EDICULA

Educational Digital Innovative Cultural heritage related Learning Activities

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

NATIONAL TECHNICAL UNIVERSITY OF ATHENS [GREECE]	SAPIENZA UNIVERSITA DI ROMA [ITALY]	BEZALEL ACADEMY OF ARTS AND DESIGN [ISRAEL]	PerpetielSI SRL / PERPETIELSI SRL [ROMANIA]	ISRAEL ANTIQUITIES AUTHORITY [ISRAEL]	HELLENIC RESEARCH INSTITUTE OF THE ALEXANDRIAN CIVILIZATION [GREECE]

INTELECTUAL OUTPUT: **O4 EDICULA DIGITAL GAMES**
DELIVERABLE: **D4.5(b) EDICULA Digital Game**
LEAD ORGANIZATION: PerpetielSI
DATE: 31 August 2023

EDICULA

Educational Digital Innovative Cultural
heritage related Learning Activities

Co-funded by the
Erasmus+ Programme
of the European Union

Table of contents:

EDICULA

Educational Digital Innovative Cultural
heritage related Learning Activities

Co-funded by the
Erasmus+ Programme
of the European Union

ΙΔΡΥΜΑ
ΚΡΑΤΙΚΩΝ
ΥΠΟΤΡΟΦΙΩΝ
IKY

1. Introduction

This deliverable defines and presents the technologies that were used for the final implementation of the EDICULA Digital Game. In particular, the implementation of the Digital Class Virtual Tour will be analyzed and the Quiz Game, as well as the necessary subsystems and the flow of execution between them and the overall system will be identified.

2. EDICULA Digital Game

The main idea of the EDICULA Digital Game is to create separate Virtual Tours for each phase of the Holy Edicule Rehabilitation, providing useful information about the monument. Moreover, to emphasize on the educational aspect of the game, a separate Virtual Tour was developed replicating a Classroom in order to provide even more information to users. The user is able to choose and navigate at the Digital Class simply by selecting the available option at the Main Menu presented below at Figure 1.
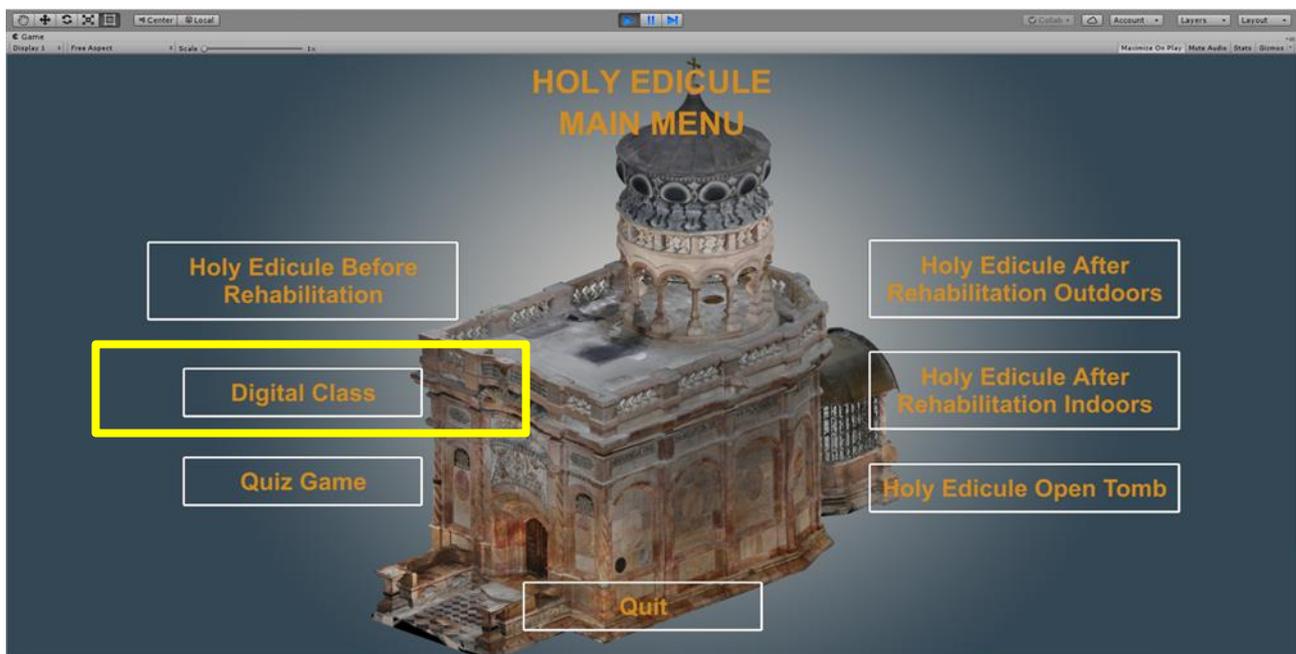

