

## D3.8 – Pilot experience(s) based on platform beta release

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**Abstract**

This demonstration deliverable details four EMOTIVE pilot experience prototypes developed in the second year of the project: the Hunterian Museum's experiences ('Ebutius's Dilemma' onsite and offsite virtual), the Çatalhöyük offsite virtual experience and the Çatalhöyük schoolkit.

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## TABLE OF CONTENTS

1	Introduction.....	4
2	Hunterian experiences .....	5
2.1	Hunterian onsite experience ('Ebutius's Dilemma').....	5
2.2	Hunterian offsite virtual experience ('Ebutius's Dilemma') .....	6
3	Çatalhöyük experiences.....	11
3.1	Offsite Virtual Catalhoyuk .....	11
3.2	Çatalhöyük schoolkit.....	14
4	Bibliography.....	19

## TABLE OF FIGURES

Figure 1.	New graphic treatment for the characters of Ebutius, Calle and Callum.....	5
Figure 2.	Screenshots of the new 'What are the Facts behind the Story?' screens.....	6
Figure 3.	Introductory screen of the offsite virtual Hunterian experience 'Ebutius's Dilemma' with floor plan on the left hand-side and story on the right hand-side .....	7
Figure 4.	Moving along the left corridor of the display with the position indicated on the floor plan .....	8
Figure 5.	By clicking on different sun symbols on the Floor Plan, users can move to another image, regardless of their position in the VM interface .....	8
Figure 6.	View from the middle of the exhibition space showing the arrow which allows the user to move to the next image .....	9
Figure 7.	Locating the hammerhead in the glass display case. The hotspot is the black square symbol with arrows on each side on the large background image. The floorplan has been closed. ....	9
Figure 8.	Different hotspots for objects are included in the same image. The floorplan and the story have been closed.....	10
Figure 9.	The user has the ability to zoom out.....	10
Figure 10.	Two interfaces, one at the right side hosts the Ebutius Dilemma story and the main window showing the slab in greater detail. The floor plan has been closed.....	11
Figure 11.	Sebastian Vizcay and Çiler Çilingiroğlu test drone-enabled digital capture methods in the North Shelter. (Photo L. Meghan Dennis).....	12
Figure 12.	3D printed and 3D molded artefact replicas provide a connection between physicality and virtuality. (Photo Sara Perry) .....	13
Figure 13.	Examples of 3D printed objects personalised by participating youth, aged 9-14. (Photo Sierra McKinney).....	14
Figure 14.	The virtual walkthroughs provide students with an opportunity to explore multiple reconstructions of Çatalhöyük's archaeology. (Photo Sierra McKinney).....	15
Figure 15.	Nicknamed Bo, the chatbot opens the conversation and establishes both its role in guiding the discussion and the presence of multiple users. (Photo Sierra McKinney. Credit to Grant Cox, Artas Media, for the 3D model of a Çatalhöyük home).....	16
Figure 16.	The results of the first stage of the Kit aim to generate a personal connection with the user. (Photo Sierra McKinney).....	17
Figure 17.	ATHENA's Floorplan editor enables the use of hotspots, visible here as the dotted box, to connect still images in order to create a larger narrative. (Photo Sierra McKinney).....	17
Figure 18.	The Storyboard Editor's question function provides a prompt for the user to reflect on their choices. (Photo Sierra McKinney).....	18
Figure 19.	Within the SnatchBot platform, creators select requirements and choose keywords to complete the if/then clauses which guide user interactions. (Photo Sierra McKinney) .....	18



## List of Abbreviations

IBR: Image-Based Rendering

VR: Virtual Reality



EMOTIVE

# 1 Introduction

This demonstration deliverable details four EMOTIVE pilot experience prototypes developed in the second year of the project: the Hunterian Museum's experiences ('Ebutius's Dilemma', both a) onsite and b) offsite virtual), the Çatalhöyük offsite virtual experience and the Çatalhöyük schoolkit.

The beta release of the 'Ebutius's Dilemma' Hunterian onsite experience took into account the results from the formative evaluation of the experience (D9.2) to improve the graphic elements, navigation and overall look and feel of the application (described in D3.7), as well as add an additional section on the facts behind the story offered at the end of the experience. This is designed for visitors interacting with the objects on display at the Hunterian Museum's Antonine Wall display. The offsite virtual 'Ebutius's Dilemma' used as a basis the same interactive, character-driven experience of the onsite 'Ebutius's Dilemma' experience, but converted the physical environment of the Hunterian Antonine Wall gallery to a 360° digital one, so that the experience could be used online by users not physically present at the exhibition, who can interact with the digital representations of both the space and the objects.

The Çatalhöyük offsite virtual experience aims to provide an interactive, multi-user encounter within a virtual reality (VR) reconstruction of portions of the Neolithic site of Çatalhöyük. The *Exploration of Egalitarianism Digital Classroom Kit* expands the on-site experience for Çatalhöyük for off-site use by students, aged 11-14. The Kit modifies the existing pre-visit and on-site elements and introduces a dialogue-facilitating chatbot to explore the application of historical empathy to a pre-historic site.



## 2 Hunterian experiences

### 2.1 Hunterian onsite experience ('Ebutius's Dilemma')

#### Background

The beta release of the 'Ebutius's Dilemma' Hunterian onsite experience takes into account results from the formative evaluation of the experience (D9.2) and includes several changes to the look and feel of the experience, user navigation through the experience, as well as reinforcing and making explicit the conceptual thinking behind the experience. It also adds an important new section on the facts behind the story at the end of the experience to help users distinguish between fact and fiction. The beta release will be evaluated in the forthcoming weeks and the results will be discussed in D9.3.

#### Experience Updates

A new graphic treatment ensures that the characters of Ebutius, Calle and Callum are consistent (see Figure 1). These were designed by Kate Vlakeska, illustrator and student from the University of Ioannina, Greece on an Erasmus+ placement at the University of Glasgow in May-Aug 2018.

