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# EDICULA

## Educational Digital Innovative Cultural heritage related Learning Activities

Project Code: 2020-1-EL01-KA203-079108

Intellectual Output: **03 EDICULA hands-on framework**

Deliverable: **D3.3 - EDICULA Hands on Experience**

Lead Organization: **Bezalel Academy of Arts and Design (BEZ)**

Participating

Organizations: **National Technical University of Athens (NTUA), Sapienza University of Rome (UNIROMA1), PerpetielSI SRL, Israel Antiquities Authority (IAA), Hellenic Research Institute of the Alexandrian Civilization (HRIAC)**

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# 1 | INTRODUCTION

## 1.1 | OUTPUT 3

Output **O3: EDICULA Hands-on Framework EDICULA Project** is the third output out of the EDICULA project's five main outputs. This output fully meets three of EDICULA project's main objectives:<sup>1</sup>

- *to proceed with the **organization of multiplier events** such as (i) **hands on events in Jerusalem and Alexandria**, (ii) **special conference sessions in Athens***
- *to reform the curricula of the three postgraduate programs of the EDICULA partners, in order to exchange good practices and create new courses that in a complimentary approach will lead to the **promotion of a Joint Master's degree in the field of protection of monuments***
- *to promote students to a professional and entrepreneurship mentality by advancing education in collaboration with enterprises concerning technical works and digital applications, and thus enhance learning outcomes to ensure professional qualifications*

Output O3 serves the listed expected results of the project:<sup>2</sup>

5. *in situ education, at the **Holy Sepulchre** in Jerusalem, its setting and context, including religious routes and ceremonies functioning as the prime educational nucleus, being a transformation from a **problem-based learning approach into a unique approach towards a real-world learning**, for application to other historic buildings and real or digital applications in the four countries.*
1. *Innovative changes of the educational curricula for **Cultural Heritage related Master Programmes** in general and specifically.*
2. *The development of educational modules that will be attended by students among the **Universities of the project**, with equivalent **ECTS accreditation** towards the creation of a new Erasmus Joint Master's degree.*
6. *in situ education for archaeologists, introducing innovation in engineering with emphasis in **non-destructive testing and evaluation methods and georeferenced multispectral and multi-semantic data**.*

Among the five outputs, output O3 is directly related to two outputs of the project. Furthermore, it is related to the project's Multiplier Events, especially to the first event out of the four where elements of EDICULA Hands-on framework is applied, and to the EDICULA Teacher's Course which is focusing on 'training the trainers' (Fig. 1.1):

- **O1: EDICULA Educational Toolkit**
- **O2: EDICULA Curricula Reformation**
- **E1: The Holy Sepulchre Hands-on Experience**<sup>3</sup>
- **EDICULA Teacher's Course**

The final goal of the O3 output is to consolidate the **EDICULA Guidelines for hands-on education in Cultural Heritage (CH) protection** which will be integrated in the project's first output **O1: EDICULA Educational Toolkit** and in its final outputs **O5: EDICULA Synthesis**.

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<sup>1</sup> EDICULA Kick-off Meeting 21.10.2020 Presentation (slides 3-4). The objectives are presented according to their relevancy to output O3.

<sup>2</sup> Ibid, slides 5-8. The numbers follow the ones given in the project but are presented according to their relevancy of the output.

<sup>3</sup> Multiplier Event [E1] – Jerusalem April 2022. Leading organizations: Bezalel Academy of Arts and Design (BEZ) and the Israel Antiquities Authority (IAA).

