Cultural heritage in context: the temples of Nubia, digital technologies and the future of conservation

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Introduction

The conservation of tangible cultural heritage, be it objects or buildings, is strongly focussed on materials and their treatment. Even with the increased interest in intangible cultural heritage and the new understandings it has fostered in conservation, attention to the intangible aspects of archaeological objects and monuments is still far from widespread. There are several possible explanations as to why this is the case, chief among which is that the preservation of tangible and intangible heritage is addressed by many different disciplines, including the material sciences, conservation, architectural history, anthropology and archaeology. As such these have their own research concerns which do not necessarily align with those others, especially because of the different theoretical approaches and different methodologies.

If the context of cultural heritage is not fully considered we are faced with a fundamental loss of information. This is a well-known problem for museum collections where, for example, an object's provenance is unknown or unclear. In the case of archaeological finds, apart from the find spot and date, there is always the absence of the rich biography and diachronic history that an object or building has taken on during its existence. Thus the environmental and cultural context of material remains changes over time and has at least two major components: (a) the original context in the past, in which material culture was produced, used and discarded; and (b) its context as cultural heritage in the present day as informed by different systems of value. Any critical or postcolonial approach to cultural heritage thus needs to discern how and why certain objects or buildings are considered worthy of preservation. Preservation represents a particular narrative, closely linked to the representation of identities of the original creators and owners of ancient material culture. Thus the question of who represents who in the preservation and display of cultural heritage is an urgent one.[1]

We argue that even if the original context is lost, the situation can be improved by collecting, combining and making accessible all extant information about an object or site. For older conservation projects, conceived before the notions of intangible cultural heritage, cultural landscape and indigenous agency were considered important, some of that missing information can be reconstructed. Gathering information and presenting it in digital forms arguably provides new avenues of aggregating and presenting the results of multi-disciplinary research and, in this case, to recreate lost context. Using digital platforms has become mainstream in the context of cultural heritage and enables the integration and preservation of data in multiple formats. It has thus become possible to preserve or recreate contexts by linking digitised information around physical collections or buildings, which allows for a distributed, but fuller and more inclusive understanding of cultural heritage in its topographical and cultural contexts. It also permits multiple researchers, stakeholders and the general public to contribute to the knowledge base, and

1 Cf. Stuart Hall, Jessica Evans and Sean Nixon, *Representation: Cultural Representations and Signifying Practices*, 2nd edn [Thousand Oaks, CA: Sage, 2013]; Mary Lawlor, *Public Native America: Tribal Self-Representations in Casinos, Museums, and Powwows* (New Brunswick, NJ: Rutgers University Press, 2006); Mario Gooden, *Dark Space: Architecture, Representation, Black Identity* (New York: Columbia Books on Architecture and the City, 2016).

include the intangible aspects of otherwise tangible items of cultural heritage. In this article we will illustrate the potential of this approach by discussing a recently initiated collaboration, *Digital Nubia: Cultural Heritage in Context*, between the University of California, Los Angeles, USA (UCLA) and the Politecnico di Torino, Italy (POLITO) centred on the study of the Nubian temples rescued in a large United Nations Educational, Scientific and Cultural Organization (UNESCO) effort in the 1960s.[2]

We describe a multi-faceted approach to context through the development of a three-dimensional virtual reality (3DVR) project that aims to recreate the drowned cultural landscape of Egyptian Nubia, defined as the area of the Nile Valley between the first and second cataracts (Fig. 1).

We describe how a 3DVR landscape model will function as the platform on which we propose to incorporate information on the history, research and methods of the preservation of both tangible and intangible aspects of Nubian heritage. The latter is not only relevant in the light of the construction of two dams on the Egyptian side of the Nile—the first, the Aswan Low Dam, was built between 1898 and 1902 and the second, the Aswan High Dam, between 1960 and 1970—but also in relation to the ongoing threat to the region from current plans for the damming of the Nile in Sudan and Ethiopia.[3]

The proposed platform not only will visualise aspects of the lost Nubian landscape but will provide a means to incorporate elements of its tangible and intangible heritage. It will be designed as a resource for further research, as well as a carrier of multi-vocal narratives. The contributions by academics will be linked to information from museums, interviews with archaeologists who worked in the region in the 1960s, memories of the Nubian population,

2 See Torgny Säve-Söderbergh, *Victoire En Nubie: La Campagne Internationale De Sauvegarde D'Abou Simbel, De Philae Et D'autres Trésors Culturels* (Paris: UNESCO, 1992).

3 See Abdul Latif Jameel, 'The Grand Ethiopian Renaissance Dam: An Opportunity for Collaboration and Shared Benefits in the Eastern Nile Basin', Brief to the Riparian Nations of Ethiopia, Sudan and Egypt by the International, Non-partisan Eastern Nile Working Group convened at the Massachusetts Institute of Technology, (2014), https://jwafs.mit.edu/sites/default/files/documents/GERD_2014_Full_Report.pdf (accessed 7 April 2017).
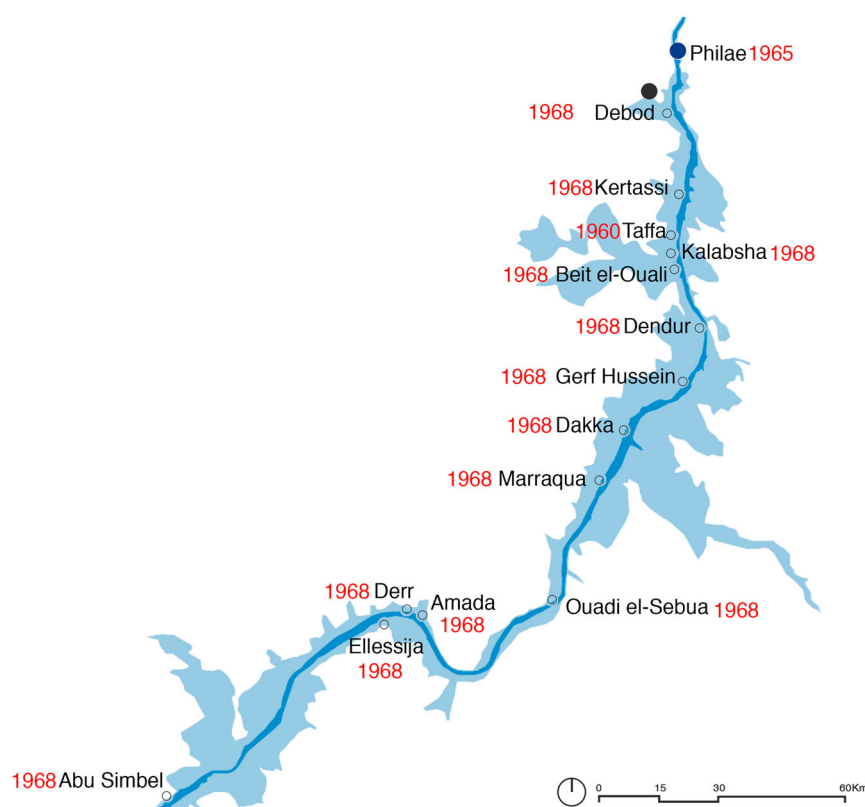

Fig. 1 Map of the Nile Valley south of Aswan: the original Nile course is dark blue and the extent of Lake Nasser after building the Aswan High Dam in light blue. Years in which sites were expected to flood are in red (drawing by Monica Del Fabro, Valentina Marchisio, Elena Zanardo). Digital Nubia: Cultural Heritage in Context, POLITO_UCLA, 2017.

as well as ephemera and documents from the recent past, such as the letters written in protest of the resettlement of the Nubians.

