



Economou, M. , Young, H. and Sosnowska, E. (2019) Evaluating emotional engagement in digital stories for interpreting the past. The case of the Hunterian Museum's Antonine Wall EMOTIVE experiences. In: 3rd Digital Heritage International Congress, San Francisco, CA, USA, 26-30 Oct 2018, ISBN 9781728102924 (doi:[10.1109/DigitalHeritage.2018.8810043](https://doi.org/10.1109/DigitalHeritage.2018.8810043))

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Deposited on: 13 December 2018

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Evaluating emotional engagement in digital stories for interpreting the past. The case of the Hunterian Museum's Antonine Wall EMOTIVE experiences

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Abstract—Digital storytelling has been used in cultural heritage for over two decades, yet integrating this in museum displays to encourage visitors' deep engagement, including both affective and cognitive outcomes, remains challenging and raises a number of issues. EMOTIVE is a European Union Horizon 2020 Research and Innovation project which addresses some of these as it aims to design and evaluate emotionally engaging digital visitor experiences for heritage sites and museum displays. The Hunterian, the museum of the University of Glasgow and one of the EMOTIVE cultural partners, has designed digital stories to interpret its permanent display 'The Antonine Wall: Rome's Final Frontier' which showcases the museum's collection from the Wall, a UNESCO World Heritage site. The paper discusses a) the design of the on-site EMOTIVE experience of 'Ebutius's Dilemma' based on the EMOTIVE conceptual framework, and b) the qualitative and quantitative, mixed-methods evaluation of the impact of the experience on diverse visitor groups, focusing primarily on emotional engagement, and based on the EMOTIVE evaluation framework. It presents formative evaluation findings, the lessons learned from using a variety of methods, and discusses the broader issues raised when designing for and studying emotional engagement in cultural heritage settings.

Keywords—digital storytelling, emotional engagement, affective outcomes, digital interpretation, evaluation, evaluation methods, formative evaluation, quantitative and qualitative evaluation, EMOTIVE project, Antonine Wall, Hunterian Museum Glasgow

I. INTRODUCTION

The preferred outcome for museum visits has traditionally focused primarily on meaningful learning outcomes and their didactic function [1, 2]. However, since the influence of the New Museology of the 1980s, the importance of examining more holistically the different ways the museum experience is affecting museum visitors has started being recognised [3], leading to a growing understanding of the need to create emotionally engaging experiences for visitors in both cultural heritage practice and research [4, 5, 6, 7].

Storytelling, which has a long tradition in the cultural sector [8], and in the last two decades of rapid technological developments, in its digital expression, is one of the interpretative means employed in different ways in this direction to 'bring displays to life' and support, among others, affective outcomes [9, 10]. This has also been supported by the move towards more participatory models of museum practice [11] and the encouragement of co-creation of digital heritage experiences by different users [12].

However, as this is an emergent field, there are few coherent or systematic frameworks for either creating or evaluating emotional engagement with cultural heritage. Most relevant is the work of Petrelli *et al* who have explored the relationship between interaction and technology to allow visitors to experience cultural heritage differently [13]. However, this work does not address visitors' emotional state or reaction specifically. In order to address this gap, the EMOTIVE research project was set focusing on the design and evaluation of emotionally engaging visitor experiences using digital storytelling in various forms. This is a three-year (2016-2019) EU-funded Research and Innovation project which aims to research, design and evaluate methods and tools that support cultural heritage and creative industries in creating digitally-mediated experiences that draw on the power of emotive storytelling (storytelling that can trigger visitors' emotions) [14]. The cultural partners in the EMOTIVE project include the UNESCO World Heritage prehistoric site of Çatalhöyük in Turkey and the Hunterian Museum's display 'The Antonine Wall: Rome's Final Frontier' with artefacts from the Antonine Wall UNESCO World Heritage site (Fig. 1). This paper focuses on the design and evaluation of 'Ebutius's Dilemma', the first EMOTIVE storytelling experience designed specifically for this exhibition.

II. CONTEXT

A. The Antonine Wall Site

Built around AD142 in the reign of the Roman emperor Antoninus Pius, the Antonine Wall ran coast-to-coast across Scotland from the Clyde to the Firth of Forth and was the most northerly frontier of the Roman Empire. It is often interpreted as a symbol of Roman power intended to celebrate victory over the northern tribes or a barrier to control trade and movement [15]. The Wall was abandoned by the Romans who retreated further south, from the late AD150s onwards.