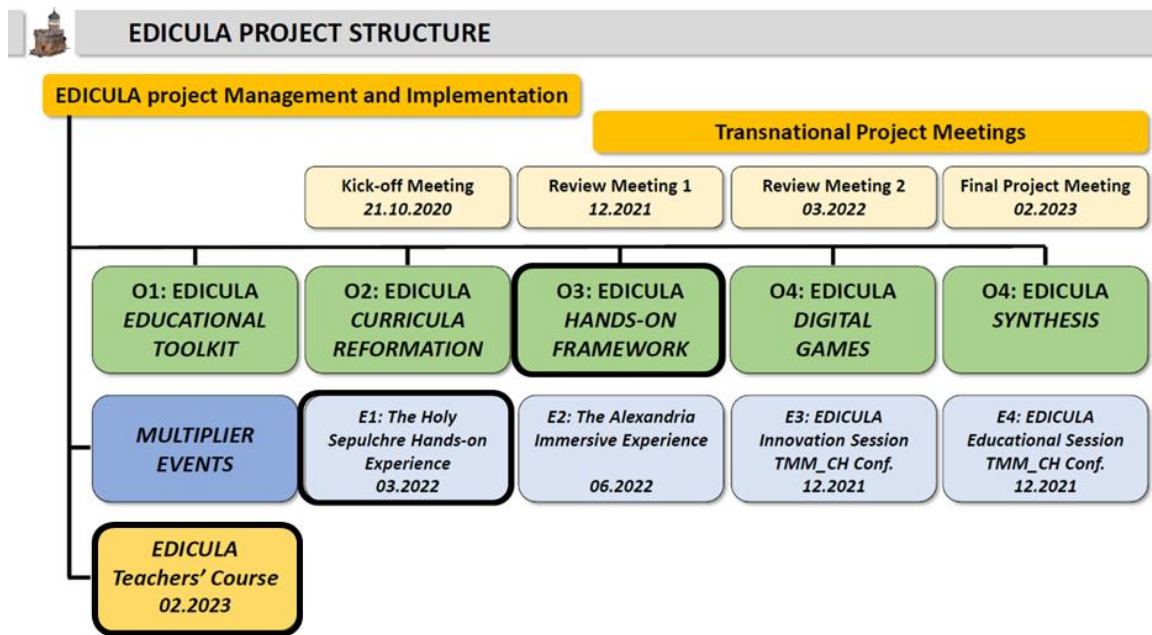


Fig. 1.1 | EDICULA Project Structure (EDICULA Kick-off Meeting 21.10.2020 Presentation)

## 1.2 | TASK 3.3

Output O3 is comprised of three tasks:

<b>Task 3.1</b>	State-of-the-art of hands-on methodologies in higher education studies
<b>Task 3.2</b>	From authentic learning to real world learning through hands-on and immersive AR
<b>Task 3.3</b>	<b>EDICULA Framework for hands-on education in CH protection</b>

This block provides a detailed view of Task 3.3. At the top, a grey header reads "O3: EDICULA HANDS-ON FRAMEWORK". Below it, a blue box contains the title "Task 3.3: EDICULA Framework for hands-on education in protection of monuments". Underneath, three light blue boxes specify "Start: Jan.2021", "End: Feb.2022", and "Duration: 14M". A grey box below contains the description "Develop the framework for hands-on education".

A blue oval contains the text: "Protection of monuments is a **TRANSDISCIPLINARY SCIENTIFIC FIELD**, characterized by a complex amalgamation of empiricism and scientific innovation". To the right is a large blue 3D arrow pointing downwards and to the right.

At the bottom, a bold black text box states: "Hands-on education cannot be applied a priori without optimum modification".

Fig. 1.2 | EDICULA Framework for hands on education in protection of monuments (EDICULA Kick-off Meeting 21.10.2020 Presentation)

Starting on the fifth month of the project – Jan. 2021, and ending on its eighteen (18) month – Feb. 2022, the duration of the task (3.3) is fourteen (14) months, and it is conducted in parallel to the other two tasks of the output.

## 1.3 | DELIVERABLE 3.3

Output O3 has four deliverables:

<b>D3.1</b>	Survey of Hands-on methodologies
<b>D3.2</b>	AR fusion in hands on training
<b>D3.3</b>	<b>EDICULA Hands on Experience</b>
<b>D3.4</b>	EDICULA Guidelines for hands on education in CH protection

Deliverable D3.3 deadline is after the first Review Meeting (Dec. 2021) and is scheduled for June 2022. This report, which follows the report of D3.1: Survey of hands-on methodologies (delivered August 2021), is focusing on deliverable **D3.3: EDICULA Hands on Experience** and mainly summarises **Task 3.3: EDICULA Framework for hands-on education in CH protection**. Additionally, it integrates insights from the report on Multiplier Event [E1] - The Historic City of Jerusalem, The Holy Sepulchre: A Hands-on Experience (April 2022).

