

User Manual: WebChaeoUrn



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1. Introduction

WebChaeoUrn is a non-immersive Virtual Reality (niVR) application developed by the Universitat Politècnica de València (UPV) as part of the European ArchaeoPills project to support practical hands-on training in archaeology. This educational tool allows students to simulate the excavation process of a funerary urn in a safe and accessible web-based environment, helping them develop essential archaeological skills without the need to handle real artefacts, thereby contributing to the preservation of cultural heritage.

The application is intuitive and accessible, offering multilingual support and running directly in a web browser without requiring installation. Through its non-immersive Virtual Reality environment, users actively engage in a step-by-step simulation that faithfully recreates laboratory excavation procedures.

To access WebChaeoUrn, visit the following web page in your preferred web browser:

<https://www.archaeopills.eu/XR/niVR>

From this page, you can launch the application or download the user manual.

This manual provides guidance on using WebChaeoUrn and explains how to make the most of its features. Our aim is to ensure that your learning experience is engaging, safe, and effective.

2. Available Languages

To ensure accessibility for an international community of students and archaeology professionals, WebChaeoUrn offers multilingual support from the moment it is launched. This feature allows users to interact with the application in their native language, making the archaeological procedures easier to understand and enhancing the overall learning experience.

Supported Languages

The application is available in the following languages:

- Spanish
- English
- German
- French
- Italian

Changing the Language

You can change the application's interface language at any time from the Language Options menu by following these steps:

1. From the main menu (Figure 1), tap the flags icon located in the upper right corner



2. Select your preferred language by tapping the corresponding flag (Figure 2).
3. The application will automatically switch to the selected language.
4. Tap the Back button in the upper left corner () to return to the main menu and begin the excavation using the selected language.



Figure 1. Main menu of the WebChaeoUrn application.



Figure 2. Language selection screen of the WebChaeoUrn application, showing the available languages: English, Italian, Spanish, French, and German.

3. Main navigation

The WebChaeoUrn interface has been designed to be intuitive, accessible, and user-centered. From the main menu, users can access all the main features of the application, organized in a clear and structured hierarchy.

Navigation flow

Figure 3 presents the navigation flow of WebChaeoUrn. This diagram illustrates how users move through the application, from launching it to interacting with the non-immersive virtual reality excavation simulation. The diagram includes the main screens and the navigation paths available throughout the educational experience.

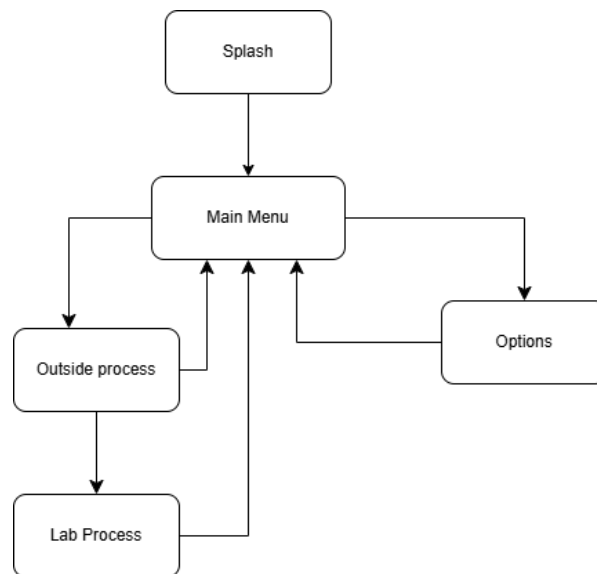


Figure 3. Navigation flow of the WebChaeoUrn application, showing the main screens and the available navigation paths.

Splash screen

- When the application is launched, a full-screen splash image is displayed (Figure 4).
- This screen remains visible for 5 seconds. After this time, the application automatically proceeds to the Main Menu.



- Tap the Full Screen icon () to display the application in full-screen mode, allowing it to occupy the entire screen.