The long history of Nubia, from prehistory to the present,[4] has produced a material culture replete with objects and architecture in a rich topographical, archaeological and historical context without which those ceramics, textiles, basketry, leather and wooden objects, worked stone, houses, fortifications and temples lose much of their meaning. Unfortunately much of this contextual information is now under the waters of Lake Nasser in a territory newly shaped by the flooding, and excavations have brought to light only a mere fraction of what had been preserved—in surprisingly good condition— throughout millennia. Inevitably, most attention has been given to large monumental architecture including the temples of Nubia (see Table 1).[5]

The research discussed here is charged with linking the now relocated temples back to their original location, that is, via the representation of the topographical conditions pre-flooding, and including the then extant villages and landscape. The decisions made in the 1960s of what to record or preserve and what to forego were subject to perceived values, costs, urgency and timescale. These are all part of the contextual narrative and the choices would probably be quite different if the same situation would present itself today. The notion of cultural heritage is a cultural product, and is one that has been changing in the decades following the UNESCO campaign. Therefore Nubia provides an excellent case to reveal both the *site* and the *place* of cultural heritage.

UNESCO's Nubian Campaign: the political and cultural context

The construction of the Aswan High Dam is closely connected to the political manoeuvring of Gamal Abdel Nasser, president of Egypt from 1956 to 1970, and set against the backdrop of the Cold War.[6] Even before the decision was made to build the dam, archaeologists had sounded the alarm bell because it was feared that the archaeology of an entire region would be destroyed in the same way as the temples of Philae, which were already under water for part of the year due to the building of the Aswan Low Dam.[7] In fact, after the Low Dam was constructed, from 1907 onwards surveys were organised to record the area that was expected to be flooded and, as part of this work, topographical maps at a scale of 1:25,000 were created by the Cairo Survey Department and published in 1910.[8]

Before the construction of the Aswan High Dam in the 1960s a limited area had been subject to seasonal flooding because of both the inundation of the Nile river and the construction of the first dam (Fig. 2). However, with the High Dam the area between the First and Second Cataracts and part of Sudanese Nubia were to be completely drowned as Lake Nasser attained full capacity in accord with the plan. In April 1959 the Arab Republic of Egypt asked UNESCO for international assistance in a bid to save the monuments of Nubia. In October 1959 the Sudanese government made the same request as it was estimated that the lake would flood an area of over 100km long between these two countries. The river level was predicted to rise to 125m above sea level (asl), but UNESCO estimated that it could actually rise to 180m asl.[9] Temples, tombs, fortresses and archaeological sites would be completely submerged and the dam project would force the Nubian population to resettle in the south of Egypt and the north of Sudan (see Figs 2, 3 and 4).[10]

The campaign to preserve the Nubia monuments marks a fundamental point in the preservation of world cultural heritage as it highlighted the role of the world community, through UNESCO, in the organisation and operation of the rescue attempt. It was the first time that UNESCO had become involved in such a large international undertaking, although initially its intervention was not obvious nor immediately effective. Gradually the organisation became convinced that the rescue of the Nubian heri-

4 Cf. William Y. Adams, *Nubia: Corridor to Africa* (London: Allen Lane, 1977).

5 *Temples and Tombs of Ancient Nubia. The International Rescue Campaign at Abu Simbel, Philae, and Other Sites* (Paris/London: Thames and Hudson, UNESCO, 1987).

6 See, for example, Hussein M. Fahim, *Dams, People, and Development: The Aswan High Dam Case*, Pergamon Policy Studies on International Development (New York: Pergamon Press, 1981).

7 Henry G. Lyons, *A Report on the Temples of Philae* (Cairo: National Print, 1908); and Henry G. Lyons, *A Report on the Island and Temples of Philae* (London: Waterlow, 1896). See also Säve-Söderbergh, *Victoire En Nubie*.

8 Survey Department Cairo, 'Topographical Map of the Nile Valley Showing the Positions of Cemeteries', in *The Archæological Survey of Nubia. Report for 1907–1908*, vol. plans II–VI, ed. Henry G. Lyons et al. (Cairo: National Printing Department, 1910).

9 Arpag Mekhitarian, *La Nubie Antique: Plaquette Réalisée Avec Le Concours Du Ministère De L'instruction Publique, Dans Le Cadre De La Campagne De L'UNESCO En Faveur Des Monuments De Nubie* (Brussels: Fondation égyptologique Reine Élisabeth, Weissenbruch, 1960).

10 Fahim, *Dams, People and Development*.

Table 1 Nubian temples transferred during the UNESCO Nubian Campaign.