## 2 | METHODOLOGY

To conduct **Task 3.3: EDICULA Framework for hands-on education in CH protection** several actions were taken including a preliminary bibliography research focusing on hands-on experience as an educational method as well as exploring the role of hands-on activities in cultural heritage conservation studies based on the outcomes of task 3.1. Highlighting hands-on activities as an integral part of the EDICULA project framework, the Multiplier Event E1: The Holy Sepulchre Hands-on Experience was chosen to be used as a case study. Summarizing by emphasizing various aspects of the EDICULA Project Hands on Experience.

## 3 | HANDS-ON EXPERIENCE

### 3.1 | HANDS-ON EXPERIENCE AS AN EDUCATIONAL METHOD<sup>4</sup>

Being one of the most researched pedagogies in the history of education, Problem-based learning (PBL) is an education method that is conceived and implemented worldwide. Growing out in a climate of change and reform of a progressive education movement of the mid-twentieth century, PBL has

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<sup>4</sup> Selected references:

- Moallem, M., Hung, W., Dabbagh, N., (eds): *Section I – Understanding PBL: Historical and Theoretical Foundations. In: The Wiley Handbook of Problem-Based Learning; Section II – Research in PBL*. 1st edn. John Wiley & Sons, Inc, Hoboken, NJ, USA (2019).  
Servant-Miklos, V. F. C., Norman, G. R., and Schmidt, H. G., *Ch. 1 - A Short Intellectual History of Problem-Based Learning*, pp. 3-24.  
Moallem, M., *Ch. 5 – Effects of PBL on Learning Outcomes, Knowledge Acquisition, and Higher-Order Thinking Skills*, pp. 107-134.  
English, M., Kitsantas, A., *Ch. 22 – PBL Capstone Experience in Conservation Biology: A Self-Regulated Learning Approach*, pp. 507-528.
- Pelman, B & Zoran, A. R., Material-Driven Architectural Pedagogy: A sociomaterial perspective. In: *Form Akademisk*. Vol.15 Nr.1, 2022, Art. 1, 1-17. <https://doi.org/10.7577/formakademisk.4787>

many sources of inspiration, including ideas of experimental learning such as “learning by doing”. Originating in medical studies back in the 1960s, it entered various fields of studies and became a common and accepted education method from the 1980s onwards and is now used in a variety of different disciplines. Though a single definition for PBL may be difficult to provide “the basic principles of this method are the use of realistic problems as the starting point of self-directed, small-group-based learning guided by a tutor who acts as a process guide rather than a point of knowledge transfer”.

Nowadays, PBL as well as contemporary analogous approaches including project-based learning (PjBL), Learning by Design (LBD), inquiry-based learning (IBL), and design thinking (DT) that are often used to refer to PBL, are integrated into many fields of study curricula. In most, integration between traditional lectures and PBL is offered, where PBL ranges from less than 10% to more than 50% of the students’ time. Their effects and value on student learning and achievement of learning out-comes are continuously assessed and evaluated.

Mentioning the analogous approaches, hands-on learning, is associated with PjBL which is one of the accepted and recognized approaches in the fields of science, technology, engineering, and mathematics known as STEM, as well as in architecture. The hands-on experience allows students to tackle real-life situations and real-world tasks that are some of the core principles and features of PBL and PjBL. Those situations and tasks are the ones to provide the challenge and the motivation necessary for the learning and inquiries of students. In general, hands-on experience was noted by students as a very beneficial and contributing feature of project-based classes.

## **3.2 | HANDS-ON EXPERIENCES AND ACTIVITIES IN CULTURAL HERITAGE CONSERVATION STUDIES<sup>5</sup>**

### **3.2.1 Hands-on experiences within cultural heritage conservation studies**

The significance of hands-on experiences within cultural heritage conservation studies was examined during the first task of the EDICULA Hands-on Framework that aimed at exploring state-of-the-art courses combining hands-on methodologies in higher education studies (carried out Sep. 2020 to April 2021, presented at the Scientific Committee Meeting on April 4<sup>th</sup>, 2021, and submitted on August 26<sup>th</sup>, 2021).

