

The Virtual and the Real: E-Learning in Interdisciplinary Education – The Case of Cultural Heritage

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Abstract

Cultural heritage preservation is not only about arts, memory, values, and the subtle balance between destruction and restoration. In this modern inter- and multidisciplinary field, research is a common part of actual conservation projects. Moreover, advanced technologies, materials and investigation techniques are being developed specifically for conservation purposes. This paper presents one of the main outcomes of a European project in heritage conservation education. It outlines the "shuttle" application of e-learning to both online and offline learning in the framework of an educational program. This educational strategy allows the online students to achieve educational goals, and also to create an educational product of independent value. The presentation outlines relevant methodological basis of the structure of the e-learning platform, and provides some tendencies and statistical data on its usage. The contribution of the application of e-learning platform to focusing the students' attention to specific research questions and to the development of their visual analytical ability is addressed. Education for conservation of cultural heritage follows contemporary trends in the education science. At the same time, education in both humanities and arts, and STEM subjects, might benefit from research and development in this inter- and multidisciplinary field.

Key words: e-learning, education, interdisciplinary, conservation, cultural heritage

Introduction

"Contemporary conservation of cultural heritage comprises such various areas as art, history, architecture, crafts, technology, engineering, and scientific research in different fields, e.g., chemistry, mathematics, physics, biology and nano-materials."

Many scientists and engineers are not aware of the inter- and multi-disciplinary character of contemporary conservation of cultural heritage, and of the direct link between research and actual conservation work in this field. The vast and important part of cultural heritage is the built heritage which includes various types of Cultural

Heritage Objects (CHO), e.g.: historic buildings, sites, gardens, and cultural landscapes. In preservation of the built cultural heritage, the role of on-site investigation and research is crucial for various stages of the conservation process, and especially for the following two: the study and analysis of CHO for conservation purposes, undertaken before the conservation process, and monitoring of the conservation state of CHO after the completion of a conservation project.

The ability of visual analysis is essential for understanding any CHO, its equilibrium of values and deterioration. Therefore, the development of the ability of visual analysis, and the methods of focusing and managing visual attention of the online students were defined as the specific targets of the project.

Background

The importance of public education for heritage preservation has been widely understood in recent decades (ICOMOS, 1993; Jokilehto, 2006; Thornton, 2008; UNESCO/UIA 2011). However, many educational activities for the general public are literally hands-on, focusing on the actual apprenticeship in conservation work, and, therefore, often without developing the students' understanding of the complexity of conservation of cultural heritage. The project Educational Linkage Approach in Cultural Heritage (ELAICH) aimed at bridging between the general public heritage education and the research for the conservation of cultural (built) heritage. Thus, it actually brought citizen science to the field of heritage conservation through the development of the basic research ability in its online students.

The educational methodology underlying the Educational Linkage Approach in Cultural Heritage (ELAICH) was formulated and developed before and during the EuroMed Heritage 4 project ELAICH (2009-2012), with the first pre-test results published online in 2008 (Lobovikov-Katz, 2009), and some results of the project published in 2014 (Lobovikov-Katz et al., 2014). Due to the stipulations of the EU grant, the educational development targeted a young audience (high school students). However, due to the specific character of the project outcome, it has also been applied as reference material in university conservation courses and in professional training, e.g. training of certified architects for conservation in Great Britain. The first steps have been undertaken for further adjustment of the methodology to the students of technological faculties at the member universities of the ELAICH consortium (Moropoulou et al., 2014).

Aims

With relevance to this paper, specific objectives of the project should be delineated, as follows:

1. To develop a methodology, to develop and provide (through the e-learning platform) an educational e-tool kit, which would introduce to the online students the values of cultural heritage (CH) and principles and challenges of its preservation, and to develop the understanding of the main components and processes of the contemporary inter- and multidisciplinary CH conservation

2. To enable (through the educational e-tool kit) the development of visual analytical ability, and visual study focus of the online students, in order to produce an educational outcome of an independent value, which might be helpful for studying and monitoring real conservation objects (CHO) by conservation experts.

Method

Based on the ELAICH methodology, which was developed in the first stage of the project, the didactical aims were achieved by several means. First, the mapping of the main components and processes of contemporary conservation of CH was developed and used as a check list for the educational content. Then, the structure of the e-learning platform was developed. All learning activities are enabled through the e-learning platform. The Manual and the Guidelines allow individual or group learning.

The e-learning platform consists of 6 Modules and "Adopt a site" unit. These learning blocks include different types of learning activities, e.g. teaching material, exercises, instructions and examples for laboratory experiments, and enable "passive" and "active" educational activities on CH sitesⁱ. All these link between online and offline activities, while learning activities on historic sites can be also supported by online instructions. This can be exemplified in various Modules.

