EMOTIVE
Storytelling for cultural heritage

www.emotiveproject.eu

D3.1 –User Requirements & Scenarios - Alpha

Sara Perry[2], Akrivi Katifori[1], Manos Karvounis[1], Maria Economou[5], Hilary Young[5], Laia Pujol Tost[2,5], Maria Roussou[1]

Reviewed by:
Ioannis Komnios (EXUS)

Abstract
This deliverable reports on the user needs and requirements for EMOTIVE experiences, focusing on both main user groups targeted by the project, namely authors and visitors. Visitor groups have been identified for EMOTIVE cultural partner sites (The Hunterian Museum's Antonine Wall site display in Scotland and the archaeological site of Çatalhöyük in Turkey) and presented in the form of *personas*. The second part of the document presents selected interpretation material and proposed experience concepts that will lead to the creation of EMOTIVE experiences for both sites. An accompanying D3.1 Annex includes supplementary information on the studies and events carried out in support of user needs elicitation and scenario development.

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Partner	Estimated Effort (in PMs)
[1]ATHENA	2
[2]YORK	1.5
[3]DXT	0
[4]NOHO	0
[5]UGLA	1.5

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LIST OF ABBREVIATIONS

AW: Antonine Wall
AR: Augmented Reality
ATHENA: Athena Research and Innovation Center in Information Communication and Knowledge Technologies
CHESS: Cultural Heritage Experiences through Sociopersonal Storytelling project
EB: Executive Board
PB: Plenary Board
UI: User Interface
UGLA: University of Glasgow
UX: User Experience
VR: Virtual Reality
WP: Work Package
WHS: World Heritage Site
York: University of York

1 Executive summary

This deliverable, along with the accompanying Annex, records the user-related activities of the first six months of the EMOTIVE project, i.e. November 2016 – April 2017. The work described, however, forms the basis for the effort to follow in the project at large, both conceptually and technically.

Summary of contents

The document focuses on two main outputs, with references to details for each in the accompanying Annex: first, understanding the users and their needs (Sections 3, 4 and 5) and second, designing and presenting preliminary scenarios for EMOTIVE experiences (Section 6). Specifically, after a brief introduction (Section 2), an overview of the EMOTIVE cultural sites is presented and personas, i.e. archetypical visitors and visitor groups for each site are crafted and detailed (Section 3). Section 4 outlines the methodology followed for eliciting user requirements, listing the multiple events in which requirements were gathered (the events are further presented in detail in the accompanying Annex). In Section 5 we present concrete user needs and requirements, as collected from the different events, collated and reflected upon. User needs are seen separately for visitors and for authors of experiences, and further classified and presented thematically. Section 6 presents the initial scenarios for guiding the design and development of EMOTIVE experiences, preceded by the process of defining scenarios (using Interpretation and Experience Cards, as well as other methods). Finally, Section 7 concludes the deliverable with a brief account of the next steps.

Methods of research and analysis

The EMOTIVE project subscribes to an experience-oriented, user-centred philosophy, which means that the research methods we adopt heavily include their target users throughout the design process. In this spirit, the various workshops, events, and research work presented in this document demonstrate the use of participatory design and bodystorming (Oulasvirta et al., 2003) approaches. The various tools and methods used to support the participatory events are detailed for each case in the respective sections of the Annex. To springboard the process of designing preliminary scenarios for EMOTIVE, we introduce the novel idea of Interpretation Cards, Experience Cards and Card Sets. All of the approaches, methods, and tools have been carefully synthesised to address the goals of each activity and complement our work thus far.

Key findings summarised

The various activities with users resulted in a rich set of ideas, some more abstract while others more concrete. In any case, multiple small case studies and ideas to follow up on have emerged, providing us with our next task, which will be to refine and focus on specific aspects of the user work described here that can be carried forward.

2 Introduction

The principal objective of the EMOTIVE project is to research, design, develop and evaluate methods and tools that can support the cultural and creative industries in creating Virtual Museums which draw on the power of 'EMOTIVE storytelling'. This means storytelling that can engage visitors, trigger their emotions, connect them to other people around the world, and enhance their understanding, imagination and, ultimately, their experience of cultural sites and content. EMOTIVE will do this by providing the means to authors of cultural products to create high-quality, interactive, personalized digital stories.

The driving force of EMOTIVE is its experience-oriented, user-centred approach, which aims at ensuring that its users' needs are perfectly addressed, thus maximising the acceptance of this highly innovative system and its potential for use in pragmatic situations. To support this approach, a user-centred design philosophy will be realised throughout the entire course of the project, both in the design and the evaluation phases. The first step of this process is to understand and record the user needs.

This report presents the alpha version of the EMOTIVE user needs and requirements and the experience prototyping work. It is the result of the close collaboration of the consortium partners who combined their experience and expertise in cultural heritage to record their insight as to the initial directions that should be explored within the project. The report has two main parts, the first focusing on user needs and requirements and the second on the prototype experience scenarios.

The identification of user needs and requirements is at the heart of any user-centred design process, and more so in the case of the EMOTIVE project, which aims to develop a rich and innovative user experiences in a cultural context, both on-site and virtual. There are two aims in the design activity of identifying needs and establishing requirements.

The first aim is to understand as much as possible about the users that we are targeting, their objectives, their context and preferences so that the systems under development can support them in achieving their goals. In the case of EMOTIVE, the target users are either visitors of a cultural site, whether online or physically (on-site), or authors, i.e., cultural and creative partners in charge of creating cultural interactive experiences (i.e., interactive stories) and making them available to the visitors. Section 3 introduces personas as the main tool to describe visitor groups. Personas describe an archetypal user in a compelling and succinct way, making it possible for the technical and design team and process to rely on a shared understanding of the needs and goals of this persona-user.

The second aim is to elicit user requirements for EMOTIVE digital storytelling experiences in a cultural context. However, this has not been a straightforward task. As such experiences are not yet developed, both potential authors and visitors have initial and clear pre-conceptions of what is the vision of this approach and it is difficult for them to propose meaningful and in depth needs and requirements. For this reason we build on top of the lessons learnt from the CHESS[1] (Cultural Heritage Experiences through Socio-personal interactions and Storytelling) project and use prototyping tools that resulted from the post-CHESS digital storytelling research work to explore user needs in a more focused way: through digital experience prototypes which enable visitors to offer concrete comments and ideas as well as specialized workshops where we put in practice methodologies and guidelines in creative ideation and design sessions with different experts, representing the author user group. Section 4 presents this methodology and section 5 reports at the results of these activities and presents the identified user needs.
The last part of the work reported in Section 6 focuses on the development of prototype EMOTIVE experiences. Starting from basic, relevant interpretation material and moving towards innovative EMOTIVE experiences, the work has been guided through the creation of templates to record the content and streamline the story creation process.

[1] http://www.chessexperience.eu

3 User groups and personas

Visitor studies have gained increasing importance in recent decades, blossoming into a veritable industry of evaluation focused on understanding and improving audience engagements with cultural sites, bettering those sites' accountability and staff performance, and targeting the marketing of sites' offerings. Whilst the nature and impact of these studies is contentious (e.g., Davies and Heath 2013; Hooper-Greenhill 2006), they tend to rely upon a small number of similar methodologies (observations, interviews, questionnaires, focus groups) and invest in overall conceptual models which entail segmenting audiences into a handful of generic categories in an effort to comprehend typical visitor motivations and experiences. Such audience segmentation strategies – common across cultural institutions and consultancies (Davies and Heath 2013:16-18; also Falk 2016), but perhaps epitomised in the work of Falk (2009), who identifies five classes of visitor (explorer, facilitator, experience-seeker, professional/hobbyist and recharger) – are variously praised (e.g., Lewalter et al. 2015) and disparaged (Dawson and Jensen 2011). Fundamentally, however, they depend upon decontextualisation and reductionism in order to generalise, which leads Dawson and Jensen (2011:128) to argue that they are "ultimately of limited value to visitor researchers because [they paint] a misleading portrait of visitors and their experiences, while offering no portrait at all of those who do not visit."

In an effort to overcome these deficiencies, others have proposed more complex, contextualised visitor profiles, biographies and strategies to understand audience experiences (e.g., Lewalter et al. 2015; López Sintas et al. 2014). Problematically, such models overwhelmingly ignore the social dynamics of cultural sites, and the group-based nature of most visits to these sites (Davies and Heath 2013). Even where sociality is accounted for, it is often narrowly conceived, ignoring pre- and post-visit experience as well as the complexities of the visit itself (which may entail both shared and independent encounters) (e.g., López Sintas et al. 2014). Developing an approach that enables the rich conceptualisation of users, both as individuals and as members of touring parties, who engage socially with cultural sites before, during and after a visit, is critical to the success of EMOTIVE. To this end, and building upon the successes of the CHESS project, we adopt and extend the model of the 'persona'.

3.1 Personas

Used in the development of products and experiences, personas are essentially fictitious individuals constructed by designers to represent and embody a typical end-user (Roussou et al. 2015). Not only do personas help focus the construction of applications, but they are also excellent catalysts for communicating and empathising with the desires and goals of target users of a product. Apart from a few cases (e.g., Roussou et al. 2013), the validity of persona use has primarily been assessed outside of the heritage sector. In these external contexts (most of which centre upon product design and marketing), personas allow creators of applications and experiences to zero in on aspects of their users, developing hypothetical scenarios which hone the usability and value of a product (Pruitt & Grudin 2003; Perfetti 2005). For the management, advertising, and technology sectors, then, personas have been factored into their organisational development and product successes since the term 'persona' was coined by Alan Cooper two decades ago (Cooper, 1998).

In recent years, the appeal of personas has extended, with museums and cultural organisations deploying the methodology to various ends. The CHESS Project's persona-led interactive digital storytelling work stands as a particularly robust example (Pujol et al, 2012; Roussou et al, 2013, Roussou, et al., 2015). Interestingly, however, virtually all extant persona applications are centred on the use of *singular* personas to design a product or otherwise target materials for individual parties. In contrast, in the heritage or museum context, it is relatively rare for a visitor to present themselves at a site alone (and, indeed, at the site of Çatalhöyük, it is virtually unheard of): guests tend, instead, to visit as a part of a family, friendship, or wider tourist party. With this in mind, we ask, is it not more prudent to develop applications and experiences for groups of people, not individuals?

While the literature on group personas is thin, Kuniavsky (2004) is among the few to discuss such multi-individual personas, specifically in relation to theme parks. He proposes that descriptions and outlines of group personas should perhaps be less pointed and focused than individual personas. Instead, needs and goals must be shared across the group, demanding prioritisation and compromise between the various players. In Kuniavsky's case, group personas emerged from an assessment of sets of typical visitor categories, including teenagers and parents with children. Such assessment led to the scripting of more distinctive classifications, for instance “Young parents with young kids” and “The extended family”. Kuniavsky provides the example of the Ancona Family persona, composed of the adult couple Luisa and Giorgio, their parents Maria and Carlo, and their children Mauricio and Laura, who decide to visit a theme park together as a group outing. Each character within the group has a personality of their own, including goals and technological abilities – all outlined in their persona profile.

However, the complexity of these various personalities demands compromise, and in order to achieve this, the model of 'focal' versus 'secondary' personas has relevance (Olsen 2004). Herein, only one or two individuals within a group persona are prioritised as the primary targets of a product or design. Hence whilst all members of the group would use that product/design, not all of their individual goals or wishes would be met due to the necessity of accommodating the group as a whole (Olsen, 2004).

As detailed below, we have adopted different strategies for both Çatalhöyük and the Hunterian Museum, based on our interests and the special context of each site to test the efficacy of group and individual personas respectively. Even when developing individual personas in the case of the Hunterian, the social interaction of these to other personas and visitor groups were always taken into account in the design and evaluation process.