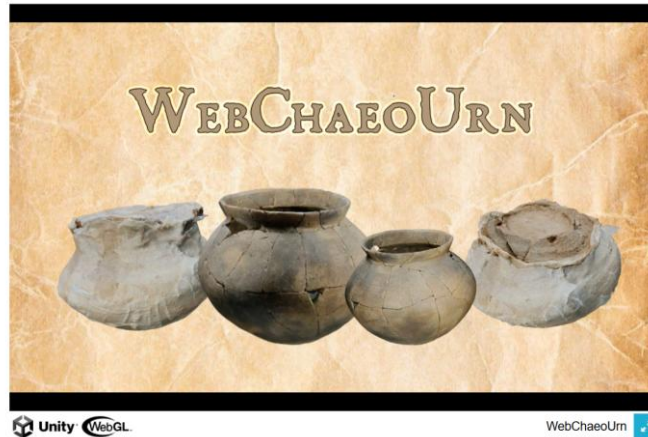


Figure 4. Splash screen.

Main Menu

When the application starts, the Main Menu screen (Figure 5) is displayed with the following options:

- **Start:** Opens the Field Process screen, where the archaeological context is introduced through text and video.
- **Credits:** Displays a screen with the project credits, participating institutions, and those responsible for the application's development.
- **Language (Flags icon):** Redirects to the Language Options screen.



Figure 5. Main menu

Language options

- Figure 6 shows the Language Options screen, where users can select one of the five available interface languages: Spanish, English, German, French, and Italian.
- The selected language is applied globally throughout the entire application.

- After changing the language, tap the Back button in the upper-left corner () to return to the Main Menu.



Figure 6. Language options

Field Process screen

- Figure 7 shows the Field Process screen, which presents an overview of the archaeological excavation in the field and the subsequent transport of the funerary urn to the laboratory.
- The screen also includes an informational video that can be played on demand and illustrates the excavation process.
- Available buttons:
 - **Hide:** Hides the explanatory text box to provide a clearer view of the video.
 - **Start:** Opens the Laboratory screen, where the interactive augmented reality simulation begins.

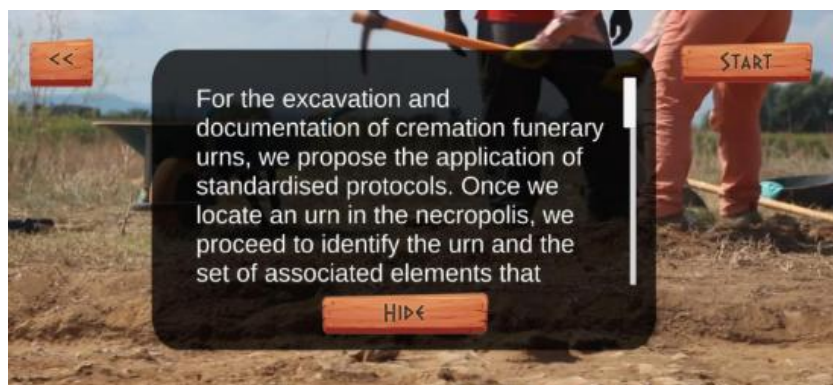


Figure 7. Field Process screen displaying an overview of the archaeological excavation process and a video of a real excavation.

Laboratory screen (Virtual Reality Simulation)

- Figure 8 shows the main screen where the Virtual Reality archaeological simulation takes place.
- From this screen, users can:
 - Use virtual tools (Hand, Swab, Awl, and Brush) to excavate the urn layer by layer.
 - Interact with objects and receive visual and textual instructions.
 - Document the process by taking photos at key moments.