Name	Present location	Period	Features
Philae Temple Complex	Agilkia Island	Greco-Roman Period	12 temples, including the large Isis Temple
Temple of Debod	Cuartel de la Montaña Park Madrid, Spain	Greco-Roman Period	
Temple of Taffeh	Museum of Antiquities, Leiden, The Netherlands	Greco-Roman Period	
Kiosk of Qertassi	Rebuilt just south of the Aswan High Dam	Greco-Roman Period	
Temple of Kalabsha	Rebuilt just south of the Aswan High Dam	Greco-Roman Period	Built by Augustus and dedicated to local god Mandulis
Temple of Beit el-Wali	Rebuilt just south of the Aswan High Dam	New Kingdom Period (Ramesses II)	Originally near Kalabsha
Temple of Dendur	Metropolitan Museum New York, USA	Roman period	Built by Augustus
Temple of Gerf Hussein	Outside pillared court rebuilt near new Kalabsha, rock cut temple submerged	New Kingdom Period (Ramesses II)	Rock cut temple with pillared court outside
Temple of Dakka	Rebuilt near the former site of Wadi el-Sebua on higher ground	Ptolemaic Period	
Temple of Maharaqqa	Rebuilt near the former site of Wadi el-Sebua on higher ground	Roman Period	
Temple of Wadi el-Sebua	Rebuilt near the former site of Wadi el-Sebua on higher ground	New Kingdom Period (Ramesses II)	
Temple of Amada	Rebuilt near the former site of Amada on higher ground	New Kingdom Period (Thutmose III and Amenhotep II)	
Temple of el-Derr	Rebuilt near the former site of Amada on higher ground	New Kingdom Period (Ramesses II)	On the East Bank of the Nile
Tomb of Pennut	Rebuilt near the former site of Amada on higher ground	New Kingdom Period (Ramesses IV)	Originally near Aniba
Temple of Elissiya	Museo Egizio in Turin, Italy	New Kingdom Period (Thutmoes III)	Rock cut temple
Temples of Abu Simbel	Rebuilt in an artificial mountain about 60m above their original location	New Kingdom Period (Ramesses II)	
Temple of Aksha	National Museum of Sudan, Khartum	New Kingdom Period (Ramesses II)	
Fortress of Buhen	The Temple of Buhen was transported to the National Museum of Sudan, Khartum	New Kingdom Period (Hatshepsut)	Only the New Kingdom temple was moved to Khartum. The mud-brick fortress is submerged
Fortress of Semna East	The Temple of Semna East was transported to the National Museum of Sudan, Khartum	New Kingdom Period (Hatshepsut)	Only the New Kingdom temple was moved to Khartum. The mud-brick fortress is submerged
Fortress of Semna West	The Temple of Semna West was transported to the National Museum of Sudan, Khartum	New Kingdom Period (Hatshepsut)	Only the New Kingdom temple was moved to Khartum. The mud-brick fortress is submerged

tage was of world importance and at the 1954 General Conference in Montevideo it was agreed to sponsor a study of Nubia, after which, in November 1959, UNESCO launched an international campaign.[11] At the official inauguration on 8 March 1960 the then Director-General of UNESCO explained that 'it is not merely a question of preserving something which may otherwise be lost: it is a question of bringing to light an as yet undiscovered wealth for the benefit of all'.[12] The aim was only partially focussed on the physical preservation of the tangible heritage as it was also seen as an opportunity to gain a wealth of knowledge, for a 'new era of magnificent enrichment […] in the field of Egyptology'.[13]

Although the campaign had the same goal for all of Nubia, the solutions for the rescue of cultural heritage differed per region. There were four types of intervention: on site preservation; transportation of monuments to other sites; documentation through surveys and photography; and excavations. The decisions taken were based on the number and dimension of the ancient remains, the costs of the transfer and their 'artistic value'. As a con-

[11] UNESCO, *Campagne Internationale Pour La Sauvegarde Des Monuments De La Nubie. Note D'information*, 15 January 1960, typewritten document (UNESCO archives, Museum-Egypt-Nubie 28/069 (62), 1960).

[12] Vittorino Veronese, *Appeal by Mr. Vittorino Veronese Director-General of UNESCO, International Campaign to Save the Monuments of Nubia* (UNESCO, 1960).

[13] Veronese, *Appeal*.

Fig. 2 Philae before the lower Aswan Dam was built and which flooded the temple for part of the year—photographed by Antonio Beato 1886–1900. UCLA—University of California, Los Angeles. Library Special Collections. N.94/228.

sequence experts decided that the Abu Simbel and Philae monuments ranked as the most important in Nubia, and should be preserved on site. The plan that was originally devised called for the creation of a protective dam around these monuments. In the end this was unfeasible and they too were moved like other monuments to safe sites (Fig. 5).

Most attention was given to the rescue of the Nubian sandstone temples, each of which presented various problems, and the choices made reflect the assessment of what was then considered important. Thus, for example, the relocation of the Philae Temple complex to Agilkia Island, between the old and new Aswan dams included several temples, but not the mud-brick housing which had crowded the entire Philae island (see Fig. 4). The result was a 'designed' archaeological landscape in which old material and immaterial connections were lost, and new illusory relationships created. In fact only the stone temples were rebuilt in an apparent 'original' state, irrespective of the already recorded (in 1909) pre-existing cemetery on Agilkia.

As the UNESCO campaign continued all the important temples were disassembled and moved, either within the same region at a higher elevation, or to a different location altogether (see Table 1). Furthermore, although many archaeological sites, including settlements and cemeteries, were considered important enough to be surveyed and recorded, they were not to be preserved. In these extraordinary urgent circumstances, the UNESCO intervention was also concerned with providing rich documentary evidence of the heritage of the region before it was lost. Curiously, prehistoric remains, of which we can only surmise to have been an equally important presence in the region, went mostly unrecognised.

A report from October 1959 showed that UNESCO organised work over two campaigns in two semesters,[14] and the 'mission map' of the region included in a subsequent report on the work in 1960–1962 shows specific areas for surveys which demarcate the survey and excavation areas for each country.[15] Reports were also published in various languages and in different contexts, and another preliminary report in 1961 on studies under-

14 UNESCO, 'Note 3' in 'Campagne Internationale pour la sauvegarde des monuments de la Nubie. Document d'information', type written document, 069(62) N/A 58:357, n.d. [1959] (UNESCO Archives Paris).