3.2 Çatalhöyük

3.2.1 The site

One of the most important archaeological sites in the world, Çatalhöyük is a densely packed Neolithic (New Stone Age) settlement in central Turkey which dates back 9000 years.

Figure 1: Map of Turkey highlighting the site of Çatalhöyük.

Rising 21 metres in height, Çatalhöyük's East Mound - the site's oldest occupied area – was created through more than 1000 years of continuous inhabitation by people who repeatedly built and rebuilt their homes on the same spot. Remarkably, at its peak, between 3500 to 8000 people resided here, living in apparent equality throughout Çatalhöyük's history – with little evidence of social hierarchy. Residents buried the dead beneath the floors of their homes, constructed incredible sculptural art and wall paintings, and lived in street-less neighborhoods, moving around on roofs and accessing buildings via openings in their ceilings.

Figure 2: Çatalhöyük site map produced by the Çatalhöyük Visualisation Team, 2010

Inscribed as a UNESCO World Heritage Site (WHS) in 2012, Çatalhöyük now sees more than 20,000 visitors annually, and has been the subject of scientific investigation for nearly 60 years. Researchers from around the globe travel to the site to study its vast landscape of buildings, remarkable ways of life, and its many exquisite works of art and craft. Together, visitors and researchers are working to pioneer new archaeological, conservation and curatorial methods in order to advance our understandings of human beings in the past. EMOTIVE now aims to share Çatalhöyük's inspiring and unusual stories of birth, life, death and afterlife with an even broader audience.

3.2.2 Visitor profiles

Çatalhöyük sees approximately 20,000 visitors a year from around the world, but particularly from within Turkey itself. Since 2002, visitor numbers, visiting patterns whilst on site, and visitor demographic data have been collected at Çatalhöyük in the form of logbooks, questionnaires, observations and interviews. In general, this research attests to the fact that visitor numbers have been steadily rising. 2015 marked the highest number of visitors recorded with numbers reaching 20,859 (note that data are collected seasonally, meaning that more recent figures are not yet available). The majority of these visitors (80-85%) are domestic, travelling from cities such as Konya, Ankara and Istanbul. International visitors make up the remaining 15-20% with countries such as China, Japan, America and Australia regularly appearing in the top five nationalities which tour the site.

Group sizes are also recorded and these, combined with qualitative interview data from the site's guards and observations, suggest that most domestic tourists visit in family groups. Many parties from local schools and universities also visit the site. International tourists tend to visit either in small, independent groups or on large tour buses, the latter of which have become particularly apparent since Çatalhöyük's inscription as a UNESCO World Heritage Site (WHS) in 2012. Indeed, it has been speculated that WHS inscription was the cause of a significant peak in Japanese tourists in 2013. Since 2013, however, international numbers have fallen back to those seen prior to Çatalhöyük's inscription whilst domestic numbers have continued to rise. In terms of seasonality, the data suggest that most tourists visit during April and May. This visitation pattern has remained consistent over time, and seemingly relates to the temperate weather and national holidays, making spring a more desirable time of year to see the site.
Visitors tour Çatalhöyük on a fixed route, accompanied by a Turkish-speaking site guard. Based on data from 2013, they tend to linger an average of approximately 40 minutes at Çatalhöyük and their tour covers just under a kilometre of walking at a usual pace of 1.45 km/h. While a variety of signs, exhibit areas, and open excavation units are available to visitors to view, they generally focus their attention on on-going excavation/conservation practice – meaning they look at experts at work – in comparison to the material culture itself or the provided interpretation. Problematically, excavation takes place for typically no more than 2 months per year, and from 2018 (when the site's permit shifts to a new site director) it is unclear whether any excavation will be conducted at all.

The material culture of Çatalhöyük is itself highly problematic. Its poorly preserved architecture regularly prevents visitors from fully engaging, as they report a complete loss of 'sense of space'. The site appears diminished as a result of the removal (for preservation reasons) of authentic artefacts and assemblages found in-situ. Lack of artefacts (e.g., wall paintings, pottery, sculpture) and of most distinguishable features has a detrimental effect on perception, leaving visitors confused or uninformed about the characteristics of the spaces and buildings that they are touring. Some guidebooks themselves seem to be warning visitors away from Çatalhöyük, suggesting it is only interpretable to expert eyes.

Figure 3: Çatalhöyük's North Shelter (Photo by Sara Perry)

Especially worrisomely, there is some indication that dwell time on site is also falling, with various visitors touring Çatalhöyük faster, with fewer stops and with even less engagement with the already limited interpretative resources available. Preliminary analysis hints that UNESCO WHS-oriented tour groups might be among the worst in terms of speeding through the content and skipping over designated stopping points on the modest visitor trail.

The challenges, then, for creating a satisfying visitor experience at Çatalhöyük are vast. Visitor research suggests that interpretation here is best led by visitors themselves, enabled with resources that can be personalised according to language, intellectual need, group dynamics, and time available, and which can be accessed anywhere, free from the bounds of the site itself.

3.2.3 Visitor personas

Inspired by Kuniavsky's (2004) group personas (see above), we crafted a skeleton framework through which to mould Çatalhöyük's personas (Annex, section 1). From here, we revisited our 10 years' worth of visitor observations at the site itself, including our individual observation data detailing real group experiences (see Annex, section 2 for examples). Immediately, several types of groups stood out as commonplace, and hence were chosen as our primary persona categories: namely, local parents with children, international families, mixed local and international families, as well as larger bodies of people such as tourist and school groups. These visitor groups not only informed the muscle and shape of the group personas, but were also integral to the creation of the motives, goals, and challenges of the personas. For example, in the construction of the Ozan Family persona (see below), their hypothetical challenges were shaped by observations of actual frustrations concerning the restricted path and speed of the tour around the site. We therefore deployed the skeleton framework, populating it with characteristics identified from actual visitor experience. In total, five group personas were developed (see full details in Annex, section 3), and at the first EMOTIVE User Workshop in Glasgow in February 2017 each persona was assigned to one of five participant teams to drive the development of new EMOTIVE experiences for Çatalhöyük (see Annex, section 5.1).

Figure 4: Çatalhöyük Group Persona 1: The Ozan Family

Turkish family of 3 within a larger tourist group of 18 people in total. The tourist group is made of several family groups, all strangers to each other. The Ozans include a grandfather, his daughter, and her son (hence grandson).

Figure 5: Çatalhöyük Group Persona 2: The Sadik Family

Local Turkish family of 4, including mother and father, brother and sister. The parents are in their 30s, while both children are under 6 years old.

Figure 6: Çatalhöyük Group Persona 3: The Ford-Jones family

An American family of 3, visiting from the USA. Two males in their 30s and their adopted teenage daughter, who is a prospective archaeologist.

Figure 7: Çatalhöyük Group Persona 4: School Group

Three Turkish students in their mid-teens (two boys and one girl) amongst a larger school group of 40. The students are not excited to be touring the site.

Figure 8: Çatalhöyük Group Persona 5: The Demir and Clark Family

Turkish family of 4, one of whom is visiting from abroad. They include a sister (younger) and brother (older) with their two spouses, all in their early 30s.

However, while the group personas were created with one eye on the visitor observations, the other eye was cast towards larger ambitions. In other words, group personas were partially constructed with bigger goals in mind – not necessarily related directly to immediate visitor needs. For example, the various comfort levels with technology amongst the different persona groups were deliberately constructed with the testing and creation of varied digital experiences in mind.

As an initial test of the utility of these group personas, we deployed them at the first EMOTIVE User Workshop in February 2017 (see Deliverable 3.4). Teams at the workshop were instructed to create an experience or application utilising the group personas as their target users. As soon as the group personas were put into action, several tensions came to light. Firstly, and most obviously, it was clear that creating an experience or product for a group was much more complicated than designing for an individual: very different needs and wants had to be balanced and compromised in order to placate as many people as possible. In order to deal with this, workshop participants tended to discern their own 'primary' persona within the group persona, whose character and demands ultimately swayed the final design. For example, a family with small children must, at the end of the day, cater to the will of their children (Sadik Family). Or, for instance, the individual who organises a site visit in the first place might ultimately find themselves with the most sway in terms of group experience (Ozan Family or Ford-Jones Family). In particular, workshop participants who were assigned the Sadik Family persona found it very difficult to construct an experience to engage the whole group, as the two-year-old child inadvertently subverted the visit whenever that child became disruptive or required attention.

Overall, however, the feedback on the use of group personas was positive. The creation of group experiences must begin at its conception, not as an afterthought. The use of group personas encourages developers to think critically of multiple scenarios and the more complicated goals and needs of realistic groups of visitors to heritage sites.

3.3 The Hunterian Antonine Wall display

3.3.1 The Hunterian Museum

The Hunterian is part of the University of Glasgow and one of the leading university museums in the world. Founded in 1807, it is Scotland's oldest public museum and home to one of the largest collections in Scotland. These have been recognised as a Collection of National Significance and include over 1.5 million items, among which the outstanding Roman artefacts from the World Heritage site of the Antonine Wall.

3.3.2 The Antonine Wall site

Built around AD 142 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. Whether a symbol of Roman power intended to celebrate victory over the northern tribes or a barrier to control trade and movement, the Antonine Wall was abandoned by the Romans from the late AD 150s onwards.

Figure 9: Map of Frontiers of Roman Empire (based on map made by FRE Culture 2000 http://www.limesdacicus.ro/limes/)

Figure 10: Route of the Antonine Wall from the River Clyde in the west of Scotland to the Firth of Forth on the east coast and position of forts along the wall. (Google maps http://bit.ly/2kw1F2n)

3.3.3 'The Antonine Wall: Rome's Final Frontier' display at The Hunterian

The permanent display 'The Antonine Wall: Rome's Final Frontier' at the Hunterian Museum, located at the entrance gallery, showcases the largest collection of objects recovered from the site. The displays of 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 Scottish landscape and its peoples and question why the wall was constructed and then abandoned so quickly (Figure 11). 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.

Figure 11: Entrance to The Antonine Wall display in The Hunterian (Image courtesy of The Hunterian)

3.3.4 Visitor profiles

The Hunterian regularly gathers information on its visitors to both the art gallery and the museum, two physically distinct sites on the University of Glasgow campus (Figure 12), and gathers specific visitor numbers for temporary exhibitions within the art gallery as well as the Mackintosh House. However, there are no separate visitor figures for the Antonine Wall display as this is a permanent display within the Hunterian museum's central offer to all museum visitors. Therefore, we must infer from the overall

museum visitor statistics and demographics information about Antonine Wall visitors, be they visitors who come specifically for the Antonine Wall display or the museum in general.