B. The Hunterian Museum and its Antonine Wall Display

The Hunterian, at the University of Glasgow, was founded in 1807. It is Scotland's oldest public museum and home to one of the largest museum collections in Scotland. These have been recognised as a Collection of National Significance and include over 1.5 million items.

'The Antonine Wall: Rome's Final Frontier' is the permanent display of the largest collection of artefacts discovered along the Wall, prominently located at the entrance to the Hunterian Museum (Fig. 1). The displays of

The EMOTIVE project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727188.

spectacular monumental sculpture, together with a rich array of military and civilian artefacts from the wall, some unique to Roman Britain, explore the impact of the Romans on the



Fig. 1. 'The Antonine Wall: Rome's Final Frontier' display, Hunterian Museum, University of Glasgow

Scottish landscape and its peoples and questions why the wall was constructed and then abandoned so quickly. The display also reflects the story of the rediscovery of the wall with over three centuries of collecting and research by the University of Glasgow on this World Heritage Site.

III. DESIGNING THE HUNTERIAN ONSITE EMOTIVE EXPERIENCES

The Hunterian onsite experiences designed for the Antonine Wall display are driven by the overall, high-level aim of all EMOTIVE experiences that they will increase or positively affect visitors' engagement and connection with the objects on display at the museum, and more broadly with related themes, historic periods, heritage, museums, and the past. The Hunterian onsite experiences were designed iteratively by the EMOTIVE user group, following the EMOTIVE conceptual framework and guide [16], and a process of co-creation, inviting end-user groups wherever possible. This started early on in the project, for example, with the participants of the 1st EMOTIVE User Experience Workshop held in February 2017 at the University of Glasgow [17] and in response to user feedback and testing throughout the first year of the EMOTIVE Project. As for all EMOTIVE experiences, we used personas for developing our experiences, i.e. archetypal visitors based on the characteristics of real Hunterian visitors [18, sections 3.3.4-5], and interpretation cards with key information about objects and exhibits (such as exhibit information, interpretation and context, available assets, tech suitability, keywords, reflection/questions, and comments) [18, Annex 15]. The use of personas, a common HCI technique which has recently started being used in the cultural sector, helped us focus on real users and integrate the user-centred approach

throughout the design process. By creating multiple individual personas and designing experiences for different combinations of them, we were able to think of how individual behavioural characteristics might impact the design at hand, which in turn allowed us to reflect on how to best balance differing user needs [19].

Arising from the 1st EMOTIVE User Experience workshop and subsequent experience development sessions amongst the University of Glasgow team and the EMOTIVE partner NOHO, a creative industry company based in Dublin, the first prototype experience was developed under the theme 'Occupation and Abandonment'. It featured the character of Ebutius, a centurion, named after the name found scratched on one of the hammerheads found on the Wall currently on display at The Hunterian. The scenario covered the abandonment of the Antonine Wall by the Romans, and started with the conceptual idea of 'The Things We Leave Behind' from which derived the experience finalised later as 'Ebutius's Dilemma'. 'The Things We Leave Behind' helped explain how the objects currently on display in the Hunterian Museum used to belong or be used by people who lived and worked on the Antonine Wall but were left behind when the Wall was abandoned. This also encouraged visitors to reflect on parallels with their life today and the conditions that might make them leave material evidence behind and what this can reveal about our society, values, and way of living.

The aims of the 'Ebutius's Dilemma' experience were:

- To connect with the Antonine Wall through the story of the character of a Roman centurion
- Address universal themes (e.g. family, work, love, loss)
- Encourage empathy and emotional engagement
- Engage with objects in the gallery
- Challenge stereotypes (e.g. about military life, the relationship of Romans with locals)

A. *Outline of narrative and experience¹ structure of 'Ebutius's Dilemma'*

In order to experience 'Ebutius's Dilemma', visitors in the Antonine Wall gallery are given a smartphone or tablet with a set of headphones and assisted to launch it using an app. The experience starts with Ebutius introducing himself. His speech is displayed on screen as text together with the graphic of a centurion (black and white in the first prototype version, colour in the second as shown in Fig. 2), as well as a voice-over. On the following screen Ebutius then explains the dilemma he faces: He must decide before sunrise whether to leave his home – the Roman fort at the site of Bar Hill – with the rest of the army, or stay behind with his partner, a local woman named Calle and their son Callum. He then asks the user to help him make this decision and in order for visitors to be able to do that, they are invited to first learn more about Ebutius and his life.