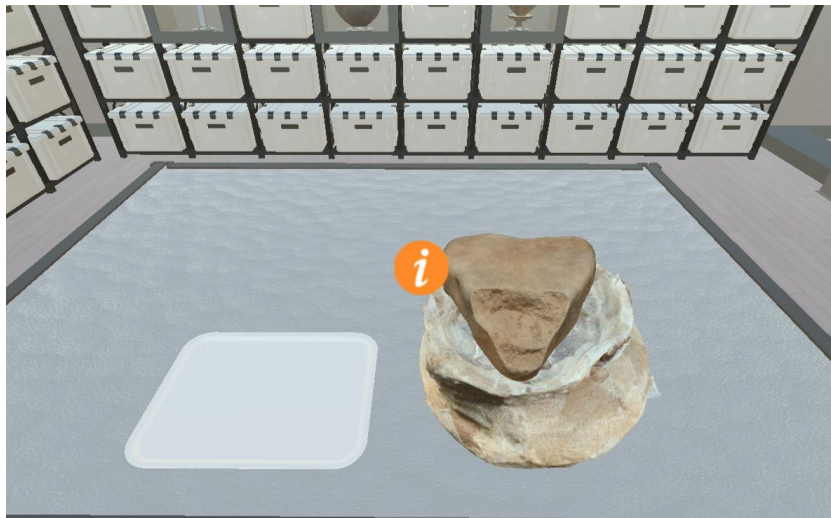


Figure 8. Virtual Reality laboratory simulation displaying the urn on the table.

Credits screen

Selecting Credits opens the Credits screen, where users can view information about the WebChaeoUrn development team, the ArchaeoPills project partners, and the project acknowledgements (Figure 9).



Figure 9. Credits screen of the WebChaeoUrn application, displaying the development team, the project partners, and the project acknowledgements.

4. Excavation simulation

To begin:

1. Select the desired language from the Language Options menu (Figure 6).
2. Tap Start from the main menu (Figure 5).

When the practice starts, an introductory video (Figure 10) will be shown accompanied by the following explanatory text:

“For the excavation and documentation of cremation funerary urns, we propose the application of standardized protocols...”

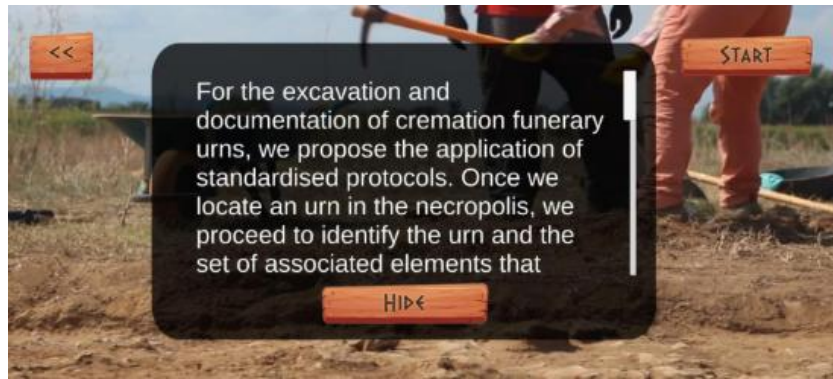


Figure 10. Introductory video and accompanying text describing the archaeological excavation process, from the excavation of the funerary urn to its transfer to the laboratory for micro-excavation.

1. You can scroll through the text using the scroll bar on the right side of the text box to read the complete introduction.
2. Tap Hide to view the field excavation video (Figure 10).
3. If you want to return to the main menu, tap the Back button located in the upper-left corner ().
4. To reread the text, tap the Information button (.
5. Tap Start to enter the laboratory simulation.

Step 1: Removing the stone

The simulation begins with an urn covered by a stone (Figure 8). An Information icon will appear (Figure 8).

When you tap the Information icon, the following text is displayed:

"This is a stone. Sometimes it was placed on top of the funerary urn to cover the burial... Now, proceed to remove the stone. Use the hand-shaped icon..."

Before removing the stone, a photo must be taken using the Camera icon (). Then, drag the stone to the tray.



To drag the stone, select the Hand icon (), tap and hold the stone (Figure 11), and without releasing it, drag it towards the tray. Once the stone is near the tray, release it (Figure 12).