Figure 1: The EDICULA's Digital Game Main Menu presenting the available virtual tours from different stages of the rehabilitation process and the Digital Class option.

2.1 Digital Class

The Digital Class a separate scene from the rest of the virtual tours and the virtual environment was built using mostly the available 2D/3D assets from Unity, while certain 3D models were found in the Sketchfab (desks, bookshelves). The 3D models were chosen to be very simple so that the game will be lighter and for the user easier to navigate into. Whiteboards and blackboards were placed on the walls to make the environment more realistic and all the necessary information were placed on the boards in the form of images, diagrams, drawings etc. In addition, 3D Info Pins were placed in front of specific boards to provide more information in the form of text. When the user interacts with the pins and clicks on them a panel appears with the available content.

Mesh colliders were added to all 3D objects so that the user will not be able to go through them and make the experience even more realistic. The rest components of the virtual environment, such as the player, the

EDICULA

Educational Digital Innovative Cultural
heritage related Learning Activities

Co-funded by the
Erasmus+ Programme
of the European Union

camera views, the lights, the floor, the mini-map have been designed and described in D4.4. At the beginning of the virtual tour the Info Panel appears in order to give guidelines and basic information to the user about the way he/she will be able to navigate into the virtual environment and interact with the components. Screenshots from the virtual tour are presented below at Figures 2 & 3.
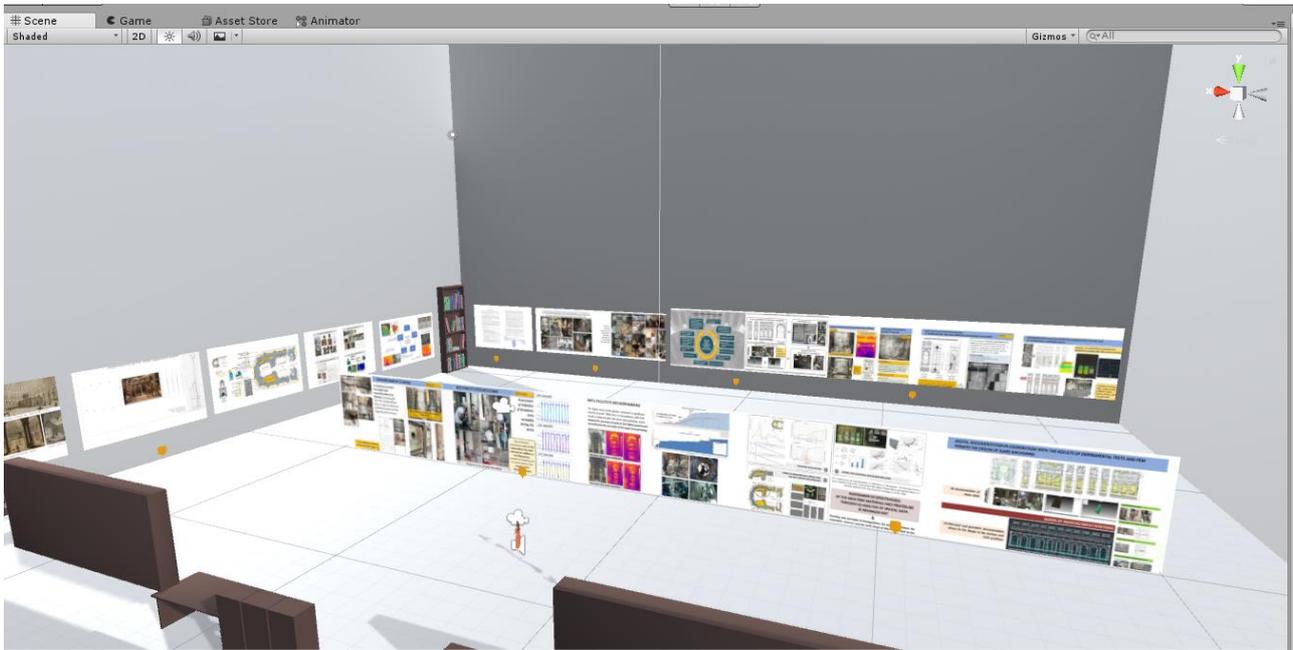