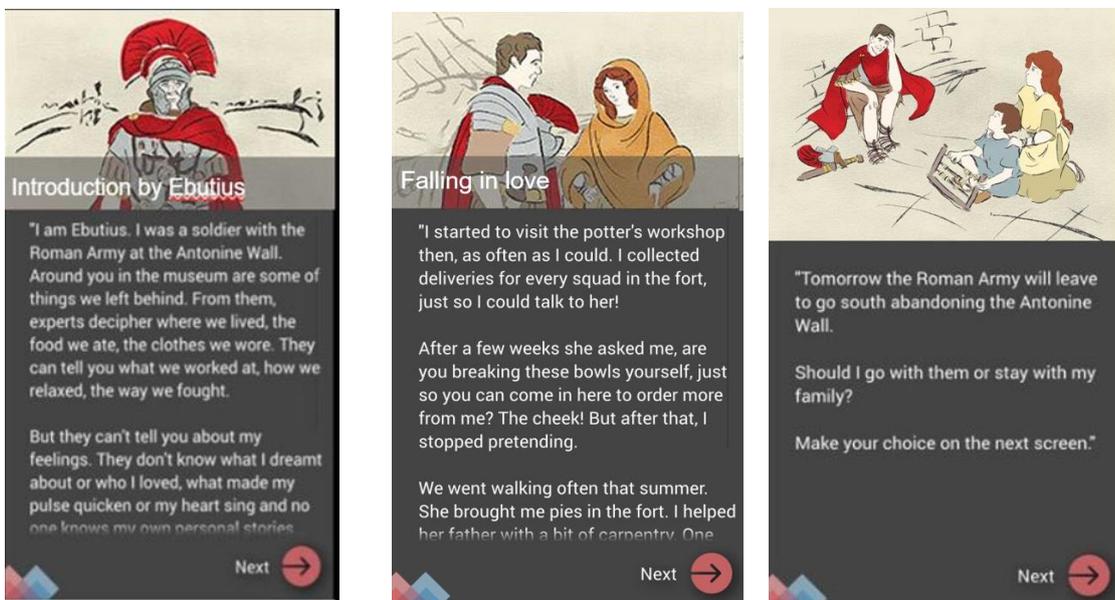


Figure 1. New graphic treatment for the characters of Ebutius, Calle and Callum

The wording for navigating through the screens was also made consistent e.g. 'Next' and 'Back'. Automatic scrolling on screens with text has been implemented. Hotspots on the 3D models of the arm purse and hammerhead with further information have been included. Shading of chapters once read has been included to facilitate more understanding of progress through the experience for users. A sound has also been included to signal to users when they have scanned the NFC tags correctly.

Branches of the story have been re-written to reinforce the emotional connection between the objects on display, the dilemma within the story and the character driven plot. Specific branches of the story, in particular the screens titled 'Ebutius's hammer' and 'As time goes by', were combined and condensed. Better titles for some chapters were made more explicit to avoid opaque titles.

Six new screens on 'The Facts behind the Story' have been researched, designed and included at the end of the experience. The questions for this section were selected following user feedback from the evaluation carried out after the alpha release of 'Ebutius's Dilemma' reported in D9.2. The screens added in the beta release make clearer the distinction between the facts versus fiction elements of the story and the connection for the user between the archaeological knowledge about the objects included in the story, the history of the Antonine Wall and the story of 'Ebutius's Dilemma' (Figure 2). Elements of the background archaeological research for the facts behind the story were carried out by Sophie Gartshore as an undergraduate final year student placement project and by Liga Gutane, as part of Museum Studies MSc Work Placement Research Report at the University of Glasgow (in the summer of 2018) (Gutane 2018).



Figure 2. Screenshots of the new 'What are the Facts behind the Story?' screens

## 2.2 Hunterian offsite virtual experience ('Ebutius's Dilemma')

### Background

The Antonine Wall offsite virtual experience derives from the onsite experience 'Ebutius's Dilemma', an interactive, character-driven experience designed for the Hunterian Museum's Antonine Wall display (See D3.7). We have retained the story-based approach, which allows the online, remote users (who are accessing this while offsite from the museum gallery) to choose their own path through the experience while they navigate their way through the virtual, online representation of the display to locate objects pertinent to the story.

The following teams were involved in developing this experience:

- UGLA providing image capture of the Antonine Wall display and conceptual design.
- ATHENA providing their Floorplan Editor Tool to create a virtual representation of the Antonine Wall display.
- Noho provided scriptwriting for the original 'Ebutius's Dilemma' onsite experience.

The prototype was developed during the summer of 2018 and tested in August-September 2018 in part, the output of a Master's dissertation at the University of Glasgow by Metaxia Adami (Adami, 2018) (evaluation results will be discussed in D9.3). The conceptual thinking behind this experience is that this is the offsite virtual version of the onsite experience which would allow both a) online, remote users from



around the world (some of which might never have visited the Hunterian Museum) to access the story and get a feel of visiting the gallery virtually, as well as b) visitors who have used the onsite version of 'Ebutius's Dilemma' to access a version of this experience after they have left the museum. Evaluation with primary and secondary teachers about the usefulness of the offsite virtual experience and their user requirements was carried out by Rachel Nicholson as part of her Museum Studies work placement research at the University of Glasgow (reported in D9.3) (Nicholson 2018).

### Experience Prototype

In order to position the offsite virtual experience and the story of 'Ebutius's Dilemma' within the Antonine Wall display, a photo-realistic representation of the gallery was required with objects located within this representation and identifiable to the user (Figure 3). The virtual walkthrough of the Antonine Wall gallery is based on 12 360° images of the gallery, as well as images of the display cases and objects taken on-site by the UGLA team at the museum using a 360° camera. These images were manually fed into the Floor Plan Editor tool to create a 360° panoramic view of the physical space. This virtual walkthrough serves as the foundation within which to embed the story, in this case, 'Ebutius's Dilemma'. Two EMOTIVE authoring tools were used to create the offsite virtual version of 'Ebutius's Dilemma', the Storyboard Editor and the Floor Plan Editor. The existing assets related to the latest version of the 'Ebutius's Dilemma' onsite experience were extracted from the Storyboard Editor and fed into the Floor Plan Editor by the ATHENA and UGLA teams. Users access the offsite virtual experience of 'Ebutius's Dilemma' via a link on the web using their own online connection and device.

