, some brochures include practical information such as ticket prices, opening hours and nearby facilities. To cater to international tourists, brochures are available in multiple languages, including English, Arabic, French, and German. This accessibility helps bridge language barriers and ensures visitors from diverse backgrounds can fully appreciate the experience. A tourism representative can describe and present the location thoroughly and at length through the brochure. Fine locations can be visited because they can all be described and pictured perfectly. “A well-designed, attractive, and coloured brochure can increase a reader’s curiosity and familiarity with a place” (Al Rabady, 2013). There are many fine pictures and crystal-clear descriptions of the places in Jordan’s tourist attractions, such as Petra and Wadi Rum. This adds dust to its colours so that tourists can realize what they are looking at even before seeing the places.

By highlighting how tourism features are presented, digital information such as blogs, web pages, and online videos has fundamentally shifted the effect of marketing in tourism (Gottlieb, 2018). Heritage websites often include virtual tours, video content and photo galleries, which help build anticipation and excitement for the visit. Websites have user-friendly navigation, such as online booking systems, search functions, FAQs and contact forms to access important details quickly. Many websites offer visuals of Jordan’s natural heritage to the people, including information and site details, a virtual webpage, and a site tour (El-Harami, 2014). Concerning social media platforms, Facebook, Twitter, Instagram, and YouTube are key to sharing engaging content and promoting

cultural and natural heritage attractions. A mixture of promotional visuals, photographs, infographics, event announcements and visitor testimonials is a dynamic way to connect with audiences. Short videos and documentaries are shared on social media and video platforms to highlight the historical significance of the heritage sites. Mobile apps with AR experiences and audio guides provide real-time information and interactive content visitors can access on their smartphones. Virtual tours and 360-degree videos allow potential visitors to explore the sites remotely. Moreover, “compared to heritage sites and monuments in the physical realm, digital mediums would allow for a much dynamic presentation of cultural heritage assets with far more opportunities to display them” (Harland & Xu, 2021).

Role of Social Media

Graphic design helps promote natural heritage sites, and social media can more effectively promote tourism on digital platforms. Social media sites, especially Instagram, Facebook, or Twitter, act as a medium with visually attractive content to showcase the exquisiteness and importance of these places. The use of rich images, video, and dynamic infographics can help heritage sites find a place in global audience awareness (Khasawneh, 2024).

Graphic design for social media may significantly improve the storytelling around natural heritage sites and make historical and ecological narratives more engaging. Visually appealing graphics can draw attention to key features while promoting events and social media campaigns that showcase the visitor experience to help create an active online community (Pervolarakis et al., 2023). This helps users interact with these heritage sites and allows them to experience them virtually or through augmented reality before they visit the site.

Social media enables site managers to obtain real-time feedback and interaction, allowing them to understand what visitors like and use these findings as an input value offering improvement. User-generated content in pictures and reviews can help sites build a community feel while providing compelling authenticity (Zarandona et al., 2018). Hence, social media is crucial to increase the visibility, engagement and educational outreach to many concerning Jordan’s natural heritage sites through visual communication and graphic design.

Heritage Interpretation

Graphic composition and visual communication play a critical role in improving heritage interpretation at natural sites in Jordan. Good interpretations are guided tours that explain to visitors what makes a particular place significant historically, culturally, and ecologically. Graphic design makes complex information accessible through properly designed interpretive panels, signage, and brochures.

Incorporating elements of local motifs, colours and symbols with graphic design shows a true spirit inherited from its heritage and makes it seem more approachable to both domestic and international visitors. Images and similar graphic art transmit visual stories that depict historical events, ecological processes, or cultural archiving tales of the site. Apps and other digital tools like augmented reality or interactive displays offer even more immersive experiences that make the heritage come alive (Pervolarakis et al., 2023).

Graphic design intervention ensures this content is stimulating and responsive to the multimedia presentations of visitor centers. Graphic design makes heritage interpretation appealing and interactive by adding visual elements; it can fill the void between time periods and past/present of Jordan’s natural heritage to be less unreal for both locals and international visitors, whether as individuals or groups.

Use of Traditional Art and Iconography in Jordan

One of the most impressive features of Jordanian cultural sites is the use of traditional art and iconography in graphic design. It ensures cultural authenticity and introduces visitors to the most exciting history of the country. Having regional cultural attributes in graphic design has a very positive direct effect on the experience of visitors (Lees-Maffei, 2022). Every history and cultural identity of a country leaves a certain residual effect on the architectural peculiarities of its heritage (Wincott et al., 2020). A proper reflection of the region’s cultural identity in the effect of a heritage site is impossible without the use of local art and iconography which is observed across Jordan, such as the heap of big signs and billboards inside Wadi Rum and Petra, along with rock charges bearing Bedouin and Nabatean designs.