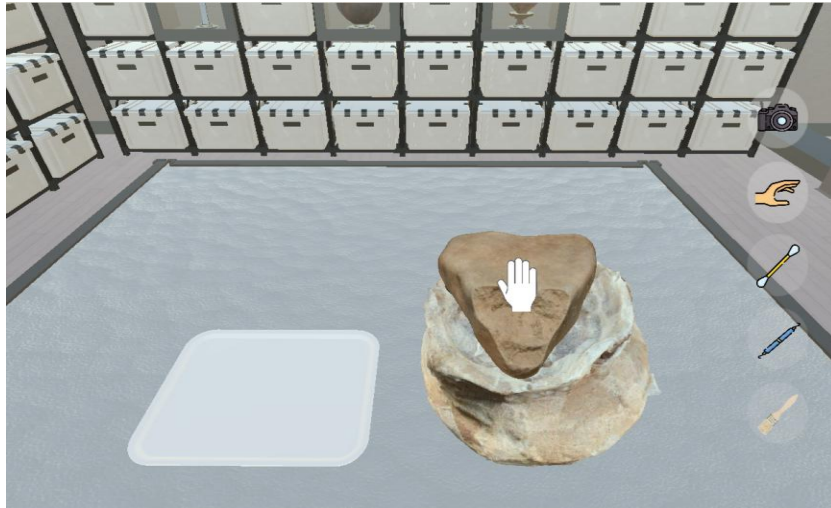


Figure 11. Initial interaction with the funerary urn. Removal of the stone with the Hand tool.

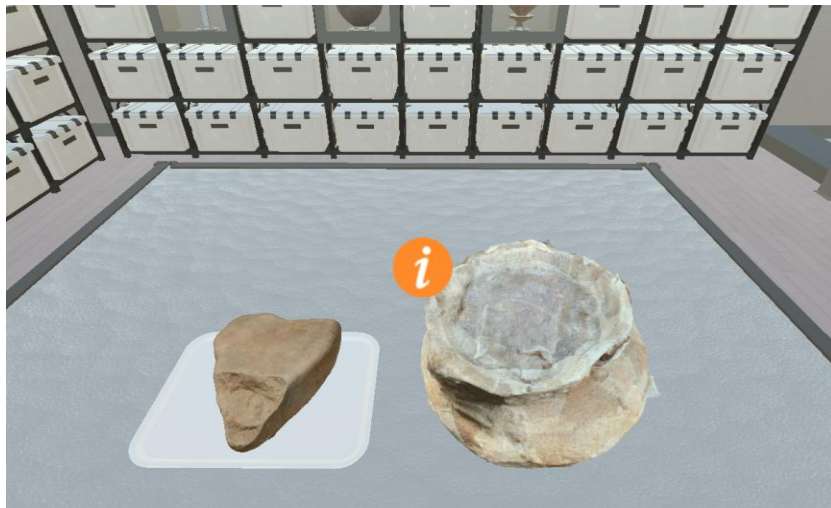


Figure 12. Stone successfully removed from the funerary urn and placed on the tray, allowing the excavation process to continue.

Step 2: Removing the gauze

After removing the stone, the urn protected by a layer of gauze is revealed. When you tap the Information icon, the text explains:

"The next step is to remove the gauze... Now proceed to separate the gauze. To do this, you must use a swab soaked with solvent..."



Take a photo before proceeding. Select the Swab icon (), the third icon on the toolbar, and apply it with circular motions.

To use the swab, tap and hold it, then drag it in circular motions over the gauze covering the urn (Figure 13). A progress bar on the left side of the screen will indicate the remaining time required to complete this stage (Figure 13).

