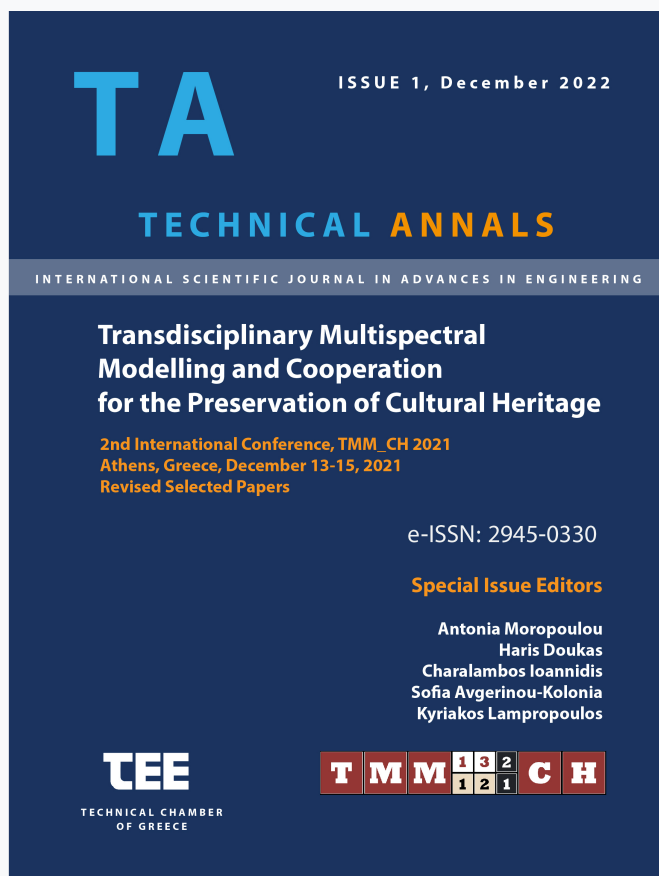


Technical Annals

Vol 1, No 1 (2022)

Technical Annals



Heritage Preservation Education for the General Public – The role of Hands-on Education

Anna Lobovikov-Katz, Antonia Moropoulou, Agoritsa Konstanti, Kyriakos Lampropoulos

doi: [10.12681/ta.32179](https://doi.org/10.12681/ta.32179)

Copyright © 2022, Technical Annals



This work is licensed under a [Creative Commons Attribution-ShareAlike 4.0](https://creativecommons.org/licenses/by-sa/4.0/).

To cite this article:

Lobovikov-Katz, A., Moropoulou, A., Konstanti, A., & Lampropoulos, K. (2022). Heritage Preservation Education for the General Public – The role of Hands-on Education. *Technical Annals*, 1(1), 290–308. <https://doi.org/10.12681/ta.32179>

Heritage Preservation Education for the General Public – The role of Hands-on Education

Anna Lobovikov-Katz¹, Antonia Moropoulou², Agoritsa Konstanti² and Kyriakos Lampropoulos²

¹Department of Architecture, The NB Haifa School of Design, and Faculty of Architecture and Town Planning, Technion - Israel Institute of Technology, Haifa, Israel

²National Technical University of Athens, School of Chemical Engineering, Iroon Polytechniou 9, Zografou, Athens, Greece

alobovikovk@gmail.com, amoropul@central.ntua.gr,
akonsta@mail.ntua.gr, klabrop@central.ntua.gr

Abstract. Heritage education for the general public by conservation experts is the key to success in preserving the world cultural heritage. An extended State-of-the-Art Review on educational activities for the general public on conservation of cultural heritage (CCH) was undertaken as part of the European Project ELAICH (Educational Linkage Approach In Cultural Heritage). Its results have not yet been published. This article revisits some selected data from the conclusions of the Review, drawn up by the leading partner of the project, with a glimpse into some present aspects of heritage education, concentrating specifically on educating the general public in CCH.

Keywords: Heritage Education; Conservation of Cultural Heritage (CCH); Education for Conservation of Cultural Heritage (ECCH); Heritage Preservation Education; General Public (GP); Non-Professional Audience (NPA).

1 Introduction

1.1 Heritage education

Heritage education is a wide area that aims to facilitate the understanding of and responsible approach to culture and heritage by the general public and contributes to diverse areas of education. Conservation of cultural heritage is an interdisciplinary and multidisciplinary field. Since the 20th century, general public has become gradually included and interested in heritage education and preservation (Cuenca-López 2021; Hunter 2021; Fontal & Martínez 2017; Moropoulou & Konstanti 2013; Eurobarometer 2017; Heritage education). These inclusive initiatives for the general public are mostly of two types: hands-on assistance of general public in actual conservation of historic sites; and heritage education of a more theoretical character. Though both types of activities differ significantly, they have a common objective: raising awareness of cultural heritage among the general public, with a view of instilling a careful approach to cultural heritage among the participants of these activities.

1.2 The main idea of the ELAICH Project

The Euromed Heritage 4 Project “ELAICH” (Euromed Heritage Project ELAICH - Educational Linkage Approach In Cultural Heritage - ENPI 150583) was specifically focused at educating the general public on the *values of cultural heritage, and challenges, principles and methods of its conservation*. Thus, target audience of the project was general public. Direct target audience of the project, in accordance with the EU Call for Proposals, was youth, namely - high school students. However, by its completion, the project has developed a methodology, and an educational e-learning platform and toolkit for raising awareness of the importance of Cultural Heritage and its conservation by the general public, suitable for diverse types of audience (Lobovikov-Katz et al. 2014). It was used as a reference material on conservation of cultural heritage (CCH) for university courses, and in other frameworks. Furthermore, the ELAICH Project extended the accepted limits of connecting general public to cultural herit-

age: it aimed and achieved basic research contribution by general public to preservation of cultural heritage, through a specifically developed scientific methodology (ELAICH Methodology). At the time of the project, conservation-related educational activities for the general public were mostly focused on hands-on activities, i.e., actual assistance on basic conservation works on historic buildings and sites, provided by the general public learners. The ELAICH Project allowed for the accessibility of inter- and multidisciplinary research in CCH to the general public learners, and allowed for “intelligent” or “intellectual” contribution of the general public to a basic collection and analysis of data on conservation state of historic sites.

1.3 Introduction to the ELAICH Project State-of-the-Art Review of Heritage Conservation Courses

Outline.

An extended State of the Art Review of educational activities on Conservation of Cultural Heritage (CCH) for the general public was undertaken by the ELAICH international research team in the first phase of the project. The Review focused at collecting and analyzing information on a large number of heritage conservation awareness courses for the general public with a dual aim in mind. First, it aimed to analyze the state of education on the conservation education for general public, to learn from good practices, to review tendencies. Second, it aimed at searching for an intellectual component of the course curricula; for verifying the uniqueness of the main idea of the project. The Review was designed to serve the specific objectives of the ELAICH Project, with regard to (1) type of the audience; (2) type of the courses.

Target Audience.

According to the ELAICH Project objectives, the Review focused on general public audience, or “Non-Professional Audience” (NPA). As defined by the project, non-professional audience means that the reviewed courses’ participants should be non-professional in the field of conservation of cultural heritage, both before and after learning a reviewed course. They should not be conservation experts in any area. At the same time, they might have been skilled professionals or experts in other areas, e.g., they might have been architects, engineers, teachers. Thus, only awareness courses were considered, excluding courses for the general public which were targeted at their specialized education and training in CCH.

