Application of information technology in protection of World Heritage Sites: capacity building for young Arab professionals: challenges and potentials

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Abstract

This paper describes UNESCO’s World Heritage Centre initiative for the Development of a World Heritage Information Management capacity in the Arab States’, focusing on providing information management capacity building to young professionals in the Arab region in the application of Information technologies in protection of World Heritage Sites.

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Introduction

Figure 1: Saqqara workshop, Gaetano Palumbo teaches Arab young professionals how to prepare a rectify image for condition assessment. Author.

The World Heritage Convention is the flag-ship of UNESCO’s efforts in the conservation of both cultural and natural sites around the World. The Convention ‘was adopted by the General Conference of UNESCO in 1972’ (WHC 2004). Currently, ‘more than 170 countries have adhered to the Convention, making it one of the most universal international legal instruments for the protection of the cultural and natural heritage’.

In recent years, the World Heritage Centre has conducted a series of regional periodic reporting exercises to evaluate the application of the Convention in the protection of the sites on the World Heritage List. These reports provided the World Heritage Committee with assessments about the legislative and administrative provisions they have adopted and other actions

1 Periodic Report: provides an assessment of the application of the World Heritage Convention by the State Party and of the state of conservation of the World Heritage properties on its territory.

The Periodic Report consists of 2 sections:

Section I: State Party’s report on the application of relevant articles of the World Heritage Convention.

Section II: state of conservation of specific World Heritage properties located on the State Party’s territory.

Main objective of Section II: to obtain an assessment of whether the World Heritage value(s) for which a property was inscribed on the World Heritage List is (are) maintained over time.

In addition, States Parties are requested to provide updated information on the management, factors affecting the property and monitoring arrangements.
which they (the State Parties) have taken for the application of the Convention, including the state of conservation of the World Heritage properties located on its territories’ (Extract from paragraph II.B.69 of the Operational Guidelines for the implementation of the World Heritage Convention).

In the Arab region, this reporting cycle has demonstrated an increasing number of critical issues in implementing the Convention and managing world heritage sites, among the most relevant issues revealed:

- Lack of an appropriate long-term management strategy for the protection and conservation of the sites, including periodic condition monitoring (maintenance), periodic values assessments, prevention, and presentation to visitors.
- Lack of capacities in conservation techniques and monitoring activities’

These statements are based on the ill-defined or non-existent definition of territorial boundaries and buffer zones of the sites that prevents control of the deterioration factors of the sites (urban expansion, road systems, agriculture etc.).

Furthermore, very few sites have coherent and on-going documentation and monitoring systems’ (Extract of paragraph 1.4. Management and conservation of the World Heritage Sites – Document WHC-03/27.COM/INF.20A : Regional Program for the Arab States).

Therefore, this initiative seeks to tackle these critical issues by developing a World Heritage information management capacity in the Arab States’ that is aimed at providing adequate documentation at the sites and promoting management and information exchange capacities on the region.

Relevance of Information Systems in protecting World Heritage Sites

The adequate preparation of measured plans and information systems, albeit digital and/or plotted in paper, contribute not only to the creation of a permanent record of the site’s past and present, but to the analytical assessment of its current condition and understanding of its authenticity, both of which encourage its future conservation.

The preparation of information systems using a measured set of representations, which is the product of the documentation process, could be seen as one of most important and reliable sources of information remaining of a monument that could eventually either be destroyed by natural phenomenon or by human action. This statement is illustrated by the vast amount of documentation material available for the pre-Islamic figures of the Buddhas in Bamyanii, Afghanistan, which were destroyed by the Taliban in March 2001 (see Figure 01-02).

These historical records along with current efforts for understanding the actual state of the remaining material will be used for preparing and implementing an emergency conservation plan with immediate effect to safeguard the monument, which is still suffering from last year’s explosions. They can also support eventually ‘Anastylosis’ study that can help to partially reconstruct the statues using the remaining materialiii.
Furthermore, in practice, the use of information systems for management and monitoring of world heritage sites is of primarily importance to the Convention.