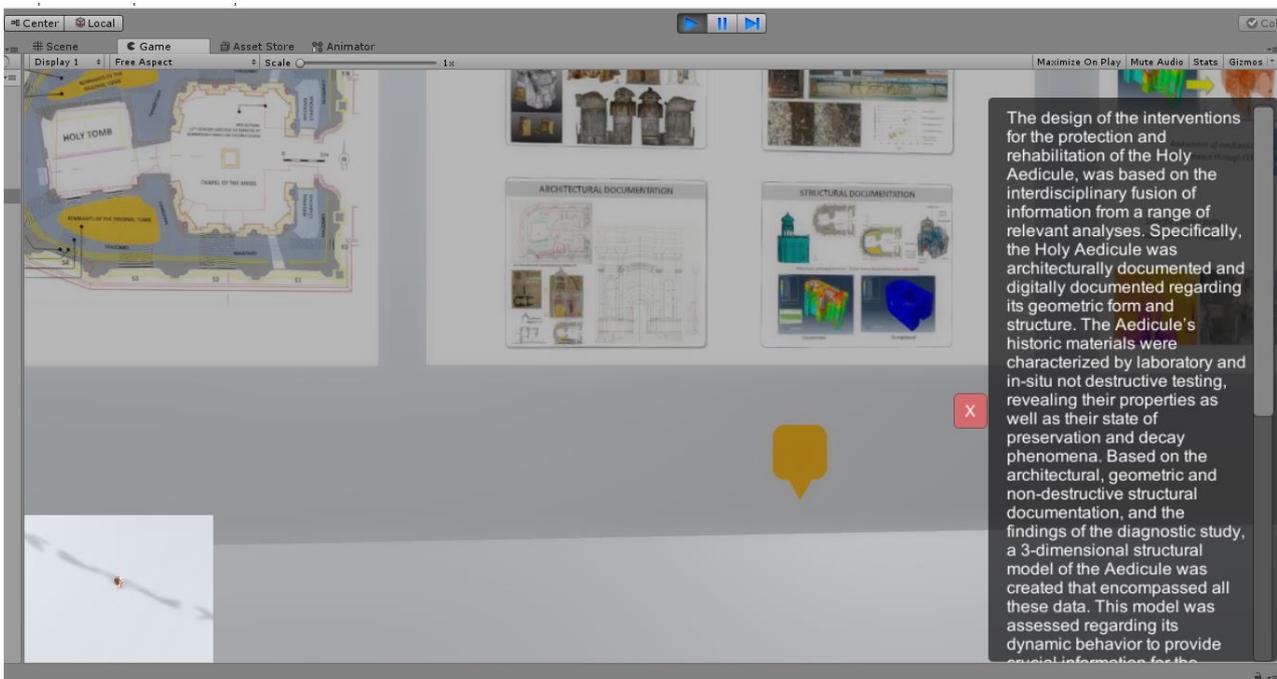**Figure 2: Screenshot from the Virtual Tour at the Digital Class.**

Figure 3: Screenshot from the Digital Class with the available content.