The experience has three main strands: one relates to Ebutius's working life, another to his personal life and a third to his sense of honour and duty (Fig. 3). It is important to

¹ Within EMOTIVE we use the term 'experience' to refer to all the elements of the story, as well as media components and technological solutions the way they are experienced by visitors in an integrated way.

note that these strands, and the museum objects that are cited within them, are all labelled according to the emotional relevance or significance they hold for Ebutius. So, for example, a Roman distance slab is linked with ‘His life’s work’ or a pair of children’s shoes with ‘My dear sweet child’. By using emotive language and labels in this way, the experience encourages visitors from the beginning to foster a connection and empathy with the characters and the story.



Fig. 5. Screenshot from the second prototype version of ‘Ebutius’s Dilemma’ - Ebutius introduces himself

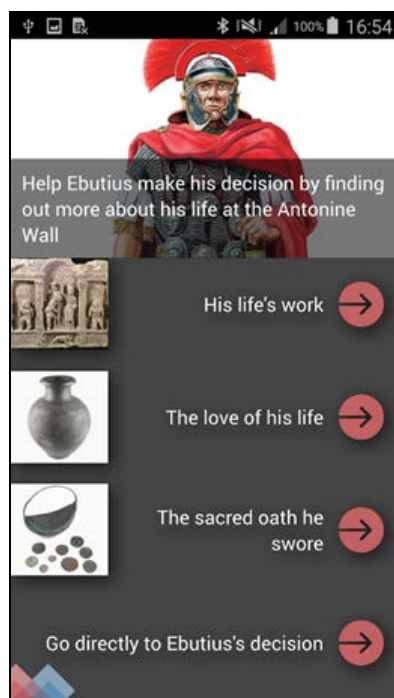


Fig. 6. Second prototype version of ‘Ebutius’s Dilemma’ – the three main experience strands

The different experience strands weave in the objects on display, directing the users to find the related artefacts and

encouraging them to engage with them in new ways, beyond seeing them only as museum objects, and referring to underlying universal themes such as work, love, and family and linking them with Ebutius’s personal story (Fig. 4).

At various points in each experience strand visitors are given choices, either to hear other segments related to Ebutius’s life, such as his career as a builder or to discover some general information about the object itself. If they choose the object they see an image of it on screen, with touchable hotspot areas which offer further information, usually archaeological facts, relating to the specific object and similar to the text in the museum label (Fig. 5).

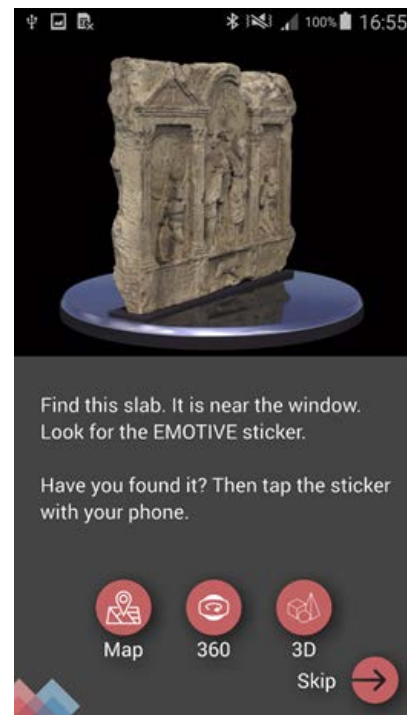


Fig. 2. Distance slab on display linked with Ebutius’s work



Fig. 3. Further information about the slab in Fig. 4 appears when selecting the hotspots

Visitors can continue to explore Ebutius’s life story by going another level into this narrative or they can return to the main menu and explore the other strands, The love of his life or The sacred oath he swore, with similar structure and mechanics. At any point within the experience the user is able to choose to make the decision for Ebutius based on what they have found out about him from the experience.