Types of Courses

The Review analyzed only the specific type of the courses, relevant to the project. Unlikely wide number of courses available about cultural heritage, the Review focused on the courses that introduced specifically Conservation of Cultural Heritage (CCH) to the general public. The Review also included the analysis of educational components of the courses.

Results of the Review of Courses on Conservation of Cultural Heritage for Non- Professional Audience (CCH-NPA courses) have not yet been published, and this paper outlines its main findings, with a view to their relevance to the present heritage conser- vation education for the general public.

2 Research Management and Structure of the Review of CCH- NPA Courses

2.1 CCH-NPA Review: General Data

The Review of Courses on Conservation of Cultural Heritage (CCH) for Non-Professional Audience (NPA) (CCH-NPA courses), was led by the coordinator of the project - Technion (Israel Institute of Technology). The criteria, plan, and parameters of the analysis of the Courses on Conservation of Cultural Heritage (CCH) for Non-Professional Audience (NPA) (CCH-NPA courses) were formulated before the start of the data collection. Questionnaire for collecting data on the Courses on Conservation of Cultural Heritage (CCH) for Non-Professional Audience (NPA) (namely: NPA-CCH Questionnaire), was developed by the project’s PI (Dr. Anna Lobovikov-Katz, Technion), and technically adjusted by the ICT expert to enable computerized data collection and analysis. The Questionnaire was distributed to the ELAICH partner universities lead researchers and their teams: Prof. Rene Van Grieken (University of Antwerp); Prof. Antonia Moropoulou, Agoritsa Konstanti, Kyriakos Lampropoulos (NTUA); Prof. JoAnn Cassar, Roberta De Angelis (University of Malta); Prof. Guido Biscontin, Francesca Izzo (University Ca’Foscari), and other research team members. Data collection on CCH-NPA Courses was also contributed by Prof. Pilar Ortiz of University Pablo Olavide, Spain. Upon the completion of data collection by the ELAICH consortium, including Technion, it was processed and analysed by the Technion ELAICH team (Dr. Anna Lobovikov-Katz and Tali Chitaiad).

Each of the ELAICH partners was assigned several countries and international or- ganizations for review. In addition, collaborative programmes held in Europe were also reviewed. The number of courses was either the actual number of courses found in a country, or representative (in cases there was a large number of relevant courses in a specific country, and only several courses were submitted to represent the common trends in CCH/NPA in a country). The responsibilities on data collection were divided as following:

Table 1. Countries reviewed by ELAICH partners

ELAICH Partner	Country reviewed
University of Antwerp	Spain
	Belgium
	Poland
Israel Institute of Technology	Israel
	Russia
National Technical University of Athens	Greece
	USA
	Turkey
	Serbia

	FYROM	
	Croatia	
University of Malta	Malta	
	Great Britain	
	ICCROM	
University of Malta	UNESCO	
	Getty Conservation Institute	
	Council of Europe	
	World Heritage Centre	
	OWHC (Youth on the Trail of World Heritage)	
Ca' Foscari University of Venice	Italy	
	France	
	UNESCO	
	ICOMOS	

The review of the state of the art was undertaken through targeted internet searches and personal inquiries and interviews. Of more than five hundred courses reviewed by the ELAICH Con-

sortium, 281 courses were found to be of most relevance for ELAICH and included in the overall analysis by the Technion ELAICH team (Lobovikov-Katz et al., 2012). According to the task definition, those were courses on conservation of cultural heritage for non-professional audience (CCH/NPA courses). In some countries large numbers of CCH/NPA courses were found, and in other - just a few. In the countries with a large number of CCH/NPA courses, some partners have chosen to review a selection of the most typical courses and educational activities available. Therefore, the Review, its data collection, analysis and conclusions, traced the major trends in the field, and aspects applicable for the ELAICH project.

2.2 Structure of the CCH-NPA Questionnaire

Aims of the Questionnaire. As outlined in the Introduction of this paper, CCH-NPA Questionnaire aimed to analyze the state of education on heritage conservation education for general public, to learn from good practices, to review tendencies; and also to search for an intellectual component of the course curricula; for verifying the uniqueness of the main idea of the project, i.e.:

1. to analyze the state of education on the conservation education for general public, to locate its trends, needs and achievements;
2. to search for an intellectual component (if any) of course curricula, for verifying the uniqueness of the main idea of the project;
3. to learn from good educational practices

Overall Structure of the Questionnaire. The review targeted a clearly defined type of courses for a specific audience. Due to a large number of courses reviewed, along with ELAICH partner teams, external researchers were involved in data collecting. To clarify the tasks for all researchers involved ("data collectors"), the Questionnaire's guidelines explained the content requirements (e.g., how to identify the courses relevant to the ELAICH) and provided clear management and data processing-related instructions (e.g., with regard to unified labelling of Questionnaires). Each single Questionnaire contained data on a specific CCH-NPA course.

Besides the guidelines, CCH-NPA Questionnaire consisted of four parts:

- A. Data collector info
- B. Course: general info
- C. Course: detailed info
- D. Course provider info

Part A - Data collector info, included data on a specific researcher, university, contact details, and also "Person in charge". "Persons in charge" were partner researchers of the ELAICH project. In some cases data collector and partner in charge was the same researcher; however, in many cases data collecting was delegated to researchers which were not part of the ELAICH team. This structure of Part A allowed to easily locate, and, if needed, to correct, any detail on all courses.

Part B - Course: general info. This part included Course code; Course area; Course provider, and other data. (Fig. 1)

Part C - Course: detailed info. Part C provided detailed data on audience; course duration; course structure; topics and teaching methods. (Fig. 2)

Part D - Course provider info. Part D consisted of D1 and D2. D1 contained detailed information on course provider, including the providing organization profile; involvement of other organizations (if any), and other data (Fig. 3). D2 contained con- servation-related (or not) profile of course instructor

B		Course general info
B1	Course code[2]	
B2	Course title	
B3	Course provider	
B4	Course area[3]	
B5	Course audience	
B6	Course location	
B7	When?	Permanent
		Once
		Once per[4]
		Other
B8	Active now?	No
		Yes
B9	Other	

and other teaching stuff, and other information. (Fig. 4)

Fig. 1. CCH-NPA Questionnaire: Part B Course: general info (© A. Lobovikov-Katz).

C		Course detailed info
Course aim		
Audience CH background[5]	No	
	Yes	
	Specify	
Audience description		
Length (hours)		
Structure (hours)	Class	
	Lab	
	in situ	
	e-learning	
	Other	
Topics		
Teaching methods		
Free comments[6]		

Fig. 2. CCH-NPA Questionnaire: Part C Course: detailed info (© A. Lobovikov-Katz).

D Course provider info							
D1 Administrative: providing organization							
Country							
Organization name							
Provider data[7]	Activity		Education		CH Preservation (CHP)		
			Non-CH	CH/CHP	Research	Other	Other
	Level	Internation.					
		National					
		Regional					
		Local					
		Other					
	Type	State					
		NGO					
		Private					
		Other					
	Education level	University					
		College					
School							
Other							
Free comment							

Fig. 3. CCH-NPA Questionnaire: Part D Course provider info: D1 Administrative: providing organization (© A. Lobovikov-Katz).

