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A visitor flow management process for touristified archaeological sites

Fernando Enseñat-Soberanis^{a,b}, Oscar Frausto-Martínez^a and Manuel Gándara-Vázquez^c

^aDivision of Sustainable Development, University of Quintana Roo, Cozumel, Mexico; ^bSchool of Anthropology, Universidad Autónoma de Yucatán, Merida, Mexico; ^cNational School of Conservation, Restoration and Museography-INAH, Mexico City, Mexico

ABSTRACT

In recent decades the number of visitors to archaeological sites has increased exponentially. This increase has generated both negative and positive impacts. This article proposes a Visitor Flow Management Process (VFMP) that aims to minimize the negative impacts and enhance the benefits visitor flows can have in touristified archaeological sites. Although several proposals for visitor management frameworks exist for natural protected areas, for archaeological sites there are only isolated strategies and actions. Following a review of the literature on the visitor impacts and visitor management strategies implemented in 11 touristified archaeological sites around the world, 96 visitor management measures were identified, classified and synthesized into a three stage-process: (1) Restrict the number of visitors; (2) Redistribute visitor flows in time and space and (3) Interpret the archaeological site considering the mass influx of visitors. VFMP is a useful tool for heritage site managers dealing with mass tourism, whose implementation can contribute to reducing damage to heritage and enhancing the quality of the visitor experience.

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Introduction

Tourism and archaeology have always had a difficult relationship. On the one hand, governments and local communities want more tourists in archaeological sites because they generate economic benefits and, on the other, the mass influx of tourists poses new challenges to the conservation of monuments, to the visitor experience itself, and rapidly transforms the way of life for communities located around the sites (Yunfei, 2013).

Although archaeological sites such as Pompeii in Italy or Athens in Greece had already been visited since the nineteenth century by the English aristocracy of the Grand Tour, it was not until the second half of the twentieth century, with the democratization of air travel and access of the middle classes of developed countries to paid holidays, that some archaeological sites became overcrowded. The profile of tourists visiting most archaeological sites open to the public has gone from being an educated minority who prefers little frequented and isolated sites to a less educated one whose main motivation for travel is entertainment and the purchase of souvenirs (Walker & Carr, 2013). In other words, archaeological sites have gone from having a few visitors seeking a deep experience focused on culture to many visitors looking for a quick and superficial experience of the site (McKercher, 2002; Santana Talavera, 2003). This has generated a number of impacts to archaeological sites and the communities that surround them.

In some cases the increase in tourism and visitor flows to archaeological sites has contributed to the economic empowerment of local communities (Jouault, Enseñat-Soberanis, & Pulido-Madariaga, 2014), while in others the scant income from visitors has not generated any economic or social benefits (Cueto Alonso, 2016). Likewise, entrance fees to some sites, such as Caracol in Belize, have allowed for the funding of archaeological excavations and research (Ramsey & Everitt, 2008) and have helped solve some of the high costs of conservation and operation that the management of an archaeological site entails for governments (Hang & Kong, 2001).

In the study *State of conservation of World Heritage properties: A statistical analysis (1979–2013)* published by UNESCO in 2014, 2642 reports of 469 World Heritage Sites were analysed, finding that tourism and uncontrolled mass visitors represent the third greatest threat affecting more sites, after lack of planning and urban sprawl (Veillon, 2014). Negative impacts of visitors to archaeological sites include excess rubbish, graffiti on monuments, increased moisture and CO² levels in closed graves and vaults, abrasion of reliefs and mural paintings by contact of hands and feet and, less frequently, petty theft and vandalism (Comer & Willems, 2011; Demas, Agnew, & Jinshi, 2015; Moreno Melgarejo & Sariego López, 2014; Mustafa & Balaawi, 2013).

Nevertheless, the connection between damage to resources and excessive numbers of visitors is not always clear. While the problems that tourism and uncontrolled mass visitors have brought about in archaeological sites are recognised (Comer & Willems, 2011; Moreno Melgarejo & Sariego López, 2014; Mustafa & Balaawi, 2013; Tinoco, 2003), in some cases it is difficult to establish a direct cause–effect relationship between excessive numbers of visitors and damage to cultural heritage (Demas et al., 2015; Pedersen, 2005). The identification of direct cause and effect relationships between visitors and damage to the monuments could require costly studies that on many occasions site managers cannot afford. Visitor management is, therefore, the tool that has been used to minimize the negative impacts of mass tourism and maximize the positive ones at many natural and cultural sites (Kuo, 2002; Mason, 2005; Shackley, 1998), and, while it may be considered that visitor management is ‘under-theorized and lacks a widely accepted definition’ (Albrecht, 2017, p. 3), it is accepted as a concept that ‘refers to all management tools and interventions that regulate the movements and behaviour of visitors in a destination’ (Albrecht, 2017, p. 4).

Unlike national parks and other protected natural areas whose visitor impacts and management strategies have been analysed and classified since the 1980s in the form of management processes and frameworks (e.g. *LAC-Limits of Acceptable Change*, *ROS-Recreation Opportunity Spectrum* and *VERP-Visitor Experience and Resource Protection*) (Manning & Anderson, 2012), archaeological sites and other cultural heritage sites facing issues of excessive visitor volume do not yet have a theoretical proposal of a visitor management process based on the review of visitor impacts and classification of the visitor management strategies and actions used thus far in the sites.

In light of the foregoing, the primary objective of this article is to propose a visitor management process adapted for touristified archaeological sites, understanding ‘touristification’ as the process by which a space becomes a tourist destination, without this term necessarily having a positive or negative connotation, but simply reflecting the fact that the archaeological site is also a tourist site (Équipe MIT, 2002). The process proposed here is based first on the literature review of visitor impacts on archaeological sites and second on the analysis, classification and synthesis of the strategies and actions implemented or proposed for implementation in 11 archaeological sites located in different parts of the world.

Visitor impacts at touristified archaeological sites

Doubtlessly, a recognition of the effects and impacts of excessive numbers of tourists in archaeological sites, both positive and negative, contributes to the development of more effective management measures (Pedersen, 2002). Thus, the first step in developing a visitor management process for touristified archaeological sites is to accurately determine the impacts these visitors are causing. This analysis may be approached from three perspectives: (1) impact on monuments and structures of

the archaeological site (object); (2) impact on the economy of the population and local governments (context) and (3) impact on the visitor experience (subject).