The introductory Module 1 consists mainly of teaching material, e.g. ppt(x) and video files. It includes online exercise, and, at the same time, it involves onsite activities, with clear instructions and content provided online.

Module 3 is chemistry-related, as it deals with the impact of natural and man-made environment of the built CH. It includes interactive exercises which involve visuals, to help the students to acquire basic knowledge and to develop visual understanding of causes and phenomena of material deterioration on historic monuments. This multidisciplinary online Module introduces nanomaterials, analytical chemistry and other relevant subjects in their conservation context. This and other Modules provide a glimpse of advanced conservation research in these areas, and, at the same time, help the online students to develop skills for visual recognition and analysis of the relevant conservation problems to serve them during their further activities on historic sites as part of the seventh unit - "Adopt a site".

Figure 1 provides a schematic view of the organization of the "shuttle" application of the e-learning platform. It traces the dual contribution of online and offline learning activities, emphasizing their contribution to the development of the basic "visual literacy" of online students in CH conservation in general, and in physical preservation state of CHO, in particular.

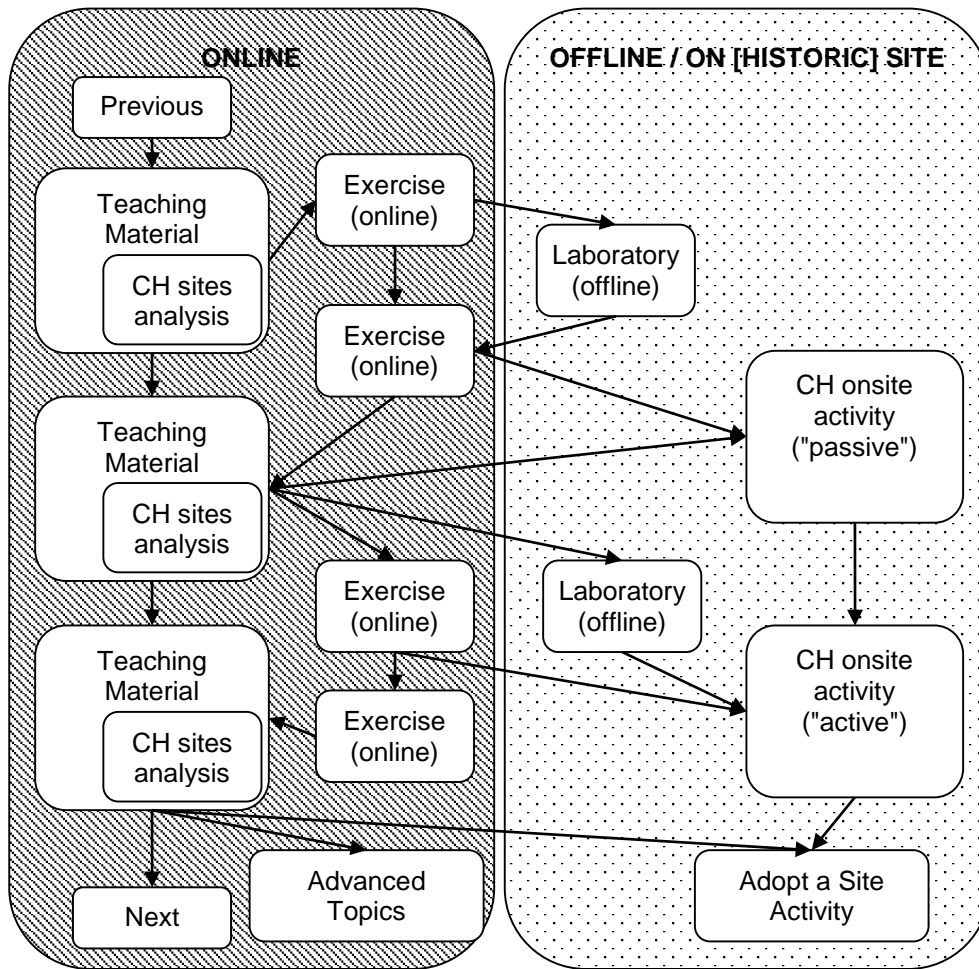


Figure 1: Scheme of "shuttle" application of ELAICH e-learning platform: a typical organization of a Module

Results

The "shuttle" application of the e-learning platform contributes to the basic understanding of the scientific and technological basis of the contemporary multi- and interdisciplinary conservation of cultural heritage, and to stressing the important role of on-site and laboratory analysis and diagnosis in conservation. At the same time, it allows to develop skills required for the discovering, collection and analyzing of visual information as part of the on-site learning and study of historic CH sites. Learning, understanding and reinforcing the knowledge both online and offline help online students to greater in-depth understanding of the subject. According to the students' feedback, they like this mixture of analytical and visual intellectual activities.