Figure 12: The different sites of The Hunterian (including the Museum and the Art Gallery)

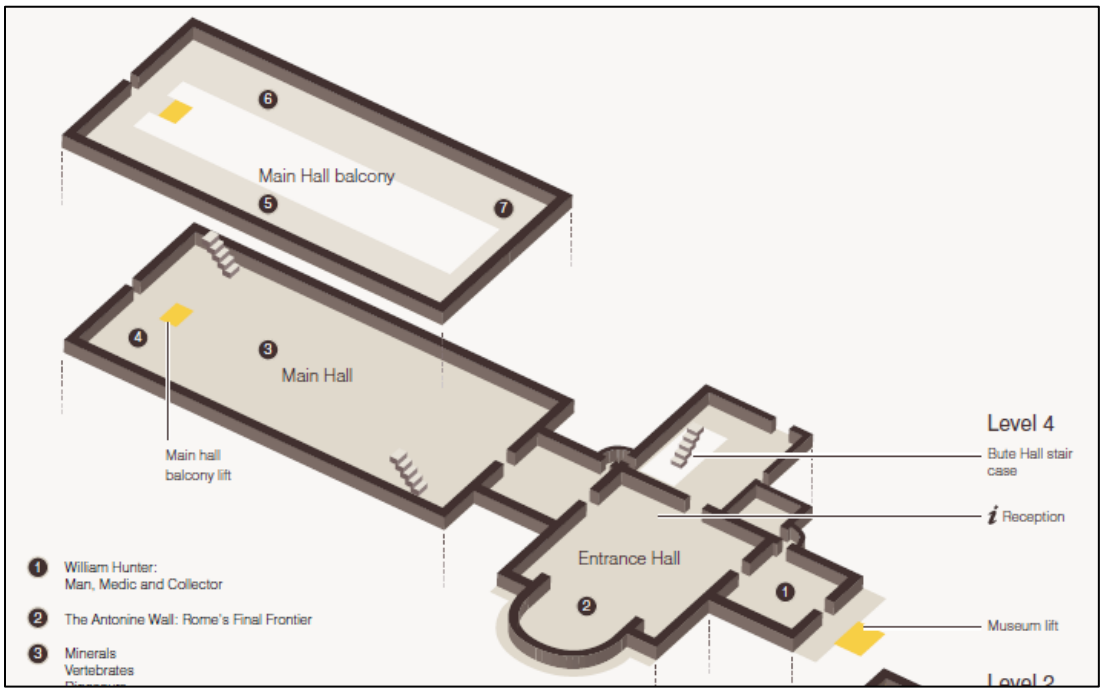


Figure 13: Hunterian Museum Floorplan (with the Antonine Wall display marked as number 2)

Despite this lack of specific visitor information about the Antonine Wall display visitors, there are several factors that make the Antonine Wall display alluring to general museum visitors and that can be used to argue that most Hunterian museum visitors would continue on to look at the display should they not have come with this as their sole aim. Firstly, the display is located in the entrance hall directly opposite the main doors to the museum, and would be among the first things any visitor would encounter when arriving at the main door. The display is well positioned in relation to the alternative entrance to the museum via the lift as it is the second display as you walk from the lift and opposite the visitor reception desk (Figure 13). Secondly, the introduction to the display is inviting; lighting is used to dramatic effect with the Roman columns to form an entrance way into the display. Finally, there is a large introduction panel with the title of the display and a map of the Roman frontier locating the Antonine Wall in relation

to Britain's other Roman Frontier, Hadrian's Wall. The map combined with the dramatic lighting and visibly distinctive Roman columns and monumental slabs on display, makes an attractive invitation for visitors to engage with the display.

The following is a summary of the Hunterian museum visitor demographics[2].

The majority of visitors are aged 60+

- 64% are aged 50 and over
- 17% are aged 30 and under
- 40:60 male to female ratio
- Average visitor comes from the UK (70%) and of these the majority from Scotland.
- 40% of visitors class their motivation as a 'general interest in art and art galleries'
- The Museum has a broader range of visitors and attracts more family audiences than the Art Gallery

In order to fulfil its core mission to 'care for' and 'communicate our knowledge' about the collections, The Hunterian has identified the need 'to grow audiences, to build awareness of our collections and to cultivate support and advocacy' (Reaching Our Audiences, The Hunterian Marketing team). In order to develop this ambition, the Hunterian has published its Strategic Plan, 2015-2020 in which it sets out its aims for developing its visitor numbers and core visitor groups. It has defined 4 key aims to help focus and develop its audience profile. These are:

1) Attract a younger demographic, especially students and young professionals;

2) Grow our community of support through Friends membership;

3) Maintain and grow current visitor figures, and;

4) Raise international profile (Hunterian Strategic Plan, 2015-2020).

The University of Glasgow has a student population of c.25,000 students (18,000 undergraduates and 7,000 postgraduates) and a staff body of c.7,500[3]. Increasing awareness of the museum collection for research and teaching and developing programmes specifically for students, staff and other adults is part of the Hunterian's current 2015 – 2020 strategic plan. Similarly, this ambition for university museums to engage this cohort more was reflected in the theme of the University Museums In Scotland annual conference this year, 'Beyond The Lecture Theatre', held at the University of Aberdeen, 26-27 January 2017[4]. With this focus in mind the Hunterian has started to develop a series of interventions to start developing this audience.

The Hunterian has seen a rapid expansion of its student engagement programme. In 2014 1,479 public gallery tours were delivered by University of Glasgow students as part of the Museum University Student Educator (MUSE) programme and 137 students were actively engaged in research and public programmes (The Hunterian Strategic Plan, 2015-2020).

The Hunterian has also started developing a programme of late events called Night at the Museum related to exhibitions or historically significant events including the following themes: Robert Burns (January 2017); Erskine 100 (November 2016); and WW1 and RMS Lusitania (May 2015).

[2] Reaching Our Audiences, Hunterian Marketing Team (internal Hunterian document prepared for presentation to Museum Studies MSc students, March 2016)

[3] Data relates to the 2015/2016 academic year http://www.gla.ac.uk/about/facts/

[4] http://www.umis.ac.uk/conferences/conference2017_programme.html [accessed 06/04/2017]

The Hunterian Friends scheme invites individuals to contribute to the Hunterian by joining the scheme for a membership fee in order to access a 'range of exclusive benefits and opportunities to participate actively in the work of The Hunterian'[5].

3.3.5 Visitor personas

Based on our analysis and understanding of The Hunterian's current visitor demographics and ambitions for developing its key audiences (namely students and staff of the university, the Hunterian Friends group, current visitor groups such as families and an ambitious growing international profile), we developed five Hunterian personas that combine these audience groups with key characteristics of current Hunterian visitors (see Annex, section 4). Each persona we designed is for an individual, that is they have sole identities detailing their own character and behaviours (backgrounds, hobbies and interest); their relationship with technology (type of devices they own, are comfortable using and software they have access to); and specific challenges they bring to a museum visit or frustrations they have (views on museums, technology within museums, accessibility issues). Our own research confirmed the well-known fact also reported in the literature (e.g. Falk & Dierking 2012; Falk 2016) that most people visit museums in groups as museum visiting is a social activity (Katifori et al., 2016). Therefore, the five individual Hunterian personas were created with this in mind and any two (or more) individual personas are able to be combined to create a group persona or different visiting dynamic that may include a hybrid experience (e.g. in the case of Annie, her grandmother Mary, and her brother Callum). In the first EMOTIVE-User Workshop in Glasgow in February 2017 during the Antonine Wall design activity on Day 2, the five groups of workshop participants were assigned either an individual Hunterian persona or a combination of 2 of the 5 Hunterian personas to design for:

Group 1 Design for Annie and Mary visiting together
Group 2 Design for Annie and Callum
Group 3 Design for Carlos
Group 4 Design for Susie
Group 5 Design for Carlos and Susie

See Annex, section 5.2 for more information on Antonine Wall experiences and scenarios designed during Workshop 1.

See Deliverable *D3.4 User Workshop #1* for more information on the activity feedback and conclusions.

[5] Hunterian Website http://www.gla.ac.uk/hunterian/support/friends/

Figure 14: Hunterian Persona 1: Mary Paterson

Mary Paterson represents a key Hunterian audience group, the Hunterian Friends. She is 70 years old and born in Scotland. A retired teacher she is keen to encourage her grandchildren, Annie and Callum, to visit museums and galleries and share in their experiences together.

Figure 15: Hunterian Persona 2: Annie Paterson

Annie Paterson represents the younger teenager visitor that currently visits the Hunterian museum as part of a family group. She is visiting her Granny Mary for the holidays. She is typically bored with museums and would rather be chatting with her friends on social media but also wants to do something nice with her grandmother.

Figure 16: Hunterian Persona 3: Callum Paterson

Continuing the focus on family groups, Callum Paterson is Annie's 10-year-old younger brother. He is also dyslexic. However, unlike Annie who is visiting their grandmother in Glasgow, Callum is at home in

Newcastle. We thought that by including a persona who is not physically present within the museum, i.e. at home it would make designing a hybrid experience more plausible.

Figure 17: Hunterian Persona 4: Susie Wong

The persona of Susie Wong represents the Hunterian Museum's current guides of the student engagement programme called MUSE. Susie is an international postgraduate student of Museum Studies

Figure 18: Hunterian Persona 5: Carlos Garcia

The persona of Carlos Garcia represents the student who is most unlikely to visit the Hunterian museum and therefore is the most hard-to-access visitor and yet is one of the key visitor types the Hunterian wants to attract. He is an ERASMUS visiting student from Spain. His subject is Engineering and he does not like museums.

4 Requirements elicitation methodology

To elicit user requirements for EMOTIVE digital storytelling experiences in a cultural context is not a straightforward task. Both foreseen authors and visitors of such experiences have no prior experience with this approach and it is difficult for them to produce meaningful and in-depth needs and requirements without an initial and clear pre-conception of what is the vision.

The CHESS project approached the issue through visitor observation and ethnographic studies attempting to record visitor behaviour in a museum without the use of any digital device. This work produced important insight as to what would be the visitor needs both for individual visits and visits in groups (Tolmie et al., 2014) that resulted in the CHESS user requirements report and guided subsequent design and development within the project and, finally, the evaluation activities which assessed the advantages and shortcomings of the approach.

In the context of EMOTIVE, we aim to build on the lessons learnt from the CHESS work and use prototyping tools that resulted from the post-CHESS digital storytelling research work by ATHENA to explore user needs in a more focused way. In some cases we have presented to both authors and visitors digital prototypes that help them understand the EMOTIVE concept and help them to envision possible improvements in terms of both conceptual and technological approach. In other cases we have organized specialized workshops where we put in practice methodologies and guidelines in creative ideation and design sessions with different experts, representing the author user group. For each activity and event, a brief report can be found in the Annex of this document. The aforementioned events include the following:

- EMOTIVE 1st User Workshop, Glasgow February 2017 (Annex, section 5)
- EMOTIVE workshop with GSA MSc in International Heritage Visualisation Students at The Hunterian Museum, March 2017 (Annex, section 6)
- Museum Studies Course Digital Storytelling Workshop, University of Athens December 2016 – February 2017 (Annex, section 7)
- Digital Storytelling Experience Evaluation at the Ancient Agora of Athens December 2016 (Annex, section 8)
- Digital Storytelling Experience Evaluation at the History Museum of Athens University, November – December 2016 (Annex, section 9)
- DialPast Course Digital Storytelling Workshop, Norwegian Institute, August – September 2016 (Annex, section 10)
- Evaluation of Authoring and Using CHESS Collaborative Experiences Built for Çatalhöyük, 2015-16 (Annex, section 11)
- CHESS Early Experience Authoring Approaches and Lessons Learned, 2012-2015 (Annex, section 12)

5 Needs analysis and user requirements

In this section we reflect on different user needs as recorded in the different events listed in Section 4.

5.1 Visitor experience

This section presents an overview of the main needs of visitors for an EMOTIVE experience.

5.1.1 One size does not fit all – the need for different experience types

A concrete result from the experience within the CHESS project and the different requirements elicitation activities with visitors within EMOTIVE is that we cannot expect to create one type of experience that will be appropriate for all visitors. Leaving aside the adult-children distinction which by default enforces the need for a different design approach, both in terms of content and presentation, even amongst the same age group one may notice important differences in preference.

This was made particularly evident in the case of the History Museum of the University of Athens mobile storytelling experience. The experience was a fully guided one, offering a storytelling based tour of the whole museum. Some visitors were content with this approach which "*took them by the hand*" and kept them company making the museum more exciting. Others felt that they would have liked more "*interaction*"; they would have preferred a more exploratory gamified experience with more user control. Others expressed the need for a more free, exhibit-based storytelling approach where they would be able to approach the objects of their choice at their own pace.