On monuments and structures

In the ancient city of Petra, in Jordan, the mass influx of nearly 1 million tourists a year has caused severe damage to its sandstone monuments and sculptures. The sensitivity of this stone to abrasion caused by contact of hands and feet is very high (Mustafa & Balaawi, 2013). In Machu Picchu and Huncopampa, Peru, tourists have damaged monuments and sculptures by climbing them, as well as causing a significant increase in the generation of rubbish both within the sites and in the communities that surround them (Moreno Melgarejo, 2012; Tinoco, 2003). Likewise, in the archaeological zone of Pompeii, Italy, the influx of more than 2.5 million visitors a year in just 0.12 km² open to the public led to the deterioration and theft of fragments of murals, frescoes, mosaics, sculptures and fragile objects by tourists, demonstrating that the agglomeration of visitors in small surface areas encourages ongoing petty theft and vandalism (Moreno Melgarejo & Sariago López, 2014).

In Luxor, Egypt, the mass influx of visitors to some graves has caused an increase in moisture and consequent fading of the colour in the reliefs (Hang & Kong, 2001). In Giza, the inappropriate behaviour of tourists climbing monuments, urinating on the limestone or entering structures closed to the public, has damaged the buildings themselves (Evans & Fielding, 1998).

In the management plan for Chichén Itzá, Mexico, it has been observed that excessive numbers of tourists have led to the loss of the original surface of several sacred Mayan causeways – the *sacbeob* – due to the erosion created by thousands of tourist footsteps. They have also generated excess rubbish, violated protective barriers on monuments, and moved and manipulated engraved stones to use them as seats, especially in areas where there is more shade, decontextualizing the objects for future archaeological studies (INAH, 2009a). In Tulum, mass tourism damaged the staircases of the structure called El Castillo to such an extent that they decided to prohibit visitor access to this building. Likewise, thousands of footsteps a day began to damage the imposts and ashlar of the buildings (INAH, 2009b).

On the economy of local populations and governments

Tourism and the mass influx of visitors to archaeological sites has generated economic benefits for local populations in regions where populations have not been able to sustain other activities such as agriculture or livestock over the long run (Équipe MIT, 2002).

In Mayan sites such as Ek Balam in the Yucatan Peninsula, Mexico, the increase in tourists is helping economically empower the local population who have formed cooperatives and offer rural accommodations and cenote swimming to tourists who visit the archaeological site (Jouault et al., 2014). In Caracol, Belize, revenues generated by entry fees have allowed for the financing of archaeological excavations and research (Ramsey & Everitt, 2008), while in Pompeii, Italy, entrance tickets generate around 7% of the total budget needed to keep the site in a 'decent' state of conservation (Moreno Melgarejo & Sariago López, 2014). While this percentage may seem low, before a change in legislation, the site received only 0.72% of the total required to maintain a minimum state of conservation. In Egypt, much of the insufficient funding for the conservation of its archaeological heritage is compensated by tourism (Hang & Kong, 2001).

Conversely, there are archaeological sites that, lacking the monumentality demanded by visitors and tour operators or being located at a distance from large tourist or urban settings, do not receive enough visitors to generate an economic benefit (Sugiura Yamamoto & Nieto Hernández, 2014). In other cases, although tourism generates a significant economic spill-over, this is unequally distributed among the stakeholders in the destinations, benefiting tour operators outside the community and central governments more than the local population (Castañeda, 2009; Mackay & Sullivan, 2013) and

often increasing the social disparity between those locals who are linked to the tourism industry and those who are not.

Too few visitors can generate disinterest on the part of key stakeholders of a destination in preserving their heritage, while excessive numbers can damage the monuments and disturb the tranquility of their villages. When opening archaeological sites to the public, a maximum number of visitors and an 'optimal' entry fee that does not jeopardize the conservation of monuments while generating sufficient income for locals and governments should be determined. While the economic benefit that heritage sites can contribute to the local populations is not always reflected in social well-being, it is the first step toward achieving it.

On the visitor experience

An excessive number of visitors to an archaeological site not only affects the monuments but also the quality of the experience of the visitors themselves. It has been demonstrated that there is a limit on the number of people visitors are willing to see in a site before their level of satisfaction begins to decrease, in something known as the 'social norm' or 'impact acceptability' curve or 'crowding perception' standard (Alazaizeh, Hallo, Backman, Norman, & Vogel, 2015; Manning & Anderson, 2012).

Moreover, visitors with a deep interest in culture are less inclined to tolerate overcrowded spaces than those for whom culture is a secondary motivation for their trip (Alazaizeh et al., 2015). In other words, deep cultural tourists, or those with greater interest in the archaeological heritage are also those less likely to tolerate the agglomeration of visitors. This is consistent with the idea of empty spaces and romanticism with which the 'real' cultural tourist wishes to view archaeological sites (Santana Talavera, 2003). Likewise, the interpretation of the site, the transmission of its historical, scientific and aesthetic values, as well as compliance with standards of behaviour within the site, are all elements that are affected by uncontrolled mass tourism. Moscardo (2009) indicates that tourists should be in a state of 'mindfulness' to be able to appropriately interpret the heritage. In addition, the site should provide a sense of security, as well as good signage, interpretative panels, diverse and multi-sensory activities and develop themes or stories that connect visitors' prior knowledge with the new knowledge they are acquiring.

Although the levels of congestion that a visitor may find acceptable in an archaeological site vary from person to person according to their sociodemographic characteristics and motivations for travel, a minimum standard of acceptability is fundamental to improve the quality of the experience and consequently contribute to the conservation of the site (Alazaizeh et al., 2015). It has been found that overcrowded conditions make it more likely for visitors to choose trails not open to the public with the consequent negative impact on the heritage resource (Burns, Arnberger, & Von Ruschkowski, 2010). Archaeological sites with high levels of visitor saturation are more likely to be damaged than those with low saturation levels. At the same time, a satisfactory experience may, in the long term, contribute to achieving both economic and social benefits in communities around the site (Turley, 1998).

Using visitor management strategies at archaeological sites

All natural and cultural sites open to the public implement or have implemented some strategy of visitor flow management, whether with a simple guestbook or sophisticated information technologies to interpret the heritage. Thus, visitor management encompasses all the strategies used to disperse or concentrate visitor flow, modify their behaviour or provide them with information on the characteristics of the site (Albrecht, 2017; García Hernández, 2003). The term *visitor flow* refers, of course, to *visitors* in plural, insofar as it does not involve individual visitors as much as groups of visitors as a collective, as the primary element to which management strategies must be directed. However, many definitions refer to visitor management in the singular rather than as flow

management. Hence, Sowman and Pearce (2000) define visitor management as ‘the process by which visitors’ use of a national park is structured by an intervening group of managers who determine, influence or organise the interaction between demand (the visitor) and supply (the national park)’ (p. 224).