The first prototype iteration of the Hunterian onsite EMOTIVE experience (version 1) was designed in August-

September 2017 with improvements and changes carried out until December 2017 using the StoryBoard Editor, which is part of the EMOTIVE authoring tools developed by the ATHENA Research Centre (Greece) partner. The second iteration (version 2), which improved the user interface and included some extra content, was designed using the Visual Scenario Editor of the EMOTIVE Authoring Tools developed by the DigiNext company (France) partner (January to June 2018).

IV. EVALUATING THE HUNTERIAN ONSITE EMOTIVE EXPERIENCES

The formative evaluation of ‘Ebutius’s Dilemma’ was split into two main phases, following the two different design phases of the experience (version 1 and 2). The initial phase of formative evaluation, undertaken during the design and development of the tools, methodologies and experiences, focused on the first iteration of the EMOTIVE experience (version 1) (September to December 2017). The second phase of evaluation involved evaluating the second iteration of the EMOTIVE experience (January to June 2018).

A. Methodology

For the evaluation of ‘Ebutius’s Dilemma’, as for all EMOTIVE experiences, we developed a modular evaluation framework which draws upon and combines approaches applied over many years in museum studies, psychology, media, education, cultural studies, and HCI [20]. In order to evaluate both authoring and experiencing and the complex set of parameters which affect them, a mixed-methods approach was used, employing both qualitative and quantitative techniques. This is especially useful to understanding complex phenomena and can provide a more holistic understanding of different facets of a project [21, 22].

EMOTIVE evaluation examines both usability and user experience of tools, methodologies and experiences. The relationship between usability and user experience, although closely interlinked, remains ambivalent [23]. For EMOTIVE, we regard usability evaluation as the testing which focuses on examining authoring tools and user experiences according to three traditional usability metrics (effectiveness, efficiency, and users’ satisfaction), extended and adapted appropriately to fit the EMOTIVE context. Usability evaluation has dominated the literature in digital heritage evaluation, usually to the detriment of understanding all other possible outcomes and impacts of digital experiences on cultural heritage visitors and end users. This is where EMOTIVE is making a significant contribution by extending the usability evaluation to include user experience evaluation, suitably adapted to the complex cultural heritage settings and experiences. User experience evaluation within EMOTIVE refers to primarily qualitative evaluation which combines a mesh of psychological, social, and physiological concepts.

1) *Measuring Emotions - Physiometric measurements*

In our research into ways of evaluating emotions we have also considered physiometric measurements of emotional response. The related research is usually based on bio-feedback, capturing blood pressure, brain waves, heart rate and skin conductance level changes. Investigation of bodily responses routinely takes place in laboratory conditions with assistance from neuroscientists who help with interpretation of biometric data. As Klaus Scherer points out: “While both nonverbal behavior (e.g. facial and vocal expression) and physiological indicators can be used to infer the emotional state of a person, there are no objective methods of measuring the subjective experience of a person during an emotion episode” [24]. This type of research has only recently started to take place in the museum environment and when it does, it tends to focus on specific artworks [25] and gallery architecture and mapping of visitors behaviour [26]. As devices recording physiometric measurements become more affordable, widespread, and less invasive, there is increasing potential in using physiometric measurements in future museum research (with some relevant papers in this volume). However, as until now research into measurement of emotional states via bodily responses has proved unreliable [27] and we could not draw from related expertise within the consortium, we have not applied these methods in EMOTIVE evaluation so far.

2) *Components evaluated*

For the Hunterian onsite EMOTIVE experience the following components and their impact on the user were explored in more depth:

- Story plot and characters
- User interface
- User control of the experience development
- Navigation within the museum display space and engagement with the objects on display
- Social interaction
- Emotional engagement

When evaluating new elements of the experience we also linked this to the overarching EMOTIVE research question: Do the new added media components and/or functionality support emotional engagement with the specific collection, period in the past, site, objects?

3) *Methods*

The design and evaluation of both stages of ‘Ebutius’s Dilemma’ were carried out in an iterative way, using the findings to refine the evaluation and feed back into the experience design.

a) *First Phase Formative Evaluation (September 2017 - December 2017)*

This first phase of evaluation using the initial pilot experience allowed us to combine and test various evaluation methods including observation sheets, visitor comment cards and early system log data.