5.1.2 Focus on interpretation vs focus on "fun"

Another aspect of the need for different experience types is the fact that visitor perspectives vary as to the balance between informational content and story plot. Some of the users were able to spend time in the museum and enjoy it only because of the story whereas there were some that felt that they would easily replace the story with more informational content.

However, even the most interpretation-centric users explained that they liked the way the information was offered, in a non-strictly academic manner but rather through interesting facts and anecdotal stories, often enriched by quotes of historical figures.

Some of the users expressed a preference for a story based on real and not fictional characters.

5.1.3 The need to re-engage visitor interest

In some cases when the visitors are engaged with an experience they may gradually lose interest and become disengaged from the experience theme and, consequently, the cultural space itself. At this point it is important to introduce a change of pace in the experience, a trigger to re-stimulate their interest and engagement.

This need was explored in the 1st EMOTIVE Workshop. Experts, internal and external, from different backgrounds, proposed experiences in the group ideation sessions that are based on this principle. The direction seem to be, on one part, focus on short "stories", content that can be combined and offered to the visitors in different ways, thematic or otherwise, as well as an experience design that enhances user "activation". This may be accomplished in several ways including:

- Questions addressed to the visitor, which relate the offered content to her life
- Anecdotal stories
- Stimulation of social interaction between visitors

Identifying the appropriate time to "activate" the visitor is also crucial, and could be tackled by automatically proposing a change when visitor actions suggest loss of interest or giving the visitor the change to switch to a different material or theme when she feels it is needed.

5.1.4 "Keep it for later" option

Some of the users who expressed the need for more informational content on exhibits not included in the story, proposed the use of a "keep it for later" option. This option would allow the visitor to select interesting exhibits in an "inventory" thus being able to review them later, maybe after the visit and possibly being offered additional informational or storytelling content regarding them then.

QR or NFC codes were also proposed as a means to collect informational content for interesting exhibits.

5.1.5 The need for visitor control over the experience duration

In general users felt that they would like to be informed on the duration of each experience. Shorter experiences seem to offer a stronger sense of control and are easier to manage than a single, longer one. Most users commented positively on optional informational content offered and the possibility to skip it if it was not interesting enough. In this sense the users did not feel bored or pressured.

5.1.6 Towards a seamless pre-, during and post-visit experience

A common point that was recorded in all the authoring and experiencing activities was the need to provide to the visitor a unified virtual and on-site experience. It is a fact that some visitors prefer to go to the cultural sites prepared, but even for those who are not interested to do so, offering a pre-visit activity to help them understand the material they will encounter and "*get in the mood*" was considered very important. A proposed approach during the 1st EMOTIVE User Workshop has been to offer to the user a brief role-playing storytelling activity as pre-visit teaser that will provide basic informational content in an engaging way, attracting visitor interest and allowing them to connect to the site before even visiting. Similarly, an appropriate post-visit experience could keep the visitor's interest alive even after the visit is completed, by offering additional activities and engaging content.

5.1.7 The need for more "interaction"

The need for "more interaction" is a constant comment re-surfacing in most of the evaluation activities. When prompted, the users explained that this comment does not mean they would like to "*interact more with the mobile screen - on the contrary.*" Prompting further for clarifications resulted in a reported need for "interaction" in different levels:

- **Interacting with the exhibits**: Some exhibits would benefit by an interactive activity explaining their different parts and their use.
- **Interacting with the story plot**: Some users prefer to have control over how the experience unfolds. This means user choices and a more active role over the plot or more choices on what they see and which objects they focus on.
- **Interacting with space and artefacts**: Many users expressed the need for more freedom to explore the space and exhibits that were not part of the story plot. The guided approach impedes free exploration and for the users who in fact did it, they paused the story and explored by themselves. These users proposed that this possibility should be provided through the app rather than antagonizing it.

5.1.8 Connection with space and artefacts

Many visitors have a strong need to connect to the cultural site and its artefacts. This need becomes even stronger in sites where the space itself dominates the visitor experience, as is the case in open-air archaeological sites.

In all activities, some users commented on the "*absorbing*" power of the mobile device, some felt that they were "*too occupied on the screen of their mobile*" and as a result they felt a bit disconnected from the space itself.

Emphasis should be given in different levels and ways to this connection with space and objects by enhancing the visitor need to observe and absorb not only information about them but also the feelings they evoke, the sense of a different historical period, their "*atmosphere*".

It must also be noted that some visitors may arrive at a site without any interest to connect to its space or artefacts. This predicament might present itself, for instance, on school trips or family outings where the visit has been organised by others, and all members of the visiting party may not be equally eager to participate. Such a situation poses different challenges, but we believe could still be mitigated by a focus on feelings, atmosphere, and attention to emotional engagement.

5.1.9 Visual vs audio experience

In general, even though the visitors in all cases enjoyed a rich audio visual experience on screen, they felt that more emphasis should be given to the audio part of the experience, as focusing on a screen too much may isolate them from the space and the objects. Focus on audio should be given for the on-site part of the experience whereas a more visual approach could be followed for a virtual visit.

5.1.10 Tangible interaction

An important direction to support the connection with space and artefacts is tangible interaction, especially in the cases where it is not allowed to touch and manipulate the artefacts. Using item replicas as props in the user experience can enhance the sense of presence in the experience.

5.1.11 Navigation

Navigation in general does not seem to be an important issue in museum spaces. Although in some of the activities, visitors were given only audio instructions, slight visual hints in the animation and almost no real photos of the space and exhibits, they were still able to navigate from one point of interest to the next and locate the exhibits. Some users proposed that the objects that form part of the storytelling experience should be marked with a specific notation.

However, in the case of archaeological sites like Çatalhöyük and the Athens Agora, a navigational aid is crucial to support the user in locating the right spot to experience a particular part of the story. The distances between points of interest are not insignificant and visitors can easily become frustrated wandering aimlessly and looking for the proposed spot to be.

5.1.12 Collaboration – social interaction

The importance of social interaction between visitors has been confirmed and recorded as a result in all activities. Visitors rarely visit cultural sites alone and they express the need for the mobile experience to

promote interaction at different points during the story, in different ways, including the possibility to discuss parts of the experience, solve riddles together or reach a common decision on how to proceed.
An EMOTIVE experience should promote and enhance visitor interaction through appropriate experience templates. Some visitors even expressed the need to share their experience with friends or relatives who were not present with them in the cultural site but would have liked to visit virtually, proposing thus a "hybrid" visit.

INTERACTIVE ACTIVITIES

The users in several of the requirements elicitation activities expressed the need to be able to author and add to their experiences more interactive activities. Several ideas were offered, all of which included a more active role on the side of the user. Some examples mentioned were:

- Augmented reality (AR) activities that enhance the exhibits in space
- Virtual Reality (VR) activities that show exhibits in their actual context of use or in their original form
- Interaction with the elements in a photo, selecting parts of the photo, zooming in, getting more information on them
- Possibility for the users to add their own photos
- Possibility for the users to comment
- Affecting the story plot, leading thus to personalized outcomes
- Different quiz types
- Interacting with images, including zoom-in and out, focusing on different parts of the image and getting information about them, etc.
- Activities to present a conversation between different story characters, possibly through their avatars.

Such suggestions are useful, but also foreseeable and relatively commonplace amongst existing digital media applications for the cultural sector. Alongside meeting user needs, EMOTIVE aims to push the boundaries on digital interactivity, going beyond the state of the art in terms of visitor engagement and surpassing visitor expectations.

5.1.13 Virtual reconstruction of monuments

An important direction for an archaeological site experience, especially a virtual one is the virtual reconstruction of monuments, allowing the users to get a more direct sense of the site. Virtual reconstruction can significantly enhance the user experience and help the visitors understand the cultural site.

5.2 Authoring

Digital interactive storytelling for cultural contexts has been universally recognized as a direction cultural institutions need to invest in to attract and engage their audiences (Pujol et al., 2013; Bedford, 2001; Springer et al., 2004; Twiss-Garrity et al., 2008). Personalization as another aspect of these experiences is also starting to seem a necessity to accommodate different visit motivations, expectations, and needs (Falk, 2009). An increasing number of museums and cultural institutions around the world use personalized, mostly mobile, museum guides to enhance visitors' experiences (Lykourentzou et al., 2013), attract new visitors (Tan et al, 2009), and address the needs of a diverse audience (Gaeta et al., 2009; Muntean et al., 2009).
However, a significant challenge remains around how museums and external creative experts can design and produce the appropriate content for meaningful mobile storytelling experiences without resorting to computer experts assisting in this process every step of the way. Especially for personalized experiences, there are still neither established practices in the field nor standard authoring workflows, already put to

practice for a sufficiently long time. This lack of standard methodologies and guidelines and appropriate authoring tools which cultural institutions can employ to integrate mobile interactive storytelling into the experience they offer to their audiences has been an impediment to the integration of mobile digital storytelling in museum practices.

Recently, effort has been invested in creating intuitive storytelling authoring tools, such as Nevigo's Articy.draft[6] for conceptual game design or lightweight web based authoring tools[7] that enable users to create "stories" without the assistance of technical experts. However, these tools by themselves do not seem to offer an integrated approach for mobile digital interactive storytelling. Furthermore, they have not yet succeeded in becoming widely accepted, as they do not propose a clear end-to-end methodology for authoring that would support all stages of such productions.

CHESS explored different aspects of digital interactive and personalized storytelling. The insights produced during the project, along with subsequent attempts to experiment with storytelling experiences in different institutions recorded in the Annex, Section 11, have led to the development and testing of story prototyping tools that have been made available to authors of various cultural institutions within the context of EMOTIVE in order to feed subsequent software design and development through an agile development approach.

This section presents user needs and requirements as they result from the analysis of the authoring process as followed in different contexts. Firstly, the different identified authoring roles are defined, followed by a discussion on authoring challenges and concluding with concrete user needs and requirements.

5.2.1 EMOTIVE authoring roles

The possible authors of personalized interactive storytelling experiences may include a wide range of roles and expertise. These categories may overlap (with one individual occupying multiple areas of expertise), and in any case, we perceive EMOTIVE storytelling to be more powerful when such roles are actively challenged and transcended:

- **Domain experts**. These include museum curators and experts in the museum content and topics (archaeologists, historians, art history experts, etc.). They provide the interpretation material on which the storytelling experiences will be based.
- **Exhibition designers**. They are responsible for the set-up of the museum exhibitions and the material that is made available to the public in relation to them. They provide a view of what the visitors need, in terms of common questions, interests and approaches that work, or not, in the Gallery.
- **Storytellers**. They provide the plot of the story and author its textual parts.
- **Digital asset designers**. They are in charge of the digital asset creation and their combination into interactive activities.

5.2.2 Authoring challenges

Digital mobile storytelling experience (co-)creation is not without challenges. On the one hand, the re-definition of the museum's internal organization or workflow, which now has to open to horizontal but also external exchanges, i.e. with professionals from outside the institution. On the other hand, pure academic skills are no longer enough; authors need to have an interdisciplinary background or at least become familiar with new methodologies (e.g., visitor-centred design, less academic and more emotionally-evocative storytelling techniques) and tools (e.g., authoring and publishing software).

[6] www.nevigo.com/en/articydraft
[7] See examples in storymaps.arcgis.com/fr; www.motive.io; izi.travel; arisgames.org; www.figibox.com; mbira.matrix.msu.edu; 7scenes.com/.