D2 Teaching: course instructor[8]		
Course instructor CH background	No	
	Yes	
	Specify	
Organization[9]		
Country[10]		
Course instructor	Name	
	Position	
Contact details	Email	
	Tel	
	Fax	
	Address	
Other teaching staff		
Teaching staff CH background	No	
	Yes	
	Specify	
Free comment		

Fig. 4. CCH-NPA Questionnaire: Part D Course provider info: D2 Teaching instructor; other teaching staff (© A. Lobovikov-Katz).

Data collected by all ELAICH partners was reviewed by the Technion team, and, upon approval, data available from up to 281 of 523 courses was processed by the Technion. The results of computerized analysis brought to conclusions. The following chapter summarizes their findings.

3 The Review of CCH-NPA Courses: Conclusions

3.1 CCH-NPA Review

The Review of Courses on Conservation of Cultural Heritage for Non-Professional Audience was led by the coordinator of the project - Technion (Israel Institute of Technology). It was carried out in 2009. Educational activities on conservation of cultural heritage (CCH) for the general public (non-professional audience - NPA) have undergone changes in the past decade, e.g., in Israel, there was a significant growth in the number of courses, while the main course-content trends remain much the same. At the same time, at some major heritage authorities in this country, conservation of cultural heritage has claimed a more important place, both with regard to actual conservation activities, and to educational introduction of heritage conservation to the general public provided by these bodies. Retrospective of the situation in this area is instrumental for understanding of the contemporary trends, and for a future development of heritage conservation education for the general public. This chapter of the paper presents some of the main conclusions of the Review as analysed and summarized in 2009 by the ELAICH Technion researchers, based on findings by all ELAICH partners, including Technion (Lobovikov-Katz & Chitaiaid 2009).

The number of CCH/NPA courses varied widely amongst the different countries reviewed. It seems that the number of courses in 2009 was closely related to conservation traditions and to the history of conservation in each of the countries, as well as to the level of interest and awareness to, and understanding of the importance of the subject of conservation in the various countries. Thus, the more developed the level of awareness of cultural heritage in a country, the larger number of courses in CCH was provided.

3.2 Course providers

Course providers' data was accumulated in Part D of the Questionnaires. In countries where there was abundance of CCH/NPA courses, there were also a wider variety of types of course providers, both public, such as universities, research centers, NGOs, public councils, as well as private organisations such as art centers, private colleges, etc. In those countries, like GB, France, Italy, and the USA, a considerable role belonged to NGOs in providing CCH/NPA courses. In Greece the most common type of provider was the government (Ministry of National Education and Religious Affairs). This might have been indicative of the high level of awareness for cultural heritage conservation and preservation in Greece. In countries less prolific in courses, the variety of providers was limited. Thus, for example, in Israel, about 18 CH/NPA courses were found altogether in 2009, and most of these courses were provided by universities. The rest (2-3 courses) were provided, e.g., by a public council. In Malta most of the courses were given by the Institute of Conservation and Management of Cultural Heritage (IC-MCH). Fig. 5 represents the relation between the types of the course providers and the number of courses.

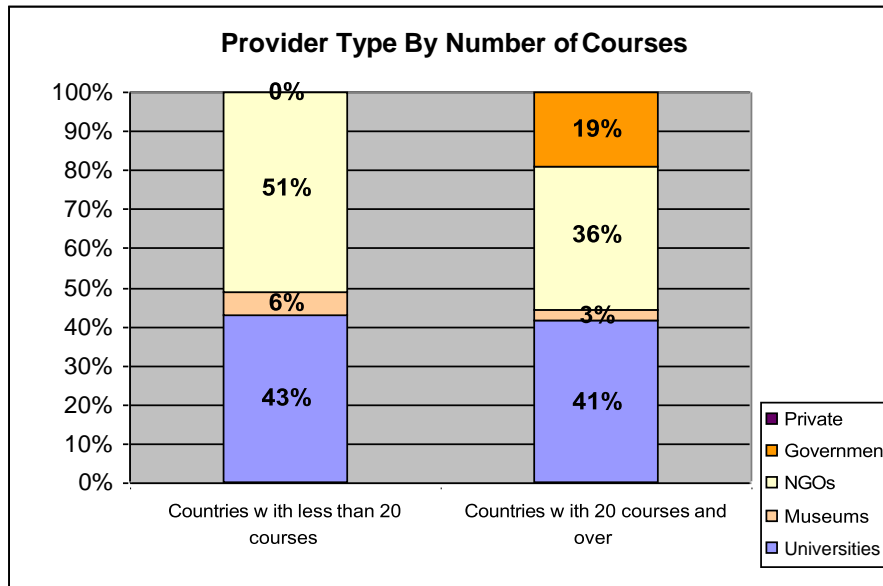


Fig. 5. Course Provider Type by Number of Courses (© A. Lobovikov-Katz).

3.3 Structure of the Courses

Data on the courses' structure was collected in the section "C" of the CCH-NPA Questionnaires. Most of the courses were structured in the traditional class format. Significant number of courses combined class and laboratory; less courses consisted of on-site activities only. Only one course combined the entire spectrum of course' components: class, lab, in-situ, and e-learning. There was an inverse correlation between the level of complexity in the structure of the course and the number of the courses using it, i.e., the more complex a structure was, the less courses with this structure were likely to be found. Fig. 6 represents data collected on the relation between courses' structure and their quantity.

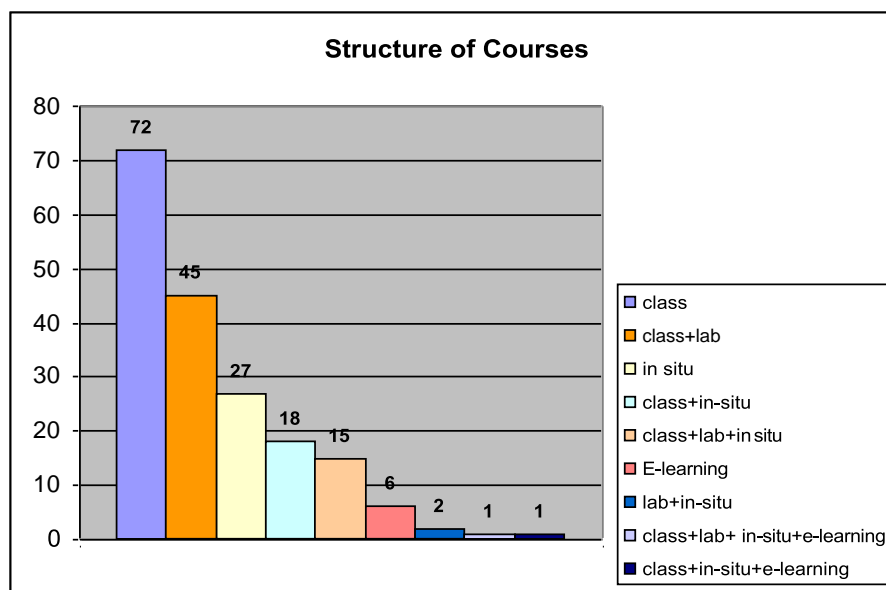


Fig. 6. Structure of the Courses (© A. Lobovikov-Katz)

3.4 Relation between course provider, area of the course, course topics and teaching methods

In the countries where less courses were located, the courses were given by fewer main providers, mostly - universities, and the courses had more general introductory topics. These courses were given within departments of related areas such as geography, interior design, and architecture; and employed traditional teaching methods such as lectures and case studies discussions. However, there were a few courses, with a more specific topic even in this framework, which employed more innovative teaching methods (e.g., the 'Studio' courses provided by the Academy of Design, Haifa (today: The NB Haifa School of Design and Education); other). In countries with a large number of courses, embedded in a strong culture of conservation, there was a larger variety of providers, a larger variety of courses, and various teaching methods (see also section 3.5). A special role was played by international organisations: in addition to their activity in the European countries, where, for the most part, awareness of preservation of cultural heritage was not a new issue, the international organisations provided attractive courses in countries with a less developed culture of conservation and were thus fulfilling their mission of increasing levels of awareness of cultural heritage and its preservation (e.g., ICCROM course in Tunisia; and UNESCO course in Petra, Jordan).