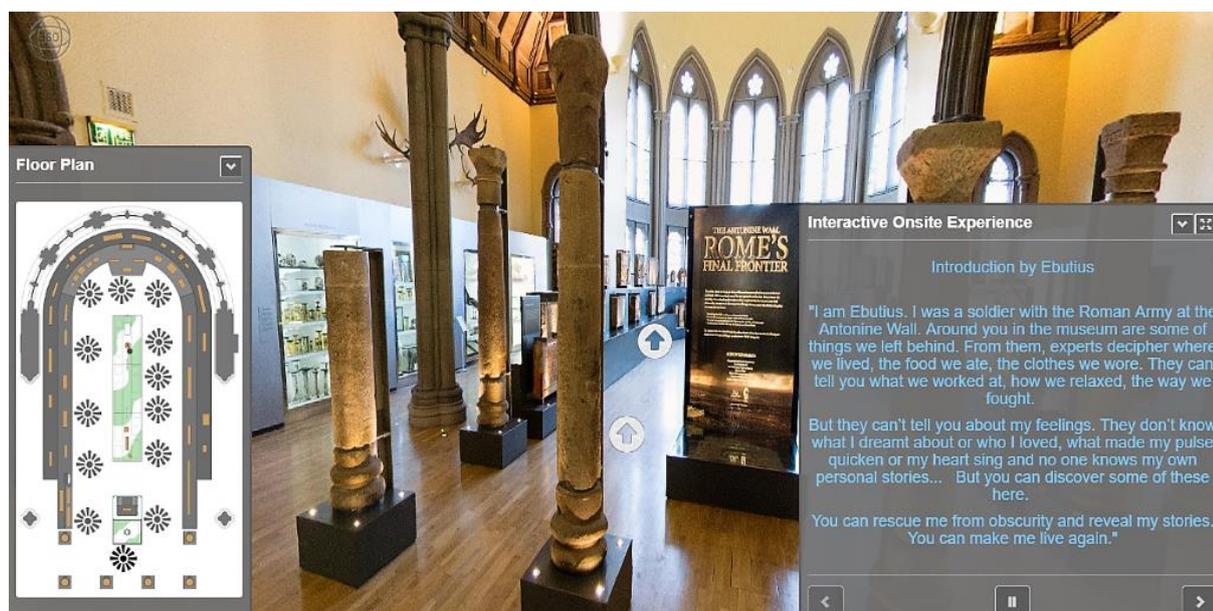


Figure 3. Introductory screen of the offsite virtual Hunterian experience 'Ebutius's Dilemma' with floor plan on the left hand-side and story on the right hand-side

Remote users are able to 'move around' the virtual walkthrough of the museum while simultaneously listening to 'Ebutius's Dilemma' and looking for objects on display that relate to the story. They can navigate the virtual walkthrough in two ways. Firstly, via the floorplan of the exhibition space, which is included at the bottom left hand-side of the screen allowing users to navigate the offsite virtual representation of the gallery. Sun icons on the floor plan indicate to the user the position in the gallery related to the images in the viewing window. The sun icons are clickable and when clicked will 'move' the user to that spot within the exhibition space (see Figure 4 and Figure 5). The aim is that by linking the floorplan to the 360° photographs, remote users will have a better understanding of the space they are navigating through. The second way users can navigate is to use the arrows that appear in the main viewing window of the experience. These indicate to the user the direction they are facing within the

virtual representation of the exhibition space and will move the user on through this space when clicked (Figure 6).

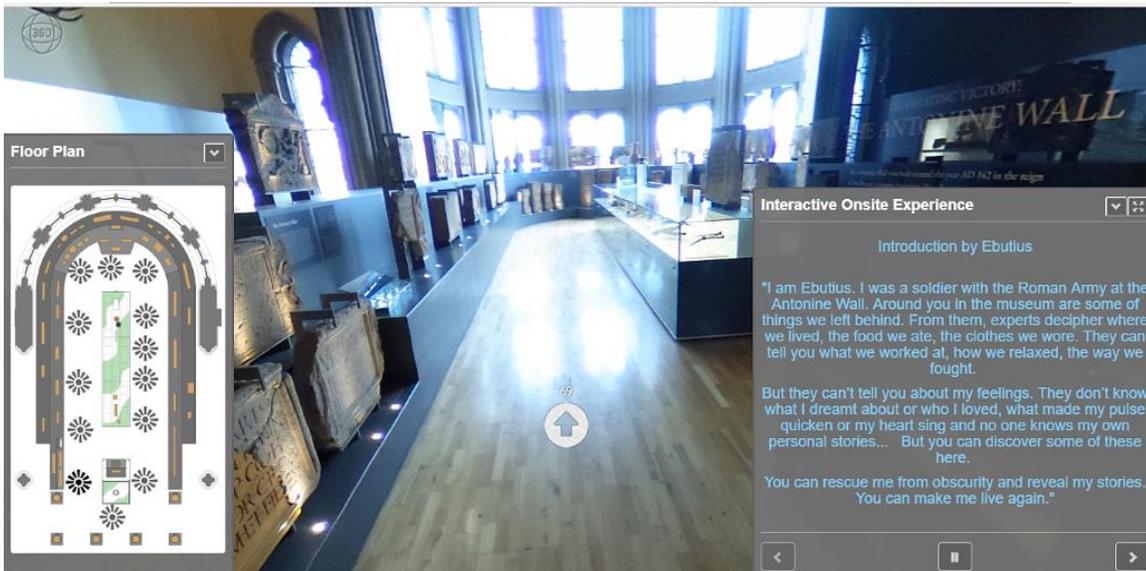


Figure 4. Moving along the left corridor of the display with the position indicated on the floor plan