The objectives for visitor flow management have not changed much since they were first identified in the 1980s (García Hernández & de la Calle Vaquero, 2012; Kuo, 2002b; Manning, 2001; Mason, 2005; Shackley, 1998): (1) conserving the resource and (2) enhancing visitor experience. These two objectives are obtained through the implementation of a wide range of strategies (Albrecht, 2017). In this regard, Kuo (2002) has identified two primary approaches to visitor management: ‘hard’ or regulatory and ‘soft’ or educational.

Hard strategies are aimed at controlling and regulating visitor flows, applying three types of interventions (Orams, 1996): (1) physical (e.g. building fences to protect sensitive resources, viewing platforms, zoning); (2) regulatory (e.g. rules and regulations to control on-site visitor actions such as animal feeding, noise levels or touching sensitive heritage) and (3) economic (e.g. differentiated entrance fees to maximise revenue and distribute visitors throughout the year). Soft strategies, in turn, aim to inform and persuade the visitor using directional information such as signage and maps, visitor codes of conduct and educational interpretative information. It is important to note that while rules and regulations are mandatory measures, codes of conduct appeal to the ‘visitors goodwill’ which in small groups may lead to self-regulating visitor behaviour (Mason, 2005). Moreover, it is very common to find both approaches, hard and soft, being used jointly in natural and cultural sites since ‘hard visitor management strategies are unlikely to be effective in the long term when applied alone, owing to their restrictive character’ (Kuo, 2002, p. 92). Recent studies also confirm that tourists whose main travel motivation is the search for culture or nature, are more likely to support hard management interventions than those who do not have heritage tourism as the most important trip motivator (Alazaizeh, Hallo, Backman, Norman, & Vogel, 2016).

Manning and Anderson (2012) propose four visitor management strategies for national parks. The first is to increase the supply of recreational activities – e.g. set up more trails or expand public areas – to increase the use of the park in certain areas and thus distribute the impacts on the site in time and space in a more balanced way. The second strategy is to reduce the demand or limit the amount of use in certain areas within the park. For this it is necessary to set maximum limits of use of the resource for recreational activities, identifying the uses that have higher negative impacts in nature or when the quality of the visitor experience declines due to congestion or conflicts over space. This strategy is strongly linked to concepts of carrying capacity and Limits of Acceptable Change (LAC). The third strategy, rather than increasing supply or reducing demand, proposes modifying the use patterns of the park, dispersing or concentrating visitors as appropriate. The fourth and final strategy involves reinforcing or making certain areas of the park more resilient, for example, by planting less fragile vegetation near the most frequented trails.

Weaver (2013), in turn, discusses two types of visitor management strategies for tourist destinations: spatial strategies and visitor management strategies. The first acts primarily on the supply, in other words, on the tourist space and usually refers to zoning. The second acts on the demand (tourist) and involve setting limits of visitors per day or time slot, increasing the entry fee to reduce demand; the dispersal or concentration of visitors in space and education and persuasion of visitors to ensure their expectations coincide with the activities and environments of the site.

Thus, the main concern in visitor flow management is the interaction between visitors (demand) and space (offer). In this way, visitor flow management in archaeological sites may be defined as the set of approaches that different site managers implement to influence the interaction between visitors (demand) and archaeological space (offer). In order for this management to be effective, the particularities of the archaeological space, characteristics of its visitors and site management goals must all be taken into account (Leask, 2010).

In addition, there are two points in time at which visitor flow management must be implemented. The first is before the visitor or tourist arrives at the site and has as the objective of influencing the

potential demand of visitors, controlling and dispersing the flows according to whether it is high or low season. The second point is when the visitor is already at the site and involves measures that seek to act on the archaeological offer or space, diversifying and redistributing its flows (García Hernández, 2003). In this way, visitor flow management should consider two dimensions, the visitor and the space; and two points in time: before and during the visit (Figure 1).

While the primary objectives of visitor management have not changed since the 1980s, the methods and techniques used in the sites to study visitor movements and improve the interpretation of the site have evolved with the emergence of new technologies such as GPS, 3D and augmented reality (Hassan & Ramkissoon, 2017; Rueda-Esteban, *in press*; Van der Knaap, 1999).

Although it has been widely argued that regulatory or ‘hard’ strategies should not be the only priority in the management of visitors, the reality is that these are the first steps being implemented in sites dealing with problems of mass visitor influx. On the other hand, more studies are needed to demonstrate that interpretative or ‘soft’ strategies are actually contributing to a change in visitor behaviour and that this change is helping conserve the resource (Leask, 2010; Mason, 2005). The paucity of literature on cross-cultural studies comparing the results of the application of visitor management strategies in developed countries with those obtained in less-developed countries opens the door to yet another direction for future research (El-Barmelgy, 2013; Helmy, 2004). The political, economic and social reasons why the application of visitor management strategies is easier in certain countries than in others has also received little critical attention.

Methods

The main objective of this article is to propose an integral visitor management process adapted to the context of touristified archaeological sites. To achieve this, visitor impacts of 11 archaeological sites (Figure 2) were identified followed by an analysis, classification and synthesis of visitor management strategies and actions implemented or proposed for implementation to alleviate these impacts.

The selection criteria for the sites are: first, the mass influx of visitors and, second, the available published literature, usually in the form of case studies or management plans. While there is no exact number at which an archaeological site may be considered touristified, the figure of around one million visitors a year is a baseline indication that the site has become a tourist attraction (Manning & Anderson, 2012).

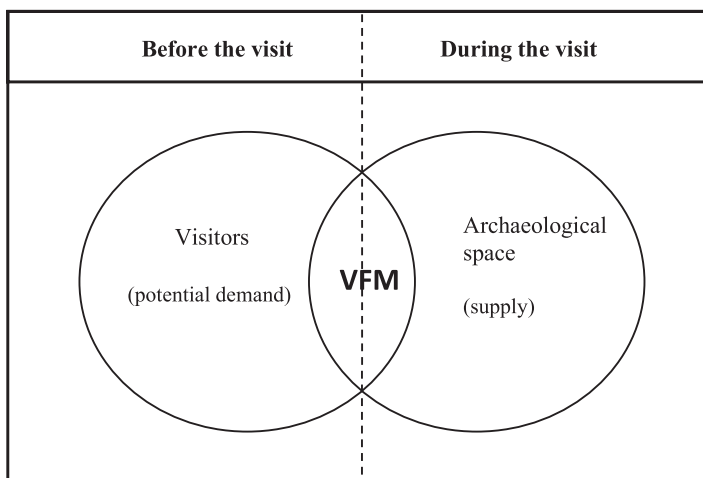


Figure 1. Dimensions and moments in Visitor Flow Management (VFM). Source: Prepared by the authors.