The task included a Survey on Hands-on methodologies. It aimed at gathering relevant information, to be studied and analyzed, and to serve as a preliminary basis for future consideration. For the survey, a methodology of an online questionnaire was chosen. The questionnaire was distributed to the EDICULA project partners as well as to other collaborators actively teaching in relevant academic programs around the world. Composed of two parts, the first part of the questionnaire requested technical information related to postgraduate and undergraduate courses in academic programs in

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<sup>5</sup> Bezalel Academy of Arts and Design, Output 3 EDICULA hands-on framework: D3.1 - Survey of hands-on methodologies 26.08.2021.

the field of protection of monuments, and cultural heritage conservation across Europe and Third Countries. A great emphasis was put on the objectives, learning outcomes, methodologies, and assignments of each of the given examples. For the second part, dedicated to assessment and evaluation, the contributors were asked to express their professional opinion as well as provide examples. The questions addressed issues such as constructive alignment between the learning outcomes, the course's objectives, pedagogic tools, and the added value of the hands-on feature and experience to the successful implementation of the learning outcomes.

**Survey outcomes.** The survey was completed by the instructors of courses and workshops in academic institutions that have either a master program that is solely dedicated to heritage conservation (preservation) or that has integrated courses in heritage conservation within their curriculum. Most programs focus on Architectural conservation, Material conservation and analysis and/or Urban conservation. Only a few focus on two or more scales, or have high specifications of scale and focus, for example on mobile materials conservation, critical heritage, or cultural landscape.

### **3.2.2 Hands-on activities within cultural heritage conservation studies**

Based on the survey outcomes it is possible to characterize Hands-on activities within cultural heritage conservation studies by their attributes, objectives and learning outcomes, pedagogical methodologies, the evaluation mechanism and their assessment and evaluation, as described below.

**The attributes of hands-on activities.** Within these programs, the hands-on activities can be divided into two categories: courses and workshops that provide hands-on experiences as their main objective, and courses that offer a hands-on experience as part of a broader course syllabus. Most courses fall under the first category. Looking at the course type, most are only for undergraduate or for postgraduate students, whereas some are open to all students including post-professional and Ph.D. students. In general, the number of credit points acquired for a course varied from two credit points to twelve and is mostly related to the course type. Terms of entry varied as well, and only half of the surveyed courses have conditional terms of entry as completing previous courses or admission requirements like software, theory, and introductory site visits. The average number of participants per course is fifteen to twenty students.

**The hands-on activities objectives and learning outcomes.** A distinction between the objectives and learning outcomes of the two types of courses may be noted: workshops and short-term courses, that focus on acquiring a particular skill or focusing on a specific material, mostly appear in undergraduate courses, and comprehensive and longer courses that award a higher number of credit points. The second type of courses is usually designed for postgraduate students, where the hands-on experience seeks to emphasize a holistic approach and a multidisciplinary integration of previously acquired training and knowledge that were gained separately and jointly expressed in the hands-on course. Analyzing the questionnaires, characteristics of PBL were seen i.e.:

- Experiencing a real-world project and a simulation of an actual conservation project.
- Coping with hands-on experiences and in-situ work whether at a site or in a museum.
- Multidisciplinary synthesis at all levels: from the pedagogical approach throughout the methodologies, to the given assignments and their final evaluation.
- Collaboration among participants who come from various backgrounds to simulate a real project team.
- Expressing a variety of skills among which knowledge and understanding, applied skills, autonomy of judgment, and communication skills.
- Improving problem identification, critical thinking, results analysis, reporting and developing initiatives and hands-on skills.

**Pedagogical Methodologies.** Due to the nature of hands-on courses and workshops, in all the received answers, without any exception, the aspect of operating in-situ was emphasized. Driven by a holistic approach and a multidisciplinary attitude, the pedagogical methodologies, both the primary ones as well as the secondary ones, include a broad span of lectures, visits and tours, and meetings with stakeholders throughout practical excavation and conservation works, field laboratories, case study analyses, problem-based, group, and constructive learning.

**Evaluation Mechanism.** The evaluation mechanism of the course is strongly related to its pedagogical methodologies and characteristics as a hands-on course with practical experience and on-site activities. The tasks, even if some are individual, are multidisciplinary in a way that teamwork and collaboration are needed. Moreover, active participation in hands-on courses predicts high fulfilment of the specified learning outcomes.

**Assessment and Evaluation.** Answers to the final two open questions dealing with the evaluation of state-of-the-art courses combining hands-on methodologies in the field of cultural heritage, provided important input for the understanding of the used methodologies in higher education studies in academic institutions.