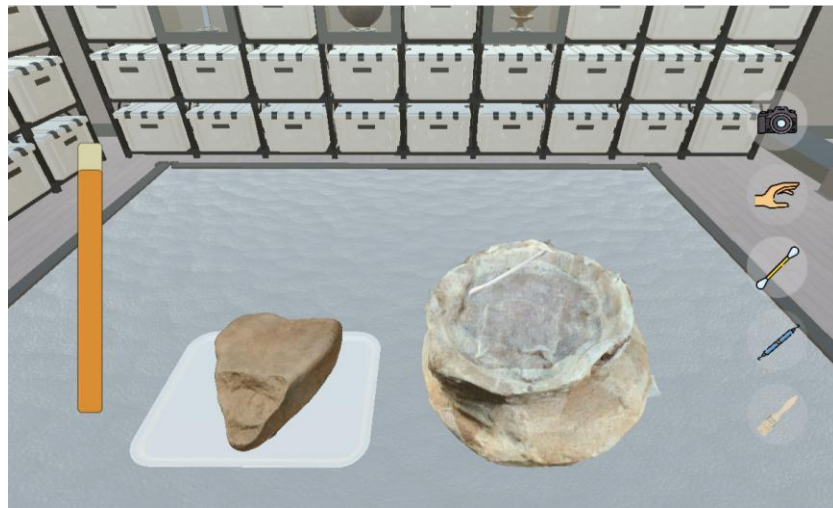


Figure 13. Removal of the protective gauze using the Swab tool.

Step 3: Excavating soil with the Awl

With the gauze removed, excavation of the interior begins. When you tap the Information icon, the text displays:

"For graphic documentation, take a photo of the current state. Then, proceed to remove the layers or strata of soil..."



Select the Awl icon () and begin excavating the soil, following a stratigraphic criterion (composition, colour, and texture).



To use the awl, select the fourth icon on the toolbar (). Once selected, it will appear on the screen. Tap and hold it while moving it across the soil to remove the soil layer (Figure

14). Similarly, a progress bar indicates the remaining time required to complete this stage (Figure 14).

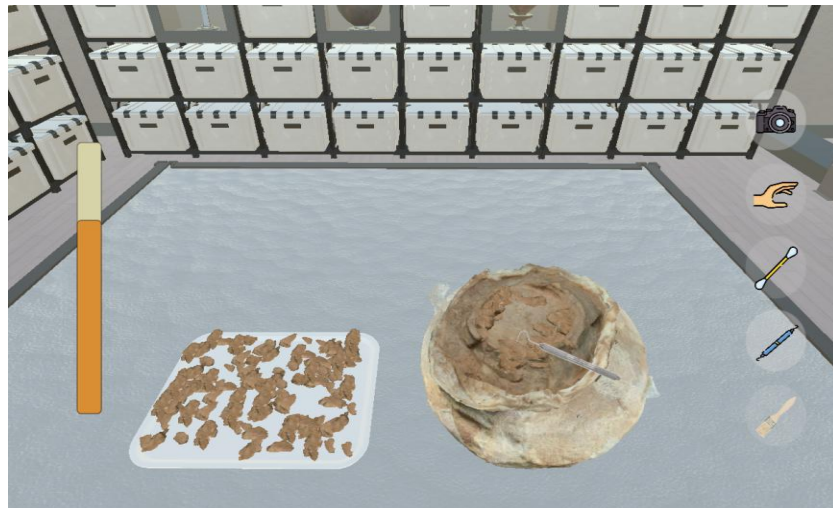


Figure 14. Excavation of the soil with the Awl tool.

Step 4: Excavation of the surface layer

At this stage, when you tap the Information icon (Figure 15), another message appears:

"The surface sediment of the urn generally belongs to the final stage of filling... The appearance of the first bone fragments indicates the beginning of the cremation levels..."

Excavation continues with the Awl tool, paying special attention to the first bone fragments.

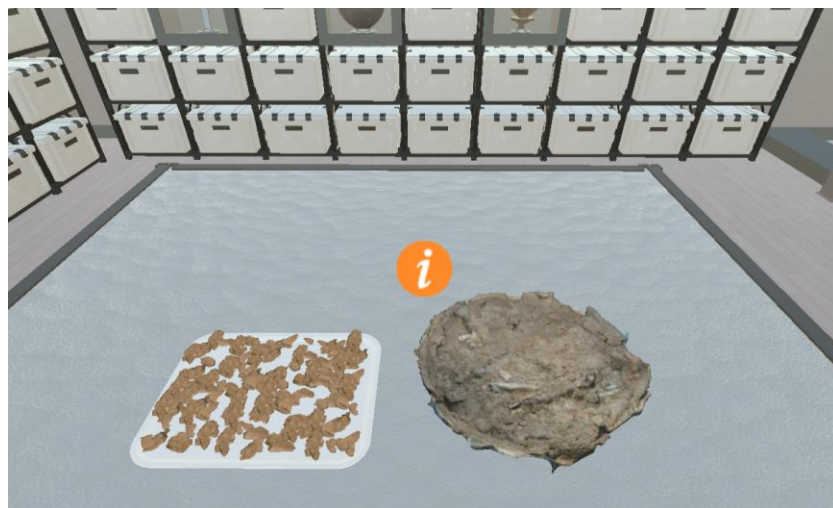


Figure 15. Excavation of the surface layer.