The involvement and interest of Jordan’s heritage site visitors can be increased effectively if such approaches as traditional art and iconography are used (Al-kheder, Haddad, Fakhoury, & Baqaen., 2009). This is supposed to reinforce the story of a location and illustrate its cultural diversity and historical significance. The utilization of traditional artwork and ancient symbolism in heritage sites would help preserve Jordan’s cultural history (Staiff, 2016). As historical sites can be described as living museums designed to preserve ancient forms of art for modern visitors, it is safe to say that traditional art and symbols implemented in Jordan’s heritage can be regarded as ongoing efforts to preserve these ancient forms and at the same time, prevent them from being irrelevant in the modern world.

Visual Branding

Visual branding is important in promoting and conserving Jordan's natural heritage sites. That means building a universal visual identity that aligns with shared attributes and beliefs across these sites. These days, graphic design plays its part in giving a brand an overall look and feel through the strategic use of logos, colour schemes, typography, and imagery that targets both local and international audiences (Pervolarakis et al., 2023).

Proper visual branding of heritage sites can help make them more attractive, distinguishing these destinations from all the others users may consider visiting. Heritage sites can have a cohesive and more professional image using consistent branding elements throughout different platforms (signage, brochures, websites or social media) (Khasawneh, 2024). Apart from attracting tourists to the region, this instils a sense of pride and ownership amongst locals).

Visual branding serves as a storytelling device by explaining the history of the property, its culture, or natural wonders visually. By giving him culturally relevant motifs and designs, his branding reflects a rich and ecologically impossibly attractive heritage to be embraced with both arms by visitors. A strong visual brand helps build marketing campaigns, boosting tourism outreach and making content more engaging for visitors with easier ingestion and interesting visuals (Zarandona et al., 2018).

Digital Technologies and Interactive Experiences

The modern art field combines traditional graphic design with digital technologies such as AR and VR more often. Digital approaches provide interactive perspectives that could interest present-day viewers (Harland, 2021). With respect to Jordan, there is a two-level approach to working with an AR app, while in Wadi Rum, tourists are invited to gander at the ancient part of the area and all its natural vacancies. As AR and VR applications are digital tools that could involve viewers and exhibit cultural features, combining them makes it possible for tourists to have an unforgettable experience and live through the Jordan heritage stories. These applications have assured that "tourists can virtually travel along the features of different eras and see how places looked long ago because of the VR app" (Harland, 2021). In its turn, "AR apps can offer an interactive overlay of data. This could be virtual content superimposed over real views".

The development of a 3D documentation system that will detail all the spatial data for each palace can be a useful tool for monitoring purposes. Recognizing that photogrammetry is the commonly used method for collecting 3D descriptions of reality, the image-based modelling method produced highly accurate 3D models of heritage and historical sites and buildings for documentation and presentation reasons (Al-kheder, Al-shawabkeh, & Haala, 2009). Jordan can create a 3D model of an ancient Jordanian city which can help visitors visualize its layout and structure. This way of conveying historical and cultural information can reach people who are planning to visit and can become interested in the site while still at home. Mobile applications provide access to and interpret the site map, and they may provide other languages and be vital for the visitors in the same way as during their visit. In addition, visitor centres work on digital exhibitions and displays in their museums and visitor centres, employing multiple multimedia appliances such as touchscreens, video installations, and interactive kiosks (Pervolarakis et al., 2023). Compared with non-digital exhibits, digital displays are an exceptional way to display what is particularly required at the moment.

Wayfinding and Accessibility

One of the most important uses of graphic design is wayfinding which facilitates the process of navigating through potentially vast and complex environments. The signage in question relies on multilingual language, colour coding, directional signs, information boards, maps, landmarks and unambiguous symbols to cater to the needs of numerous site visitors (van Eeden, 2022). For heritage sites to be accessible, inclusive design is necessary as far as visual communication is concerned (Silberman, 2012). Efficient wayfinding is critical to leading tourists through the often large and complex areas constituting much of Jordan's pristine natural heritage sites. Since the key element of inclusive tourism is accessibility, heritage sites must ensure all their resources and communication means are accessible to tourists, both in terms of physical impairment and visual and listening disabilities (Agustín-Hernández et al., 2020c). The wayfinding objects that aid disabled tourists in engaging with Jordan's heritage sites include braille signs, tactile models, and wheelchair-friendly tactile paths. Digital kiosks and mobile apps can provide real-time information and navigation means to tourists. Such technologies include augmented reality features, GPS-based interactive maps, and voice-narrated guides through which visitors can tour the site by themselves (Gottlieb, 2018).