### 3.3 | HANDS-ON ACTIVITIES IN THE EDICULA PROJECT FRAMEWORK<sup>6</sup>

Hands-on experience and activities are well addressed in the framework of The EDICULA Project, starting from the project's aims and objectives, its outcomes, and expected results. The third output of the project – The EDICULA Hands-on Framework, is fully dedicated to this topic. Highlights from the project's objectives are:

- Proceeding with the organization of multiplier events such as (i) Hands-on events in Jerusalem and Alexandria, (ii) special conference sessions in Athens.

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<sup>6</sup> EDICULA Project, Project Summary. Call 2020 Round 1 KA2 - Cooperation for innovation and the exchange of good practices. KA203 – Strategic Partnerships for higher education.

National Technical University of Athens (NTUA), Presentation of EDICULA Project Kick-off Meeting 21.10.2020.



- Promoting students to a professional and entrepreneurship mentality by advancing education in collaboration with enterprises concerning technical works and digital applications, and thus enhancing learning outcomes to ensure professional qualifications.

And from its expected results:

- In situ education, at the Holy Sepulchre in Jerusalem, its setting and context, including religious routes and ceremonies functioning as the prime educational nucleus, being a transformation from a problem-based learning approach into a unique approach towards real-world learning, for application to other historic buildings and real or digital applications in the four countries.
- In-situ education for archaeologists, introducing innovation in engineering with emphasis on non-destructive testing and evaluation methods and georeferenced multispectral and multi-semantic data.

The above objectives and outcomes emphasize and demonstrate the final goal of consolidating the EDICULA Guidelines for Hands-on education in Cultural Heritage, integrating it into the project's final output **O5: EDICULA Synthesis** (fig. 1).

### **3.4 | THE HISTORIC CITY OF JERUSALEM, THE HOLY SEPULCHRE: A HANDS-ON EXPERIENCE<sup>7</sup>**

Described below in details, the **Multiplier Event E1: The Holy Sepulchre Hands-on Experience** that is part of the projects' multiplier events is used as a case study for experimenting and assessing the part and role of Hands-on activities within cultural heritage conservation studies and training.

The workshop was organized by a joint team of Bezalel Academy of Arts and Design, Jerusalem – Prof. Mike Turner, Architect Shmuel Groag and Architect Adi Sela Wiener, and the Israel Antiquities Authority – Dr. Amit Re'em and Liat Weinblum, in close collaboration with Prof. A. Moropoulou as the scientific responsible of the EDICULA project, within which the workshop was implemented, and the National Technical University of Athens (NTUA) and Sapienza University of Rome (UNIROMA1) teams.

#### **3.4.1 The EDICULA Project Hands-on Experience: content and characteristics**

A three-day workshop titled: **The Historic City of Jerusalem, The Holy Sepulchre: A Hands-on Experience** took place in Jerusalem on 3-6 of April 2022. The workshop meets the general vision of the EDICULA project connecting the City of Jerusalem with the rehabilitation of the Holy Aedicule of the Holy Sepulchre. This rehabilitation project is a prime case study where innovation and transdisciplinary are the key elements for a successful rehabilitation of an emblematic monument.

The EDICULA Hands-on Experience Workshop was applied to introduce students and professionals to the complex array of scientific and engineering challenges in the protection of monuments that offer the backbone for achieving scientific thinking by merging theoretical background with practical training. Applied on a pilot scale the workshop seeks optimum hands-on experience by both:

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<sup>7</sup> Bezalel Academy of Arts and Design, Israel Antiquities Authority, Output 3 EDICULA hands-on framework: Multiplier Event [E1] - The Historic City of Jerusalem, The Holy Sepulchre: A Hands-on Experience 29.04.2022.

- Analysis of the relevant hands-on methodologies that can be applied in other fields of knowledge than cultural heritage.
- Using technologies and scientific tools for the protection of cultural heritage (i.e., nondestructive technology, analytical and modeling techniques, and AR technologies)

The workshop activities were led by experts from various fields, all operating non-invasive instruments for the benefit of either materials, engineering or documentation and interpretation aspects of the conservation and rehabilitation of historic monuments.