3.5 Course Providers

In general, there was very little collaboration between institutions as to providing a joint course. From the 281 courses documented, only 18 were joint courses with the following distribution: Israel-3, International courses-8, Great Britain-4, Greece-3. These collaborative courses seemed to be carefully thought of and planned. They usually employed innovative teaching methods and used various advantages of each of the partners, thus each and every partner brought its own expertise and knowledge, and all partners together wove it into an innovative and exciting educational fabric. In addition, as some may have more experience with certain subjects, such collaboration brought about both educational and economic benefits. Furthermore, each organisation was able to promote the course to its constituencies, and a collaborative effort could yield more fruits. Fig. 7 illustrates the ratio between single and multiple course providers.

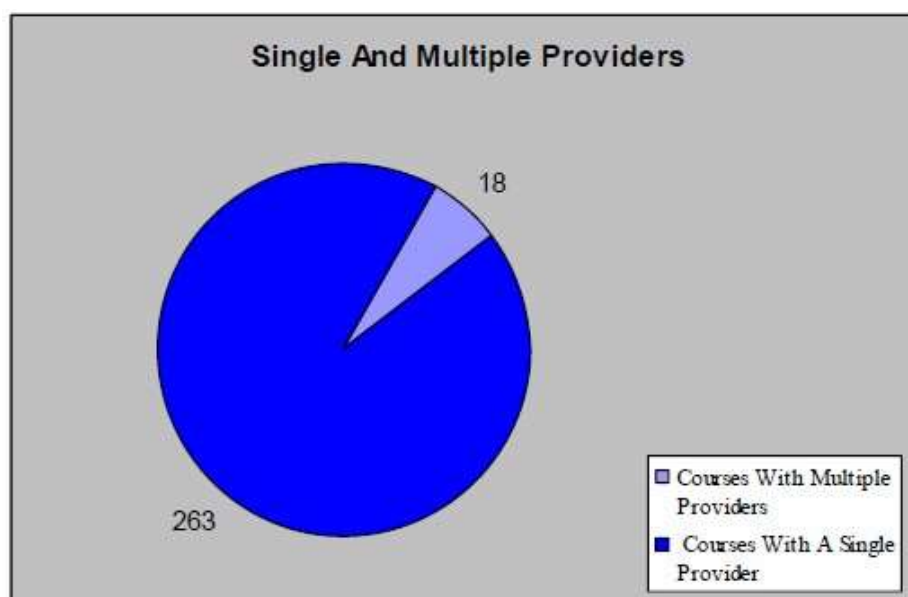


Fig. 7. Single and Multiple Course Providers (© A. Lobovikov-Katz)

3.6 Teaching Methods Versus Course Audiences

General Trends. Analysis of CCH-NPA Questionnaires brought to formulation of several main trends:

- Courses, which targeted younger audiences, applied more innovative trends in the teaching approach, including, e.g., interactive and creative work; hands-on activities; project-based learning; e-learning, and other.
- About 50% of the courses provided by multiple providers used innovative and attractive teaching methods.
- Countries with a larger number of CCH courses also counted a larger part of innovative teaching methods included in courses, e.g.: while in Israel about 7%-14% of 18 courses reviewed used more innovative methods, in Greece 60 out of 140 courses reviewed (44%) used innovative teaching methods.
- There was also a correlation between innovative teaching methods and the international institutions: 10 of the 16 (63%) international courses reviewed applied innovative teaching methods.

3.7 Selected Innovative and attractive teaching methods at CCH/NPA courses targeting young audiences

Students' engagement. Students were engaged in interactive activities tailored for specific learning outcomes. Such activities usually included an initial tuition phase (e.g., lectures), required to introduce basic concepts and terminology (i.e., tools for implementing the activities). In the courses provided by international organisations (UNESCO, ICCROM, Getty Conservation Institute, OWHC, Council of Europe, World Heritage Centre), students were assigned active role during the learning process. E-learning platform was considered a valuable asset for its great potential for interactive resources.

Course materials. Course materials were based on excellent visuals: lectures included simple diagrams, a large number of photographs, use of video clips (e.g. filmed interviews with experts, youth or other stakeholders involved in the field, filmed demonstrations, etc.), 3D reconstructions, animation, etc. Interactive worksheets and/or quizzes were usually used during activities to encourage discussion. A wide range of interactive digital resources could be found in museum websites as educational tools to engage youth.

Teaching packs. Besides providing material useful to implement the project/course (e.g. worksheets for students), "teaching packs" provided guidelines for teachers (e.g. list of tasks that needed to be carried out before implementing the activity, list of materials required, etc.), basic information useful for the course (e.g. history of a site, definitions of conservation, CH, etc.), and ideas on activities to be implemented (generally more than one option was provided to adapt to different needs). (E.g., courses provided by the Council for Conservation of Historic Sites in Israel and also a course by The Avi Chai

Foundation and the Zalman Shazar Center for Jewish History).

Cross-curricular activities. There was a noticeable effort/tendency to develop the course/activity content and structure as part of school curriculum, with an emphasis on cross-curricular activities. This was particularly evident in short activities implemented in museums and historic sites, but could also be found in medium or long courses/projects. This approach could significantly benefit from multi- and interdisciplinary character of the field of conservation of cultural heritage.

3.8 Course, student, and a historic site

Connection between a course, a student and a historic varied significantly among the courses.

Course content and historic sites. Content of some courses was built around a specific historic site, e.g., introductory part, as study tours on site. This helped to connect students to their local cultural heritage, and also facilitated educational process through exemplification of learning material on actual historic site.

Courses and preservation of historic sites. Several types of activities could be outlined, with regard to an immediate contribution of CCH/NPA course to preservation of historic sites, as based on information provided by the ELAICH international team.

- Course/Projects/Campaigns aimed at increasing awareness of local CH and of its protection usually adopted a “catchy” project/course name for inducing in the course participants a sense of ownership of the heritage (site/monument).
- Actual preservation activities on historic sites were part of or a sole content of many courses.