15 *Mission 1960–1962*, Map (Paris: Archives Nationale Paris, 20150308/187).
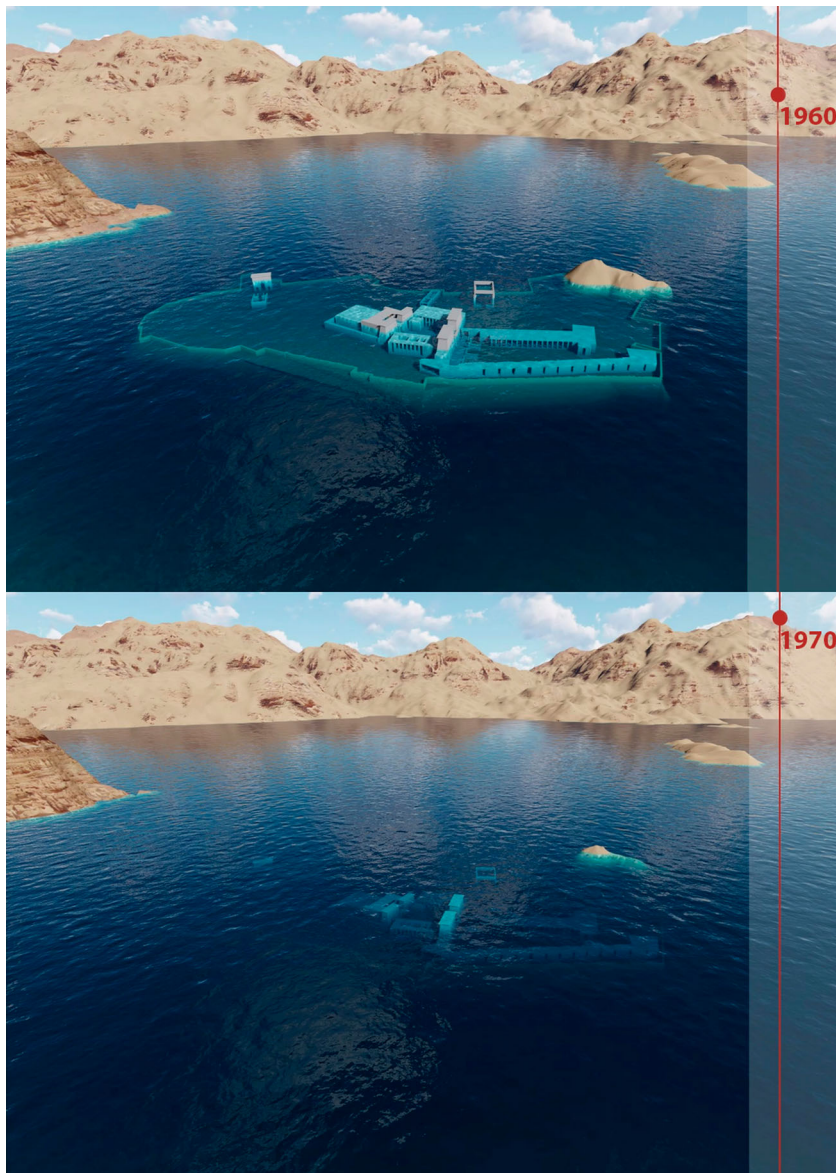
Fig. 3 Reconstruction in 3DVR of Philae Island in 1960 (partly flooded) and a projection of how much the temple complex would have been under water in 1970 if it was not rebuilt on higher ground after the construction of the Aswan High Dam (drawings by Monica Del Fabro, Valentina Marchisio, Elena Zanardo). Digital Nubia: Cultural Heritage in Context, POLITO_UCLA, 2017.

taken by the Egypt Exploration Society as a part of the British contribution, highlights that:

> 'the purpose of the Survey was to explore, map, and record all sites of archeological importance for the history of Nubia from the beginning of the ancient Egyptian dynasties onwards that were to be found in those areas of Egyptian Nubia below River Level 180, which had not previously surveyed and had not yet been conceded to other expeditions contributing to the campaign to save the monuments of Nubia.'[16]

One goal was thus to complete the archaeological mapping begun in the survey of 1907–1911, and the survey and excavations carried out from 1931 to 1935.[17] Both photography and aerial photography was used to identify areas that were considered more urgent for site-mapping. Other new methods were also adopted with photogrammetry being introduced to

16 Harry S. Smith, *UNESCO's International Campaign to Save the Monuments of Nubia: Preliminary Reports of the Egypt Exploration Society's Nubian Survey* (Cairo: Antiquities Department of Egypt, General Organisation for Government Print Offices, 1962), 2.

17 Walter B. Emery and Laurence P. Kirwan, 'The Excavations and Survey between Wadi Es-Sebua and Adindan, 1929–1931', *Mission Archéologique De Nubie* 1929–1934 (Cairo: Government Press Bulâq, 1935).

Fig. 4 The original buildings of Philae as recorded in 1907 by Lyons, projected over a satellite photograph of Agilkia Island where the temples but not the mud-brick houses were rebuilt. Courtesy of the Ancient Egyptian Architecture Online Aegaron Project, Deutsche Archäologische Institut/UCLA.

18 Maurice Carbonnell, 'Relevée Photogrammétique Des Monuments Et Sites Du Haut-Euphrate', in *Book Relevée Photogrammétique Des Monuments Et Sites Du Haut-Euphrate* (City: type written document, Paris 1968, UNESCO 581/BMS.RD/CLT., 1968), 552.

19 IGN, Map of the Topographical Survey, scale 1:10.000, 1959 (Institut National de l'information Géographique et forestière, Paris).

20 See *Actes Du Symposium International Sur La Nubie, Les 1er, 2 & 3 Mars 1965, Mémoires De L'institut D'egypte* (Cairo: Institut Français d'archéologie orientale, 1969); and Labib Habachi, *Actes Du II Symposium International Sur La Nubie, Février 1–3, 1971* (Cairo: Institut Français d'archéologie orientale, 1981).

ensure the accuracy of mapping.[18] A final map at a scale of 1:10,000 and of 40 sheets detailing Adindan to the Aswan High Dam, was commissioned by UNESCO and published by Egypt's Ministry of Labor, based on the 1959 survey (see Fig. 8).[19]

The UNESCO-led effort included recording of temples, tombs, stelae and rock inscriptions and was undertaken in approximately 30 expeditions by many different institutions in more than 20 countries.[20] The many different organisations involved explains why the notes, records and visual materials

Fig. 5 Reconstruction in 3DVR of the building site for the relocation of the temple of Abu Simbel (drawings by Josephine Buzzone, Alessandro Piovano, Giorgia Senini). Digital Nubia: Cultural Heritage in Context, POLITO_UCLA, 2017.

that would allow us to better understand the context of the Nubian cultural heritage are so widely dispersed.

Ethnographic recording

The UNESCO campaign was focussed on the preservation of ancient Nubian remains at a time when the intangible heritage was not explicitly considered as part of the conservation strategy. The rescue effort focussed on major monuments at the expense of the extant Nubian villages which had a long history in the region and which manifested distinctive vernacular architectures, as well as expressions of material culture, languages, rituals, food and community events. Some attention was paid to ethnographic recording and in two conferences organised in 1965 and 1971 not only the ancient remains, but also the modern Nubian culture was discussed.[21] Between 1961 and 1975 the Social Research Center of the American University in Cairo, directed by Robert Fernea, embarked on an ethnographic survey in both Old Nubia and the region of resettlement around Kom Ombo, Egypt, now known as 'New Nubia'. The Ford Foundation financed two phases of this ethnographic work, which included recording intangible heritage. This resulted in a number of publications on both Nubian culture before and after resettlement.[22] Although the ethnographic survey resulted in important documentation, it was treated as a completely separate endeavour from the removal of the temples—the people who had lived for centuries in the cultural and natural landscape of Nubia were apparently not considered stakeholders in the 'rescue' of the world cultural heritage.