As already mentioned, EMOTIVE authors are members of the cultural and creative industries in charge of creating digital interactive cultural experiences (i.e., interactive stories) and making them available to the visitors.

This type of production very often results from collaboration in multidisciplinary teams, involving experts from different domains. In "simpler" productions, involving proven and widely accepted professional technologies, like the making of audio guides or multimedia productions for a museum website, the technology aspect is considered a "given" and the team can focus mostly on content design with specific guidelines on how to structure and prepare the content.

However, even in such cases where clear guidelines and technological solutions are available, this process is not always straightforward or smooth. Cultural site experts include scientists who have a deep research interest and understanding of the exhibited content, either objects or the cultural space itself. When asked to deliver "meaningful", "interesting" or " engaging" content it is very challenging for them to choose the most appropriate content for their intended “consumers”, the visitors, without projecting on their visitors their own needs, interests and concepts for what would be an ideal experience. An “interesting” piece of information of a particular archaeological site for an archaeologist may be completely boring for the uninformed visitor and vice versa.

In these cases it may become a significant challenge to leverage the objectives of the site experts for the delivery of particular content with the actual needs of their intended audiences.
In the still "experimental" fields like personalized storytelling, the process can become even more complicated. On one hand, the cultural site experts have no clear concept of what the resulting product, the produced digital experience, will be. On the other hand, the design and interaction and computer experts bring to the multidisciplinary group ideas and proposals that may not yet be tested or fully accepted by the domain experts. However, the most important goal remains the same for cultural institutions, to bridge the gap between the domain experts, their research and interpretations and the visitors, their interests, preferences and needs.

5.2.3 Towards an EMOTIVE authoring approach - lessons learnt and authoring needs

ESTABLISHING A COMMON VISION

The first step towards bringing an EMOTIVE storytelling experience in a cultural institution is establishing a common vision between all the experts involved, the domain experts and the creative industry involved in the production of the envisioned experience. All involved authors should be made aware through an appropriately presented conceptual framework of the characteristics, challenges and limitations of the mobile storytelling approach and establish early on their objective, taking into account the institutional needs and budget.

A STRONG NEED FOR GUIDELINES

An EMOTIVE approach for story design and implementation in cultural context requires specific and detailed guidelines for each step of the authoring process, starting from the collection of the interpretation material to staging of the story in space to the creation of assets and the compilation of the end experience.

All involved experts need to be trained not only in the use of possible authoring tools, but also in the overall authoring methodology. This may be especially true for cultural heritage professionals who are less familiar with the new aspects introduced by digital tools (interaction, personalization, non-linearity), and need some initial guidance to assimilate them.
Concrete guidelines, in different forms for different uses, including a more detailed textual format and a card format, should be available to support ideation, design and development.

DIFFERENT TOOLS FOR DIFFERENT AUTHOR ROLES

Building upon the need for specific guidelines, tools are needed to support and automate the story creation process each step of the way, providing a direct way to structure the interpretation material, guide the story design and ensure an implementation that will adhere to the given guidelines and protect the authors from repeating common mistakes.

To support an iterative, collaborative story design process, the tools should be available under a unified methodology and framework with the possibility to feed the results of one to the other. These tools should support all stages of experience creations, including:

- **Interpretation.** Domain experts would benefit from a tool that would guide them in collecting and recording interpretation material that can function as an inspiration for the experience designers.
- **Storyboarding – experience templates**. An appropriate story prototyping tool should guide the experience designers to select the most appropriate experience template and guide them towards designing the experience.
- **Activity templates**. Different activity templates could guide and significantly simplify the production of the experience.

PERSONAS ARE A MUST

Museum experts who have been exposed to the use of personas during the design process have insisted on their strong presence throughout the development process; they consider them very convenient not only as design tools, but also to convey easily the idea that a particular image, narrative style, subject, narrator, or story unit would be interesting for one visitor category or irrelevant to another. Thus, personas feature among the design tools available to the author when compiling a story. They can be used to "tag" particular story elements and assets such as images, videos and other material. These persona tags are translated into user characteristics to be later matched with user profiles and to personalize the visitor experience.

STAGING THE EXPERIENCE

As already established, the production of digital interactive personalized stories for museums needs systematic refinement. Yet, to keep iterations to the optimal minimum number, it is paramount that staging, i.e., the development of the story in the exhibition space or the cultural site, is taken into account during the whole process.

Yet, staging can be done in different ways. The creative authoring workshops and authoring approaches applied so far (Annex, Sections 7, 10, 11, 12) showed that no matter the author's familiarity with the gallery or the quality of available gallery maps, storytelling is improved by the real feeling of the space. In the cases where the participants did not spend time early on in the gallery/site, the produced stories had issues with visitor navigation and positioning in relation to the exhibits; although they were exciting stories, they needed tweaking to be more effective in relation to the gallery's or site's spatial arrangement.

SUPPORTING ASSET RE-USE

All storytelling approaches examined so far showcased the need for the capacity of digital storytelling to link not only exhibits under different discourses, but also existing digital and analogue assets, which can be "recycled" into engaging narrations. This is important given the fact that digital productions still constitute a major economic and personal effort for museums.

5.2.4 Conclusions

The main objective of the EMOTIVE authoring approach is to bridge the gap between the domain expert and the visitor, to allow domain experts to bring to light and communicate to the public the cultural wealth at their disposal. EMOTIVE storytelling experiences are the means to accomplish this through appropriate authoring methodologies and tools that will support all involved authoring roles, domain experts and creative industries to realize the EMOTIVE vision.

6 Scenarios

6.1 Introduction

This section presents the initial work for the EMOTIVE scenarios. As described earlier in the document, the creation of story experiences requires a complex, iterative, and collaborative process, where people with different backgrounds need to come together to define and form a “quality” story. At the core of this process is the collaboration between creative industry professionals (digital artists, audio technicians, animators, etc.) and cultural heritage experts (archaeologists, historians, art historians, story writers, exhibition designers, museum educators, museum professionals, heritage site managers, etc.).

The site experts usually have access to an extensive understanding of the landscape and the archival documentation of the site and the relevant time periods, which need to be studied to highlight interesting concepts or subject matter on which visitor experiences may be based. Nevertheless, the site experts are one contingent amongst a variety of individuals who must be engaged in the design of final story experiences, including experts from the creative industries who are adept at making interesting end-user experiences. Of course, the creative industries lack an adequate understanding of the site, which is a requirement for creating story experiences with a coherent, relevant, and meaningful plot, characters, and events.

As a result, and as experimentally verified in various authoring workshops and previous experiences of the consortium outlined earlier in the document and detailed in the Annex, a loop emerges: on the one hand, creative industries need concrete and focused information and resources from the site itself and the archival documentation to design end-user experiences, whereas, on the other hand, site experts need an understanding of the final visitor experience to constructively contribute site-related resources to the process. Breaking this loop is essential for starting the iterative process of creating story experiences. This section details our approach and the material gathered as part of this process.

More specifically, we introduce the novel idea of Interpretation Cards, Experience Cards and Card Sets. These are approaches for helping the site experts document their site knowledge (and story ideas) in a way that will provide the various partners from within and beyond the creative industries with the material they need to start thinking of end-user experiences. To produce these cards, our site experts from the University of York and the University of Glasgow followed these instructions:

Interpretation Cards are based on interesting stories/factoids/concepts/interpretations from a cultural heritage site’s landscape and archival documentation. To create Interpretation Cards, start by thinking “*What is especially interesting and engaging in my museum?*”. We are not interested only on highlight exhibits, we want to base the cards on interesting stories and interpretations for these exhibits.

Nevertheless, for all Interpretation Cards, it is important that they are associated with an on-site artefact, or, more generally, with something the visitor can directly examine and which is related to the interpretation information of the card. Therefore, the Interpretation Card template requires a reference to one or more on-site exhibits or landmarks.

In contrast, the Experience Cards aim at articulating a larger interactive engagement with the site, not necessarily tied to specific exhibits or landmarks. Herein, visitors might explore a concept or story whilst touring the site, using their digital device and related digital and 3D printed assets as the primary points of reference. Particular features of the site may be enrolled in the experience, as with Interpretation Cards, but these are not the focal point of visitors' engagements.

In the following sections, we describe the template we used for the Interpretation and Experience cards. Note that the fields included in the template and all the relevant instructions, created by ATHENA, reflect

the guidelines and best practices described in Deliverable 5.1. This way we ensure that the cards are based on sound ground and can indeed support quality end-user experiences.

The idea of Card Sets is to put together different Interpretation and Experience Cards in the context of a larger experience (e.g., a role-playing story). The various cards in a set have a certain function in the experience, i.e., they represent information about a story character, help reinforce the story's setting, etc. The card sets are the main communication channel between the site experts and the creative industries, so that site experts can outline their ideas on how the end-user experience may look like. All the interpretation cards and sets produced per cultural site (Hunterian Museum & Antonine Wall, Çatalhöyük) are found in the relevant Appendix at the end of the document.

Finally, for this deliverable the EMOTIVE consortium's user (UGLA, York) and tech (ATHENA, EXUS, DXT, INRIA, CNR) partners worked together to highlight the potential use of technologies in the cards. The relevant instructions given to the user partners are described in the relevant Appendix. Nevertheless, the consortium decided that the user partners need not adhere to them too strictly at this early point in the project; this will allow for new ideas to form, which can help our technologies grow in new and interesting directions. Nevertheless, all interpretation cards and card sets will be reviewed by the tech partners in the context of Deliverable 8.2 (Functional Specifications) to highlight how our technologies can satisfy the user requirements.

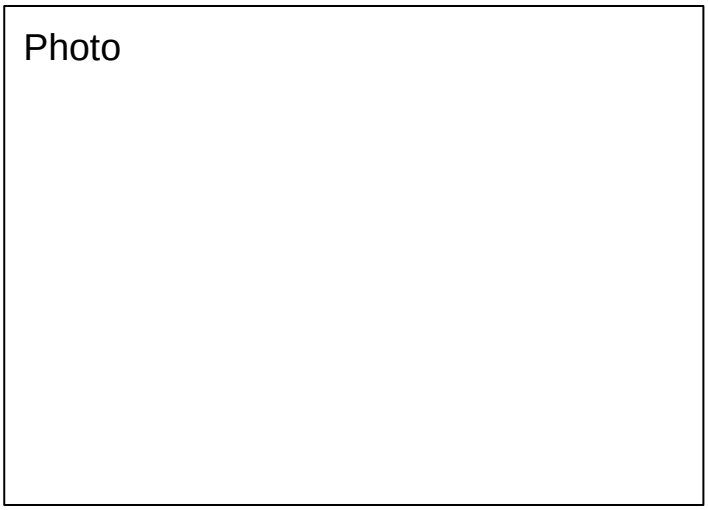
6.2 Interpretation Cards

This section presents a template for the Interpretation Cards, which are later extended into Experience Cards for the cultural site of Çatalhöyük via addition of several extra categories of data, including genre, emotion, and pre- and post-visit experience. You can find a template with explanatory comments and a clean template for further use. Finally, the notion of Cards Sets is presented, which are used in Story experiences and Collaborative Location-Aware experiences.

6.2.1 Interpretation Card Template (with explanatory notes)

Title A short title that identifies the card's contents

Essential Information The most crucial and interesting information this card conveys (as seen from the eyes of a typical visitor). Should not be more than a couple of short sentences.



A photo of an exhibit related to the card.

Note that more than one exhibit may be related to the card, i.e., there are multiple on-site artefacts the visitor can examine that convey this card's information. If so, please provide a Photo and related Exhibit Information for each exhibit.

Note that an "exhibit" does not need to be an on-site object on display. It can be anything the visitor can examine while on-site, e.g., parts of a wall or a room, a mound, a portrait, vegetation, etc.