Students and cultural heritage. Diverse courses instilled diverse approaches to preservation of cultural heritage. Courses, defined as “Studios” introduced specific subjects which differed from introductory CCH courses, and should be specially mentioned. Those were mostly university courses, and in some cases, they combined practical implementation alongside theories; their lesson plans were more varied, and they utilized more unique teaching methods, which derived from architectural and design education, and included e.g.: research conducted by students, hands-on practice, teamwork, planning sessions, presentations, etc. Those were actually architectural design studios, based on examples of historic buildings. This practice has undergone little change during the past decade (e.g., in Israel), and it has both advantages and disadvantages, the latter originate from the lack of an educational background in CCH understanding prior to the design studio, including lack of awareness and understanding of heritage conservation challenges and principles by students.

Specific examples of course activities could be mentioned, e.g.: in Greece, many of the courses targeting youth, provided by the Ministry of National Education and Religious Affairs, used more attractive teaching methods and aimed at the development of creative procedures, which promoted cultural heritage. Through the programme, students evaluated cultural achievements and comprehended the meaning of cooperation. The knowledge of the past became the motivation for new creation and students became active citizens and part of the cultural creation.

Other worth mentioning courses in Greece were provided by museums. Among the activities were:

- Tours of the museums and observation of exhibits
- Identification of characteristic features of art and culture
- Reviewing the relationship between religion and Greek culture, etc.
- Use of visuals such as slides and maps
- Trips in the monuments in the footsteps of Greek greats. (as preparatory, student read related texts, learned the history and context of the period)
- Simulation of the process of building temples, the most important building type of ancient Greek architecture. During the programme, students built, little by little, their own ancient Greek temple. They became ancient Athenian citizens, architects, sculptors and craftsmen, and they participated in both the decision making and the building process.

3.9 “Intelligent” In-Situ Work/ Learning

One of the main targets of the ELAICH project was to develop the “intelligent” in-situ work-learning (which was successfully fulfilled by the completion of the project). “Intelligent” in-situ work means that the in-situ work itself would be focused on intellectual work, such as understanding, analysis, survey, and not focused on manual work; the latter was and still is currently the practice in many

CCH/NPA educational activities. The review that was conducted reaffirmed our work assumption that there were only very few courses, which used “intelligent” in-situ component, and that this aspect definitely needed enhancement, which ELAICH sought to do. Out of the 281 courses reviewed, only six included an “Intelligent” in- situ work (one in Israel, two in the USA, three in Greece). Fig. 8 shows the ratio between courses, which included “Intelligent” in- situ work, and those which did not.

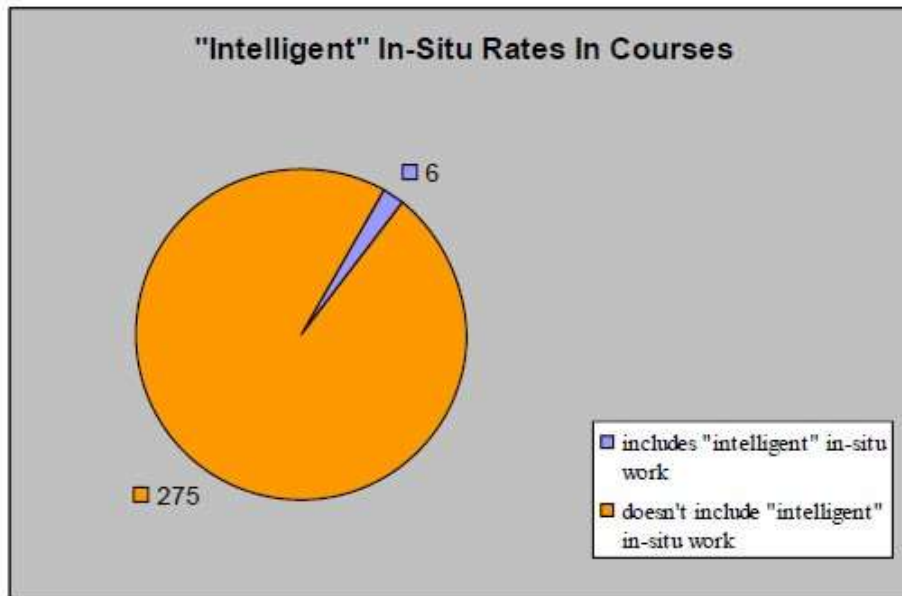


Fig. 8. Intelligent In-Situ Component in Courses (© A. Lobovikov-Katz).

3.10 Distance Learning / E-Learning

In 2009, when the Review was conducted, only nine courses out of the 281 used distance learning platform. Significant changes occurred in this direction. The number of distance learning activities has grown tremendously in 2020 - 2021, the years of the Covid-19 pandemic. These changes should be analysed, while a distinction should be made between distance learning and e-learning. The graph (Fig. 9) illustrates the ratio between courses, which included distance learning platform, and those which did not, as per 2009.

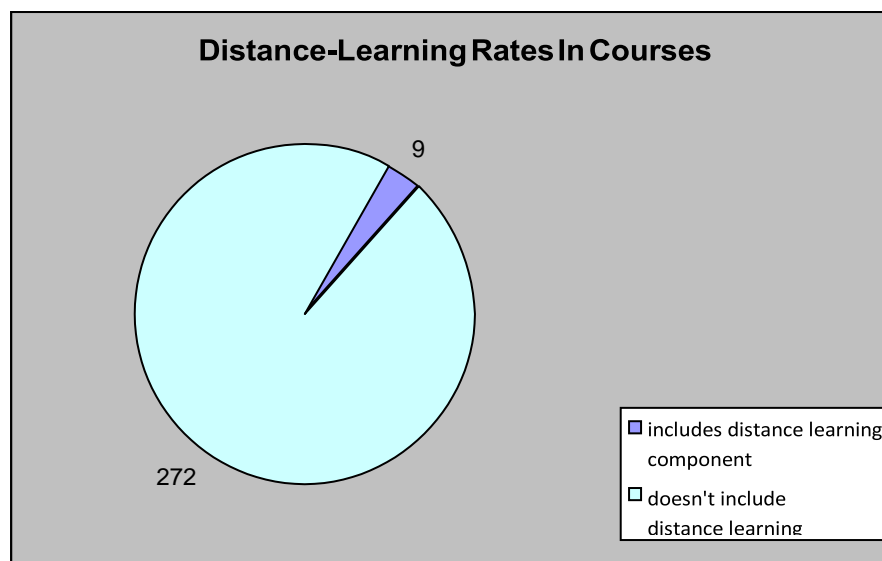


Fig. 9. Distance-Learning Component in Courses (© A. Lobovikov-Katz)

4 A Glimpse into the Selected Aspects of Present Education for Conservation of Cultural Heritage for the General Public

A glimpse into the present CCH-NPA education shows certain changes in overall approach to and content of CCH-NPA educational activities. For example, a very significant growth in overall number of heritage courses, and of those provided by a cooperative effort of multiple course providers, are a significant change in heritage education in Israel in recent years. Since the three main heritage authorities in Israel (Israel Antiquities Authority - IAA; Israel Nature & Parks Authority - INPA, and the Council for Conservation of Heritage Sites in Israel) are required by law to promote heritage education, they held, often collaboratively, many hundreds of educational activities for the general public. However, though larger than in 2009, still only a relatively small part of heritage education activities seems to be dedicated to conservation of cultural heritage at present. Israel Antiquities Authority's educational focus is on archaeology, hence, of hundreds of educational activities provided by IAA, only few types of activities presently include conservation, with a focus on actual participation in conservation. The Council for Conservation of Heritage Sites in Israel shows a very different picture. The Council was founded in 1983 by the Ministry of Education. Overall number of educational activities provided by the Council, has grown significantly since 2009, from few educational activities, to more than a hundred per year, and they all include conservation theme in their content. Furthermore, they also include an investigative part, which in some courses reminds to some extent the "intellectual" component of the ELAICH Project. However, while the ELAICH e-learning Toolkit and Methodology enabled active learning and contribution of NPA students to the basic data collection and basic analysis on historic sites, the Council for Conservation students mostly conduct archive research and collect historical data about specific historic sites, but not on conservation state of the sites.