Observation Sheet – EMOTIVE Antoinette Wall

Observer: _____ Date: _____ Time: _____ Sheet #: _____

Group composition:	# Adult Females		#Girls	(ages)
	#Adults Males		#Boys	(ages)

Time entered exhibition: _____ Time left exhibition: _____

Mark on plan below with a C where group has **conversation**, R where they stop to **read** any text. Note any intriguing conversation or interesting behaviour in margins (e.g. H-off and H-on for Headphones). If you can discern facial expressions, use E for **excitement** and F for **frustration**. Later tally up the behaviours and expressions in table below.

	Adult Fem	Adult Male	Girls	Boys
Convers				
Read				
Excitem				
Frustr				

We also gathered user comments on postcards in the case of public events, like Explorathon, the European Researchers’ Day [28]. Following the experience, we invited users to complete the following statement on an EMOTIVE postcard: “The EMOTIVE experience made me...” [Fig. 7]. The statement purposely did not include a verb in order not to constrain users’ answers. This method proved useful as it was a ‘quick and dirty’ way to gather a wide range of initial thoughts and feedback from users. The comments we collected ranged in topic from usability of the device, to comments on the display of objects to emotional engagement with the experience.

[illegible]

Finally, we complemented this data by conducting a focus group with the volunteer observers (University of Glasgow MSc Museum Studies students) who acted as facilitators when two Primary 7 classes with 27 11-year-olds (Fig. 7), as well as adult visitors used the experience during Explorathon. This verbal feedback was invaluable in ascertaining how younger users found using the experience as well as navigating their way around the display space and engaging with the story, the objects, and each other. The volunteers were also invited to contribute to a shared debrief document after the event where they recorded their reflections from having observed the visitors' interactions and engaged with them.



Firstly, this included carrying out semi-structured interviews immediately after users had completed the

experience using a post-experience questionnaire (with 5 questions which combined a variety of Likert-type, multiple choice and open-ended questions). These collected user responses about user engagement, emotional connection, and learning and understanding. The interviews often included more than one user even if they had not used the experience together but had used the experience simultaneously. This method of recording a semi-structured interview immediately after the user had tested the experience allowed us to gather rich qualitative content regarding emotional impact of the experience, as well as capture any usability issues with the interface or extra media.

Additionally, we integrated in the questionnaire a ‘Where in your Body?’ section with a human body graphic, asking visitors where they felt the experience most in their body and why (adapted from Matthew Reason [29] who first used this technique to record performance viewers’ reactions). ‘Where In Your Body?’ (WIYB) [30] is a post-experience evaluation tool designed by Reason to capture online audiences’ kinesthetic responses to dance (but used for the Hunterian EMOTIVE evaluation in face-to-face interviews). Reason’s original question asked: ‘Where in your body would you locate your experience of watching the performance?’, explaining the rationale of asking for one body area only: ‘This might seem like an odd question, and we know it can be difficult to select just one answer, but we are interested in how it makes you consider your experience of dance. Maybe you felt it in your brain, your heart, your toes or somewhere else?’ [29] The playful and engaging manner of this type of evaluation was deliberate, designed to elicit talk, ‘to stir a small moment of wonderment, to encourage participants to actively ponder.’ [29]. When Reason compared this technique with a traditional marketing type of questionnaire for evaluating a Royal Danish Theatre performance, there was a significant increase in the number of returns using the WIYB link which received twice as many responses compared to the traditionally delivered evaluation questionnaire. The WIYB responses were also more emotional, experiential and descriptive.

For the purposes of testing how this approach might work in a cultural heritage setting, we adapted Reasons’ WIYB questionnaire for the second phase of the evaluation process. We amended the question to make it more generic for cultural heritage experiences: ‘Where in your body did you feel this experience the most?’ and retained the graphic of a human body for users to mark on the colour-printed questionnaires, asking them also to fill in a short explanation. One aspect we did vary was how many parts of the body users could select, as after initially asking them to select only one and give a justification, they were then given the choice to select more body parts if they wished. The self-completion of the questionnaires was followed by a short, recorded, semi-structured interview.