Analysis of usage of the ELAICH e-learning platform shows that the 32 % of total number of page views correspond to session durations of more than 30 min. The e-learning platform is provided in six languages: English, Hebrew, Arabic, Italian, Greek and Maltese. Different patterns of uses from different cultural origins are yet to be examined in a separate study. Here are some of the most popular learning subjects,

regardless of language: "What is cultural heritage?" (16% of total number of page views of Module 1); "Why should we preserve cultural heritage?" (28% of total number of page views of Module 1; 5% of the entire platform). Among other popular topics of various Modules are: online exercises of all modules, Decay and environment; Management and use; Definition of monitoring; Monuments: their social significance and conflict of values; Environmental effects, phenomena and decay mechanisms; Historic structural systems - behavior and typical damage; Atmosphere and particles; Graffiti and anti-graffiti systems; How acid rain affects limestone buildings; Earthquake effects on historic structures; Requirements for compatible materials and conservation interventions, and others.

Conclusions

The ELAICH project achieved all of its objectives, while the development of the e-learning platform was the main visible result of the project. Due to its advanced scientific content and the wide scope of its approach, the ELAICH toolkit continues to be an important educational instrument in education for conservation of cultural built heritage, accessible to all. This and further analysis of the specific features of the ELAICH e-learning platform could be useful to the development of e-learning methods beyond the heritage conservation education. This includes the online – offline "shuttle" use of the e-learning platform in the learning process combined with the specific focus on enabling the development of visual analytical ability caused by the specific character of the main theme of this platform – conservation. Furthermore, as shown in the framework of the EU project "ELAICH", inter- and multidisciplinary field of conservation of cultural (built) heritage might be used as a showcase for introducing interdisciplinary approaches and their realization in contemporary science and technology.

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References

- ICOMOS. (1993). *Guidelines for Education and Training in the Conservation of Monuments, Ensembles and Sites*. Retrieved from <http://www.icomos.org/charters/education-e.pdf>
- Jokilehto, J. (2006). *An International Perspective to Conservation Education. Built Heritage Conservation Education*, Edited issue of Built Environment. Retrieved from http://cif.icomos.org/pdf_docs/Documents%20on%20line/Built%20Heritage%20Jokilehto.pdf
- Lobovikov-Katz, A. (2009). Heritage Education for Heritage Conservation (Contribution of Educational Codes to Study of Deterioration of Natural Building Stone in Historic Monuments), *Strain - An International Journal for Experimental Mechanics*, Article first published online: 18 November 2008. Vol. 45, Issue 5, pp. 480-484
- Lobovikov-Katz, A., Moropoulou, A., Konstanti, A., Ortiz Calderón, P., Van Grieken, R., Worth, S., ..., G., Izzo, F. (2014). Tangible Versus Intangible in e-Learning on Cultural Heritage: from Online Learning to on-Site Study of Historic sites. In M. Ioannides, N.

Magenat-Thalmann, E. Fink, R. Žarnić, A.-Y. Yen & E. Quak (Eds.), *Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation and Protection*, LNCS, Vol. 8740, pp. 819-828, Springer

Moropoulou, A., Konstanti, A. & Lobovikov-Katz, A. (2014). "Hands-on Cultural Heritage" Educational Approach Interconnecting Secondary With Tertiary Level Education, *6th International Congress Science and Technology for the Safeguard of Cultural Heritage in the Mediterranean Basin*, 22-25 October 2013, Athens, Greece, Vol. III, pp 326-334

Thornton, L. L. (2008). Current Trends in Historic Preservation Education at the Primary and Secondary School Levels: A Survey of Online Resources, *Preservation Education & Research*, Vol. 1, pp.67-76. Retrieved from <http://www.ncpe.us/wp-content/uploads/2012/06/6THORNTONpaper.pdf>

UNESCO / UIA. (2011). *Charter for Architectural Education*. Revised Edition. Retrieved from <http://www.uia.archi/sites/default/files/charte-en.pdf>

Endnotes

ⁱ Lobovikov-Katz, A. *eLAICH, Topic 1.1 (1)*, slide 38, <http://elaich.technion.ac.il/e-learning/en/activities/part-i.html>

ⁱⁱ

"Passive on-site learning consists of visiting a site and obtaining information from a third party (e.g., instructor) for the learning process. [It] does not include any sort of practice, e.g. experiments, tests or taking measurements. ... An example of passive on-site learning activity can be a conservation study tour... Those activities are not actually passive from a didactical point of view – they are just named so for easy distinction between the two types of on-site activities in the context of the project...

Active on-site learning includes active learning process on historic sites. Here, a historic building or site is used as part of the teaching material which has to be actively studied by students with the assistance of guidelines ..." (Lobovikov-Katz et al., 2014)