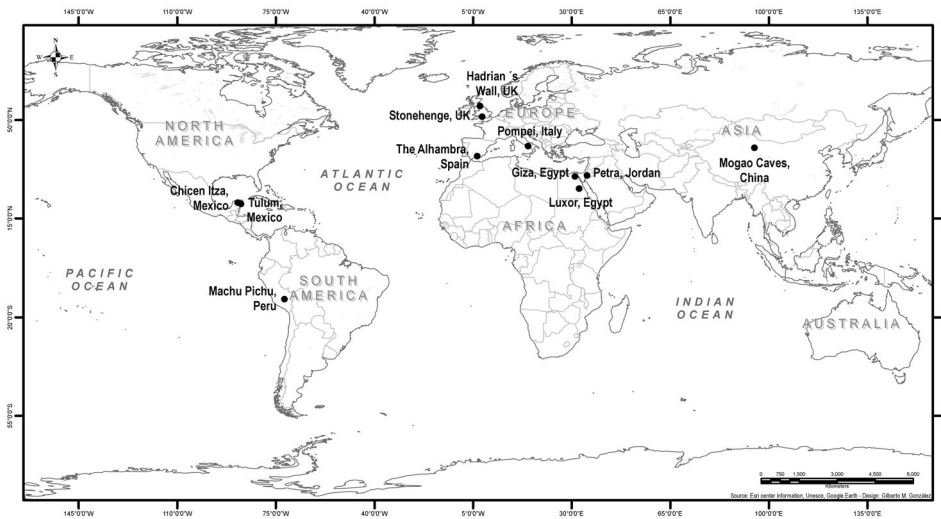


Figure 2. Map with the archaeological sites selected for this study (a high-resolution quality JPGE map will be uploaded at the JHT site). Source: Prepared by the authors.

Hence, the archaeological sites selected were Chichén Itzá and Tulum in Mexico; Machu Picchu in Peru; La Alhambra in Spain; Stonehenge in the United Kingdom; Pompeii in Italy; Giza and Luxor in Egypt; the Mogao Caves in China; Petra in Jordan, and Hadrian’s Wall in the United Kingdom. In the case of Petra, Jordan while the average annual influx in the last ten years is slightly less than 600,000 visitors, in the year 2010 it reached a record high of 918,136 (www.visitpetra.jo). In addition to the above, Petra has abundant literature documenting the problems of mass tourism and the strategies used to mitigate it (Alazaizeh et al., 2015; Comer & Willems, 2011; Mustafa & Balaawi, 2013). Hadrian’s Wall in the United Kingdom was also selected due to the availability of literature, although it also has under one million annual visitors (Turley, 1998; Warnaby, Bennison, & Medway, 2013; Willis, 2009). In some cases, the management plans of the sites were reviewed, while in others, case studies published in specialised journals were consulted (Table 1).

The analysis was comprised of four basic stages. First, the problems and impacts common to all sites with mass tourism were recognised. Second, 96 visitor management measures to alleviate mass visitor problems were identified. The third stage involved classifying the 96 measures into three groups or categories: (1) Restrictive Strategies, measures designed to limit the access or contact between the visitor and the monument; (2) Redistributive Strategies, measures whose purpose, rather than limiting access, is to disperse or concentrate visitors in time and space and (3) Interpretative

Table 1. Documents analysed for each archaeological site.

Site	Authors	Type of document analysed	
		Case study about the site	Management plan
Chichén Itza, Mexico	INAH (2009a); INAH (2012)		✓
Tulum, Mexico	INAH (2009b)		✓
Machu Picchu, Peru	Moreno Melgarejo (2012)	✓	
Stonehenge, U.K.	Mason and Kuo (2006)	✓	
Hadrian’s Wall, U.K.	Turley (1998)	✓	
La Alhambra, Spain	García Hernández (2001); Chamorro Martínez (2004)	✓	
Pompeii, Italy	Moreno Melgarejo and Sariego López (2014)	✓	
Giza, Egypt	Evans and Fielding (1998)	✓	
Luxor, Egypt	Rivers (1998)	✓	
Petra, Jordan	Mustafa and Balaawi (2013)	✓	
Mogao Caves, China	Demas et al. (2015)	✓	

Source: Prepared by the authors.

Strategies, measures whose primary objective is to communicate the values of the site and/or persuade visitors to improve their behaviour within the site. These three categories were determined based on the objectives proposed by the visitor management strategies of Kuo (2002), Manning and Anderson (2012) and Weaver (2013) and considering that the goals of all visitor management strategies fit in with at least one of these three main categories.

When a measure had two or more objectives, as it is the case of visitor centres, which can serve both to interpret the site and to distribute flows, these were classified under two strategies: Redistributive and Interpretative. Following these classifications, 30 Restrictive, 43 Redistributive and 23 Interpretative Strategies were identified.

A fourth and final analysis allowed each group of strategies to be reduced. This reduction was necessary because within each group there were measures that, although they appeared to be different, pursued common objectives. For example, limiting the size of groups to 25 people and limiting visitor access to 300 people every half hour are measures that pursue the same goal: to limit the use of the archaeological resource, and consequently, these were classified as Restrictive Strategies. The end result was one Restrictive, two Redistributive and two Interpretative Strategies. In addition, we distinguished between strategies intended to be applied before the visitor arrives at the site (potential demand) and those implemented once the visitor is at the site (offer).

Results: restrictive, redistributive and interpretative strategies

Before presenting the strategies, it is important to clarify that these three groups (Restrictive, Redistributive, and Interpretative) are not mutually exclusive and that their division is only for the purposes of analysis. In practice, they may be applied simultaneously or in isolation, suggesting that more than headings, these groups should be regarded as attributes that visitor management strategies can have (Table 2).

Restrictive strategies

The idea of limiting or restricting use of a natural resource by establishing a maximum number of visitors in recreational areas began in the 1970s with national parks in the United States. The U.S. government's concern over the growing number of visitors in natural areas led to the creation of a series of management models beginning with the Recreation Opportunity Spectrum (ROS) that defined seven types or 'opportunities' for experiences that may be pursued in parks based on different scenarios or environments (Nilsen & Tayler, 1997). These experiences were distributed in a continuum that went from primitive to urban. In the 1980s, the concept of Limit of Acceptable Change (LAC) began to be implemented, considering the types of experiences defined by the ROS and determining performance indicators or limits of acceptable change for each type of experience. This concept outlined a methodology to establish ecological and social indicators that make it possible to know when the planned limit has been exceeded and act accordingly. In the early 1990s the U.S.