The version of the experience evaluated in January 2018 did not have the functionality of recording system logs implemented yet but this function was integrated into the next version and used in conjunction with other instruments for evaluation during the May evaluation events. When system logging was functioning, and combined with other forms of evaluation at both evaluation stages, it allowed us to understand the navigation and choices of different users.

Observation sheets allowed us to record movement of simultaneous groups of users within what is a relatively small display area and also observe how easily users located the specific objects that feature in the experience as well as any obvious frustrations.

4) *Sample and Evaluation Events*

Both phases of formative evaluation carried out so far extending in total from September to June 2018 included a sample of over a hundred adults and 27 children. These included the following formative evaluation events:

- a) evaluation of version 1 of the Ebutius’s Dilemma experience with 27 school pupils and c.40 adults at the Explorathon event held in September 2017 at the Hunterian Museum in Glasgow (Fig. 8).
- b) evaluation of version 1 with c.25 University of Glasgow MSc Museum Studies, Museum Learning and Interpretation students, November 2017.
- c) evaluation of version 2 held in January 2018 with 10 student volunteers from Information Studies, University of Glasgow.
- d) evaluation of version 2 with 20 museum visitors May-June 2018.

As well as these events, we also held more informal testing sessions with colleagues in Archaeology, University of Glasgow, and Heritage Environment Scotland. These discussions with peers who are also involved in cultural heritage interpretation of the Antonine Wall site and display in the Hunterian Museum, were helpful to hone our ideas and thinking in relation to the on-site experience.

V. INITIAL FINDINGS

As the focus of this paper is more on the design and evaluation of the Hunterian Onsite EMOTIVE experiences and the lessons learned from these processes, there will only be brief summary reporting of the findings from the evaluation research, which will be discussed in greater detail in a separate future publication.

The qualitative data that we have collected yielded valuable insights about the usability of the interface, the narrative of the experience, visitors’ reactions, both verbal and physical, to the experience characters, interaction with the museum objects and the exhibition space, and most importantly, emotional engagement with the objects, the experience and the heritage site. The quantitative data from the system logs and the more quantitative questions in the questionnaire helped to link back to and verify the qualitative data.

A. *Usability and navigation*

The evaluation offered useful feedback on usability issues such as the need to indicate more clearly to users that scrolling of the text on the screen was required to keep up with the audio, so that they would not inadvertently hit ‘next’ which took them to the next section of the experience. The analysis of the system logs combined with the observation sheets confirmed that the average time spent using the experience was c.15 minutes (longer for children and where the experience was used by a pair). The logs showed that most users explored the majority of the branches. However, offering several branches in the experience and allowing users to explore these in a non-linear way resulted in some

cases of users getting lost, as some users reported that they got “stuck”. Forgetting the point of the story in relation to a specific branch was also reported by users. The navigation through the “chapters” or levels of the experience needs to be refined as people interpreted the terms “back” and “skip” used in the experience differently, in some cases getting confused when navigating through it. The lack of a specific back button to allow users to return to the page they had just visited was also highlighted. Users also commented that they would like to be able to return to specific pages, namely the ones with the 3D models to “play” with them more at the end of the experience. Currently, once the experience is completed, the user is unable to revisit pages completed during their exploration. These navigation issues and usability ones will be addressed in the next development version of the experience.

B. Emotional engagement and social interaction

Both version 1 and 2 of the Hunterian onsite experience prototypes provoked strong engagement and emotional responses from our users as evidenced in the postcard feedback, users’ remarks to volunteers and researchers after the experience and comments recorded in the semi-structured interviews and ‘Where In Your Body?’ question. One user commented at the interviews:

‘I think I was pretty invested in the story as well, so the whole emotional side as well’
(Transcription_2018018_Session2).

Based on the user evaluations of both versions, these emotional responses were elicited by a combination of factors including: writing the story in the first person while looking back in time; the way the story was linked with physical objects on display; the final decision that users had to make for the main character of the story which gave an element of drama and engaged users from the beginning of the narrative, and the voice over used to narrate the story.

The postcard feedback revealed a high degree of immersion in the experience based on the character development. The comments which were freely submitted by visitors without any interview, questionnaire or other prompt from the researchers, were reflective and in many instances expressed strong emotional engagement with the story, empathy with the characters, and connection with the objects. As one visitor wrote, the experience encouraged them to: *‘understand the backstory, lives and feelings at the time. A very creative way to learn about the exhibits’* (IMG_2895). *‘I really liked the story and I felt like I was there. It was quite strange because it felt like he [Ebutius] was talking to you in real life’* (IMG_2961).