Exhibit Information Information related *directly* to the exhibit, i.e., explains what the visitor can directly examine when looking at the exhibit.

Note that more than one exhibit may be related to the card, i.e., there are multiple on-site artefacts the visitor can examine that convey this card's information. If so, please provide a Photo and related Exhibit Information for each exhibit.

Note that an "exhibit" does not need to be an on-site object on display. It can be anything the visitor can examine while on-site, e.g., parts of a wall or a room, a mound, a portrait, vegetation, etc.

Interpretation / Context Information that interprets the exhibits and sets them in their historical context. This information reinforces what the visitor can directly examine with all the necessary information to make this examination meaningful beyond the obvious. For example, everyone can see that they have a hammer in front of them, but what was it used for? To whom it might belong? Why is it so worn out? Is this a typical hammer or does it stand out somehow?

Interpretation is the information that can help the visitor construct her own stories while examining the associated exhibits.

Available Assets Any interesting assets of the exhibits or the interpretation information we already have or can easily obtain. We are especially interested in (a) 3d models of the exhibits, (b) drawings of related recreations, (c) videos and images that relate to the interpretation information, (d) the ability to take further photos of the exhibits, e.g., from different angles

Tech Suitability Needs to be one of the technologies listed in Annex, section 13. Not every Interpretation Card is suitable for a technology and some may be suitable for multiple ones.

Tech Comments Ideas and comments on how the technology can be used. For example, in the case of VR, what are the textures we can overlay on the 3d printed object and how do they relate to the interpretation information?

Keywords / Themes Keywords that can help us bring out indirect relationships between different Interpretation Cards. Keywords may include themes, topics, historical periods, etc.

Reflection / Questions Interesting questions a visitor (or a group of visitors) can reflect on before or after they have consumed the Interpretation Card information. The idea is to promote social interaction through conversation and reflection. They can also be used by our chatbot technology. These questions don't need to have definite answers.

Comments Any comments related to the card and not covered by the other fields. For example, indicate if the related exhibits were found on a related archaeological site (e.g., the Antonine Wall).

6.2.2 Interpretation Card Template (clean)

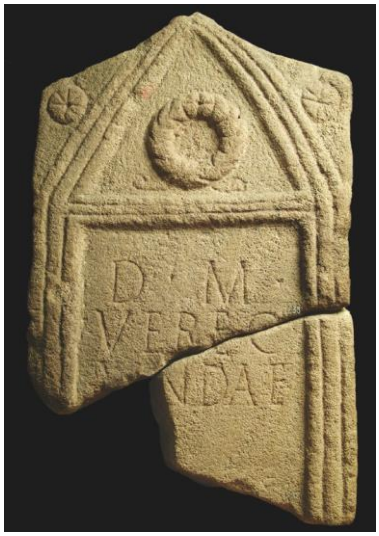
Title Card-title-goes-here
Essential Information Information-goes-here

Photo

Exhibit Information Information-goes-here
Interpretation / Context Interpretation-goes-here
Available Assets Asset-information-goes-here
Tech Suitability Tech-goes-here
Tech Comments Comments-go-here
Keywords / Themes Keywords-go-here
Comments Free-comments-go-here

INTERPRETATION CARD EXAMPLE

Title Gravestone of Verecunda
Essential Information This stone commemorates the life of a slave woman called Verecunda.



Accession Number GLAHM F.38
Location and Date found if known Shirva Farm, near Bar Hill fort c.1728
Exhibit Information
Inscription: D M VERECVNDAE
Inscription reads: "To the spirits of the departed [and] of Verecunda"
Dimensions: H 0.91m x L 0.54m x W0.15m
The stone refers to the person who it commemorates only by the name Verecunda. Roman women were given both a personal name and a family name**.** As Verecunda had only one name mentioned on her gravestone, it is believed that she was a slave. We do not know anything about Verecunda's origins. It is possible that she came to be enslaved during the conquest of foreign provinces or was born into

slavery. The erection of a costly gravestone, rather than a cheaper wooden equivalent, suggests that Verecunda was a respected member of her household.

Interpretation / Context As slaves were legally owned by their masters, many had to endure poor treatment. However, dependent upon the household, slaves could enjoy a better lifestyle than the freeborn poor. Female slaves were usually employed for domestic tasks such as cooking, or cleaning. Others worked as midwives or nurses. As slaves could spend their whole life working for the same family, it is understandable that bonds were formed. Many were not as fortunate as Verecunda – it was common for the ashes of the poor or enslaved to be placed in a pot and buried. Others were buried with no grave markers at all.

Available Assets

- Object photographs from the Hunterian
- Video of the 3d scans of the Verecunda gravestone is available at https://vimeo.com/136081274

The Hunterian provided access to the objects for the 3D scans to be done with the agreement that it would have access to the digital files afterwards for non-commercial use. These were created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) (who were contracted by HES to do the 3D work).

Related Assets

- Bar Hill flyaround -https://vimeo.com/102815441 A virtual reconstruction of the Roman fort at Bar Hill, showing the main buildings and the possible civilian settlement, (Created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) for HES)
- see http://www.antoninewall.org/media-galleries/bar-hill
- 3D reconstruction of an altar dedicated to Silvanus also found at Bar Hill Fort. The inscription read [D]EO SILV)ANO C]ARISTAN[IVS I] VSTIANV[S) PRAEF [C]OH I HAM V S L L M which translates as: Dedicated by Caristanius Justianus, prefect of the First Cohort of Hamii. The altar measures 0..92 x 0.45 x 0.26 m. Hunterian Museum - GLAHM F.24, owned and created by HES https://vimeo.com/98561638 (Created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) for HES)

Tech Suitability 1) Exhibit Brower, 2) Other

Tech Comments

1) The visitor can see a photo of the gravestone on her mobile and click on the inscription to learn more about it (e.g., that it reads "To the spirits of the departed [and] of Verecunda"). She can also click on the broken sections of the gravestone and learn that it was reused as building material by Caledonian settlers for a dwelling.
2) Apart from translation from Latin to English, offer users the possibility to write a sentence they want in English (or any other language?) and have it automatically translated to Latin. Offer users option to choose patterns, colours, and textures of what they would put on their own gravestone. Upload the personalised gravestone to an online gallery where the visitor can see their gravestone alongside other peoples. Share their gravestone via social media.

Keywords / Themes Religion, Death, Abandonment, Domestic Life, 'tumulus' - burial mound, Slavery, Women

Reflection / Questions
How did Verecunda feel about living in the frontier of the Roman empire?

What was her relationship with the members of the household where she lived?

Comments As the Romans believed that dead bodies had polluting qualities, cemeteries were always situated outside settlement walls. It is believed the gravestones were taken from the fort cemetery after the Roman departure from Caledonia, and were recycled as the supporting walls of an indigenous dwelling. This explains why they have survived in such good condition.

6.2.3 Interpretation Card Examples

See Annex, sections 14 and 15.

6.3 Experience Types and Card Sets

This section introduces a selection of the different experience types we aim to offer and how card sets are related to them. These experience types will be elaborated and added to as EMOTIVE progresses.
Card sets are two or more compatible Interpretation Cards put together in the context of a story or a location-aware experience. The rest of this section explains these sets in greater detail.

6.3.1 Role-playing Story Experiences

Description A story is created by using multiple Interpretation Cards, which are "compatible" and serve specific purposes under the story concept that was determined.
The main story structures we want to explore are role-playing experiences, where the visitor assumes a role in the story and sees it unfold from a first-person view. For example, the visitor may be a Roman soldier in an Antonine Wall fort.

The basic story plot needs to be interesting and engaging. At various points, it will make brief mentions to "objects" that the visitor can see onsite. These mentions will be carefully integrated in the plot as not to disturb it and will serve a real function in the plot (i.e., they will not be there just to make the reference to an onsite object). When a mention to an onsite object is made, the story temporarily stops and the visitor is encouraged to seek the object in the actual site (or virtual representation of the actual site). Then we go into a mode where we interpret the object in the context of the story, i.e., the visitor learns something *about the object that helps her understand the story better*.

For example, if we make a mention to the hammers that Roman soldiers used for public works during peacetime, a hammer must appear in the story and it must have a real function in its plot. Furthermore, the information the visitor gets when examining the hammer exhibit needs to inform your role-playing experience as a Roman soldier.

Note that the archaeologist needs, at a minimum, to identify a story concept and create a card set. Creating the end-user story is done by the creative industry, however, in our experience, archaeologists' contributions to the story through the co-design process have proven meaningful both for the final experience and for the archaeologists' own research process.

STORY SET TEMPLATE (WITH EXPLANATORY COMMENTS)

Story Concept The basic story concept, e.g., the life of a Roman soldier stationed at the Antonine Wall
Referenced Card The title of an Interpretation Card that will be used in the story
Function The function the card above has in the story. Possible functions are presented below. Other function may also be possible.

(a) Character. The card describes a character the visitor can meet or a character she can assume (i.e., role-play as such a character).
(b) Props. The card describes an object the visitor or story characters can interact with.
(c) Setting / Backdrop. The card describes the story's setting, i.e., the environment and historical backdrop where the story takes place.
(d) Events. The card describes an interesting historical event that the visitor can take part in or witness as part of the story.
Please include a "Referenced Card" and "Function" for every card that is part of the set.

6.3.2 Collaborative Location-aware Experiences and Card Sets

Description A collaborative location-aware experience is based on multiple Interpretation Cards that can be meaningfully placed in nearby locations in an open-air archaeological site (e.g., the Antonine Wall). The type of experiences we are targeting are equivalent to a "find-the-clues" or "treasure-hunt" game, where two teams race against one another to find as many artefacts/clues as possible (it can also be non-competitive with all the visitors being in one team). Along the way, we give the participants interesting snippets of interpretation for the artefacts, which also play a role in the game (for example, you need to understand them to solve a puzzle, like in a real treasure hunt).

This experience type can also play out in a hybrid session, where some people are on site and others are at home (or, possibly, some are in an open-air site and some are at a relevant indoors museum, e.g., Antonine Wall and Hunterian Museum, Parthenon and Acropolis Museum, etc.)

COLLABORATIVE LOCATION-AWARE SET TEMPLATE (WITH EXPLANATORY COMMENTS)

Game Concept The basic game concept, e.g., a murder has taken place in the Red Hill Fort, search the area around you to find clues and solve the mystery
Referenced Card The title of an Interpretation Card that will be used in the game
Note that the archaeologist only needs to identify a basic game concept and create a card set. Creating the gaming experience is typically done by the creative industry and relevant gaming experts, but meaningfully benefits from co-design with site experts.

6.3.3 Collaborative (Hybrid) Game Experiences

Game Concept The basic game concept, e.g., a murder has taken place in the Red Hill Fort, search the area around you to find clues and solve the mystery
Referenced Card The title of an Interpretation Card that will be used in the game
Note that the archaeologist only needs to identify a basic game concept and create a card set. Creating the gaming experience is typically done by the creative industry and relevant gaming experts, but meaningfully benefits from co-design with site experts.

6.3.4 Short Story Experiences

Description A short story revolves around a specific Interpretation Card and it is a rather brief experience (e.g., 5 minutes). Its goal is to present the information of the Interpretation Card in an engaging way by good creative writing and by leveraging various technologies offered by the consortium.

7 Conclusions and next steps

This document and the accompanying Annex, encompass the alpha version of the work on eliciting user requirements and drafting scenarios for the EMOTIVE project. In this sense, the documents combines a body of rich and diverse preliminary work carried out on multiple fronts, and thus may come across as disconnected. Nevertheless, the extensive work described in this collection of documents reflects the defining characteristics of the project: an iterative, participatory design approach, where target users form the core of the design activity.