Table 2. Visitor Flow Management strategies for archaeological sites and when they are implemented.

Strategies When implemented	Restrictive strategies	Redistributive strategies	Interpretative strategies
Before arrival at the site (potential demand)		1. Disperse visitors in time through an advance reservation system	
At the site (offer)	1. Limiting the use of the archaeological resource	2. Disperse visitors in archaeological space	1. Communicating the importance of heritage values of the site 2. Persuade visitors and change their behaviour

Source: Prepared by the authors, based on García Hernández (2003) and Manning and Anderson (2012).

National Park Service created the Visitor Experience and Resource Protection (VERP) management model. This model again used carrying capacity as the central element of visitor management, but now based on the quality of the resource values (quality resource values) and the quality of the visitor's experience (quality visitor experiences). The VERP model uses the principles of LAC to the extent that it establishes zones within the park (zoning) and the future conditions each of these zones should attain.

Although widely used in natural areas, the concept of visitor carrying capacity has rarely been applied to cultural sites. In Luxor, Egypt, following various studies demonstrating that 125 people at the same time for one hour in the tomb of Nefertari produced the equivalent to three gallons of water in the walls of the tomb, it was decided to limit access to 150 visitors a day. Other tombs at the same site limited the length of stay of small groups to a maximum of 16 min (Rivers, 1998). In the Mogao Caves in China the physical capacity of the caves and the permissible levels of CO₂ for human health were considered in setting the maximum number of visitors in each cave. Group size was limited to 25 people and in some very crowded caves the viewing duration was reduced from eight to five minutes per cave (Demas et al., 2015).

In the case of archaeological structures in open spaces, it is more difficult to quantify the damage caused by excessive numbers of visitors and consequently, to determine maximum numbers. Although clearly it is possible to recognise that the deterioration of a sandstone façade or a Mayan bas-relief is caused by the abrasion of hundreds of hands and feet, it is not feasible to define a specific maximum number of visitors at which the progressive wear of the façade or the bas-relief becomes irreversible. One poorly sensitized visitor may cause equal or more damage to monuments than 50 conscientious visitors (Pedersen, 2002). In this regard, more than finding a magic number, carrying capacity and Restrictive Strategies seek first of all, to establish a baseline from which flows can be managed and limit visitors from being able to inflict irreparable damage to the heritage site. Protection with fences or ropes, as well as permanently closing access to some structures or quarters considered sensitive are some measures that may be considered Restrictive.

Redistributive strategies

Along with the idea of restricting the number of visitors to recreational areas, there is also a need to redistribute their flows in time and space. In time, through an advance reservation and pre-purchase system, which allows for a balance in the seasonality of visits and in space, through actions that disperse the flow and decentralise the most overcrowded spaces (Leung & Marion, 1999)

The first Redistributive Strategy is associated with the implementation of an advance reservation and pre-purchase ticket system. As Chamorro Martínez (2004) indicates, visitor flow management begins from the moment the visitor decides to go to the site. Advance reservations and pre-purchase of tickets is a fundamental step in starting the redistribution of flows because not only does it allow sites to set capacity limits, but also to distribute the visitors in time, reducing pressure on the monuments and improving the visitor experience. In La Alhambra, Spain, more than 60% of the tickets are sold in advance online or by telephone. The sale of tickets responds to a logic of distribution of flows where the visitor can choose between 17 different timeslots throughout the day (from 8:30 am to 8:00 pm) to enter the Nasrid Palaces, which allows access to 300 people each half hour. This distributes visitors and improves the quality of the visit (Chamorro Martínez, 2004). This strategy seeks to control the flows of potential visitors before they arrive at the site.

The implementation of this system requires significant effort on the part of the managers of the archaeological site to communicate the implications of starting a system of this kind to visitors, tour operators and site workers.

The second Redistributive Strategy is associated with three actions: (1) Adaptation of road and service infrastructure for mass tourism; (2) Expansion of the area open to visitors, considering opening visitor centres and/or interpretative centres and (3) Design and implementation of visiting routes and itineraries.

Adaptation of road and service infrastructure

The construction and adaptation of road and service infrastructure is the first action to be implemented to achieve a correct redistribution of flows. Roads and highways are the most common way to enter archaeological sites. Parking lots are the first point of contact that the visitor has with the site, and their saturation, albeit frequent, is correctable. In Giza, Egypt, a ring road was built that surrounds the area of pyramids and connects to three access gates for each of its main attractions: Khufu Gate, Sphinx Gate and Desert Gate, thereby facilitating the dispersal of cars and buses (Evans & Fielding, 1998).

Expansion of the area open to visitors considering the opening of interpretation and/or visitor centres

Archaeological sites, unlike protected natural areas, need more time to expand to open for visitors due to the excavation, consolidation, restoration, and conservation work that opening a historic monument to the public entails. In this regard, visitor centres are an option to both transmit the heritage values of the site and increase the area open to visitors at the same time as they act as distribution hubs facilitating the control and redistribution of flows (Demas et al., 2015; Evans & Fielding, 1998). Interpretation or visitor centres have a dual function: on the one hand, they must be suitable scenarios to communicate the values of the site to visitors in a controlled, ample and more pleasant environment than the frequently hot and humid climate of some open air archaeological sites, and, on the other, they must 'provide visitors with tools to plan their visit and better understand what they are about to see' (Gándara Vázquez & Pérez Castellanos, 2017, 13).

In the Mogao Caves in China, the construction of a parking lot and visitor centre 12 km from the main entrance will allow them to have better control of large visitor volumes, thus reducing crowding at the main entrance. People will be moved on a small bus from the visitor centre to the caves (Demas et al., 2015).

Design and implementation of visitor routes and itineraries

Another action associated with the second Redistributive Strategy is the design and implementation of itineraries or routes by means of signposted paths that allow visitors to enjoy the site while 'forcing' them follow a mapped route, thus reducing the possibility of damage to the heritage site. It has been found that when recreational spaces are saturated, visitors opt to leave the trails and occupy areas not open to the public to the detriment of the natural or cultural resource (Burns et al., 2010). In other words, touristified sites must have well-signposted suggestions for routes and itineraries principally for two types of visitors: for individuals, who make the tour independently, and groups, who usually move through the site accompanied by a guide. The design and implementation of trails and itineraries must have a dual purpose: (1) to protect monuments by keeping visitors away from the most fragile buildings while concentrating them in more resistant areas and (2) to improve the quality of the experience *in situ*, making the visit more fluid and enjoyable.