A changed understanding of context

Assessing the rescue action of the 1960s, the UNESCO campaign yielded excellent results according to the then goals and standards. This success has been widely recognised as both a feat of engineering and establishing the importance of UNESCO as an international cultural arbitrator. However, since the early 1960s the notion of landscape has changed markedly, with concepts of historical and cultural landscape coming to the fore with the UNESCO World Heritage Convention in 1972 highlighting the intrinsic links between communities and their natural environment.[23] In 1992 UNESCO's World Heritage Committee eventually admitted 'Cultural Landscape' as a new category of cultural heritage and this decision has marked the beginning of a global strategy 'in bringing nature and culture closer together in the implementation of the World Heritage Convention'.[24] UNESCO now recognises the importance of cultural landscapes as world heritage and defines heritage as being the 'combined works of nature and humankind, they express a long and intimate relationship between people and their natural environment'.[25] This definition stresses the interactions of humans and their environment, including the 'humanization' of nature, taking into account the cultural phenomenon of change.

'Cultural landscape' has also been formalised as a concept to cover rural, urban and semi-rural areas and implements preservation objectives as defined in the 2000 European Landscape Convention of Florence.[26] Several sites have been listed as world 'cultural landscapes' and they include different integrated aspects, both tangible and intangible. Among the criteria for designation is that the context of monuments from whatever period is inalienable. Villages, traditions and rituals are thus inscribed as part of cultural heritage.

These conventions have clarified the links between cultural landscapes and archaeology especially given that cultural landscapes are now understood as 'those where human interaction with natural systems has, over a long time, formed a distinctive landscape'.[27] The notion of conservation has concomitantly shifted as well, with a broader definition of cultural

21 See *Actes Du Symposium* and Habachi, *Actes Du II Symposium*.

22 See, for example, Fahim, *Dams, People and Development*; Hussein M. Fahim, *Egyptian Nubians: Resettlement and Years of Coping* (Salt Lake City, UT: University of Utah Press, 1983); and Robert A. Fernea and Georg Gerster, *Nubians in Egypt: Peaceful People* (Austin, TX: University of Texas Press, 1973).

23 Anonymous, 'Convention Concerning the Protection of the World Cultural and Natural Heritage. Adopted by the General Conference at its Seventeenth Session Paris, 16 November 1972', (1972), http://whc.unesco.org/archive/convention-en.pdf (accessed 24 February 2017).

24 Francesco Bandarin, 'Preface', in *World Heritage Cultural Landscapes. A Handbook for Conservation and Management*, ed. Nora Mitchell, Mechtild Rössler and Pierre-Marie Tricaud (Paris: UNESCO, 2009), 3.

25 'Cultural Landscapes', UNESCO Paper Series 26 (2010), http://whc.unesco.org/en/series/26/ (accessed 26 February 2017).

26 'European Landscape Convention', European Treaty Series—No. 176 (2000), https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=0900001680080621 (accessed 24 February 2017).

27 'Cultural Landscapes'.

28 For example, the *International Charter for the Conservation and Restoration of Monuments and Sites* [the Venice Charter 1964] (Venice: International Council of Monuments and Sites, 1965), https://www.icomos.org/charters/venice_e.pdf (accessed 7 April 2017).

29 'The Australia Icomos Charter for Places of Cultural Significance, the Burra Charter', (2013), http://australia.icomos.org/publications/charters/ and 'The Burra Charter and the Indigenous Cultural Heritage Management, Practice Note, Nov. 2013', (2013), http://australia.icomos.org/wp-content/uploads/Practice-Note_The-Burra-Charter-and-Indigenous-Cultural-Heritage-Management.pdf (both accessed 7 April 2017).

30 See Karl W. Butzer, *Early Hydraulic Civilization in Egypt: A Study in Cultural Ecology, Prehistoric Archeology and Ecology* (Chicago, IL: University of Chicago Press, 1976); and Karl W. Butzer and Carl L. Hansen, *Desert and River in Nubia: Geomorphology and Prehistoric Environments at the Aswan Reservoir* (Madison, WI: University of Wisconsin Press, 1968).

heritage and a new approach to preservation methods integrating the monuments with its context.[28] This new understanding of the relationship between cultural heritage and its context started to be implemented just after the 1959 start of the Nubian Campaign. Since then there has been a growing awareness of the importance of incorporating both the local populations and non-Western perceptions in the measures taken to safeguard cultural heritage. For example, the 1979 Burra Charter, and its subsequent updates, identifies the concept of 'cultural significance' as including 'all of the cultural values and meanings that might be recognised in a place'.[29]

The Nubian Campaign is a perfect case study of the close relationships between environmental changes and preserving cultural heritage, as well as a model for understanding the complexity of approaches to sustainable change. It should be noted that the Nubia landscape of the 1960s was not a static, 'original' nor intact landscape. Floods have always been part of the lands along the Nile, and this has resulted in constant change.[30] We suggest that landscapes, as with their buildings or objects, require a diachronical approach to their analysis. Due to the choices made in the 1960s the context of the Nubian temples changed and the perception of the temples was modified. When they were rebuilt at a higher elevation in the Nile valley their relocation resulted in a paradoxical 'creation' of new archaeological sites. Furthermore, the temples themselves were built or occupied at different periods, ranging from Middle Kingdom through the Greco-Roman period, after which some were re-used as Christian churches. Their movement to higher ground was followed by restoration that was anastylotic, but also made use of modern materials. Thus both new landscapes and new monuments were constructed, far away from the original river banks and set in different spatial relationships. In some cases, the orientation of the building changed, resulting in a different play of light and shadow, while several temples were removed from the region completely. Six are now inside roofed areas, three in The National Museum of Sudan in Khartoum, and three in the museums of Leiden, Turin and New York (see Fig. 6 and Table 1) and one more has been rebuilt in a public park in Madrid.

It is clear that each monument has its own story linked to the vagaries of change in the prevailing political and cultural conditions, with each having a narrative of how they come to be at their present location. For each set of ancient and modern contextual circumstances specific research methods are required. The multi-faceted background of the flooded lands of Nubia does not only comprise the context of the 1960s, but also of the millennia before and the years after. The essential premise of our ongoing research is to study and represent the Nubian cultural landscape by focussing first
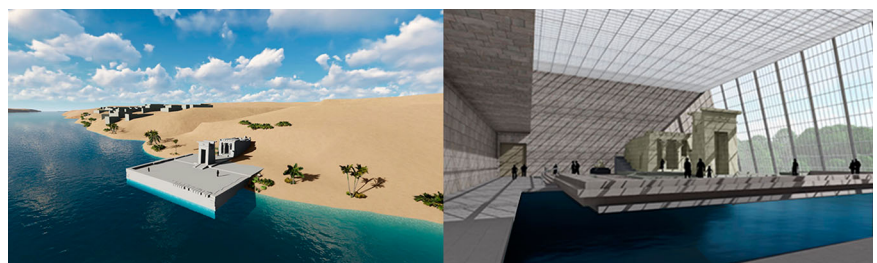

Fig. 6 Reconstruction in 3DVR of the temple of Dendur in the Nubian landscape (left) and the relocated temple in the Metropolitan Museum of Art, New York. Note the podium in front of the Temple, protruding in the River Nile and the attempt to contextualise the temple near the river's edge through the pool in the museum setting (drawings by Andrea Coccolo, Cristian Blangetti, Volodymyr Dutka, Deborah Rosso, Federico Rossi). Digital Nubia: Cultural Heritage in Context, POLITO_UCLA, 2017.

on the Nubian temples and then gradually integrating onto the platform the variously detailed information on settlements, both ancient and modern, and elements such as cemeteries, fortresses, routes, agricultural areas, the banks of the Nile and other natural and cultural features.