Our next steps, following the iterative nature of our approach, will be to refine and focus on specific aspects of the user work described here that can be carried forward. As already mentioned, the main objective of the EMOTIVE authoring approach is to bridge the gap between the domain experts and the visitors by providing appropriate authoring methodologies and tools to experience creators that will support all those involved in authoring (e.g., domain experts and creative industries) to create EMOTIVE storytelling experiences.

To this end, the current document becomes an important resource and a practical foundation for the EMOTIVE project.

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9 About the Annex

The accompanying (separate) file, titled *EMOTIVE_D3.1_UserReqs-ScenariosA_ANNEX*, includes detailed descriptions of the following:

1. GROUP PERSONA TEMPLATE
2. ÇATALHÖYÜK OBSERVATION DATA (SAMPLES)
3. ÇATALHÖYÜK GROUP PERSONAS
4. HUNTERIAN MUSEUM ANTONINE WALL PERSONAS
5. EMOTIVE 1st USER WORKSHOP, GLASGOW, FEBRUARY 2017
6. EMOTIVE WORKSHOP WITH GSA MSc IN INTERNATIONAL HERITAGE VISUALISATION STUDENTS AT THE HUNTERIAN MUSEUM, GLASGOW, MARCH 2017
7. MUSEUM STUDIES COURSE DIGITAL STORYTELLING WORKSHOP UNIVERSITY OF ATHENS, DECEMBER 2016 TO FEBRUARY 2017
8. DIGITAL STORYTELLING EXPERIENCE EVALUATION AT THE ANCIENT AGORA OF ATHENS, DECEMBER 2016
9. DIGITAL STORYTELLING EXPERIENCE EVALUATION AT THE HISTORY MUSEUM OF ATHENS UNIVERSITY, NOVEMBER – DECEMBER 2016
10. DIALPAST COURSE DIGITAL STORYTELLING WORKSHOP, NORWEGIAN INSTITUTE, AUGUST – SEPTEMBER 2016
11. EVALUATION OF AUTHORING AND USING CHESS COLLABORATIVE EXPERIENCES BUILT FOR ÇATALHÖYÜK, 2015-16
12. CHESS EARLY EXPERIENCE AUTHORING APPROACHES AND LESSONS LEARNT, 2012-2015
13. SUPPORTED TECHNOLOGIES BY EMOTIVE CONSORTIUM
14. ÇATALHÖYÜK EXPERIENCE AND INTERPRETATION CARDS
15. HUNTERIAN ANTONINE WALL INTERPRETATION CARDS AND CARD SETS
16. QUALITY CHECKLIST

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Storytelling for cultural heritage

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D3.1 – User Requirements & Scenarios – Alpha **ANNEX**

Sara Perry[2], Akrivi Katifori[1], Manos Karvounis[1], Maria Economou[5], Hilary Young[5], Laia Pujol Tost[2,5], Maria Roussou[1]

Reviewed by:
Ioannis Komnios (EXUS)

Abstract
This deliverable reports on the user needs and requirements for EMOTIVE experiences, focusing on both main user groups targeted by the project, namely authors and visitors. Visitor groups have been identified for EMOTIVE cultural partner sites (The Hunterian Museum's Antonine Wall site display in Scotland and the archaeological site of Çatalhöyük in Turkey) and presented in the form of *personas*. The second part of the document presents selected interpretation material and proposed experience concepts that will lead to the creation of EMOTIVE experiences for both sites. An accompanying D3.1 Annex includes supplementary information on the studies and events carried out in support of user needs elicitation and scenario development.

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Version: 1.0

Partner	Estimated Effort (in PMs)
[1]ATHENA	2
[2]YORK	1.5
[3]DXT	0
[4]NOHO	0
[5]UGLA	1.5

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LIST OF ABBREVIATIONS

AW: Antonine Wall
AR: Augmented Reality
ATHENA: Athena Research and Innovation Center in Information Communication and Knowledge Technologies
CHESS: Cultural Heritage Experiences through Sociopersonal Storytelling project
EB: Executive Board
PB: Plenary Board
UI: User Interface
UGLA: University of Glasgow
UX: User Experience
VR: Virtual Reality
WP: Work Package
WHS: World Heritage Site
York: University of York

1 Group Persona Template

Group Name	
Picture	
Group Type	
Total Number	
Relationship	
Ages	
Gender and Name	
Country of Origin	
Occupation	
Language	
Hobbies/ Interests	
Technology	
Group Goals	
Challenges and Frustrations	
Group Needs	

2 Çatalhöyük Observation Data (Samples)

Date:	**09/07/16**
Start time:	15.25
Tour guide's name:	XXX
Number of people in group:	40+ (huge group!)
Age, nationality and demographic of group:	Mostly families of local Turkish visitors, mixed ages. One Turkish/American family (who live in US and come home to Turkey every 2-3 summers) - 2 adults, 1 older teen girl, 1 younger teen boy. One family with a baby carriage.
Other notable features about group (e.g., dress, presence of guidebooks, use of photog/video equipment):	Almost all wearing sneakers and Western dress.
Weather:	Very hot and sunny.
Other notable features about site or tour:	XXX and I missed the very beginning of the tour - we caught up with the group as they were entering the North Shelter.

Times of observations + Notes	**Themes**
15.25 Arrive at North Shelter **- Lots of photos taken** **- Very crowded, people moving through to the walkway on their own** **- Many read signage only briefly as they pass** **- Various questions and conversation** **- Many, but not all, continue on to the far area of the walkway (dead end beyond the exit) to read our signs**	Questions Photos
15.30 Exit of North Shelter **- Q: "Who is excavating this area?" (Turkish - Burcu translated)** **- Q: "Why did they only excavate a small area?" (American boy asked Dena)** **- Q: "Were they Roman?" (Turkish/American mom)**	Questions Total time in NS = 5 min (some may have had a slightly longer dwell time before we joined)
15.38 Arrive at South Shelter **- Selfies** **- People walking through at their own pace to bottom of Shelter** **- "Why is there not a ramp?" (Family with baby carriage)** **- Various questions/comments in Turkish** **- Q: "Is there a current excavation happening?" (Archaeologists had left site for the day. I explained a bit about the international Research team. American family was very interested in the Stanford connection.)**	Questions

- Family with baby carriage leaves and heads back to Visitor Centre area **15.42 Walking to top of South Shelter** **- No stopping at TPC, but some people peered in before moving on into the South Shelter** **15.46 Top of South Shelter** **- Small girl takes photo of TPC** **- American family tells me that the girl studied Catal in AP World History, which is how they decided to come here.** **- Burcu leads a discussion with at least half of the group about: destruction and reconstruction of houses, the burials, etc.** **15.50 Leave South Shelter** **- Some had already started leaving on their own** **- Various questions in Turkish as we leave** **- Q: "So we're standing on buried corpses right now?" (American boy)** **15.56 Bottom of the mound - end of tour** ****Note: There were tons of new people in the Visitor Centre when we got back. Also, some of the people who were on the tour went into the Visitor Centre after. Did not see if anyone entered the Experimental House.**	Photos Discussion Tour-guide led discussion Questions Total time in SS = 12 min Total Time of Tour = 31 min

Date	**11/07/2016**
Start Time	2.21 pm
Tour Guide's Name	XXX
Number of people in group	3
Age, nationality and demographic of group	Family group of 3 (parents 50+ and daughter 18yo). Travelling from Washington State. Asian. Educated.
Other notable features about group	Casual dress with closed shoes. All had cameras.
Weather	Hot and summery
Other notable features about site or tour	Toured whilst there were no archaeologists working. Was just prior to the new signs going in so there were two gaps on the walls regarding excavations.

Time	**Notes**	**Themes**
2.20	**Visitor centre**. Followed the narrative to the left, got disjointed at the old	Size of the site Use of site

	panels and split up to look at different things. Daughter spent a lot of time with the artefacts, mother read the scarves and commented that she thought it was nice that they involved / represented the community. Did not ask me many questions during this part of the tour, were happy to just read all the information. Took photos of the group at the entrance to the centre.	Role of archaeologists
2.30	**Experimental house**. Asked a million questions about why archaeologists do experimentation / reconstruction, what it was that they found, how we know things looked certain ways. The father also offered hypothesis and engaged in the discussion of why the roof entrances and position of the stove, daughter was interested in what else we experimented on and asked if there was more information available on experimental archaeology. The group followed the planned narrative for the first 2 signs but then got distracted.	Experimental archaeology Archaeological process Archaeological thought How people lived in the past How we know how people lived in the past
2.42	**North Shelter.** Walked to the top of the north shelter and they engaged in discussion as we progressed over the mound – talking to each other and then asking me specific questions. Wanted to know why the structure was built / what it covered / whether it was more effective than leaving it open to the elements etc. Group was particularly impressed at the top of the hill and took 30+ photos between them here – all of the archaeology and also of me pointing out things. Some of the equipment was still on site – the theodolite, buckets and spades and they asked many questions relating to how excavation occurs, why the first house is fully excavated and not the others yet and what all the various walls were. They were particularly interested in the use of ochre, excavation practices, the egalitarian society, how vast the site was and the construction practices in	Size Use of ochre Construction methods Archaeological practice Archaeological method Buildings Living spaces Structures Egalitarianism Mother goddess / figurines The north shelter construction

	the past / how we could observe them now.	
2.55	**North Shelter.** Father was particularly interested in the mother goddess figurines and engaged in conversation within the group about whether they were mother goddess figures or something else. Brought in discussion of other figurines / making practices / ritual / art.	Art Figurines Making Ritual
3.05	**Walk to South Shelter.** Walked across the mound and they discussed how the society built up, the construction / destruction cycle of houses and the enormity of the site.	Size of site Society build up Cyclical nature of life / death in houses
3.08	**Highest point.** Took a lot of photos. Asked what the well preserved rock formations were, laughed when it was said that it was the highest point on the site. Took 20+ photos of the landscape and them on it. Asked questions about where else in the world I had worked doing archaeology and were interested in drawing out comparisons / similarities / differences with where I had worked in Egypt – both in terms of archaeological method and the past. They were particularly fascinated with the idea of post-processualism.	Comparison to other Neolithic sites / themes Similarities / differences to archaeological method elsewhere. Post processualism Interplay between past and present
3.10	**South Shelter.** Took 80+ photos between the group members around the bottom of the shelter. Were ridiculously impressed with the scale and how much they could see. Questions were particularly focussed around the wall paintings, differences in construction at the bottom of the hill and the top, how archaoelogists use stratigraphy, the Mellaart vs Hodder excavations and how the site compared to other Neolithic sites they had visited around the world.	Wall paintings Burials Living with the dead Construction changes over time Mellaart / Hodder Neolithic in general Comparison to other Neolithic sites
3.30	**South Shelter.** Took another 40+ photos from the side of the shelter. Were interested in the conservation teams work. Asked a huge number of questions regarding why conservation was important, how conservation happens and the artefacts that they could see on the various information	Conservation Artefacts Art Relationship of the Neolithic to earlier and later phases

	boards. They discussed amongst each other the role of art / aesthetic on the site. They also were interested in how the Neolithic lined up with the paleolithic and other phases such as the Ottomans.	
3.50	**Spoil Heaps.** Were really interested in the spoil heaps and the impact which archaeologists have on the landscape as they excavate. Asked lots of questions about the sieving stations and how the labs fit into the archaeological practice. Took 10+ photos of the spoil heaps and old Mellaart excavations.	Spoil heaps Archaeological processes Role of the labs Sieving
4.00	**Base of the Hill.** Tour came to a close, they stayed on to ask some additional questions of me and take photos back up towards the site. They asked to take photos with me as it was the first site they had been to that an archaeologist had been on hand to talk to them – a key quote from their closing statements about the site: *"what a special place and a special experience… today was unforgettable"* They had visited multiple other UNESCO sites around the world (take the summer holidays off to travel in a caravan as a family for 2months every year around the world). Highly educated family (father and mother both held PhDs and the daughter was about the start university to study computing + bioarchaeology). As a group they wanted to know everything, discuss broader themes between themselves and include me in these discussions. The only criticism they had of the site was that it could have more life in the tour – they mentioned that the commentary provided by the boards went some way to staring conversation within the group, but	Archaeologists How incredible the site was

	that “such an incredibly special place could come alive more”.	