Interpretative strategies

Two primary Interpretative Strategies were identified in archaeological sites: (1) to communicate the importance of the heritage values of the site and (2) to persuade visitors to change their behaviour *in situ*, thereby minimizing the negative impacts to the monuments (Gándara, 2012; Weaver, 2013). However, the case studies and management plans reviewed do not provide sufficient information about the specific measures sites have implemented to interpret heritage, focusing more on restrictive and redistributive interventions. This confirms that in touristified heritage sites the first priority is to regulate, control and redistribute visitor flow and then, to interpret the site.

In our analysis of the interpretative measures adopted or proposed for implementation in the archaeological sites selected, the tendency observed was the construction of visitor centres which function at the

same time as museums and interpretative centres (Demas et al., 2015; Evans & Fielding, 1998; Mason & Kuo, 2006; Moreno Melgarejo & Sariago López, 2014; Mustafa & Balaawi, 2013; Turley, 1998)

In the Ancient Roman archaeological site of Hadrian's Wall in the United Kingdom, a visitor centre was proposed to convey the importance of the site, as well as a museum to exhibit the archaeological objects as part of daily life and not merely 'archaeological curiosities' (Turley, 1998). In Chichén Itza, Mexico, there is a proposal to interpret the site so that the visitor may recognise and appreciate its aesthetic, historical and scientific value (INAH, 2012). In contrast, in Petra, Jordan, the proposed priority is to inform and sensitize visitors on the possible damage that their presence may cause to the heritage site before and during their visit, which corresponds to the second interpretative strategy. However, these strategies were identified as the least used in the sites.

Although interpretation originally focused more on sensitizing and conveying the cultural and natural importance of the heritage site to the visitor, with the exponential increase of people in some national parks in the 1980s and 1990s, the priority of interpretation came to focus more on management of visitor behaviour (Moscardo, 2017).

It is important to note that interpretation has a dimension linked to the degree of authority or power exerted in the communicative process, where coercion is situated at one extreme and persuasion at the other (Moscardo, 2017). The first seeks to enforce the rules and regulations of the site in a compulsory manner, while the second seeks to convince visitors by explaining the reasons why. Both are part of the same continuum and should be applied in a joint manner for best results, especially when it comes to large sites where limited surveillance may be remedied with interpretations that inform and persuade the visitor to adhere to the site rules and regulations. An example of the above occurs in La Alhambra, Spain, where, as with many other archaeological sites with murals, stuccoes or bas-reliefs, visitors are prohibited from touching the walls and ceilings decorated with plaster, wood, and ceramics. To compensate for the above, the site has 'touch points' where not only are the reasons for not touching explained, but visitors are offered an alternative where they may touch reproductions of the original works made with similar materials, giving the visitor the opportunity to feel the same textures, shapes, and colours (Figure 3).

These two interpretative strategies are not necessarily mutually exclusive. In a proposal currently under development in Mexico known as 'meaningful divulgation', Gándara (2018) maintains that they are complementary and equally essential. While helping visitors understand the heritage values, it is also necessary to promote a culture of conservation that starts with respectful conduct during the visit. In other words, it is not possible to interpret heritage values and not make a call to conserve them.

This idea is at the heart of the thematic interpretation strategy proposed by Ham (2013), who suggests that an act of successful communication can provoke not only reflection on heritage, but a change in beliefs, then, impact attitudes and, in the best of worlds, produce changes in conduct. Although few studies have shown that successful interpretation actually translates into a long-term change in visitor conduct (Mota, 2015; Munro, Morrison-Saunders, & Hughes, 2008), the interpretative measures that seek to activate visitor values through interactive and visual means rather than solely relying on words and numbers have proven to be the most effective interventions in influencing visitor attitudes and behaviour (Ballantyne, Hughes, Lee, Packer, & Sneddon, 2018; Copeland, 2004; Walker & Moscardo, 2014). In archaeological sites and historical sites in general, touching replicas of objects, observing virtual reconstructions of buildings and artefacts in ruins as well as seeing representations of daily life in the past, have proven to be important interpretative measures in achieving a memorable, significant, and gratifying visitor experience (Copeland, 2004; Turley, 1998).

Interpretation in touristified heritage sites must be designed in consideration of non-captive visitors making a sequential visit (Ham, 2013). Non-captive because unlike students who must obtain a grade, visitors may decide not to pay attention to what they observe or hear; and sequential because about 80% of the visitors in most touristified patrimonial sites visit through a guided tour following a specific sequence or order (Alazaizeh et al., 2015; INAH, 2009b, 2012).

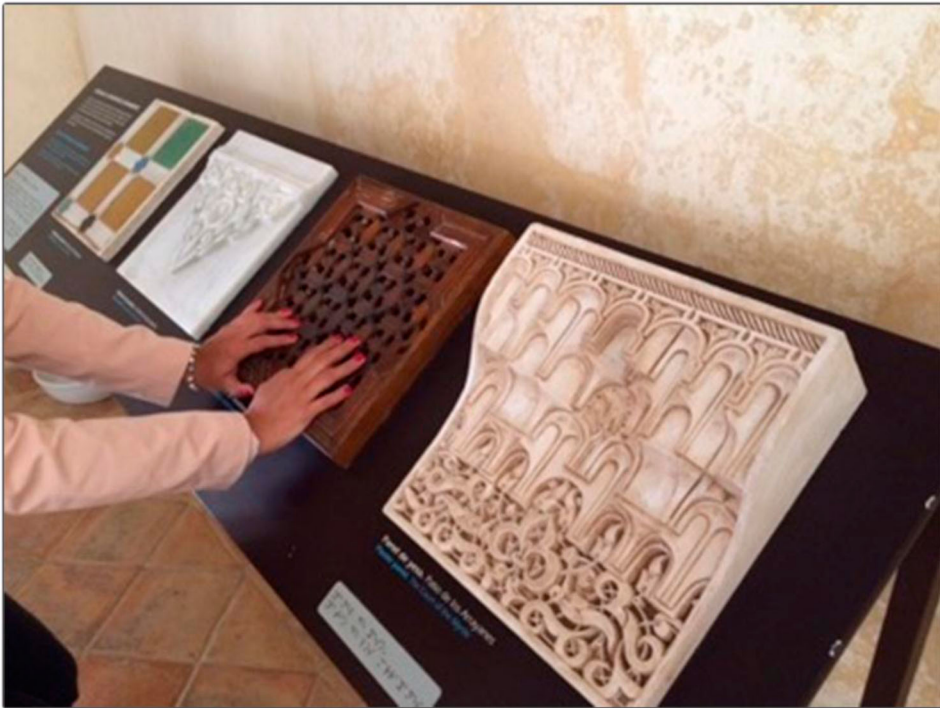


Figure 3. Touch points where visitors to La Alhambra can touch and experience copies of original works in the Nasrid Palaces. Source: Fernando Enseñat-Soberanis.