In 2009, there was very little collaboration between institutions as to providing a joint course. From the 281 courses documented in different countries, there were only 18 joint courses. In the last decades this situation has changed, e.g., in Israel, all main heritage authorities - course providers, collaborate in many courses. Since the Review showed a positive educational and awareness impact on courses given as a joint initiative of several providers, this might be a significant point for a further review.

Another important feature of the present heritage education in Israel, is the inclusion of practically all groups of general public in educational activities. These include schoolchildren of all age groups, from primary school through high school, pre-military preparatory educational frameworks, university students, tourists, local population. Many educational activities, e.g., "Adopt a site", focus at connecting local public, directly, or through educational establishments, to historic sites in their vicinity, and aim at educating them for learning about and taking care of historic sites in their town, village, neighbourhood.

Digitization of cultural assets and learners' experience was on its way in 2009 and has been further developed in recent years. Museums often stand out in this process, some of them have played leading role since the early 2000-s (Monteagudo-Fernández et al. 2021; Hazan 2011; Hazan & Lobovikov-Katz 2017), and their experience should be further examined for its targeted application to education of the general public for conservation of cultural heritage.

5 The importance of hands - on education through the use of NDTs

Through hands-on education, trainees have the chance to learn and acquire a deep understanding of the concepts theoretically taught at lectures' level by applying this knowledge in a tangible way. The use of non-destructive testing is an important tool that can be utilized in hands-on approach of cultural heritage education, giving the chance to trainees to learn by doing on site with the use of high-measuring techniques, where significant results are revealed at real time on site.

Non-destructive testing approaches are widely used for minimal invasion as they can provide important data regarding the current state and response of the monument. The combination of non-destructive techniques is nowadays a common practice for diagnostic maintenance and monitoring purposes, highlighting NDT as an ideal tool to determine pathology before any interventions and assess and monitor the effectiveness of applied conservation and restoration interventions. NDTs have also an important role in the decision-making process during dynamic situations, such as throughout the progress of rehabilitation works conducted on complex monuments (Alexakis et al. 2018). NDTs are extensively used in hands-on education in the framework of NTUA Post Graduate Master Program "Protection of Monuments", revealing the value of interdisciplinarity in understanding in a better and a more holistic approach the theoretic knowledge gained in class through the collaboration of various disciplines for obtaining integrated results.



Fig. 10. Work in situ and in labs, presentations, educational visits of students (Efesiou et al., 2018)

Additionally, as another example of NTUA Research Team experience, through the use of ground penetrating radar, in combination with historical, architectural and geometric documentation, trainees can acquire information about the structural layers and state of preservation of cultural heritage assets and infrastructures (Alexakis et al. 2018), (Daniels 2004), (Jol 2008)

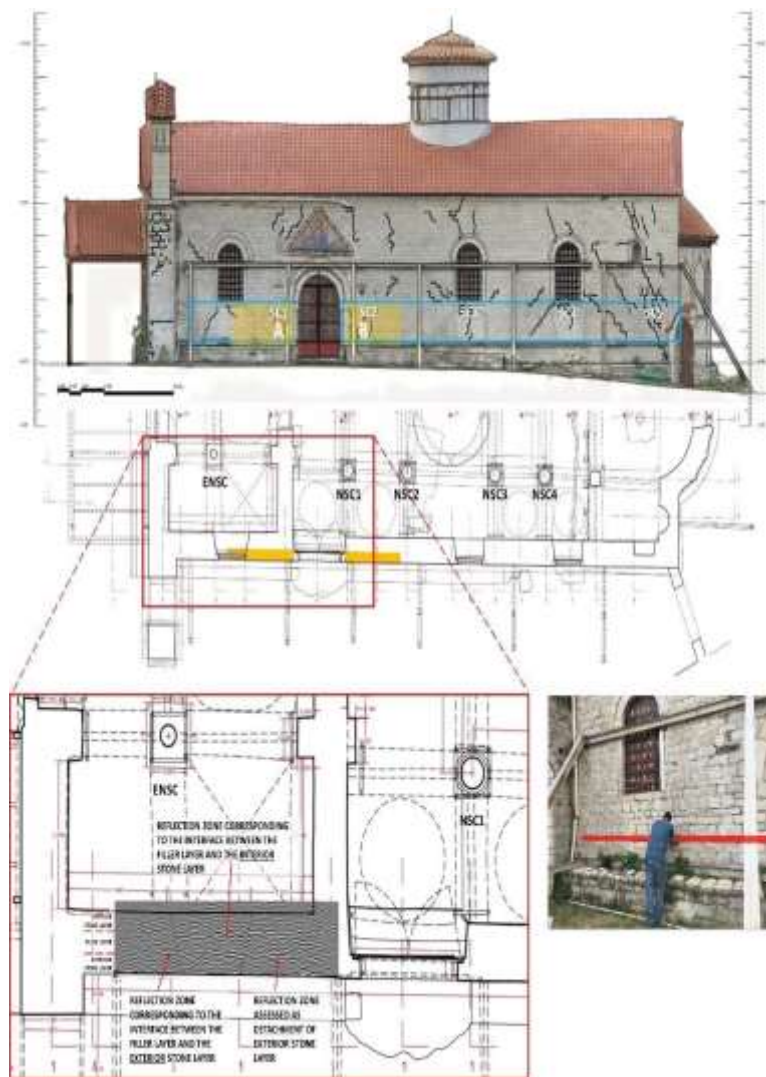


Fig. 11. GPR prospection at the south masonry of the Katholikon. The radargram depicted overlaid on the plan of its corresponding area, shows indications of detachment of the exterior stone layer from the filler layer. The affected areas are depicted with yellow-color (Keramidas et al. 2021)