**Presentation of the project:**

**Objectives:**

The objectives of the project are:

1) To make available updated information about the Convention to World Heritage site managers and the general public in the Arab region; and

2) To assist in capacity building on World Heritage information management within the Arab States, including data collection, production of maps and production of monitoring systems, in order to improve the management and the conservation of World Heritage Sites in the region.

**Implementation:**

The project consists of four core activities:

1 - The creation and the development of an Arabic language web site on the World Heritage in the Arab Region, in cooperation with the a regional partner (possibly the Al Ain Authority, from the United Arab Emirates);

2 - The development, through pilot workshops in the field, of four training modules for the reinforcement of capacity in World Heritage information management;
3 – The development of a human and scientific resources network (database, list of experts, responsible institutions, bibliography, etc.)

4 - The organization of a regional workshop in order to present the results of these activities to regional partners, collect their comments and define follows up action.

This paper will focus on capacity building issues presented in points 2 through 4.

**The training modules**

This training initiative is innovative and has a long-term vision, which focuses on capacity building for the region. The initiative provides sustainable solutions adapted to the current regional exposed in the periodic reporting cycle explained previously.

**Objectives**

**Develop training modules for the region**

Preparation of handbooks and guidelines for the use of information managements systems in recording, documenting, and managing information for protection of World Heritage Sites.

These modules could be financed in the future using international assistance from the World Heritage Fund and other external sources.

**Develop a working force of young experts in the region**

Invite, involve and give training to regional experts in the use of Information Management Systems

**Identify and empower regional institutions to play an active role in the initiative**

Develop partnerships and provide technical support – identify funding sources

**Implementation**

The first of the proposed workshops has already gathered a group of young professionals nominated by the State Parties of the Arab region for training in basic and advanced recording, documentation and information systems for World Heritage sites.

The training programme has been led by qualified instructors from both international and regional institutions. This interdisciplinary group of experts has extensive experience in mapping and conserving World Heritage sites.
The first training course took place from February 17 to March 4, 2004 in Cairo, Egypt. It aimed to identify and develop human resources in the Arab Region in documenting Cultural World Heritage sites.

Furthermore, this first training in Egypt was organized in cooperation with Egypt’s Supreme Council of Antiquities (SCA) and the Centre for Documentation of Cultural and Natural Heritage (CULTNAT). Is this strictly relevant?

The second event, to be organized will take place in Tunisia, in May 2004, in cooperation with the Tunisian ‘Agence Nationale de Protection de l'Environnement’ (ANPE). This training workshop will be devoted to documentation of Natural World Heritage sites. (same comment as before – strictly relevant?)

Contents

The modules are being developed as ‘know how’ handbooks for recording, documenting, monitoring, and managing information related to a the condition of a World Heritage site.

An introductory handbook to the training course and four modules will be integrated and taught in each of the proposed training workshops. In the future, these modules handbooks could be taught separately, depending on the needs of each site and/or national institution. A handbook about applying to the World Heritage Fund for assistance will be integrated in the handbooks.

Furthermore, the teaching contents of the two first workshops organized 2004, will make use of a selected number of case studies on sites selected in consultation with the World Heritage Centre and the relevant national authorities.

Training courses:

The course contents include the following teaching modules:

1. Introduction to the use of recording, documentation and information systems in conservation and protection of World Heritage sites.

2. Module 1: Preparation of a digital site reference map, a measured map(s) containing geographic information, features and other relevant thematic assessments of the site. These maps could be developed through GIS and other technologies.

3. Module 2: Preparation of systematic monitoring tools to assist site managers in planning and evaluating conservation activities at WH properties using Information Systems and other related techniques.

4. Module 3: Preparation of digital measured datasets of specific locations within the site. These maps could be developed through non- and imaged-based recording tools, such as REDM Total Station, digitizing conventional hand measurement maps, 3D laser mapping devices, rectified photography, photogrammetry and other techniques.

5. Module 4: Introduction to the use of advanced digital information system, targeted to mainly for the national experts.