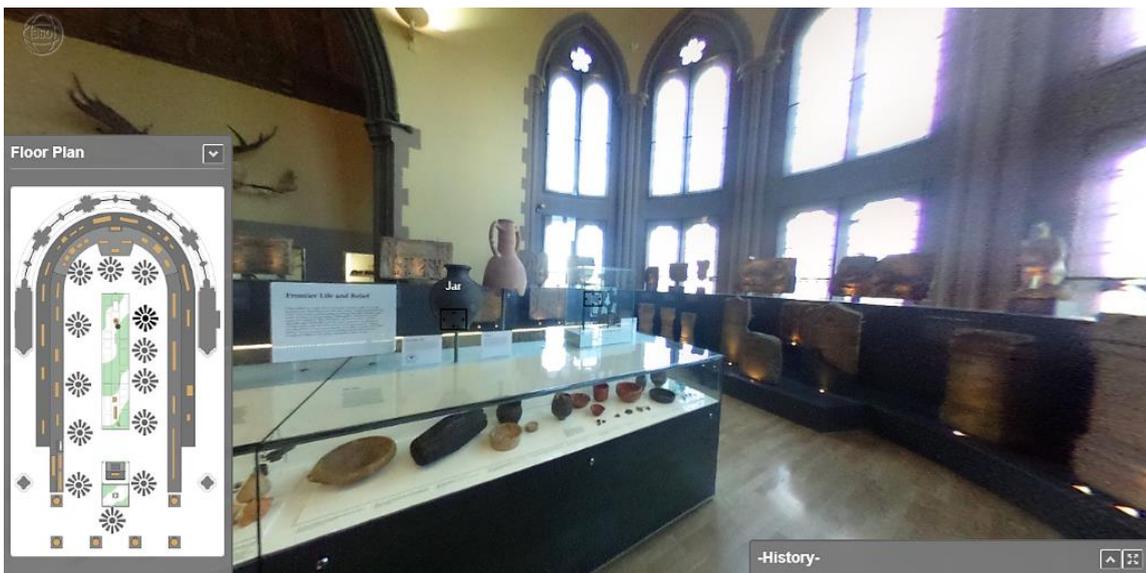


Figure 5. By clicking on different sun symbols on the Floor Plan, users can move to another image, regardless of their position in the VM interface



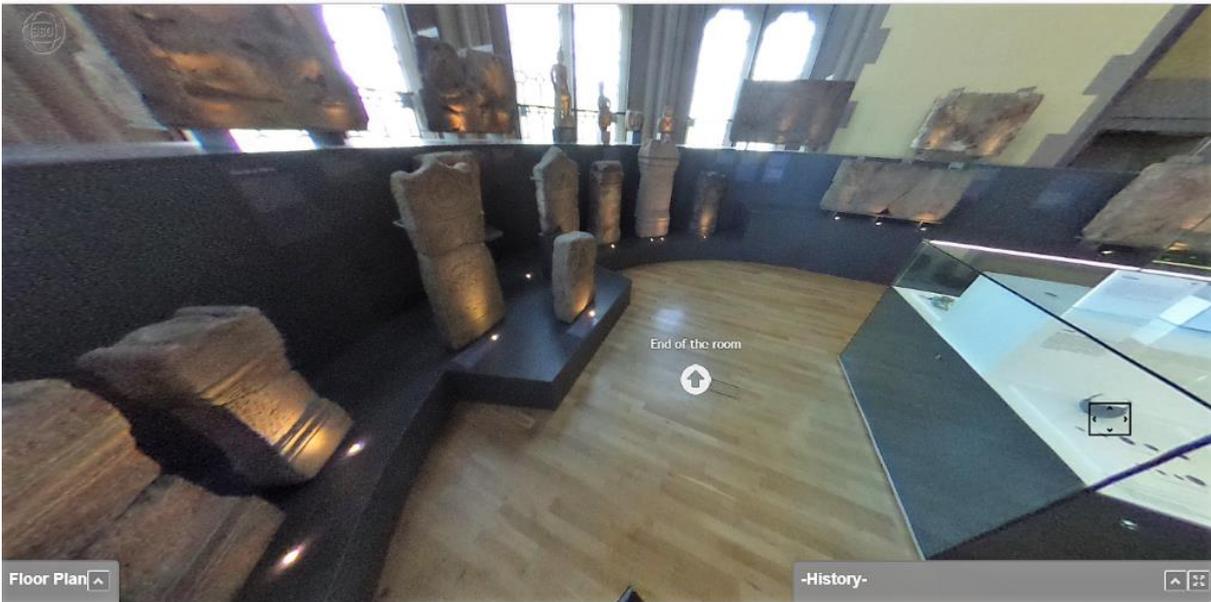


Figure 6. View from the middle of the exhibition space showing the arrow which allows the user to move to the next image

Hotspots have been included within the offsite virtual experience which allow the user to access more detailed descriptions about the objects on display. See Figure 7 and Figure 8.

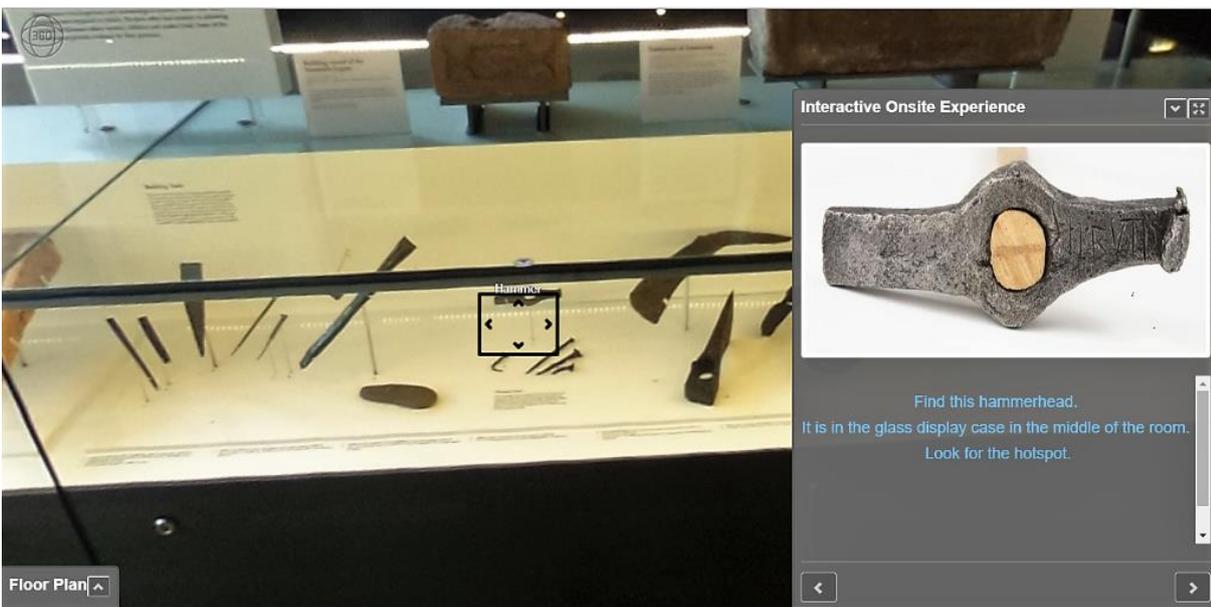


Figure 7. Locating the hammerhead in the glass display case. The hotspot is the black square symbol with arrows on each side on the large background image. The floorplan has been closed.