Step 5: Cleaning with the Brush

Once more delicate remains appear, the brush should be used to separate small fragments without damaging the archaeological remains. Tap the Information icon to view the related information.

To use the Brush tool, select the Brush icon in the toolbar () , the last one. Just as you did with the Awl and the Swab, tap and hold the brush that appears on the screen and drag it in circular motions over the urn until the progress bar is completed (Figure 16).

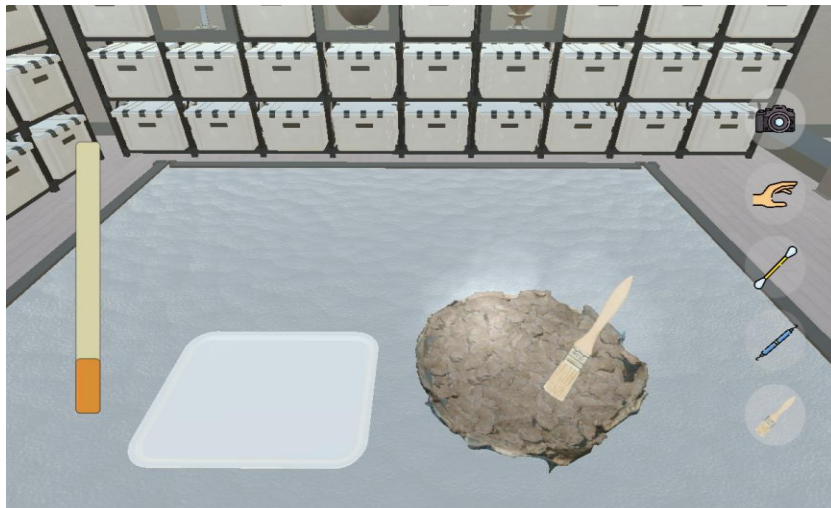


Figure 16. Removal of small debris with the Brush tool.

Step 6: Discovery of the bone bundle

In the lower third of the urn, the main concentration of cremated bones appears (Figure 17). When you tap the Information icon, the following text is displayed:

"The bone bundle appears concentrated at the base of the urn... During the work process, a record sheet will be created..."

It is recommended to photograph this stage and observe the different soil colours and bone arrangement.

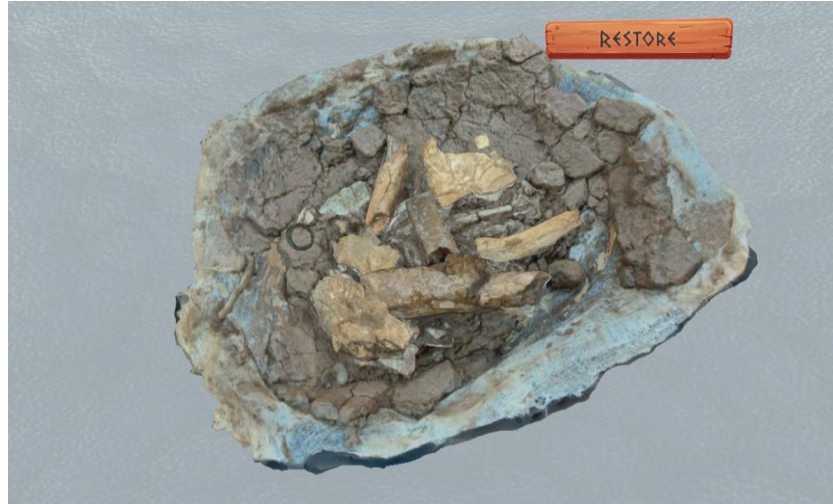


Figure 17. Lower third of the urn showing cremated bones and grave goods.