Case Studies:

Natural heritage: Ichkeul National Park (Tunisia): The Ichkeul Lake and wetland are a major stopover point for hundreds of thousands of migrating birds, such as ducks, geese, storks and pink flamingoes, who come to feed and nest there. Ichkeul is the last remaining lake in a chain that once extended across North Africa (Inscription on the List of
World Heritage in Danger: 1996) (see Figure 5).

**Cultural heritage:** Memphis and its Necropolis - the Pyramid Fields from Giza to Dahshur (Egypt), focusing on Saqqara: the capital of the Old Kingdom of Egypt has some extraordinary funerary monuments, including rock tombs, ornate mastabas, temples and pyramids. In ancient times, the site was considered one of the Seven Wonders of the World (Inscription on the List of World Heritage in 1979) (See Figure 6).

**Figure 5:** Ichkeul National Park, Tunisia, 2003. Author.

**Target audience: trainees**

**Trainees:** experts on cultural and natural heritage preferably with knowledge of cultural heritage recording and documentation and computer skills. Experience in application of information technology is also desirable. They should be attached to the national authority dealing with protection of World Heritage sites.

The first training in Egypt counted with 25 representatives of several Arab countries including Egypt, Morocco, Saudi-Arabia, Tunisia, Mauritania, Sudan, Jordan, Bahrain, Yemen, and the Sultanate of Oman.

**Figure 6:** Visit to Saqqara during the workshop in Egypt, 2004. Author.

**Duration:**

The training workshop in Cairo consisted of a two-week course including four teaching modules; this first event was designed for mapping cultural heritage sites. The Tunisia course will focus on natural sites.

Furthermore, a technical study excursion to visit other cultural and/or natural sites were planned during the training course.

**Teaching staff: trainers**

The course will be taught by an interdisciplinary group of experts covering the training module contents.

The experts would (or will?) provide support for preparing the contents of the teaching modules, teach an intensive training course to the participants, including theory and practice, and produce an evaluation report and contribution to the publication of a
handbook after the completion of the training course, of scientific contents of training workshops, as well as with supplying instructors to teach the different modules.

Furthermore, depending on their resources, the national institutions hosting the training workshops will be asked to provide logistical support and present their scientific expertise and digital equipment (computers, scanners, printers, etc) for the course.

**Executive Committee:**

Giovanni Boccardi, UNESCO World Heritage Centre (Paris, France)
Karim Hendili, UNESCO World Heritage Centre (Paris, France)
Mario Santana Quintero, UNESCO World Heritage Centre (Paris, France)

**Local Organizing Committee:**

Zahi Hawas, Director, Supreme Council of Antiquities (Cairo, Egypt)
Fathi Saleh, Director, Centre for Documentation of Cultural and Natural Heritage (Cairo, Egypt)
Fekri Hassan, University College London (London, UK), Center for documentation of cultural and natural heritage (Cairo, Egypt)
Mohamed Saied, Advisor to the Director General, National Agency for the Protection of the Environment (ANPE).

**Training workshop in Saqqara (cultural heritage):**

International program committee:

Alonzo C. Addison, Center for Design Visualization, UC Berkeley (Berkeley, USA)
Gaetano Palumbo, World Monuments Fund and University College London (London, UK)
Koenraad Van Balen, R. Lemaire International Centre for Conservation, University of Leuven (Leuven Belgium)
Bill Blake and Jon Bedford, English Heritage (UK)
Maurizio Forte, Italian Research Council (Rome, Italy)
Rand Eppich, Digital Lab, Getty Conservation Institute (Los Angeles, U.S.A.)

**Training workshop in Ichkeul (natural heritage):**

International program committee:

Adrian Philips (IUCN).
Dr. Natarajan Ishwaran (Chief of Natural Heritage Sector – World Heritage Centre).
Philippe De Maeyer, Geography department of the University of Ghent (Ghent, Belgium).
Pere Tomas-Vives (Station biologique de la Tour du Valat, Baleares, Spain).
Mike Smart (Consultant to IUCN – Specialist on Ichkeul).
Jamie Skinner – Director (IUCN – Centre for Mediterranean co-operation, Malaga, Spain).
Jean Jalbert - Directeur de la Conservation (Station biologique de la Tour du Valat).
Peter Valentine (James Cook University, Australia) – WCPA (World Commission on Protected Areas).
Alonzo C. Addison, Director, Center for Design Visualization, UC Berkeley (Berkeley, USA).