This was reinforced by the answers to the questionnaire the initial analysis of which highlighted a strong propensity for users to self-report a high emotional engagement with the experience when defining their emotional connection. Specifically the Likert-type (ranging from Completely disagree to Completely agree) questions D1 (I felt empathy for the characters in the story) and D2 (I found the experience emotionally engaging). The visitors not only felt emotionally engaged during the experience but felt that through it they could explore and learn more about the objects on display.

The ‘Where in your body did you feel this experience the most?’ question elicited some insightful and thoughtful

responses from the users and provided rich qualitative data. For instance, one user (Male, 20s) chose the heart and continued to explain why:

‘This was mainly to do with the final choice. The experience connects you with the characters that by the end I didn’t want anything bad to happen to them. Other moments where this “feeling” came about was when the couple fell in love and got married (the pot and the ring).’ (User 01_20180116)

The observations showed that the EMOTIVE experience did not break but on the contrary, appeared to support and even encourage social interaction, while the post-experience interviews allowed us to probe and verify this. During a shared experience it was noted that the users were “chatting about the screen” when they were in front of the hammer on display (OS_01_03_B_20180116). Based on this observation of users, the interviewer was able to confirm what they were talking about:

Interviewer: ‘It looked at points [like] you were discussing quite a lot. And I was wondering if you were debating which choice [to make] next.’

User 3: ‘We did it in the order. We were talking about the features of the app, ‘oh so that’s cool the 360, [if] you could not be here personally, you could view it at home and the story itself.’
(Transcription_20180116_Session1)

In another instance observation showed that two users who were using the experience individually, did interact with each other at the beginning of the experience with one user indicating to the other and “pointing at the text panel/map” which is on display (OS_04_B_20180118). These examples of interaction between users (both using the experience together as a shared experience or individually but at the same time) are a strong indication of the potential to develop emotive group experiences and needs to be explored more explicitly in future developments of the experience and future evaluation.

C. Storytelling versus Authenticity

One concern we had was that the inclusion of more traditional museum information (often seen as having a didactic character) would remove users from feeling immersed in the story or experience. However, the hotspots with more information on objects were welcomed by most users and were a highlight of both versions tested, with some users requesting more of this type of functionality. Most users reported that this enhanced their experience by being able to explore similar objects not included in the experience. Indeed, the main finding from this phase of evaluation is the need to find a way to deliver more contextual information, without disrupting the engagement with the narrative, within the story. Finding the right balance between engaging storytelling and communicating archaeological evidence/historical facts and integrating these effectively is challenging and there is no single approach which would fit all heritage contexts.

VI. CONCLUSION

The results of our formative evaluations are promising, in terms of their contribution to the state of the art of digital

heritage practice, their capacity to engender visitor engagement with museum displays and cultural heritage sites, and – most importantly – their potential for emotionally connecting visiting audiences with the distant human past. As EMOTIVE progresses we will continue to reflect on the conceptual framework of EMOTIVE experiences in response to our evaluation data in order to be able to develop a framework for designing and evaluating emotionally engaging experiences for cultural heritage.

The variety of methods used have allowed us to create a holistic, triangulated and multi-level approach to evaluation that we were able to adapt after each session. We will continue to refine this throughout the life of the EMOTIVE project as these characteristics - the variety of methods, the triangulation, and the iterative design - are all essential for further development of the experiences. Although most of the methods used are well tested in the cultural sector and more broadly in social science research, the EMOTIVE evaluation experience so far has shown that the way they are adapted, contextualised and combined depending on each case study, are important elements for all digital heritage research which require time, reflection and refinement.

ACKNOWLEDGMENT

The authors wish to thank all partners of the EMOTIVE H2020 project and particularly the ATHENA, NOHO, DigiNext and York teams for their contribution in the design and evaluation of 'Ebutius's Dilemma'; the numerous colleagues, students and visitors who assisted in and/or participated in the evaluation; Hunterian colleagues for support and access to the collections; and Historic Environment Scotland for permission to use 3D models of objects in the application.

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