Chosen by limited calls, a total of twenty-five participants were mainly from two defined groups of trainees. The first group from the School of Architecture of the Bezalel Academy of Arts and Design was composed of fifteen local and exchange (foreign) students from France, Italy, Greece, and the Czech Republic, all with strong architectural backgrounds. The second group of ten participants was from the Israel Antiquities Authority, mainly professionals with a strong archaeological research or conservation background. The guidelines for participating were a strong connection to conservation works, open-mindedness and the ability to attend an English-speaking workshop. In addition, members of the project partners – NTUA, Sapienza, Bezalel and the IAA participated, as well as invited additional experts and stakeholders During specific activities.

Starting on Sunday morning the general program of the workshop was designed for three full days. The main venue of the workshop was the Tower of David Citadel, in the Old City of Jerusalem, enabling a reflection in real-time on some of the techniques used in the prime case study of the Rehabilitation of the Holy Aedicule, thus fulfilling the EDICULA Project Objectives. The workshop program included three main aspects: 1) Setting and Context; 2) Hands-on Experience; 3) Transnational Project Meeting, fully representing the multidisciplinary and transdisciplinary character of the EDICULA Project. Those aspects go along with the innovative approach of in-situ education, enabling a hands-on experience as part of evolving from a PBL approach towards a unique approach of real-world learning (fig. 3.1).

The EDICULA Project | Multiplier Event 1 [E1]: The Historic City of Jerusalem, The Holy Sepulchre: A Hands-on Experience - General program\*

Day 1	Sunday 03.04.22	Day 2	Monday 04.04.22	Day 3	Tuesday 05.04.22	Day 4	Wednesday 06.04.22
<b>Setting and Context</b>		<b>Hands-on experience</b>		<b>Hands-on experience</b>		<b>Transnational Project Meeting</b>	
10:00 - 17:30	<b>Historic-Cultural &amp; Urban Walk</b> <sup>(1)</sup>  From the Historic City to the Church of the Holy Sepulchre via the Old City of Jerusalem  Site visit: The Historic Monument and its surroundings  Learning from the Holy Sepulchre and Holy Aedicule	09:00 - 16:30	<b>Hands-on workshops at the Citadel</b> <sup>(1)</sup>  <ul style="list-style-type: none"> <li>• Materials</li> <li>• Engineering</li> <li>• Conservation and interpretation</li> </ul>	09:00 - 12:00	<b>Visit to the IAA Labs</b> <sup>(1)</sup>  12:30 - Transportation to the Historic City Centre 14:00 - Cultural mapping, cultural significance, and Communities engagement activity <sup>(3)</sup> 16:00 -	09:00 - 10:30	<b>Curricula Reformation WP [O2]</b> <sup>(2)</sup>  11:00 - <b>EDICULA Project - Review Meeting 2</b> <sup>(2)</sup> 12:30 -
		18:00 - 20:00	<b>Public Event at Hansen House</b> <sup>(4)</sup>	<b>Transnational Project Meeting</b> 16:30 - <b>Workshop Summary and Assessment &amp; [E1] Evaluation</b> <sup>(1)</sup> 18:30 -			

- (1) Workshops Participants and the Team of the EDICULA Project
- (2) EDICULA Project Partners
- (3) Workshops Participants and Additional Stakeholders
- (4) Workshops Participants, Additional Stakeholders and General Public

\* The general program is subject to change



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Fig. 3.1 | monuments Multiplier Event [E1] General Program (printed 04.2022)

For the **Setting and Context**, a one-day activity was assigned. Getting familiar with the Old City of Jerusalem, its cityscape within the walls and its multi-layered historic character. All those characteristics are to be emphasized by means of an urban walk from Jaffa Gate to the Holy Sepulchre followed by a tour of the Greek Orthodox complex surrounding the Historic Monument of the Holy Sepulchre and the Holy Aedicule.

For the **Hands-on Experience** a day and a half were assigned. The First day was split into three parts, each one of them focusing on the conservation aspects of monuments rehabilitation projects. In order to enhance the hands-on experience, the participants were split into smaller working groups. Local experts took part in this day, presenting the methodology of their instruments and the used technology. All experts were allocated the most suitable location within the Citadel to assure maximum participants' experience while using the equipment and learning how to read their data outputs. Each part was concluded by a short presentation of the methodology used at the Rehabilitation Project of the Holy Aedicule, and a wrap-up of the topic (fig. 3.2). The first part of the Third day was a direct continuation of the in-situ hands-on experience and consisted of a visit to the IAA Laboratories at Har Hotzvim, Jerusalem including the analytical and mobile labs, which capabilities and instruments were presented during the previous day. On the evening of the second day a public event titled: **The Historic City of Jerusalem, The Holy Sepulchre: A Hands-on Experience** took place and was broadcast for the benefit of the general public who could not attend physically.