**Regional Workshop**

The web site and training modules will be presented to concerned institutions and individuals from the Arab Region through a Regional Workshop, to be organized in Al Aïn (UAE) in cooperation with the Al Aïn Authority, at the end of 2003. The Workshop will constitute an occasion for exchanges among site managers, international heritage management experts and IT partners from the region.
This workshop seeks to be the catalyst for the development of agreements on the implementation of training modules (kits) for all sites in the region. State parties can support such agreements by requesting training assistance from the WH fund, which will be in charge of the implementation of all the activities relating to the project, in close collaboration with the identified partners.

**Closing remarks: lessons learned in the Saqqara workshop**

Networking in a multidisciplinary and international environment: participants were able to explore, share, and actually apply information management techniques in documenting cultural heritage using first-hand examples (for examples of the results see figures 7 -11)

The trainees worked together with renowned regional and international instructors, and benefited from exchanging and presenting ideas with them (? It was a bit repetitive otherwise).

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Figure 7: an example of the presentation prepared by the participants during the workshop in Egypt, 2004: slide showing the site context (Group: Toubel, M. Adel, N. Abdel Kader, M. al Shayal, T. Khalek el Sheykha, A.).

Figure 8: an example of the presentation prepared by the participants during the workshop in Egypt, 2004: slide showing the field data collected using a differential GPS system (Group: Toubel, M. Adel, N. Abdel Kader, M. al Shayal, T. Khalek el Sheykha, A.).
Figure 9: an example of the presentation prepared by the participants during the workshop in Egypt, 2004: slide showing a rectified aerial image with the field data collected using a differential GPS system and a Total Station (Group: Toubel, M. Adel, N Abdel Kader, M. al Shayal, T Khalek el Sheykha, A.).

Figure 10: an example of the presentation prepared by the participants during the workshop in Egypt, 2004: slide showing the site zoning definition (Group: Toubel, M. Adel, N Abdel Kader, M. al Shayal, T Khalek el Sheykha, A.).
Figure 11: an example of the presentation prepared by the participants during the workshop in Egypt, 2004: slide showing the preparation of a 3d model from recorded measured data from a Mastaba of Niankh-Khanum and Khnumhotep (Group: AlMahari, S. Hussein, A. Refaat, H Mohamed, N. Hijazeen, H. Gamal El-Din, M. Abd El-Aziz, M. Abd El-Gawad, S. Badran, A. Facilitators: Blake, B. Bedford, J.); (1) raw wireframe collected with a Total Station, (2) preparation of the model, (3) texture model.

References:

1 « Information management includes the collection and processing of documents and information enabling better implementation of the Convention and the effective management of the properties inscribed on the World Heritage List... The nomination dossiers prior to 1997 rarely contain up-to-date topographical maps, geographic coordinates, photos, recent bibliographies, etc., provided by the Conservation Services and the sites. With rare exceptions, the sites have not produced appropriate maps or measurements defining the boundaries and buffer zones. This lack of information is very detrimental to the conservation of heritage properties, because it prevents the establishment of a coherent system of legal protection, monitoring and maintenance.» (Extract of paragraph 1.6. Information management - Document WHC-03/27.COM/INF.20A : Regional Program for the Arab States).

2 The Valley of Bamyan and the wall of the Buddhas, Afghanistan: The Valley of Bamyan, lying north-west of Kabul, is one of the most famous sites in Afghanistan for its spectacular statues of Buddha and the numerous grotto-sanctuaries dug in the rock. Mastropietro, M. Ed.‘Archaeology or: conservation and maintenance; Restoration and Beyond Architecture from conservation to conversion Projects and works by Andrea Bruno (1960-1995), Edizione Lybra Immagine, Milano 1996, p. 27.
This is based on discussion among the participants of the ICOMOS-UNESCO Mission carried out in July 2002 to Bamiyan.