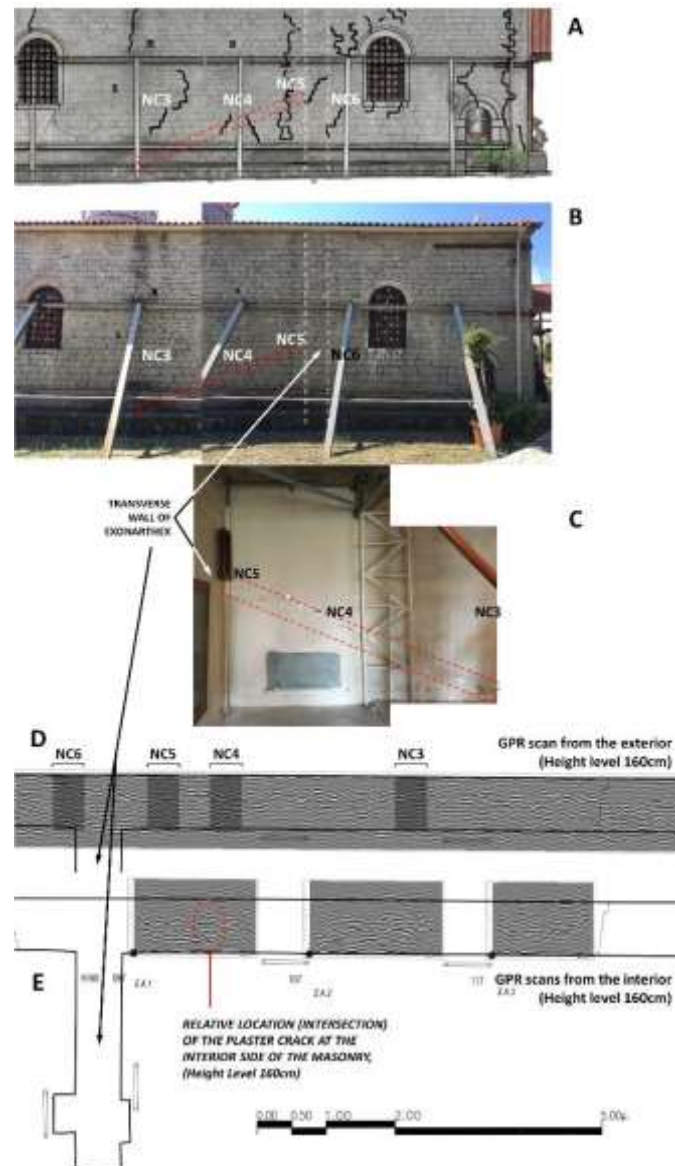


Fig. 12. Assessment of the state of structural cracks in the western segment of the north masonry of the Katholikon and their correlation with the documented diagonal crack at the interior of the nave. A. Location of the cracks on the north view of the Katholikon. B and C. Photos of the actual area. D. Segment of GPR scan from the exterior surface of the masonry. E. GPR scans from the interior of the masonry. D & E overlaid on the plan of Katholikon (Keramidas et al. 2021)

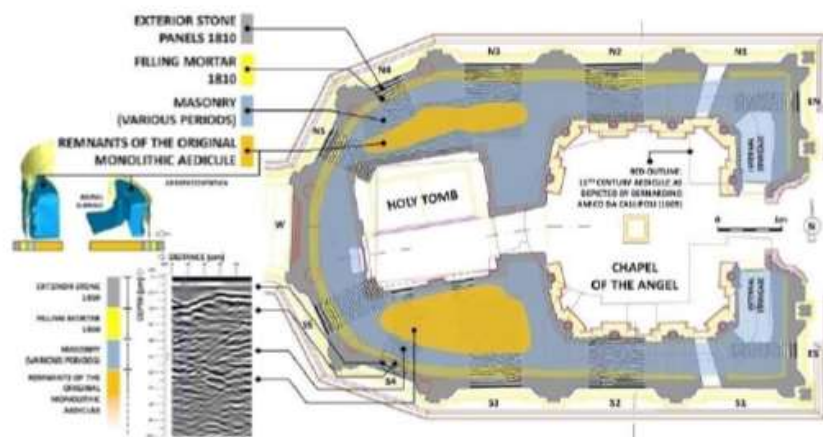


Fig. 13. GPR revealed the internal structure of the Holy Aedicule. Gray: stone facades, yellow: filling mortar, blue: masonry, orange: Remnants of the original monolithic Aedicule (Holy Rock) (Alexakis et al. 2018)

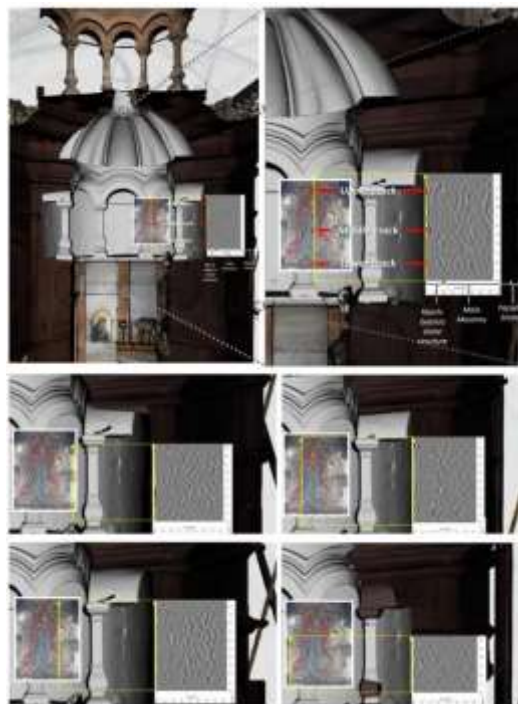


Fig. 14. GPR survey on the Virgin Mary wall-painting, prior to interventions. Upper left depicts the cross-section of the Aedicule at the center axis of the Virgin Mary painting. Upper right shows the main findings and the layers revealed, lower four images depict the other four GPR scans at this painting. (Alexakis et al. 2018)

6 Conclusions

Review of hundreds of courses on conservation of cultural heritage (CCH) provided for the general public, (non-professional audience - NPA) (CCH-NPA courses) in Europe and beyond, undertaken at the first stage of the European project ELAICH (Educational Linkage Approach in Cultural Heritage), systematically analysed data, with regard to many aspects of the courses, including organizations, teaching methods, courses' structure, audience, as of 2009. The Review provides a retrospective resource, and might be an asset for a deeper understanding of the development, present trends and reviewing perspectives of heritage education, and specifically - education for understanding the values of cultural heritage, and challenges and principles of its preservation by the general public. The Review methodology and tools could be useful for a similar analysis of the modern situation in this area.

The specific focus of the ELAICH Project on introducing Conservation of Cultural Heritage (CCH)

to general public derived from the idea that understanding Conservation demanded for a deeper and better understanding of the cultural heritage, than a generic heritage education, thus, allowing for better educational outcomes and heritage preservation capacity of general public learners. The idea was verified by the results of the learning process with the use of the ELAICH Methodology and educational Toolkit by the end of the project.

Besides the innovative changes in education in general, and heritage education and conservation of cultural heritage in particular, innovative teaching methods have emerged following the urgent demand for online learning since the start of the Covid-19 pandemic in 2020, which has brought to qualitative and quantitative metamorphoses in education on all levels, for diverse types of audience.

Research innovations in conservation of cultural heritage, including advancements in research and data collection methods and technologies on historic sites, provide new opportunities for involvement of the general public in heritage conservation, as based on the ELAICH Methodology, including digital applications, combining tangible and intangible in learning (Lobovikov-Katz et al. 2014) and onsite-online shuttle learning (Lobovikov-katz 2015).

Hands-on education gives the chance to trainees to acquire deep understanding of complicated multidisciplinary concepts in cultural heritage preservation and protection field, making use of non-destructive techniques at real time on site.

Reviews undertaken in the recent years add important data on heritage education for general public (Fontal, 2016; Castro-Calvino et al. 2020). However, a specific focus on education for *conservation* of cultural heritage seems to remain a predominantly ELAICH feature. A new review of recent development of CCH-NPA education with a view of heritage education in a wider sense, might provide an important data for defining the future goals and strategies for the development of heritage preservation education. Combining the ELAICH Methodology with the results of recent research and development in the field of conservation of cultural heritage, and in education and heritage education, might allow for the development of powerful tools for active involvement of the general public in conservation and preservation of cultural heritage.