A multitude of sources

Virtual reconstruction of the context of Nubian cultural heritage requires the use of many heterogeneous sources. These include the work of architects who recorded the temples, early travellers who made descriptions and drawings, archaeologists who published excavation reports, topographical maps from the surveys done in the early twentieth century, early photographs and films from the 1960s and the documentation collected by UNESCO. Much information is available in the 'Documentation and Study Centre for the History of Art and Civilization of Ancient Egypt' in Cairo. The centre was created by the Egyptian government to organise and store the results of the (Egyptian) Nubian surveys and excavations and, along with the foreign missions, was under the supervision of Christiane Desroches Noblecourt, curator of Egyptian Antiquities at the Louvre Museum in Paris who started the survey of the temples and pushed the French government to embark on the rescue of the Amada temple.[31] The Documentation Centre was conceived of as a permanent information centre on the history and culture of the region and at present it is part of the Egyptian Ministry of Antiquities in Cairo. Records from archaeological expeditions, notes, drawings, photos and videos were collected and/or commissioned by UNESCO, which also promoted publications of the results. Several research groups have published extensively on the archaeological work, but, and as discussed, many groups from many countries were involved and so documentation of the entire Nubian Campaign is dispersed both far and wide. If they can be recombined they can enable a deeper understanding of Nubia over time, including those rapid changes undergone in the early and late twentieth century.

Any attempt to digitally represent the physical landscape of ancient Nubia, including the Nile Valley (see Fig. 7)—previously a deep canyon and now a large body of water between two newly shallowed mountain

31 Christiane Desroches-Noblecourt, *La Grande Nubiade, Ou, Le Parcours D'une Égyptologue* (Paris: Stock/Pernoud, 1992), 130; and, for example, *Le sauvatage du temple d'Amada*, Video, http://www.ina.fr/video/AFE86000218/le-sauvetage-du-temple-d-amada-video.html (accessed 7 April 2017).

Fig. 7 Reconstruction in 3DVR of the temple of Kalabasha in the Nubia landscape before relocation (drawings by Cristina Marchiori, Maria Vittoria Tappari, Paola Treves). Digital Nubia: Cultural Heritage in Context, POLITO_UCLA, 2017.

32 France, *Commission des science et arts d'Egypte, Description De L'Égypte; Ou, Recueil Des Observations Et Des Recherches Qui Ont Été Faites En Égypte Pendant L'expédition De L'armée Française 2* (Paris: C.L.F. Panckoucke, 1821).

33 Georges Michailidis, 'Deux Lettres De J.N. Huyot, Ami De Champollion, Concernant La Nubie', in *Nubie Par Divers Archéologues Et Historiciens*, ed. Fernand Debono (Cairo: Cahiers d'Histoire Egptienne, 1967).

34 Isabella Frances Romer, *A Pilgrimage to the Temples and Tombs of Egypt, Nubia and Palestine in 1845–6 Vol. 1* […] (London: Bentley, 1846), 185.

35 David Roberts et al., *Egypt & Nubia: From Drawings Made on the Spot* (London: F.G. Moon, 1846).

36 'Egyptian Views Brought Home by John Muir', UCLA, Ernst Young Research Library Special Collections, (1904), http://www.oac.cdlib.org/findaid/ark:/13030/c8k077kz/entire_text/ (accessed 21 February 2017).

37 Cf. for example, Anne Burdick et al., *Digital_Humanities* (Cambridge, MA: MIT Press, 2012), https://mitpress.mit.edu/sites/default/files/titles/content/9780262018470_Open_Access_Edition.pdf (accessed 7 April 2017).

ranges—requires an enormous amount of additional data. Colonial sources are copious and date to at least Napoleon's 'French Campaign in Egypt and Syria' (1798–1801),[32] during which the architect Jean-Nicolas Huyot prepared architectural drawings for a comprehensive publication about the region.[33] The magnificence of the landscape is also expressed in the descriptions of early travellers, novelists, illustrators and photographers who escaped to Nubia for adventure or otherwise. Such descriptions typically characterise how the landscape appeared to the Western gaze in the nineteenth and twentieth centuries:

> 'On the 5th the scenery of each side of the Nile began to assume a very picturesque appearance—mountainous and almost Alpine in its character to the east; on the opposite bank, the eternal desert, whose golden sands there form themselves into all sorts of fantastic mamelons; and the river's edge on either side fringed with the castor oil-plant, and the prickly mimosa upon which the patient camel browses with delight. Long plantation of date and doum palms tower above, the fruit of which form all the riches, and the chief sustenance of the poor Nubians, among whom bread is an unknown luxury.'[34]

Apart from scientific reports, early photographs and drawings depict the state of the landscape and illustrate that originally many monuments had important spatial relationships with both the water of the Nile and the surrounding desert, with some built under, or carved into dramatic cliffs. The extant drawings of the nineteenth-century artist David Roberts exaggerate the scale of some of the buildings and rock faces, but represent the awe that visitors to Nubia must have felt.[35] Photographs, often considered as more 'objective' registrations of landscape, also show the magnificence and monumentality of the Nubian region well and help explain why the American landscape preservation activist and photographer John Muir, who travelled to Egypt in 1903–1904, brought home an album which included work of the nineteenth-century Italian explorer and photographer, Antonio Beato (see Fig. 2).[36]

A multi-context re-contextualisation method

In line with the recent charters on the preservation of cultural heritage, our research context is understood as a combination of conditions including the archaeological, cultural (ancient and modern), physical, historical, political, social, economic and gender-related ones. Such a broad scope requires the multitude of sources outlined above, and also requires critical tools and methods for the organisation of often very distinct kinds of information. A discipline that has developed such critical methods is Digital Humanities (DH), which has developed a theoretical approach to data, informed by an explicit consideration of how evidence is constituted, presented and distributed.[37] For our purposes it is important to be vigilant that the computer-aided presentation of information itself can be fatally flawed. For example, using Geographic Information Systems (GIS) requires the input of specific coordinates to represent uncertain locations which could create a false sense of objectivity. Similarly, since imagery is often more persuasive than the written word, digital reconstructions representing a statue or a building in a beautifully rendered 3DVR model can determine our mental image and hamper the development of alternative theories or reconstructions. Critical annotations are, therefore, key and the awareness of such a complex and unlimited research project has pushed us to conceive of our work as constructing a meeting point linking documents, studies, expertise, scholars and users.