Visitor flow management process

Management is comprised of processes, and an articulated set of processes produces a management system (UNESCO, 2013). All management processes, in turn, consist of a series of stages whose objective is to produce a result that improves a current state. In this way, the primary goal of visitor management processes is to conserve the site and improve visitor experience (Mackay & Sullivan, 2013). In this regard, it is pertinent to incorporate Restrictive, Redistributive and Interpretative Strategies in the form of a process that comprises visitor flow management (Figure 4).

This process has three stages in turn associated with different strategies and actions. The first stage consists of *Restricting* the number of visitors and is associated with strategies for limiting the use of the archaeological resource and the action of estimating a maximum number of visitors allowed per day and per timeslot. The methodology of estimating visitor capacity adapted to archaeological sites is a suitable way to complete stage one.

The second stage of the process involves *Redistributing* the flows in time and space by adapting the road and service infrastructure, implementation of advance reservations and pre-purchase of tickets, increase in available area open to visitors and development of trails and routes. This involves adapting access roads to the site, parking lot capacity, and restrooms to the number of visitors. It is difficult to speak of good visitor management if the entrance, number of parking spaces and basic facilities such as restrooms and rubbish bins do not correspond to the number of visitors.

The third and final stage consists of *Interpreting* the site, communicating its values and persuading the visitor to behave more responsibly. This should also be implemented taking into account the daily volumes of people who visit the site. The construction of a visitor centre with the sufficient capacity to hold visitor volumes should be considered.

It is important to point out that in practice sites do not implement all stages of the process, nor do they do so in the proposed order. Some have never estimated the maximum number of visitors but

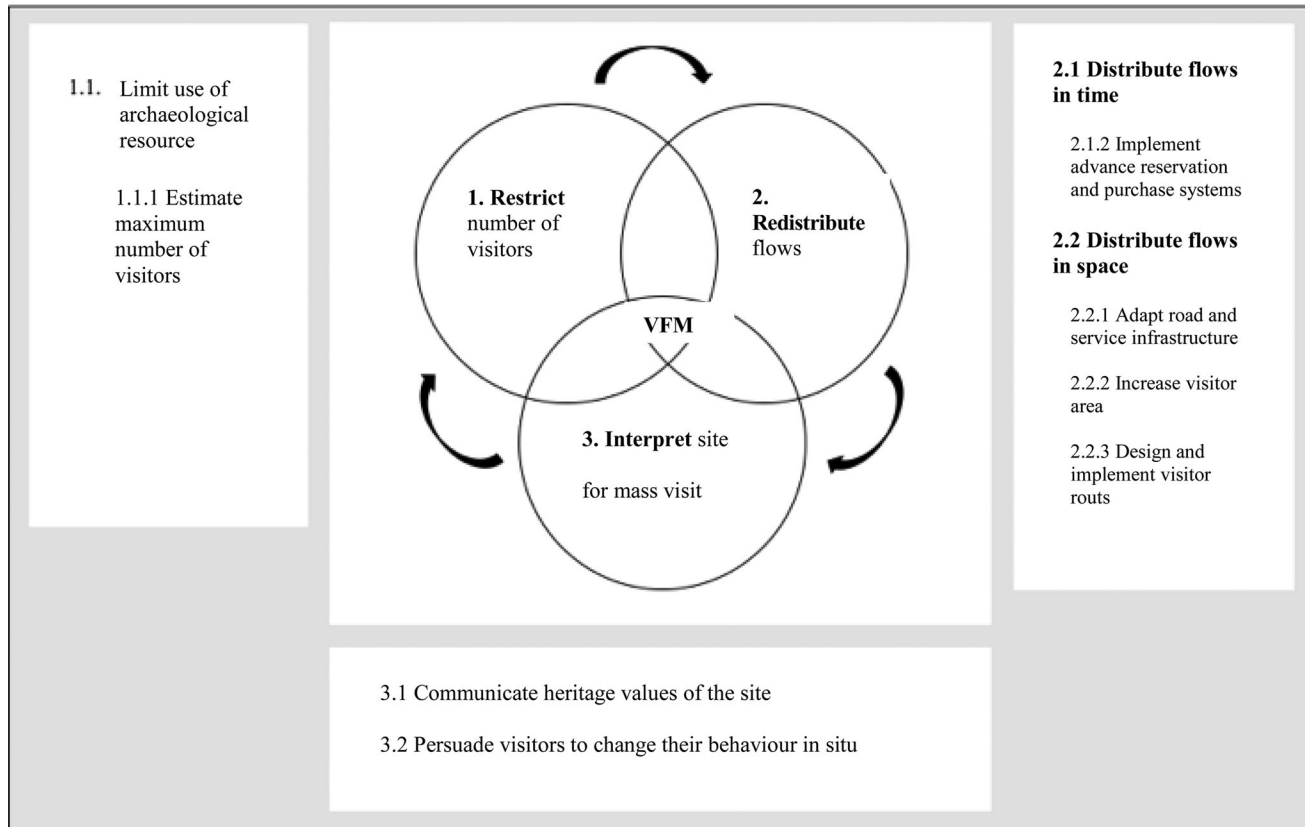


Figure 4. Visitor Flow Management Process (VFMP) for touristified archaeological sites and the strategies and actions associated with each stage. Source: Prepared by the authors.

have designed trails and routes. In other cases, land access roads have been adapted but no visitor centre exists to act as a distribution hub. An appropriate visitor flow management must follow the three stages. This proposal is intended to be a guide for better visitor management of archaeological sites and to minimize, in this way, the negative impacts of mass tourism. Finally, before implementing any strategy, it is important to consider the site-specific characteristics, their management objectives and the type of visitor who frequents them. Otherwise, one runs the risk of having an ineffective flow management.

Discussion and implications

Mass tourism is impacting archaeological sites in a number of ways. Negative impacts include damage to monuments and the detriment to visitor experiences while positives include revenues for local inhabitants and governments.