Figure 8. Different hotspots for objects are included in the same image. The floorplan and the story have been closed



Figure 9. The user has the ability to zoom out.

The user is able to toggle between different views of each element of the experience including floor plan (left-hand window) interactive media of objects (main window), the virtual walkthrough (main window) or the story (right-hand window).



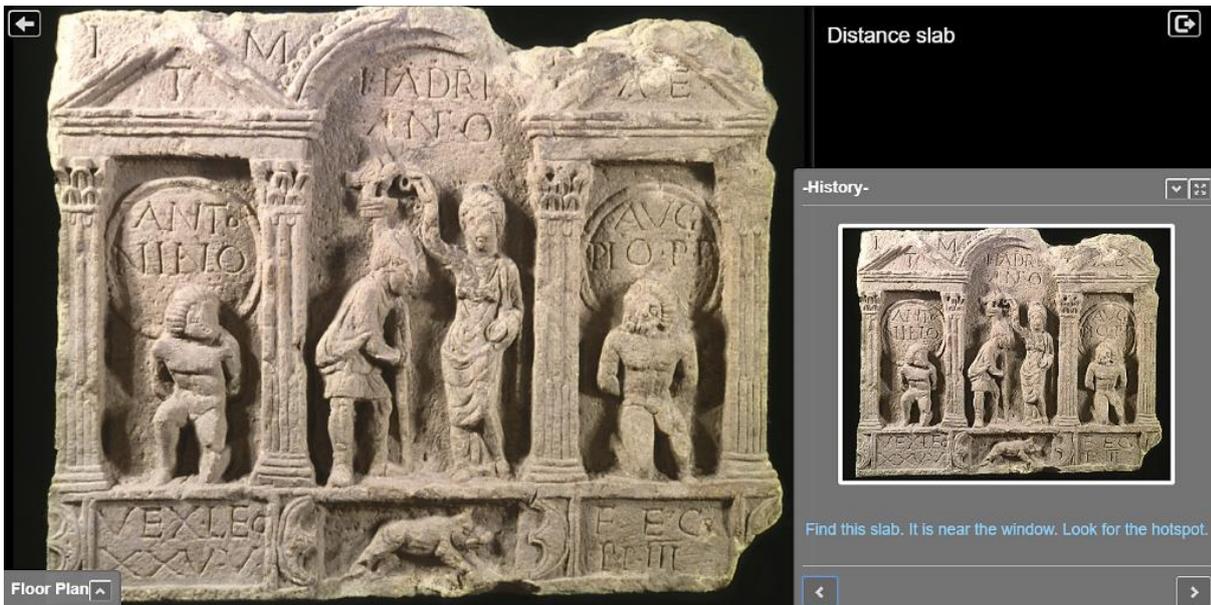


Figure 10. Two interfaces, one at the right side hosts the Ebutius Dilemma story and the main window showing the slab in greater detail. The floor plan has been closed.

Users are invited to make a choice for what Ebutius should do (stay with his family or follow the army) at the end of the story, as is the case with the onsite experience.

### 3 Çatalhöyük experiences

#### 3.1 Offsite Virtual Catalhoyuk

##### Background

The Çatalhöyük offsite virtual experience aims to provide an interactive, multi-user encounter within a virtual reality (VR) reconstruction of portions of the Neolithic site of Çatalhöyük. This experience is narrative-driven and focused on engaging users with their emotional responses to both the history of the site and with connections to modern social issues and themes.

The following partners are involved:

- University of York, providing conceptual design, interaction design, scriptwriting, and audio recording
- INRIA, providing photographic site capture via camera and drone, and novel Image-Based Rendering (IBR) technology
- ATHENA, providing Unity programming of the interactive features
- Noho, providing Unity programming, graphics to accompany the narrative experience, and audio-visual integration
- CNR, providing the 3D moulds

Following an initial prototype developed in the summer of 2017 (see description in D3.7), a combined team of EMOTIVE and INRIA members revisited Çatalhöyük in the summer of 2018 for additional image captures and narrative refinement (Figure 11). The experience has been substantially revised from its original conception (in D3.7) of a 'virtual novel', focusing more now on a multi-user interactive exploration



of social issues that affect neighbourhoods (in the past at Çatalhöyük, and in visitors' own present-day lives).



Figure 11. Sebastian Vizcay and Çiler Çilingiroğlu test drone-enabled digital capture methods in the North Shelter. (Photo L. Meghan Dennis)

### Experience prototype

The redesigned experience contains three parts, incorporating elements from the onsite experience, the schoolkit, and a handful of components of the earliest version of the offsite virtual experience conceived in 2017.

Users begin their experience online, through the completion of a rapid-fire personality quiz designed to isolate individual traits and personal values related to beliefs and desires. The quiz ultimately links users to the social and material communities of Çatalhöyük through an algorithm that combines users' answers into complex but familiar Çatalhöyük identities. It is completed individually, and before participation in the VR experience. The results also provide the user with access to a 3D-moulded replica of an artefact related to the site of Çatalhöyük (Figure 12).



Figure 12. 3D printed and 3D molded artefact replicas provide a connection between physicality and virtuality.  
(Photo Sara Perry)

The second part of the experience takes place in virtual reality, and is facilitated through the use of HTC Vive headsets and accompanying hardware. In-experience directions are provided via voice-over audio and text-based descriptions in the English and (later) Turkish languages. Users, in groups of two or three, begin their VR experience in the North Shelter at Çatalhöyük, where open movement is possible both on the visitor pathways/viewing platforms and inside a selection of excavated houses. Users make co-operative decisions on the pathways/platforms, the results of which dictate movement to one of four replica house environments which are overlaid within the excavation area. Within these environments, users participate in additional co-operative decision-making exploring themes of egalitarianism and social roles, aging, privacy and personal space--the exact themes are still under development and will change over the upcoming year.