EDICULA

Educational Digital Innovative Cultural
heritage related Learning Activities

Co-funded by the
Erasmus+ Programme
of the European Union

2.2 Quiz Game

The main idea for the EDICULA Quiz Game was to develop a 2D Interface similar to the Main Menu UI (Fig. 4). The switching of the questions and answers is controlled via the Unity Scene Management and the appropriate script (Game Manager) was written to set the correct answer for each question and the informative answer if the user is right or wrong. The buttons that represent the available answers in each question have the necessary script in order to load the next scene (correct answer or wrong and then next question) in each case. The "True" or "False" button slides to the bottom of the window and the answer is being presented through the Animator while the questions always change order randomly so that the user focuses on the information and doesn't memorize the order of true or false answers.
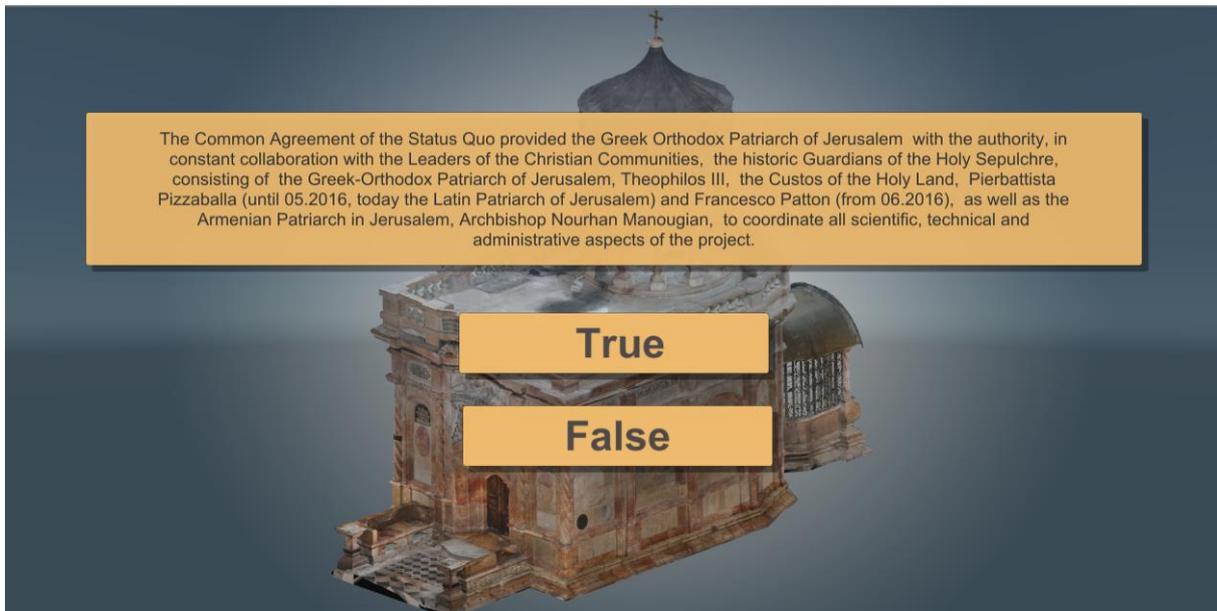

Figure 5: Screenshot from the Quiz Game UI.