Our purpose is to create a digital cultural heritage repository which can be accessed through different digital interfaces. Such a repository necessarily

consists of information in various digitised formats, such as texts, drawings, spreadsheets, databases, maps, plans, photographs, videos, audio files and three-dimensional models. Content will range from descriptions and drawings of early travellers, photographs, oral histories, published research, unpublished research, newspaper articles, policy documents, intervention reports, protest documentation, funding statements, commentaries, 2D or 3D reconstructions etc. Such digitised primary sources should be stored for the long term in digital repositories that are capable of ensuring sustainable preservation of single files in a limited number of formats (e.g. .pdf, .tiff, .wav). As long as all files have unique stable identifiers, they can be preserved separately from the interface which combines this information into interpretatively relevant combinations and this UCLA-Polito *Digital Nubia: Cultural Heritage in Context* project collaborates with UCLA's Digital Library for long-term storage. Access to photographs, videos, maps and models can be provided through several types of front-ends that combine and display the relevant files to the user and need to be regularly reprogrammed due to changing digital environments (such as browsers or apps). This is an existing model, tried and tested at UCLA: providing long-term storage of unique assets (digitised files) with regularly updated web interfaces.[38]

The rich visual narratives of the interface require the reconstruction of the landscape based on extant topographical maps that provide information on the elevations of the Nile Valley. The survey maps produced by the various archaeological projects, although very detailed, do not always link up well. Reports and letters in the archive of the UNESCO headquarters in Paris also highlight how important, and at the same time how difficult, it was to safeguard the accuracy of the cartography.[39] Since these maps form the basis for the digital reconstruction of the landscape, we are faced with very similar problems as the 1960s researchers because, just as then, the accuracy of cartographical data is fundamental for core landscape representation of the project. Older cartographic documents, photographs, drawings and travel guides in the UNESCO archive help in reconstructing the exact position of the temples in the landscape. It is from this information and the 1959 UNESCO survey carried out by the French Institut Géographique National (IGN) that the UCLA/Polito project has produced a first digital base map (see Fig. 8). Digitising and then combining the paper-based materials from Paris required the expertise of our specialists in topography and geomatics to create a geographic information system (GIS) for identifying the correct location and georeferencing all the material that can be identified from any period.

Recent explorations of the UNESCO archives have not only helped in discovering paper-based materials to aid in the landscape reconstruction, but have also provide information on the political and social aspects of past preservation efforts. The proposed digital 3DVR platform is intended to represent the Nubian landscape as a whole, but will also include these intangible political, social facets. This will provide the context under which to understand the preservation strategies employed in the efforts of the 1960s. The project thus provides several narratives of change at different scales: landscape, settlements and architecture in the past; resettlement and preservational decision making in the present. This allows for the diachronic presentation of the temples, rather than one that is frozen in time. In contrast, settlements, both those archaeologically explored and those abandoned in the 1960s, although a required part of the UNESCO project, are proving difficult to reconstruct due to the lack of sufficiently detailed documentation from which to create any three-dimensional models.

38 The UCLA-Polito *Digital Nubia: Cultural Heritage in Context* project website is http://ArchVR.ucla.edu/Nubia. Other examples of this model are the UCLA Encyclopedia of Egyptology (http://uee.ucla.edu) and the Ancient Egyptian Architecture Online project (http://dai.aegaron.ucla.edu) (both accessed 7 April 2017).

39 See http://www.unesco.org/archives/new2010/en/access_archives.html (accessed 9 April 2017).

Fig. 8 Paper drafts produced by IGN for UNESCO, 1959, Institut National de l'information Géographique et forestière (IGN), Paris. Scale 1:10,000. Georectified map produced by Digital Nubia: Cultural Heritage in Context, POLITO_UCLA, 2017.

Conclusion

The future of the conservation of cultural heritage is multi-disciplinary. Although it is vitally important to understand the physical properties and behaviours of materials and their environments other objectives are now being implemented around the question of preservation. Our argument is that if the full context of an object or building is lost, then we limit its meaning to its most recent or current setting.

The strength of preservation is its mission to enfranchise future generations with the benefits of cultural heritage in full. The 1960s UNESCO Nubian Campaign partially achieved this goal, but the bulk of its information is inaccessible, hidden in archives and libraries. Digital technologies appear to present tools and methodologies that can improve the understanding of the layered and complex context of material culture and cultural landscapes over time. In attempting to achieve this goal, this research starts from an assessment of the present condition and the contextual setting of the temples in order to create 'a flash back of understanding'. What we mean by this is that by amassing existing documentation and linking it digitally to particular locations in the virtual landscape, we can represent a biography of an object, building or feature, from which we can then begin to understand its development over time. This allows us to create a sense of time which would be difficult to grasp without the use of digital visualisa-

tion. The recreation of landscape requires that all sources on which the digital model are built, the paradata, are made available and are accessible while exploring the 3D virtual environment.[40]

Digital preservation does not replace physical interventions, nor is it at present clear how well we will be able to preserve digital files in the long term. But digital documentation will aid in bringing together and managing the large amounts of information that are distributed over many national archives and the 'grey literature' of unpublished reports.

The importance of a multi-disciplinary approach to safeguard the context of cultural heritage is even more clear now that we realise that we are never preserving a static past, rather one that is living and for which we are responsible for accounting for our own interventions. After the spectacular feats of the 1960s, including the wholesale cutting up and moving of massive monuments, we presumably now have different insights in what we would have 'rescued' if such an imminent destruction faced us today—unfortunately we need to exercise our understanding of any lessons learned right now, and with some urgency, as the threat again is upon us with the next series of dams being built across the Nile in Sudan and Ethiopia.[41]

40 Paradata is the information used to reconstruct landscapes, buildings or objects. It is a broad term which encompasses evidence from excavations, ancient drawings, descriptions or other references. See, for example, Anna Bentkowska-Kafel, Hugh Denard and Drew Baker, *Paradata and Transparency in Virtual Heritag*e, Digital Research in the Arts and Humanities (Farnham, Surrey/ Burlington, VT: Ashgate Publishers, 2012).