For the **workshop summary**, a half day was assigned. The time spent was dedicated to a professional visit to the Holy Sepulchre, emphasizing the conservation works held by the NTUA Team in 2017, with additional explanations from a representative of the Greek Orthodox Patriarchate of Jerusalem and a representative of the IAA. Due to different constraints, some ad-hock adaptations of the Program were required. All changes were coordinated with the contributors and replaced with alternative activities. All in all, the planned framework of the workshop was kept.



Fig. 3.2 | Multiplier Event: The Historic City of Jerusalem, The Holy Sepulchre: A Hands-on Experience (Day 2)

### 3.4.2 The EDICULA Project Hands-on Experience: The workshop analysis

The assessment of the workshop was of high significance to the entire process, and an integral part of the EDICULA Project aims and objectives. Therefore, great attention was paid to collecting information so that it could serve as a basis for the required analysis and assessment. Hence, it was conducted on three levels:

- A daily assessment online questionnaire that was distributed among the workshop participants. The questionnaires included closed questions about the activities carried out on that day with additional space for comments. Participants were asked to classify themselves in knowledge/professional categories of students (Bezalel), professionals and conservators (IAA), lecturers (NTUA, Sapienza, Bezalel, IAA), or others (free text).
- A daily discussion among the workshop organizing team at the end of each day.
- An overall impression presentation during the EDICULA Project review meeting, held the day after the workshop ended.

The methodology of Daily Assessment through an online questionnaire allowed us to reach as many participants as possible and to receive their impact as close as possible to the completion of the hands-on activity or other events. The response to the questionnaires was high.

The list of criteria that was used and led us to structure the workshop content and program, was also used for analysis and assessment. Overall satisfaction from the workshop was high. It was sweeping across all participants whose attendance, with no exception, was very high whether reside in Jerusalem or commuted daily to the city (annex 1).

**Activities type.** One of the Multiplier Event objectives was learning from the Holy Aedicule Rehabilitation Project. Thus, technologies and techniques of nondestructive methodologies, previously used in the Rehabilitation Project, needed to be performed on-site and be used by the participants. Collaboration and assistance of high-level experts were required, including outsourcing experts in addition to IAA experts. The variety of offered methodologies and techniques was highly appreciated by both the participants, for whom it was a first-time experience, and for those that were already familiar with them but had a chance for in-depth learning.

**Program characteristics.** The integration of the current workshop activities with the know-how experience of the previous Rehabilitation Project demanded a very well-integrated and organized plan with a strict timeframe for each of the workshop days. The wide range of activities, the hands-on necessity and the sensitive instruments involved, required working in small groups. The participants were divided into three heterogeneous groups, simultaneously working on different techniques in different locations on site. The workshop also included lectures, given in-situ. The purpose of the lectures was to ensure a common knowledge base for all participants. Analysis of the participant's feedback clearly indicates that the lectures are needed but should focus and provide theoretical inputs about the used or to be used techniques, and more time should be allocated to hands-on experience.

**Participant's classification.** Considering the participants' backgrounds, they formed a heterogeneous group with gaps in previous knowledge, capabilities, and professional expertise. As such, the planned hands-on activities and lectures had to bridge those gaps by offering content that will suit different knowledge levels and still maintain attractiveness. Based on the online questionnaires, this concern is expressed in the participants' comments.

**Activities' location.** Unlike conferences, the Multiplier Event took place on several sites, sometimes even in more than one location citywide per day. This required tight planning of the timetable and coordination of the transportation. Furthermore, the sensitive location of the Holy Sepulchre within the Old City of Jerusalem, and the location of the Tower of David Citadel near Jaffa Gate, required daily security and coordination consultation.

## 4 | SUMMARY

Chapter 4 of the current deliverable **D3.3: EDICULA Hands on Experience** presents a summary of the third task – **Task 3.3: EDICULA Framework for hands on education in protection of monuments** of the third output of the project **O3 EDICULA Hands-on Framework**, emphasizing the significance of hands-on activities as were described throughout the report.