An object was created to assign the script to it (Fig. 5), where the questions are being set as facts in a text form, as well as the True and False Text (buttons) and the animator that slides the appropriate button in each case based on the user's answer (Fig 6.).
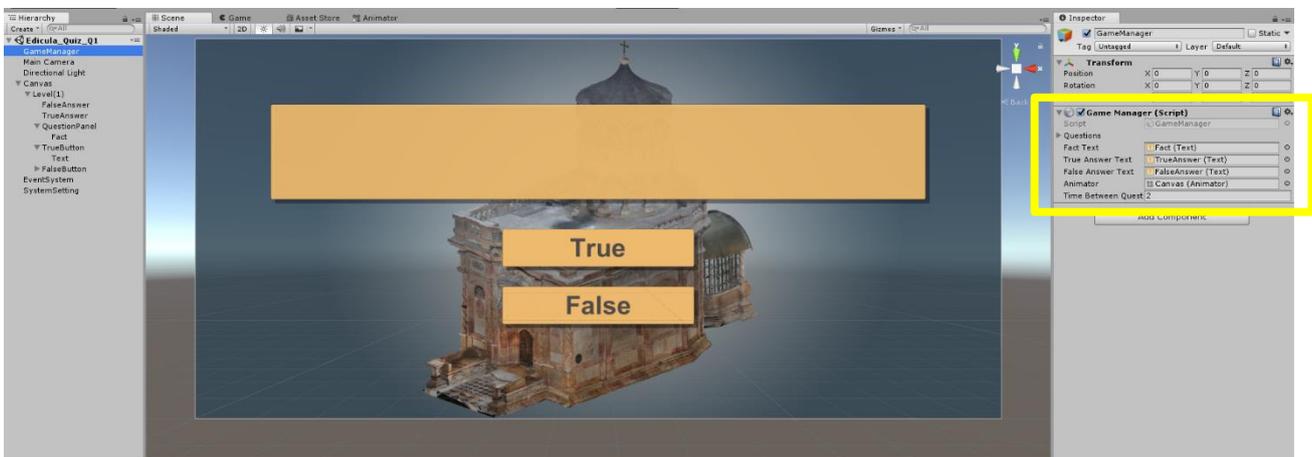

Figure 5: Screenshot from the Virtual Tour at the Holy Edicule after the Rehabilitation (Indoors Scene).

EDICULA

Educational Digital Innovative Cultural
heritage related Learning Activities

Co-funded by the
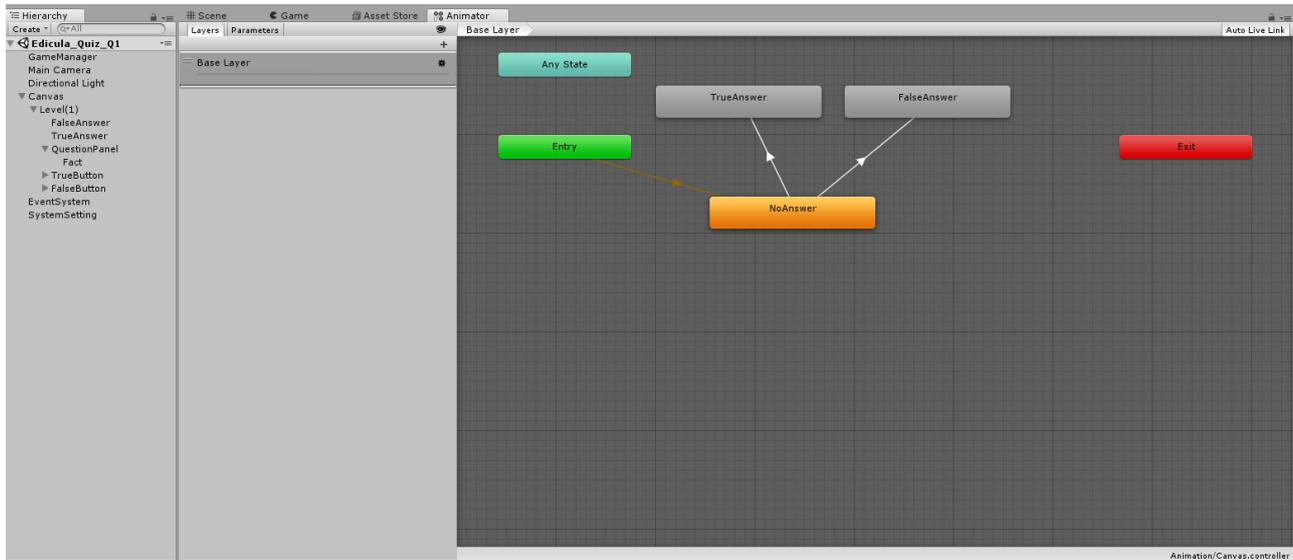Erasmus+ Programme
of the European Union

Figure 4: Screenshot from the animator and the relationship among the actions of the user.