Acknowledgments.

The ELAICH Project has received funding from the European Union in the framework of EuroMed Heritage 4 Programme under ELAICH grant agreement n° ENPI-2008/150-583. The authors of the paper would like to thank all research teams of the ELAICH Consortium, for their contribution to the project, as well as heritage authorities and other organisations, for their cooperation in CCH-NPA review.

References

1. Alexakis E., Deleogou E.T., Lampropoulos K.C., Apostolopoulou M., Ntoutsis I., Moropoulou A., NDT as a monitoring tool of the works progress and the assessment of materials and rehabilitation interventions at the Holy Aedicule of the Holy Sepulchre, *Construction and Building Materials*, 189, 2018, p. 512 - 526
2. Castro-Calviño, L., Rodríguez-Medina, J. & López-Facal, R. (2020) Heritage education under evaluation: the usefulness, efficiency and effectiveness of heritage education programmes. *Humanit Soc Sci Commun* 7, 146 (2020). <https://doi.org/10.1057/s41599-020-00639-z>
3. Cuenca-López, J.M., Martín-Cáceres, M.J. & Estepa-Giménez, J. (2021) Teacher training in heritage education: good practices for citizenship education. *Humanit Soc Sci Commun* 8, 62 (2021). <https://doi.org/10.1057/s41599-021-00745-6>
4. Daniels D.J., *Ground Penetrating Radar*, 2nd ed., Radar, Sonar, Navigation and Avionics Series 15, Institute of Electrical Engineers, London, UK. 2004
5. Efesiou I., Maistrou E., Moropoulou A., Balodimou M., Lampropoulou A., 20 years of the N.T.U.A. Interdisciplinary Post Graduate Programme "Protection of Monuments", *Proceedings of 1st International TMM-CH Conference "Transdisciplinary Multispectral Modelling and Cooperation for the Preservation of Cultural Heritage"*, 10-13 October, 2018, Athens, Greece
6. Eurobarometer 466: Cultural Heritage, (2017) EU institutions data, Publisher: Directorate-General for Communication, https://data.europa.eu/data/datasets/s2150_88_1_466_eng?locale=en (accessed: 14.9.2021)
7. Fontal, O. (2016) The Spanish Heritage Education Observatory / El Observatorio de Educación Patrimonial en España, *Culture and Education*, 28:1, 254-266, DOI: 10.1080/11356405.2015.1110374
8. Fontal, O., Martínez, M. (2017) Evaluation of educational programs on Intangible Cultural Heritage, *Pedagogical Studies*. vol.43 no.4 Valdivia 2017, <http://dx.doi.org/10.4067/S0718-07052017000400004>

9. Hazan, S. (2011) The museum in the palm of your hand: presenting the Israel Museum through ICT, *IL CAPITALE CULTURALE. Studies on the Value of Cultural Heritage*, N° 3 (2011), <http://dx.doi.org/10.13138/2039-2362/166>
10. Hazan, S., Lobovikov-Katz, A. (2017). The Willing Suspension of Disbelief: The Tangible and the Intangible of Heritage Education. in *E-learning and Virtual Museums*, In M. Ioannides, N. Magnenat-Thalmann & G. Papagiannakis (Eds.), *Mixed Reality and Gamification for Cultural Heritage* (pp. 549-566) Springer, Cham. https://doi.org/10.1007/978-3-319-49607-8_22
11. Heritage education, In: *European Commission: EU policy for cultural heritage*, *Cultural heritage and education*, <https://ec.europa.eu/culture/cultural-heritage/cultural-heritage-eu-policies/cultural-heritage-and-education>, (accessed: 12.9.2021)
12. Hunter, K. (2021) *Heritage Education in the Social Studies*. ERIC Digest. ERIC Institute of Education Sciences
13. Jol H.J. (Ed.), *Ground Penetrating Radar. Theory and Applications*, 1st ed., Elsevier, 2008
14. Keramidas V., Lampropoulos K., Bletsas-Yfantis G., Tsilimantou E., Mouzakis Ch., Moropoulou A., Non-destructive evaluation of the pathology of the Katholikon of the Monastery of Panagia Varnakova with ground penetrating radar, 2nd TMM-CH Conference Proceedings Transdisciplinary Multispectral Modelling and Cooperation for the Preservation of Cultural Heritage Recapturing the World in Crisis through Culture, 13-15 December 2021, Athens, Greece
15. Lobovikov-Katz, A. & Chitaiad, T. (2009) *Conclusions: Courses on Conservation of Cultural Heritage for Non-Professional Audience. Based on the Review of the State of the Art: CCH- NPA Courses*, with contribution of Anna Lobovikov-Katz, Tali Chitaiad; Rene Van Grieken, Pilar Ortiz; Antonia Moropoulou, Agoritsa Konstanti; JoAnn Cassar, Roberta De Angelis; Guido Biscontin, Francesca Izzo, et al. (Euromed Heritage Project ELAICH - ENPI 150583)
16. Lobovikov-Katz, A. (2015). The virtual and the real: e-learning in interdisciplinary education – the case of cultural heritage, *The 13th Annual MEITAL National Conference New Technologies and Their Evaluation in Online Teaching and Learning* (pp. 58-63) Technion – Israel Institute of Technology, Haifa <https://pdfs.semanticscholar.org/c04c/11a1fc408d8254b57288b4ff07b847a27105.pdf>
17. Lobovikov-Katz, A., A. Konstanti, K. Labropoulos, A. Moropoulou, JA Cassar, R. De Angelis, (2012). The EUROMED 4 Project “ELAICH”: e-tools for a teaching environment on EU Mediterranean cultural heritage, In: M. Ioannides, D. Fritsch, J. Leissner, R. Davies, F. Remondino & R. Caffo (Eds.), *Progress in Cultural Heritage Preservation. EuroMed 2012. Lecture Notes in Computer Science Vol 7616*, (pp. 710-719). Springer https://doi.org/10.1007/978-3-642-34234-9_75
18. Lobovikov-Katz, A., Moropoulou, A., Konstanti, A., Ortiz Calderón, P., Van Grieken, R., Worth, S., Cassar, JA, De Angelis, R.; Biscontin, 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. Magnenat-Thalmann, E. Fink, R. Zarnic, A-Y. Yen & E. Quak (Eds.), *Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation and Protection. EuroMed 2014. Lecture Notes in Computer Science Vol 8740*, (pp. 819- 828) Springer, Cham. https://doi.org/10.1007/978-3-319-13695-0_84
19. Monteagudo-Fernández, J.; Gómez-Carrasco, C.J.; Chaparro-Sainz, Á. (2021) *Heritage Education and Research in Museums. Conceptual, Intellectual and Social Structure within a Knowledge Domain (2000–2019)*. *Sustainability* 2021, 13, 6667. <https://doi.org/10.3390/su13126667>
20. Moropoulou, A., & Konstanti, A. (2013) *Hybrid Educational Methodology for the Cognitive Domain of Built Heritage Protection Interconnecting Secondary with Tertiary Level Education*, *International Journal of Engineering Pedagogy (iJEP)* Vol 3, No 4 (2013) eISSN: 2192- 4880