Hands-on activities and workshops, as part of or as a full course, are one of the cornerstones of PBL. The EDICULA Project, in its aims and objective, supports hands-on experience as part of real-world learning. Furthermore, it actively promotes the development of hands-on methodologies as an essential part of cultural heritage conservation curricula in higher education academic studies. In the project framework, conducting the workshop *The Historic City of Jerusalem, The Holy Sepulchre: A Hands-on Experience* was one of the project's Multiplier Events. The challenges the workshop presented in compiling the structure and program of the workshop, following a strict schedule, finding qualified tutors to teach advanced techniques and materials in-situ to heterogeneous participants and integrating various fields of studies, were all worthwhile. The high involvement and commitment of all participants, their enthusiasm and interest that was expressed during all parts of the workshop, all clearly demonstrate the high relevance of the hands-on experience. Strengthening the participants' feedback were the positive impression and comments of the EDICULA Project members, emphasizing the effectiveness of this teaching methodology for all, whether for students who will eventually become emerging professionals or for professionals at various stages of their professional development.

The EDICULA Project, as a successor of the Rehabilitation Project of the Holy Edicule, enabled us to highlight the importance of learning the work methodologies, techniques, and technologies from successful, challenging, and complex real-world projects. The implementation of their conclusions on projects with similar characteristics will empower any project's planning, execution, and understanding. Empowering all involved professionals to benefit from previously acquired knowledge and experience that can easily be used for planning additional multiplier events dedicated to hands-on experience and activities in broad cultural heritage conservation content and in various locations worldwide.

## Annex 1: Daily Assessment of the Multiplier Event [E1] - Day 2

### Students

- *The workshop expanded my whole spectrum of super progressive techniques to be used and combined in the restoration projects. It was very exciting to see, hear and touch the real experience that applied those tools!*
- *This workshop taught me a lot about conservation and rehabilitation of monuments and historic sites using digital tools and techniques. I discovered many techniques that I didn't know existed. I really liked being able to use some of these tools by myself.*
- *The conferences with the professionals allowed me to really understand the real archaeological issues. Thus, during the workshops I really had in mind the important points helping me to better understand the exceptional qualities of the tools on the subject and orienting me to ask my questions. The fact that these workshops were participative, in addition to being very educational and open-minded, opened the field of possibilities on all subjects, to understand, try and analyze them. Also, I was particularly surprised by what man was able to invent as tools, I did not know most of them, or at least their range of skills. I think that these tools greatly facilitate the research that is sometimes complicated under the weight of the constraints that this discipline represents.*

### Professionals / Experts

- *I was exposed firsthand to technologies I only heard of before. I had the opportunity to ask questions and meet professionals in several different fields.*
- *The workshop provided an excellent overview of the various digital tools including their implementation as NDTs for the rehabilitation of the Holy Aedicule. All aspects including the engineering and architectural aspects were explained and demonstrated in a very clear and convincing manner. The Aedicule project and the knowledge dissimilation is an inspiring case and benchmark of best practice in conservation a rehabilitation of cultural heritage.*
- *I got acquainted with the practical methods used in the industry of renovation and preservation of historical monuments. This has increased my professional potential which I can use in my daily work and special projects.*

### Lecturers

- *The multiplier event successfully promoted the trans-disciplinarity and cooperation in the field of Cultural Heritage protection. The workshop combined lectures and hands-on experience that covered a wide range of relevant activities. This combination was indeed effective, as the lectures presented the overall framework of activities in monuments protection, whereas the hands-on training demonstrated both the benefits as well as the actual experimental difficulties during on-site testing. As a lecturer, I gained useful information regarding documentation (especially digital tools), which thus enhanced my engineering background.*
- *Getting familiar with other experts' approaches on protection, conservation, and rehabilitation of cultural assets, gaining knowledge about the history of Jerusalem. Improving teaching skills.*
- *The workshop and the round table allowed to look at protection, conservation, and rehabilitation issues with a more critical approach.*

### Others (PhD candidate; Conservator)

- *The pattern of the workshop was good, with lectures and hands-on demonstration. The Aedicule Project experience shared, and the technology used while conservation was enriching, to see how actually innovation can be implemented.*