41 Jameel, 'The Grand Ethiopian Renaissance Dam'.

Abstract
The conservation of tangible and intangible cultural heritage is a well-developed field. However, cultural heritage is only ever partially preserved if its context is lost. This contribution argues that the future of conservation should include context as an integral and inalienable part of all forms of cultural heritage. As such, this will require an increase in cross-disciplinary collaborations with, among others, archaeologists, historians and archivists involved in efforts aimed at restoring cultural heritage to the contexts from which it has become disengaged. Based on theoretical frameworks from the digital humanities, cultural theory, history of the built environment and archaeology, the authors outline a method of recontextualisation using the drowned landscape of Nubia as a case study. Aside from the landscape in which the Nubian monuments once stood and the vernacular of historical Nubian cultures, we argue that the history and socio-political nature of the decisions made in the name of preservation itself should also be incorporated as part of this context. The contribution argues that digital representations coupled with digital archiving provides one means of incorporating such heterogeneous and diverse information to present the contexts in which descriptions, texts, photographs, letters, videos and oral history can be better understood, interpreted and distributed.

Résumé
«Patrimoine culturel en contexte : les temples de Nubie, technologies numériques et avenir de la conservation»
La conservation du patrimoine culturel matériel et immatériel est un domaine bien développé. Cependant, le patrimoine culturel n'est jamais que partiellement conservé lorsque son contexte est perdu. Cette contribution soutient que l'avenir de la conservation devrait inclure contexte comme partie intégrante et inaliénable de toutes les formes de patrimoine culturel. En tant que tel, cela nécessitera une augmentation des collaborations interdisciplinaires avec, entre autres, des archéologues, des historiens et des archivistes impliqués dans des efforts visant à restaurer les contextes du patrimoine culturel. A l'appui des cadres théoriques issus des sciences humaines numériques, de la théorie culturelle, de l'histoire de l'environnement bâti et de l'archéologie, les auteurs décrivent une méthode de recontextualisation en utilisant le paysage inondé de la Nubie comme étude de cas. Outre le paysage dans lequel se trouvaient les monuments de la Nubie et la langue vernaculaire des cultures nubiennes historiques, nous soutenons que l'histoire et la nature sociopolitique des décisions prises au nom de la préservation elle-même devraient également être intégrées dans ce contexte. La contribution soutient que les représentations numériques associées à l'archivage numérique fournissent un moyen d'intégrer des informations aussi hétérogènes et diverses pour présenter les contextes dans lesquels les descriptions, les textes, les photographies, les lettres, les vidéos et l'histoire orale peuvent être mieux compris, interprétés et distribués.

Zusammenfassung
„Kulturelles Vermächtnis im Kontext: die Tempel in Nubien, digitale Technologien und die Zukunft der Restaurierung''
Die Erhaltung von materiellen und immateriellen Kulturgütern ist ein gut entwickeltes Feld. Trotzdem ist Kulturgut immer nur teilweise erhalten, wenn der Kontext verloren geht. Dieser Beitrag argumentiert, dass die Zukunft von Bestandserhaltung in der Erhaltung des Kontext als ein integrer und unveräußerlicher Bestandteil eines jeden Kulturguts liegt. Das würde dann eine Verstärkung der interdisziplinären Zusammenarbeit unter anderem mit Archäologen, Historikern und Archivaren, die an den Bemühungen beteiligt sind den Kontext des Kulturgutes wiederherzustellen, von dem es getrennt worden ist, notwendig machen. Die Autoren skizzieren eine Methode der Re-kontextualisierung basierend auf theoretischen Grundlagen aus den digitalen Geisteswissenschaften, Kulturtheorie, Archäologie und Bebauungsgeschichte, mit den „ertrunkenen" Landschaften Nubiens als Fallbeispiel. Wir argumentieren, dass, abgesehen von der Landschaft, in der die nubischen Monumente einst gestanden haben und den einheimischen historischen nubischen Kulturen, die Geschichte und sozial-politische Natur der Entscheidungen, die im Namen der Erhaltung selbst getroffen wurden, auch als Teil des Kontextes verstanden werden sollten. Dieser Beitrag vertritt die Meinung, dass digitale Repräsentation verbunden mit digitaler Archivierung einen Weg bietet, heterogene und diverse Informationen zu verbinden um den Kontext für ein besseres Verständnis von Beschreibungen, Texten, Fotografien, Briefen, Videos und mündlicher Überlieferung zu bieten, sie zu interpretieren und zu verbreiten.

Resumen

"El patrimonio cultural en contexto: los templos de Nubia, las tecnologías digitales y el futuro de la conservación"

Aunque el campo de la conservación del patrimonio cultural tangible e intangible esté bien desarrollado, el patrimonio cultural se conservará sólo parcialmente si se pierde el contexto. Este artículo sostiene que en el futuro la conservación debe incluir el contexto como una parte integral e inalienable de todas las formas de patrimonio cultural. Requerirá un aumento de colaboraciones interdisciplinarias entre profesionales -entre otros, arqueólogos, historiadores y archiveros- los cuales participan en iniciativas orientadas a restaurar los contextos de los que el patrimonio cultural se ha desconectado. Los autores exponen un método de re-contextualización utilizando como estudio de caso el paisaje inundado de Nubia y apoyándose en los marcos teóricos de las humanidades digitales, la teoría cultural, la historia del entorno construido y la arqueología,. Aparte de incluir, como parte de este contexto, el paisaje en el que antiguamente se encontraban los monumentos de Nubia y las culturas históricas vernáculas de Nubia, argumentamos que la historia y la naturaleza sociopolítica de las decisiones tomadas en nombre de la preservación misma también deberían ser incluidas. Se argumenta que las representaciones digitales junto con el archivo digital, proporcionan un medio de incorporar información heterogénea y diversa y así, presentar los contextos en los que se pueden entender, interpretar y distribuir mejor las descripciones, los textos, las fotografías, las cartas, los vídeos y la historia oral.

摘要

情境中的文化遗产：努比亚的寺庙，数码技术和保存修复的未来

有形和非物质文化遗产的保护是一个发达领域。但如果文化遗产的情境丢失，那它只有部分能被保留下来。作者认为未来的保存修复对象应包括情境，因为它是所有形式的文化遗产不可分割的组成部分。因此，我们需要加强与考古学家、历史学家和档案工作者等其他领域的跨学科合作，使大家尽力参与到已被剥离的文化遗产情境的还原工作中来。基于数字人文学科、文化理论、建筑环境史与考古学的理论框架，作者用努比亚被淹没的景观作为案例研究重塑情境化的方法。除了努比亚古迹上曾经矗立的景观和历史上努比亚文化的语言之外，我们主张以保存的名义对历史和社会政治性质做出的判断，也应作为这一情境的一部分。作者认为数码表象连同数码归档一起提供了一种融合不同类型和多样化信息来呈现情境的手段，这样的情境在描述、文本、照片、信件、视频和口述历史中可以被更好地理解、解释和散播。

Biographies

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