Step 7: Information on the findings

From this moment, you can tap on the bones and grave goods to display detailed information about each item. A three-dimensional model of the selected bone or grave good will also appear on the side of the screen, where you can rotate it by dragging with the mouse or your finger (on touch-enabled devices) to examine it from different angles.



Figure 18. Two examples of the information displayed after selecting archaeological elements during the micro-excavation process: a bone fragment (left) and a grave good (right). The application displays descriptive information together with a rotatable three-dimensional model of the selected item, which can be examined from different angles by dragging it with the mouse or on a touch screen.

Each finding should be documented by taking a photograph.

Step 8: Reconstruction of the urn

Once the excavation and documentation of all the interior elements of the funerary urn have been completed, the application offers an additional feature that allows users to visualize the restored urn.

By tapping the Restore button (Figure 17), the 3D reconstruction of the funerary urn will be activated, showing its restored appearance (Figure 19).

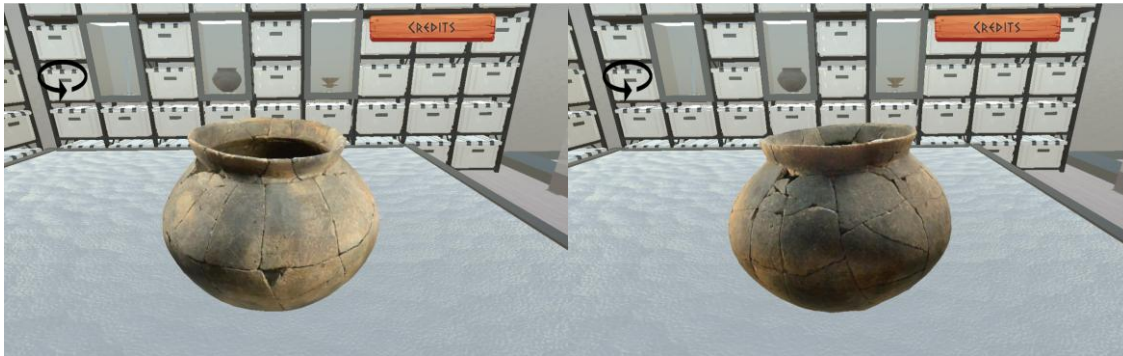


Figure 19. 3D reconstruction of the restored funerary urn.

5. Process documentation

An essential part of archaeological work, both in the field and in the laboratory, is the rigorous and systematic documentation of each stage of the process. WebChaeoUrn incorporates this practice into its educational simulation through a key feature: taking photographs at specific moments.

Captures at each phase

During the virtual excavation process, the application will prompt the user to take photographs at key moments during the procedure, such as:

- Before and after removing the stone
- After removing the protective gauze
- When uncovering each significant layer inside the urn.
- Upon discovering the first bone remains.
- During the identification of grave goods.

These photographs not only simulate the professional archaeological practice but also allow the student to review their progress and reinforce their visual understanding of the process.

Integrated camera function

- The Camera icon appears automatically when a photo needs to be taken.
- The user can proceed to the next step even if the photo has not been taken.

6. Authorship and copyright

Authors of the WebChaeoUrn application and this manual: Lorena Zaragozá and M.-Carmen Juan

Special thanks to the Archaeological Museum of Burriana, especially José Manuel Melchor, Josep Benedito, and Juan Lorenzo Domínguez.

The WebChaeoUrn application and this user manual were developed within the ArchaeoPills project. The software, documentation, and associated materials are protected by copyright. This manual is distributed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) license.



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Related publication

The development and evaluation of WebChaeoUrn are presented in the following publication:

- Juan, M.-C., Benedito, J., Melchor, J. M., Zaragoza, L., & Baratta, G. Digital Technologies for Funerary Urn Micro-Excavation Training: Video, Interactive Web-Based, and Augmented Reality Approaches. Electronics (2026). (In press).

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