In the Figures 7 & 8 below one of the answers is being presented and the UI when the user is giving a false answer informing him/her about it. Figure 9 presents the UI when the user is giving a correct answer.
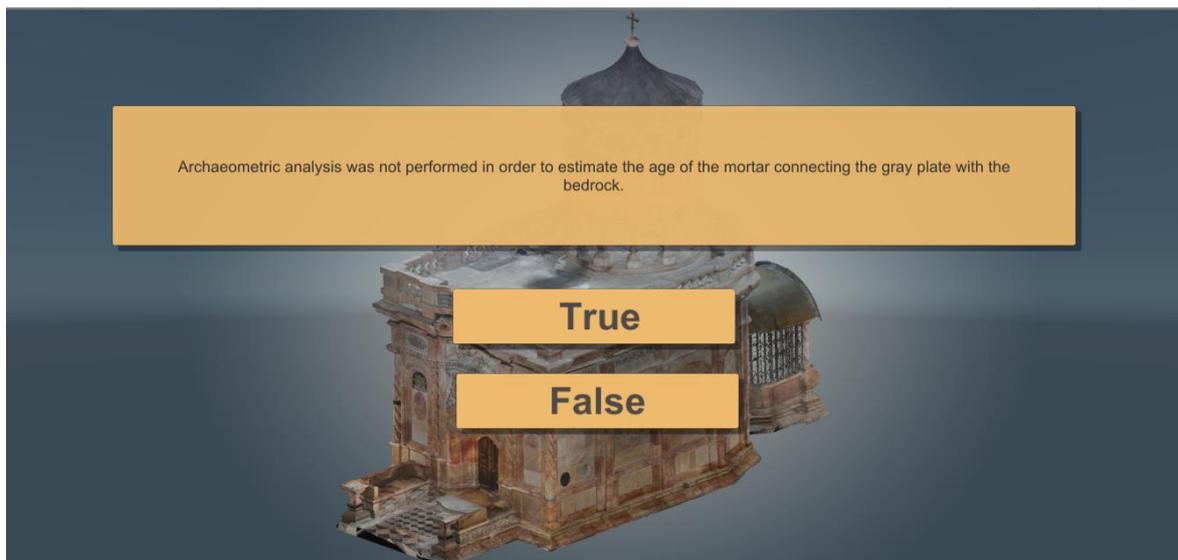

Archaeometric analysis was not performed in order to estimate the age of the mortar connecting the gray plate with the bedrock.

True

False

Figure 7: The UI of the EDICULA Question with the available True or False options.

EDICULA

Educational Digital Innovative Cultural
heritage related Learning Activities

Co-funded by the
Erasmus+ Programme
of the European Union
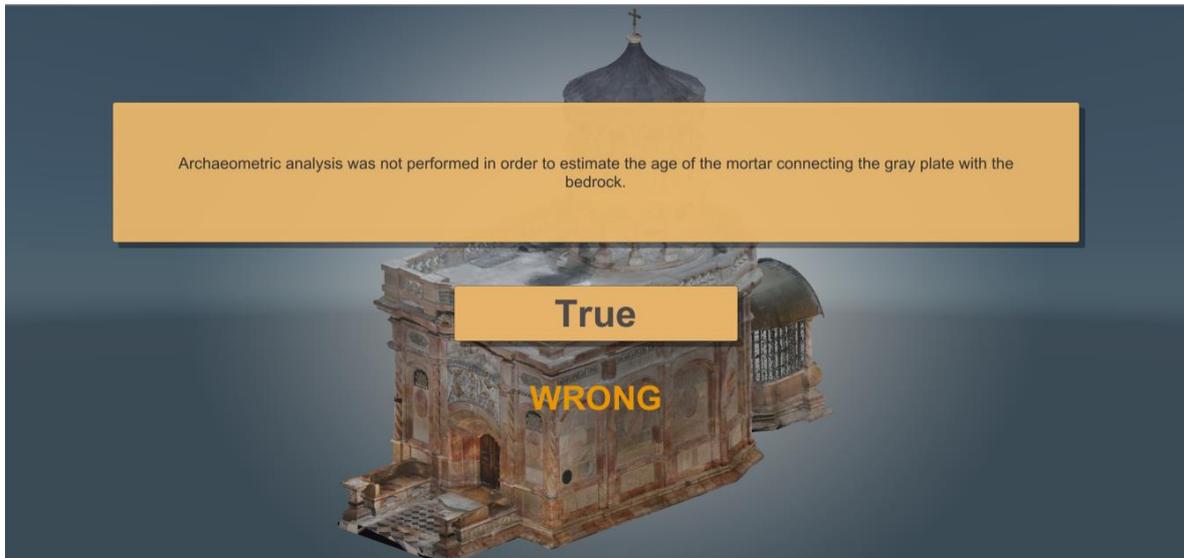
ΙΔΡΥΜΑ
ΚΡΑΤΙΚΩΝ
ΥΠΟΤΡΟΦΙΩΝ
IKY