The third part of the experience is likely to also take place in virtual reality. The details of this component of the use case are still under discussion and are likely to be elaborated or perhaps revised depending on the development of Part 2 (described in the previous paragraph). As currently conceived, within a reconstructed virtual house, users are provided with a suite of Neolithic imagery and graphics in order to contribute to a shared artistic installation designed to test the limits of shared storytelling. The 'story' here will entail users contributing content relatively blindly to it, without the benefit of knowing where or how the storyline will develop. Participation draws on previous choices within the main narrative experience to demonstrate relationships between users, and to incorporate user-decorated and modified versions of the 3D artefact objects they received in the personality quiz, and utilized in the narrative experience.

## 3.2 Çatalhöyük schoolkit

### Background

The *Exploration of Egalitarianism Digital Classroom Kit* expands the on-site experience for Çatalhöyük for off-site use by students, aged 11-14. The Kit modifies the existing pre-visit and on-site elements and introduces a dialogue-facilitating chatbot to explore the application of historical empathy to a pre-historic site. Growing out of research from the field of history education, historical empathy is both a cognitive and affective endeavour in which the development of historical contextualisation, perspective taking, and affective connection enable students “to better understand and contextualize [historical peoples’] lived experiences, decisions, or actions” (Endacott and Brooks 2013, 41). The school kit enables EMOTIVE to expand its previous efforts at Çatalhöyük to reach new audiences through the creation of widely accessible emotion-based educational tools. Note the Çatalhöyük *Exploration of Egalitarianism Digital Classroom Kit* was, in part, the output of a Master’s dissertation for the University of York by Sierra McKinney (McKinney, Sierra, 2018. *Generating Prehistoric Empathy: An Examination of a Digital Classroom Kit*. MSc Dissertation, University of York, York, UK).

### Experience Prototype

The Exploration of Egalitarianism Digital Classroom Kit consists of three components; Welcome to Çatalhöyük, an Egalitarian Trading Experience, and a Discussion with Bo the Chatbot. During our initial evaluations with members of the Young Archaeologists’ Clubs, the children engaged with all three elements of the Kit over the course of approximately two hours. In the first section, Welcome to Çatalhöyük, the children take a personality quiz to find their role in the Neolithic society of Çatalhöyük. This quiz provides each child with a Neolithic identity and a selection of artefacts. Students choose one from the selection, which they use in the subsequent elements of the experience. They are then provided with a 3D printed version of their chosen artefact to decorate and personalise. Examples of decorated prints can be seen in Figure 13. Through the creation of an identity and the personalisation of an object, an affective connection begins to form.

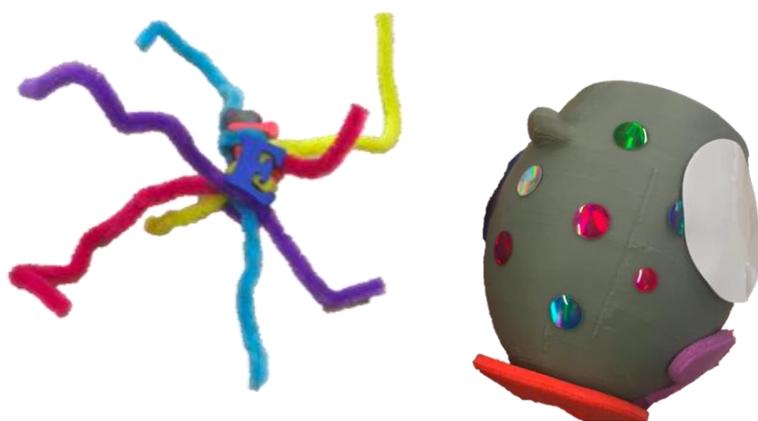


Figure 13. Examples of 3D printed objects personalised by participating youth, aged 9-14. (Photo Sierra McKinney)

During the second element of the Kit, the children are guided through an embodied experience with the assistance of the mobile application and virtual houses. The app sets the students a variety of tasks, including exploring the virtual houses to find specific elements of the building and answering pop quiz questions. As the children explore the houses they also discover information about Çatalhöyük’s history, archaeology, and culture resulting in a deeper sense of historical contextualisation. An example of the virtual walkthrough can be found in Figure 14.



Figure 14. The virtual walkthroughs provide students with an opportunity to explore multiple reconstructions of Catalhöyük's archaeology. (Photo Sierra McKinney)

However, the primary activity outlined by the application is a series of four exchanges. In the initial evaluation these exchanges were facilitated through the use of NFC tags. Following the on-site approach, the app was used to transfer the students' personality profile or role between objects through the tangible act of tapping the phone to each object in the exchange. This was intended to strengthen the connection between the student and the various objects they encountered in the exchanges. During these exchanges, the students work collaboratively in groups of two or three to decide which of their personalised items they wish to keep and which should be left behind for the community. In making these decisions, the children's emotional investment in the object becomes apparent and the act of exchanging *their* objects further develops the affective connection.

The third and final component of the Kit is the chatbot, an innovative digital tool designed to facilitate conversation between multiple users, seen in Figure 15. Groups of five to eight students engage with the bot and together answer and discuss a series of questions related to the topic of egalitarianism. This topic is investigated through an examination of the archaeological evidence for gender equality, non-biological households, and the consistency of architectural structures. The questions are structured to relate both the archaeology and egalitarianism to the children's own lives before prompting the students to consider the information they have learnt from alternative perspectives. Through engagement with the bot's facilitated dialogue, this final component of the Kit aims to encourage students to partake in perspective taking and foster curiosity about the nature of their own society.