Environmental Considerations in Design in Jordan

The most important aspect of graphic design at natural heritage sites is the preservation of the environment. Therefore, design elements and their placement should be accomplished in such a way that they naturally blend in with the surroundings and do not harm the environment. Meanwhile, exhibition and proposition designs should

appeal to sustainable materials. The design of heritage sites in Jordan, such as Petra, was sustained using environmental materials and technologies that save energy (El-Harami, 2014). In addition, the Wadi Rum site made a step forward in reducing carbon emissions and maintaining the natural balance in the area by using locally made materials and solar energy to construct new buildings (Abuamoud, 2015). With respect to the restoration of historic buildings, retaining the importance of preserving natural landscapes is also necessary. The design must be so well integrated into the landscape that it should become it (Al Rabady, 2013). This is evident in Wadi Rum as the signs are created in colours and materials and the desert landscape combines perfectly.

In addition, coordinated efforts towards planning recycling, water management and waste disposal systems should be executed to prevent the rise of tourism-induced environmental effects (Abu-Khafajah, 2010). In Jordan's heritage sites, recycling and waste bins are labelled to reduce littering and pollution. These steps include equipping the monuments with rainwater collecting systems and using water-saving facilities in modern restrooms (Alshawabkeh, Alhaddad, & Gandah 2016). Also, the design's potential impact on the animal and plant life in and around the heritage site is a critical element of the environment. Environmental impact assessments can forestall any potential adverse effects of the new constructions and visitor amenities on the locale's fauna and flora (Al-kheder, Haddad, et al., 2009). Presently, tourists are provided with specific paths and limited access to particularly fragile sites to preserve the natural population of these sites in Jordan. Also, guidelines for visiting and exploring heritage sites are available at the site area and on social media (Alamri & Kafafi, 2018).

DISCUSSION

It was found that visual design helped raise visitor interaction and attention to the site in Jordan. Attractively designed interpretive materials, such as displays, pamphlets, and signage, helped attract tourists and kept them engaged (Alshawabkeh et al., 2016). Jordan employed a variety of high-quality images, maps, and diagrams along with AR and VR technologies, which overlay historical images or reconstructions with current views, enabling tourists to virtually 'walk through' its heritage. Digital kiosks and interactive touchscreens featuring multimedia presentations, including videos, animations and interactive maps, allow visitors to visualize different historical layers and significant archaeological discoveries. Printed materials such as brochures, guidebooks and maps incorporating detailed illustrations, photographs and infographics serve as handy guides that visitors can refer to during their visit and take home as souvenirs. Curated exhibits and displays use a combination of texts, images and artifacts in a visually coherent manner (Khasawneh, 2024). Moreover, Jordan has embraced digital marketing and social media with visually appealing content, helping attract a global audience and raising awareness and interest in its cultural heritage.

The research showed that attractive, informative signs increased tourists' attention to the heritage sites of Jordan and increased interaction with them. Moreover, visitors had more information with respect to the sites due to graphic design and visual communication. Tourists tended to remember more information about the sites if materials combined attractive visuals with short but informative interpretations (Hasouneh & Abu Alzeat, 2020). The other site, Wadi Rum, also had more data when presented as attractively designed brochures and displays containing educational text and attractive pictures. In addition, digital technologies contributed to both the interactions and experiences of visitors. When mixed, augmented and virtual reality helped increase visitors' experience and knowledge (Nilson & Thorell, 2018). Such technologies made the given experience more immersive; as a result, visitors remembered more information while being more absorbed in the event. With the help of augmented reality, Petra's visitors could see reconstructions, which helped them understand what the city looked like in the past. Hence, accessibility to design is crucial in tourism in heritage sites (Abu-Khafajah, 2010). The study reiterated that the attractiveness of interpretive materials positively affects efficient communication and education at heritage sites. The application of digital technologies, including augmented and virtual reality, has been proven to improve the interactions and experiences of visitors. Such technologies make visitors' experiences more immersing, thus allowing them to remember more information (Agustín-Hernández, Vallespín Muniesa, & Fernández-Morales, 2020b).