Although there are frameworks created expressly for the management of cultural heritage in general (UNESCO, 2013) and the management of visitors at natural areas in particular (e.g. *ROS*, *VERP*, *LAC*) (Kuo, 2002; Manning & Anderson, 2012; Weaver, 2013), there is a shortage of proposals for visitor management frameworks adapted to archaeological spaces with mass tourism (Mackay & Sullivan, 2013). It is not appropriate to manage a touristified archaeological site in the same way as one with low numbers of visitors. Although their conservation goals are the same, the agents of deterioration are not, and therefore their management priorities are different as well. Sites with mass tourism must allocate resources prioritizing the implementation of measures that help mitigate the negative impact of tourism on the site.

In this regard, this work analyses, classifies, and synthesises 96 visitor management strategies found in the literature review of 11 archaeological sites with high tourist demand, proposing the implementation of a Visitor Flow Management Process (VFMP) consisting of three stages: (1) Restrict the number of visitors, (2) Redistribute the visitors in time and space and (3) Interpret the site in order that heritage values may be communicated and visitor behaviour can be modified. Each stage is associated with specific strategies and actions to complete the process. Although appropriate visitor management must complete all three stages of the process, in touristified heritage sites priority should be given first to Restrict, then to Redistribute and finally to Interpret.

The Restrictive stage coincides with the physical and regulatory 'hard' strategies mentioned by Kuo (2002) and Orams (1996) since the latter seeks to control visitor flows with rules, regulations and physical barriers. Likewise, the strategy limiting the use of the resource proposed by Manning and Anderson (2012) for national parks may be considered as part of the Restrictive stage. The Redistributive stage corresponds to Manning & Anderson's strategies: increasing the supply of recreational activities and modifying visitors' use pattern. The Interpretive stage of the process coincides with many of the 'soft' strategies indicated by Kuo (2002), Mason (2005) and Copeland (2004).

The touristification of archaeological sites open to the public is a process that is difficult to avoid, and its most negative impacts are not only at the level of damage to heritage and visitor experience but also as a generator of social conflict originating in the struggle between different stakeholders in taking advantage of the economic benefits the archaeological resource generates. Moreover, sites are unable to transmit their heritage values in overcrowded contexts, making them solely recreational areas, completely losing their original function as museum spaces.

While it is true that there are cases where visitors deliberately inflict damage on cultural heritage, such cases of vandalism are comparatively infrequent. In most cases, the damage is not intentional but the result of inadequate infrastructure, poor interpretation and tourist overcrowding concentrated in particular areas of the site (Burns et al., 2010; Evans & Fielding, 1998).

It is not a question of satisfying all the needs of the visitor to the detriment of the conservation of the structures, but of identifying their patterns of movement and use and to condition the archaeological space, where possible, in such a way as to protect the buildings and improve the experience. An simple example that illustrates this well is the installation of benches in certain areas of Luxor,

Egypt, so that the tourist can sit in the shade, thus reducing the improper use that had been made of using archaeological structures as seats (Rivers, 1998). Preventing damage to a heritage site is relatively straightforward: a protective barrier, prohibiting visitors from climbing a temple or closing a path. Once these restrictive measures are implemented, the damage, if not completely avoided, decreases significantly.

On the other hand, overcrowding in these sites deters tourists for whom culture is the central core of their travel and who seek deep cultural experiences, and attracts tourists seeking superficial cultural experiences for whom culture is a secondary motivation for their visit (Alazaizeh et al., 2015). In other words, crowded archaeological sites could discourage the 'good' tourists and attract the 'bad' ones. Both local inhabitants and governments want increasingly more tourists, without realizing that the saturation of the site could ultimately result in the disinterest of independent tourists and tour operators seeking less crowded and better organized sites.

Of all the strategies identified in archaeological sites, the Restrictive measures of estimating maximum visitor capacity and setting limits to the number of people per day and timeslot, are the first steps that must be implemented in touristified sites (De La Calle Vaquero & García Hernández, 2015; García Hernández, 2001). The model of Limits of Acceptable Change (LAC), which, rather than setting limits on the number of visitors, sets limits in terms of impacts, has been poorly adapted to cultural sites. Historical and archaeological monuments do not have the capacity to regenerate like natural areas, and to define an acceptable 'limit' for the impacts that the visitor can cause, would imply the acceptance of damage difficult to reverse (Demas et al., 2015).

While clearly there is a consensus recognising that Restrictive strategies are the most relevant measures for flow management, these measures, considered 'hard' approaches – as opposed to interpretative or 'soft' approaches such as persuasion – have more of an effect on visitor experience than on reducing damage to the heritage. Solely limiting the number of visitors does not always guarantee a decrease in damage (Mason, 2005; Pedersen, 2002), with the exception of closed rooms and vaults where the production of CO₂ and moisture increase with the agglomeration (Demas et al., 2015).

The VFMP described in this paper represents a theoretical contribution to better understand the impacts of tourism at archaeological sites and how these impacts can be managed through strategies and actions presented in the form of a process. VFMP may be a useful tool to be considered by not only managers of archaeological sites but managers of all types of heritage attractions having problems with excess tourist traffic. Future research in visitor management should focus on analysing the factors behind which certain visitor management strategies succeed or failed in more developed countries compared with their success or failure in less-developed countries.

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Notes on contributors

Fernando Enseñat-Soberanis, PhD Student at the Department of Sustainable Development at Universidad de Quintana Roo, Mexico. Graduated from University of Quebec at Montreal (UQÀM) with a Master in Tourism Management and Planning. He has been working as a Professor at UADY and his research interest focus on visitor management strategies, sustainable tourism and carrying capacity at turistified archaeological sites and natural protected areas of the Yucatan Peninsula, Mexico.

Oscar Frausto-Martínez, Professor at the Graduate Program in Sustainable Development and Geography at Universidad de Quintana Roo, Mexico. PhD. in Research and Spatial Analysis from University of Bauhaus, Germany and

graduate studies in Geography and Management of Natural Resources. His research focus at indicators for sustainable tourism, geomorphology, GIS and remote sensing management in tropical countries.

Manuel Gándara-Vázquez, Professor at the Graduate Program in Museology at Escuela Nacional de Conservación, Restauración y Museografía of the Instituto Nacional de Antropología e Historia in Mexico City. Ph. D. in Anthropology. Ph. D. in Design and New Technologies with graduate studies in Anthropology and Philosophy of Science (Univ. of Michigan). He has published extensively on Archaeological Theory, Epistemology and Philosophy of Social Science, as well as on computers in education, human-computer interaction and usability. Currently doing research on socialization of archaeological knowledge as a way to foster heritage conservation at museums and archaeological sites, specially through the use of digital technologies and new communication strategies. Former Fulbright Scholar.

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