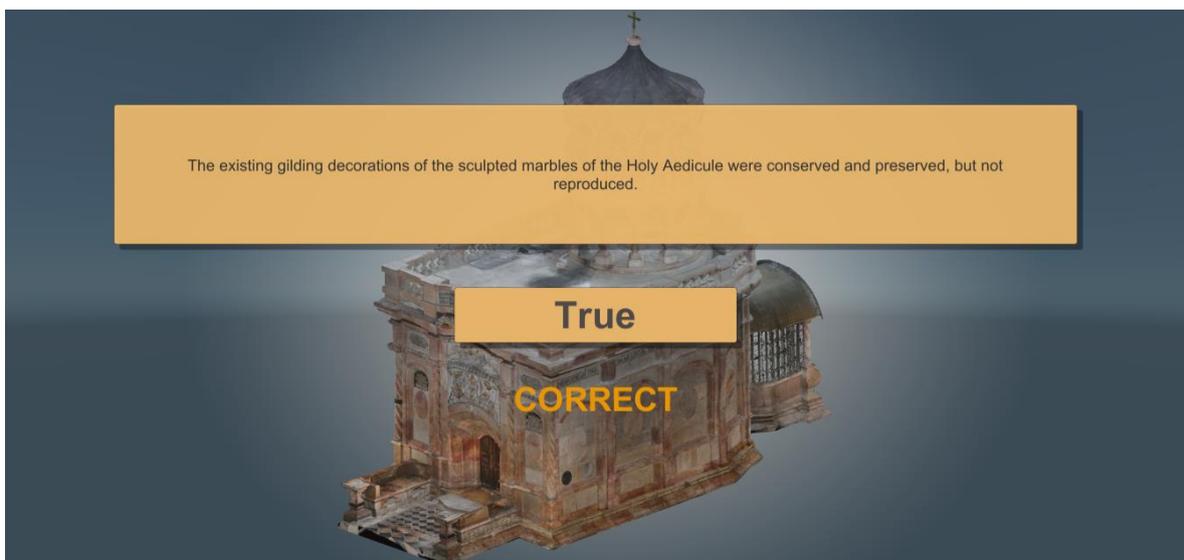**Figure 8: The UI when the user is giving a false answer.**

Figure 8: The UI when the user is giving a correct answer.

3. Conclusion

The development of the EDICULA Digital Game was a rather complex process, requiring familiarity with a whole set of software, concepts and tools. This first approach on the development of a realistic serious game that focuses on the edutainment of the users seems quite impressive and promising. The overall game will be evaluated to get useful comments and feedback from the users in order to understand whether VR and AR based games are educationally effective, useful, meaningful and, most importantly, appealing to users.

EDICULA

Educational Digital Innovative Cultural
heritage related Learning Activities

Co-funded by the
Erasmus+ Programme
of the European Union

4. Minimum Specifications

The following are the minimum specifications for the PC to properly execute the EDICULA game

EDICULA PC SPECS	
CPU	Intel® Core i7-6700 (3.40GHz)
GPU	NVIDIA GeForce RTX 3060 Ti
RAM	32gB

In case the app is slow change the graphics quality to a lower setting when running the .exe file.