The study shows the importance of accessibility in design. As it was discovered, designing accessible materials, which includes utilizing clearer iconography, accessibility of bilingual text, and standard languages that can attract wider audiences, also broadens the range of visitors. It is integral to ensure that the design is accessible to all visitors, no matter whether they come from vulnerable groups or have other needs that might be difficult to satisfy, keeping the level of accessibility and overall improvement, which could have been provided with the proper design (Alzubi, 2022). Beyond that, the combination of traditional graphic design with modern technologies is able to vastly alter the learning and educational experience of the visitors of heritage sites. As the example with the Petra site shows, adding augmented and virtual uses to the traditional design provided a more engaging and informative learner experience (Khasawneh, 2024). Augmented visualizations of the city allowed

the visitors to see how the city seemed and to naturally place newly acquired knowledge in the appropriate context where it is visible as a real object.

Graphic design plays an essential part in contributing to the accessibility of the historical and cultural content. Additionally, traditional visitor graphic supports can be integrated with virtual reality technologies and multimedia to increase visitor involvement and go deeper into the cultural story (Wincott et al., 2020). With respect to digital reconstructions and 3D modeling, Jordan's culture, history, and heritage have been saved for a long time now by graphic designers. Jordan should take the initiative to 'create heritage places' to support the importance of efforts against tourism and cultivation (Alzubi, 2022). This involves print or digital advertising, which ensures the balance between promoting tourism and preserving heritage. By focusing on the need for sustainable tourism and responsible cultivation, these advertisements can garner support for protective measures, encourage respectful visitor behaviour, and promote conservation efforts that safeguard heritage sites for future generations.

However, among many issues in Jordan, it faces a lack of funding for graphic design for historical preservation. This financial shortfall limits the ability to create effective visual communication tools which are essential to enhance tourism in heritage sites (Al Qur'an, 2019). However, modern design may not accentuate its rich history. While there are many opportunities for the country's history to benefit from graphic design, the bitter truth is that modern innovations may be too difficult to incorporate while keeping things genuine. If implemented efficiently, graphic design at heritage sites can facilitate and promote cultural tourism. As a result, increased tourism efforts can attract more visitors and increase revenue for the country's economy (Ababneh et al., 2016). Working together with a graphic designer, a historian, or a preservationist may come up with various creative and efficient practices. Furthermore, learning and sharing both skills and acquired experience may allow graphic design for the purposes of historical preservation to become of far greater quality in Jordan.

CONCLUSION AND RECOMMENDATIONS

The research highlights the significance of graphic design and visual communication for ensuring that visitors to Jordan's natural heritage sites have interesting and inspiring experiences. High-quality interpretation panels and signage, effective exhibition displays and visual aids will make it possible to pass on the most valuable information to the visitors and connect them with the environment. Simultaneously, design features that "appeal to the sense and emotions" of the visitors, such as appealing visuals and visual narrative, strongly impact how the people interpret and value the natural heritage. At the same time, it is essential to preserve and underline the unique cultural heritage of Jordan. As a result, graphic design needs to incorporate Jordanian art and culture more effectively. Using local motifs, symbols, and narratives without offending the local culture and collaborating with local artists and craftspersons make the design experiences authentic and relative to tourists, promote the best design ideas, support local artists and craftspersons, and preserve the culture. The research also points out that technology provides and can further enhance immersive and attractive experiences at natural heritage sites. The most promising way to do that is through the application of augmented reality, which shows 3D reconstructions and virtual tours and enables visitors to participate in the activities and virtual displays via a smartphone or part of the interactive display. Nonetheless, to ensure that interactive technology is beneficial and inclusive for all interested visitors, more attention should be paid to the issues of the accessibility of disabled people.

The study suggests using a comprehensive set of design guidelines for the development of Jordan's natural heritage monuments. This list should include typefaces, colour schemes, and layouts corresponding to the monument's natural and cultural environment. It should also invest in educational and training efforts for graphic designers, giving them the skills and tools to create successful designs for natural heritage. It also implies a user-centric design approach, which involves performing preliminary research to understand better the needs, expectations, and overall habits of visitors. It is beneficial to gather the visitors' feedback regularly so that the graphic design aspects can be addressed to ensure that they meet the needs of a wide range of users. Graphic designers should be allowed to cooperate with cultural experts so that cultural sensitivity is integrated into design projects. Another necessity is getting in touch with the local community to learn the meanings of natural heritage features and patterns, symbols, and narrations used in the design. Since the design uses local patterns, symbols, and plotlines with special attention to capturing cultural sensitivity, interactive technology and design elements of speech-to-text, punctuation, and touch interfaces, inclusion is ensured in augmenting tourism in heritage sites.

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