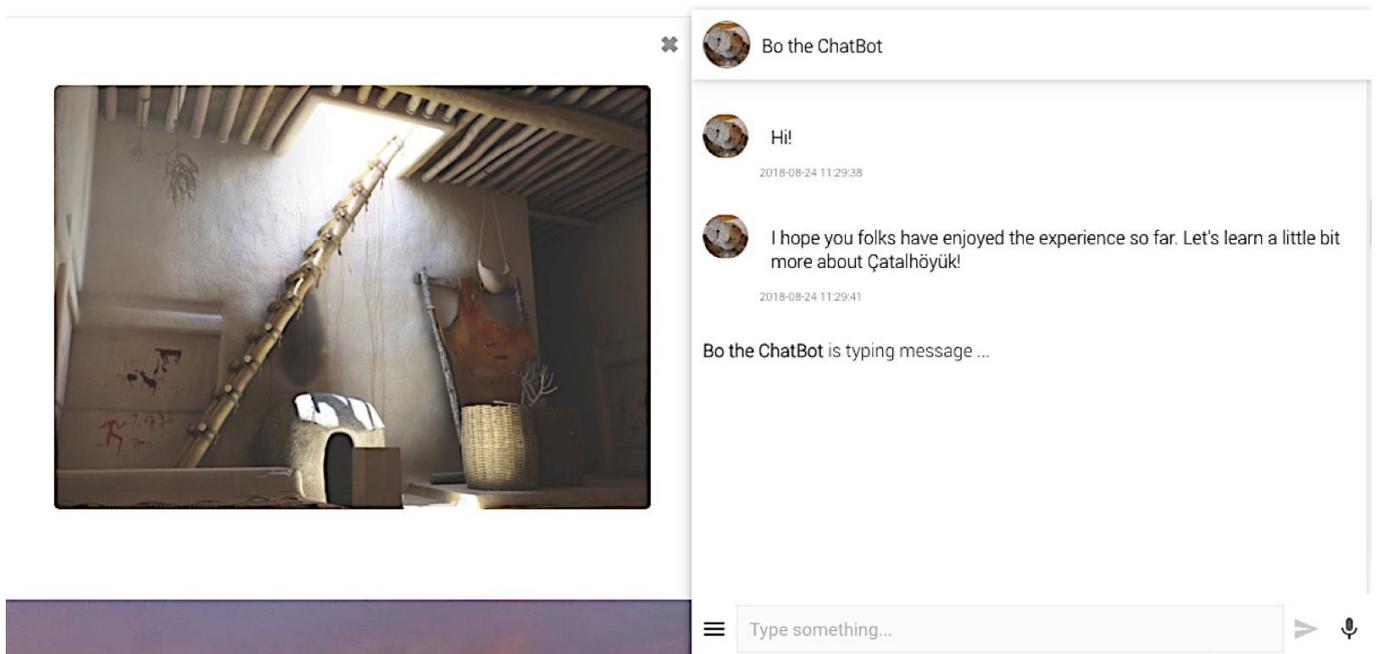


Figure 15. Nicknamed Bo, the chatbot opens the conversation and establishes both its role in guiding the discussion and the presence of multiple users. (Photo Sierra McKinney. Credit to Grant Cox, Artas Media, for the 3D model of a Çatalhöyük home)

## Technological Approaches

The first stage of the Kit is hosted on a website, created by ATHENA. Following the model set by the on-site experience, the website includes a multiple-choice quiz followed by a long-answer personality profile. The site is programmed so that the results of the quiz determine which of ten personality types the user receives (Figure 16). In addition, the user is provided with a selection of artefacts that include figurines, stamps, and cooking tools matched to their personality. The artefacts correspond to 3D printed objects that are used throughout the remainder of the experience. Using photos taken by York student Hermione Elderton, the objects were modelled by EMOTIVE partner CNR and ATHENA affiliate Maya Lara. They were then printed at various locations in Athens.

The second component of the Kit was created using a combination of ATHENA's Floorplan Editor tool and the Storyboard Editor. Four virtual walkthroughs of Çatalhöyük's replica houses were created in the Floorplan Editor using ten 360° photos of the on-site and additional images as 'hotspots'. The incorporation of hotspots enables the user to explore specific areas of the houses in greater detail by selecting a highlighted box. An example of this can be found in Figure 17, which depicts a reconstruction of the roofs of Çatalhöyük, which is accessed by selecting a hotspot located on a ladder in the second virtual house.



You are a creator, primarily a builder with artist traits. Just like today, the people of Çatalhöyük were complicated individuals. Whether it was as acting as a friend, trading partner, plasterer or cook, each person would fill multiple roles in their day-to-day life. However, creators are builders and artists at their core.

Detail-oriented and well organized, a Builder always has a plan. Builders are known to be reliable and trustworthy, which is why they are the perfect person to maintain the home. They always know when it's time for a new coat of plaster!

Creative and talented, Artists have a keen eye for beauty and frequently see it where others cannot. They know the power of art to convey meaning and create emotion.

As a creator, you'd fit right in at Çatalhöyük with one of the following objects in your hand. Choose from:



**Animal Figurine**  
This figurine is probably a bull. Bulls' skulls and horns were placed on walls, in benches, and next to doors as decoration. The dangerous parts of animals like teeth or horns might have been brought into houses to remember important events or hunters.



**Mudbrick**  
Çatalhöyük was a town of mudbrick houses. In the earliest periods of the site's history the mud bricks were very long – often over 1 metre in length! Over time the bricks became smaller and more efficient, similar to the ones used today.

Figure 16. The results of the first stage of the Kit aim to generate a personal connection with the user. (Photo Sierra McKinney)

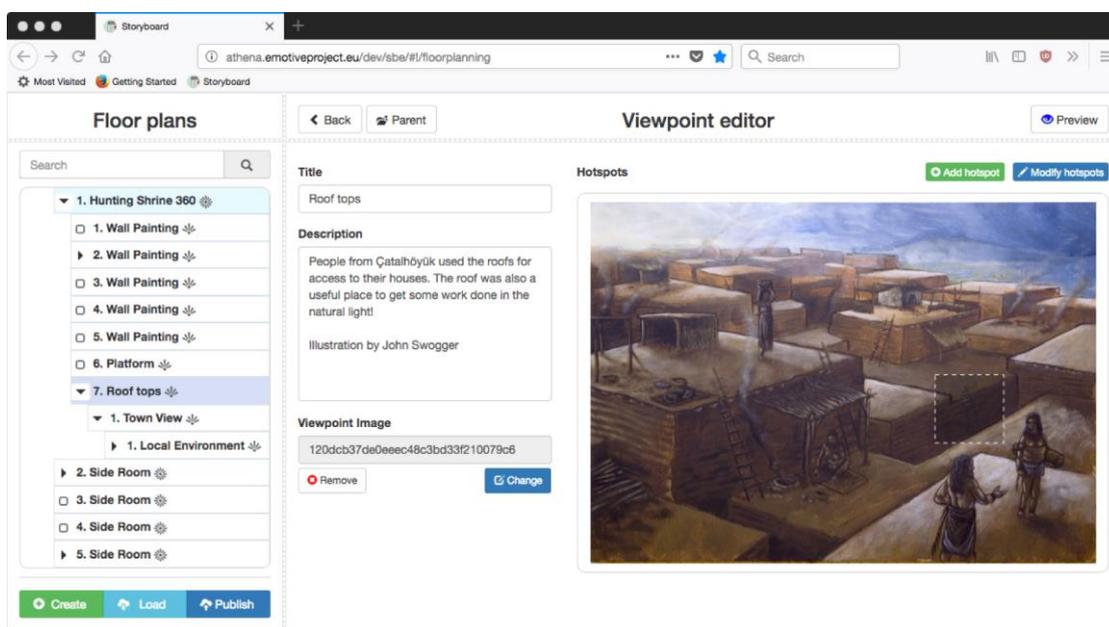


Figure 17. ATHENA's Floorplan editor enables the use of hotspots, visible here as the dotted box, to connect still images in order to create a larger narrative. (Photo Sierra McKinney)

Additionally, the Storyboard editor was utilised to create a mobile application that leads the students through the experience. Two versions of the application have been developed, one for groups of three students, and one for groups of two. The Storyboard editor allows for the incorporation of a variety of media including multiple choice quizzes, NFC tag interactions, photos, and text (Figure 18). This was used to create various forms of engagement throughout the experience.



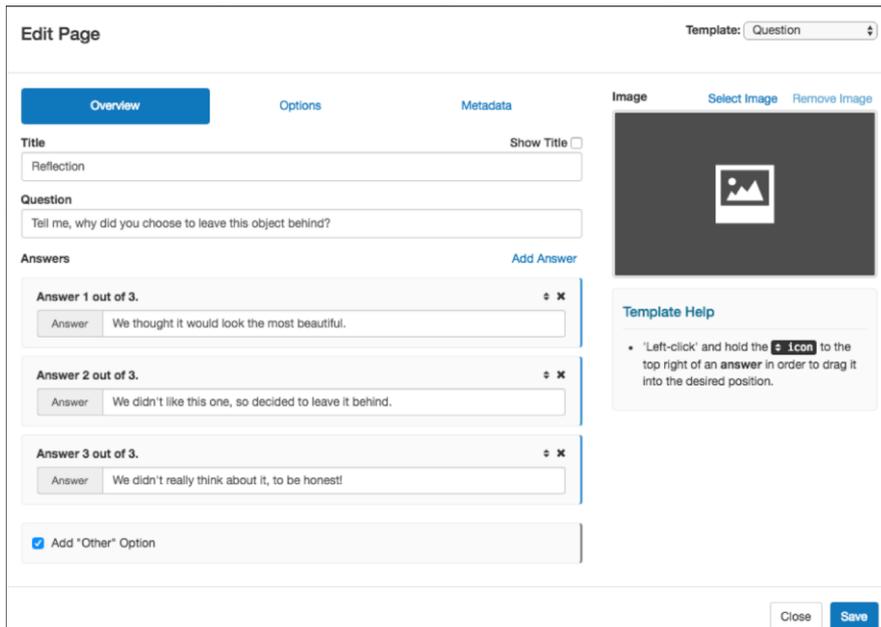


Figure 18. The Storyboard Editor’s question function provides a prompt for the user to reflect on their choices. (Photo Sierra McKinney)

The final element of the Kit was constructed using Snatchbot, a third party chatbot development platform. While EMOTIVE is currently developing a non-proprietary tool to facilitate the creation of chatbots in heritage, it was in its infancy at the time the Kit was established and it was therefore necessary to use an alternative platform. Snatchbot utilises an if/then structure to determine the flow of conversation. The bot identifies the presence or absence of specific terms and directs the user to subsequent exchanges based on predetermined criteria. An example can be seen in Figure 19: if the user answers A they will be taken to exchange T1-2A and if the user replies with any other response they will be taken to exchange T1-3. While the user is able to respond with free text, they are unable to change the topic of the conversation or truly question the bot. While the limitations of this format restrict the user’s ability to explore non-programmed material, the if/then structure, in which the bot rather than the user directs the conversation, enables the chatbot to efficiently guide the users through a facilitated discussion, thus fulfilling the bot’s objective.

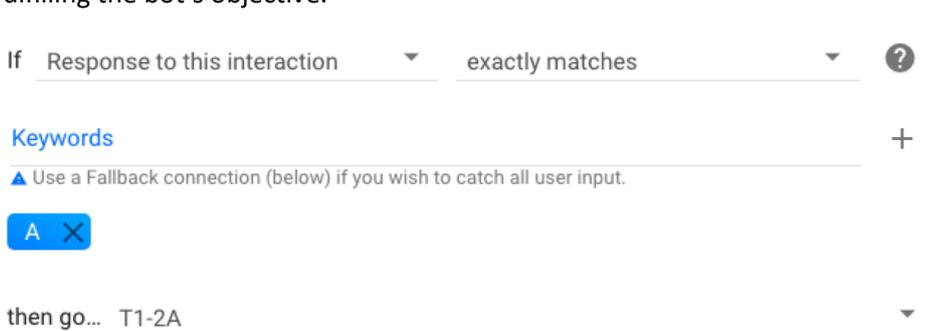


Figure 19. Within the SnatchBot platform, creators select requirements and choose keywords to complete the if/then clauses which guide user interactions. (Photo Sierra McKinney)

While a number of digital tools were utilised to construct the experience, users engage with the Kit through a mobile application and a purpose-built website that hosts the personality quiz, virtual walkthroughs, and chatbot. Hosting the chatbot on a website rather than a third-party social media platform allows students to participate in the experience without requiring they login in to a personal account.



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