3 Çatalhöyük Group Personas

Group Name	Ozan Family
Picture	 https://www.flickr.com/photos/77967821@N00/5736726108/
Group Type	Family unit within a larger tourist group
Total Number	18 tourists in all; our family is 3
Relationship	The tourist group is made of several family groups: strangers to each other. Our group is grandfather, his daughter, and her son (hence grandson)
Ages	67, 40, 10
Gender and Name	Kemal Reis (male - grandfather), his grandson Adem Ozan (male), and his daughter Seda Ozan (female - mother to Adem)
Country of Origin	Turkey - Ankara - 4 hour drive to Çatalhöyük
Occupation	Kemal is retired, Seda is a middle school teacher, and Adem is a young student
Language	Turkish
Hobbies/ Interests	(1) **Kemal** enjoys gardening and woodworking. He is an avid reader, and a bit of a luddite. He particularly enjoys doing research into local history and family ancestry. (2) **Seda** teaches middle school science and is very physically active. Enjoys running and swimming on the weekends. She uses technology often but doesn't really understand how it works. She prefers using her digital camera rather than taking photos on her smartphone. She is a fairly social person and is keen to strike conversation in quiet moments. (3) **Adem** is very interested in dinosaurs and trains. He is excellent at using technology - much to his grandfather's chagrin, and is quick to pick up new games and apps.
Technology	Kemal has a Nokia (no wifi/3g), Seda has an iPhone 6.0 and Adem has Seda's old iPhone 4.
Group Goals	Seda wants to have an enjoyable time out with her family. She hopes that Adem will gain some interest in history. She is the one that has booked her family on the tour. Her father Kemal loves to follow along on these outings to spend time with his grandson. He has heard of Çatalhöyük and is curious to see whether what he's heard matches the reality.

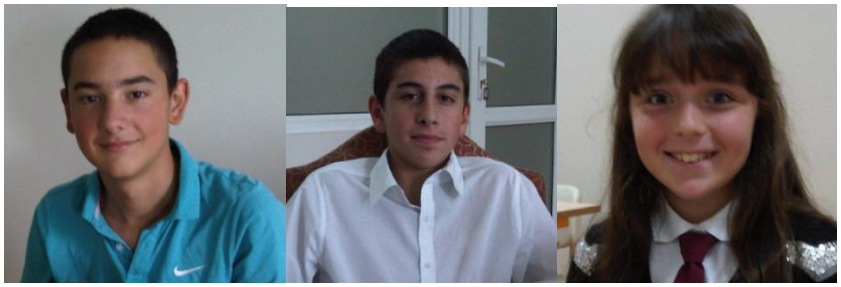
	The needs of their family, however, must also be shared with the needs of the wider group, which moves at a clipped pace throughout the site. Adem is quite happy to bounce around, but Seda and Kemal are a little frustrated with the quick speed of the wider group.
Challenges and Frustrations	A challenge they face is compromising with the wider group. Kemal finds it a little hard to move around owing both to his age and his interest in the site. He feels it would be nice to move slower – he also wants a closer view of the archaeology. He's hoping to get inside one of the excavation units to touch the walls of these homes from the distant past. Unlike his daughter, he's not naturally inclined to speak to the other people in the group.
Group Needs	The group needs to get through the site efficiently and keep together as a whole. The tour guide needs to achieve satisfaction from customers – on an enjoyment level, perhaps on a knowledge base too (although this is more secondary because it's a leisure tour). The site's guards need tourists to stay on the path and steer clear of the archaeology as it is fragile and easily destroyed.

Group Name	**Sadik Family**
Picture	 https://c1.staticflickr.com/1/63/194690227_e59351ce1b_b.jpg
Group Type	Local Turkish family
Total Number	4 people in total
Relationship	Two parents, two young children
Ages	35, 36, 5, 2
Gender and Name	Arash (male) and Cari (female) and their children: Fatma (female), Erol (male)
Country of Origin	Turkey, Konya - about an hour's drive to Catal
Occupation	Arash is a mechanical engineer, Cari is a full-time parent and used to work at a department store. They've been married for 6 years.
Language	Turkish and some English
Hobbies/ Interests	(1) **Arash** is the main person who encouraged the family to come here, as he remembers hearing from a colleague that it was an enjoyable place to take the children on a free day. Arash likes technology - he's always buying the next new piece of tech even before his old one is used up. (2) **Cari** is pregnant with their third child, and tends to spend her days trying to come up with interesting things to do with her children. She particularly likes taking them to zoos because she loves watching them look at the animals and they are always engaged with what's in front of them. (3) **Fatma**: like her mother, Fatma loves animals. Her favourite animal is her cat. Fatma has limited technology time everyday so she spends a lot of time playing outdoors or with her pets. She is a pretty quiet child for the most part and is a little shy in new places. (4) **Erol** is a little more attention-seeking than his sister, and prefers to be chatting or crying most of the time.
Technology	Arash has the newest iPhone on the market, as well as a Smartwatch and a tablet. Cari has one of his old iphones (5.0), which still works perfectly. Fatma and Erol do not have any technology.
Group Goals	The goal for today is to offer a pleasurable day out with the children. There was not a lot of research done about the site beforehand - it was merely an activity to carry out only an hour away from home. Arash and Cari

	remember a little about Çatalhöyük from when they were in school, but not much else.
Challenges and Frustrations	Erol is only young and finds it hard to focus, often fussing if too much time is spent in one place. Arash, despite liking new pieces of tech, is not too keen on using them at a historical site and doesn't like his children using technology for more than a certain amount of time per day. Cari doesn't have much inclination to interact with other people. She's focused mainly on keeping her children in check.
Group Needs	Arash and Cari need to entertain their children for a day out. They have a collection of souvenirs they've collected from the zoos and cultural sites they've visited, and they're interested to add to this collection on their visit to Çatalhöyük.

Group Name	**Ford-Jones Family**
Picture	  https://upload.wikimedia.org/wikipedia/commons/thumb/9/99/Gay_Couple_Reed_and_Drew.jpg/ http://1.bp.blogspot.com/-JsppjYlP1to/UguHPht8poI/AAAAAAAAP0A/pi4A4rAtMdg/s640/gadis.jpg
Group Type	American family visiting
Total Number	3 in total
Relationship	Two parents, older child
Ages	37, 33, 17
Gender and Name	Arthur (male) and Noah (male) and their daughter Abigail (adopted, female)
Country of Origin	San Francisco, California, USA
Occupation	Arthur is a lawyer and Noah is a blogger and works from home. They've been together for 15 years, having adopted Abigail when she was five. Abigail is about to graduate from high school and begin university studying Archaeology
Hobbies/ Interests	(1) **Arthur** is a lawyer. He is really interested in History, but more Modern History than anything earlier. He is particularly fascinated with the Second World War, and watches all the TV shows he can find on it. (2) **Noah** is the author of a semi-successful political blog and he devotes the majority of his time to Abigail's school activities, especially theatre. He's looking for another hobby to take up when Abigail moves away to university: he has his eye on pottery making. (3) **Abigail** is about to graduate from high school. A theatre fanatic for all four years of school, she is also an excellent student and an obsessive planner. It was her idea to travel around to visit archaeological sites with her parents before she heads off to university in England.
Technology	Arthur and Noah both have older iPhones. Abigail has an older Android phone, but her parents bought her a tablet for university which she is new at using. None of them, however have 4G access in Turkey.
Group Goals	The primary goal is driven by Abigail - she was the one that did the research on this site and was so keen to visit it herself. She is particularly interested in the method and theory of excavation at the site. Arthur is probably the next most interested, but he is unsure how relevant prehistory could be to him.

Challenges and Frustrations	Abigail has come with a lot of preconceived notions about the site: it's one of the most important places in the world for archaeologists. She wants to use this as an opportunity to prepare for her future studies. She did research before coming here in order to properly time their visit: she knows that a team of experts is on site doing excavation and other studies. Her theatre background means she's easily excitable and chatty. Arthur and Noah are fully expecting not to really understand what's happening. Noah's been interested in the political situation in Turkey for many years and is somewhat worried about visiting the country.
Group Needs	Abigail feels like she should meet an archaeologist or at least get a sense of the job whilst she's here. She wants photo and video documentation of her experience. Noah wants to keep the group safe. The site's guards need tourists to stay on the path and steer clear of the archaeology as it is fragile and easily destroyed.

Group Name	**School Group**
Picture	 https://www.flickr.com/photos/25649583@N00/6199978501/ https://www.flickr.com/photos/25649583@N00/6200481192/ https://www.flickr.com/photos/25649583@N00/6199948547/
Group Type	Teenage students
Total Number	40 students in total, but 3 of these 40 are the focus here
Relationship	These 3 students know one another from school, however they wouldn't call themselves friends
Ages	14, 15, 14
Gender and Name	Turan (male), Hasad (male), and Melika (female)
Country of Origin	Turkey
Occupation	Students
Language	Turkish
Hobbies/ Interests	(1) **Turan** is very interested in photography. He has an active Instagram account and is constantly looking for new subjects to capture. He is not the best student. He's also a bit of class clown. (2) **Hasad** loves video games and board games, and is never found without a deck of cards. He also likes to hike and his favourite subject is geography. (3) **Melika** is aware that she is little over-attached to her mobile phone and is an avid user of Snapchat. She is convinced that history is nothing but a boring list of dates and names that she has to memorize.
Technology	Turan has a new (recent model) Android phone. Hasad has an older generation iPhone, and so does Melika, but hers usually has slow 3g. None of them are very far from their phones at any given time.
Group Goals	These students are not over-enthused about being here in the summer and they do not have any great expectations about having fun. One of their main goals is to try to make the best of it and have a good time if they can - focusing on the things they really like, including a day out with their friends (although they're stuck with a lot of other students they don't like or feel indifferent to). Both Melika and Turan are keen not to let their social media accounts lag during this time. Their various friend groups expect to be kept up-to-date on their activities.
Challenges and Frustrations	One of the main challenges is that these students did not *choose* to be here: they were selected by the school. Therefore it was necessity - not curiosity - that drove them to visit the site. Hasad is also a little upset because he is missing a games convention to be here. Under normal circumstances they wouldn't hang out with each other.
Group Needs	The students need (ideally) to learn something from this experience - perhaps even remember something from their time here for the future. However, this trip wasn't part of the usual teaching programme as prehistory has recently been removed from the curriculum.

	The group needs to get through the site efficiently and keep together as a whole. The teacher needs to keep an eye on everyone, make sure they drink water, eat lunch and stay safe. The school wants to use this trip as a promotional opportunity, showing prospective students and others what an exciting programme of extracurricular activities they offer. The site's guards need tourists to stay on the path and steer clear of the archaeology as it is fragile and easily destroyed.

Group Name	**Demir and Clark Family**
Picture	 http://previews.123rf.com/images/lvnel/lvnel1005/lvnel100500040/6985355-young-Turkish-student-group-of-friends-in-a-row-with-faces-close-Stock-Photo.jpg
Group Type	Turkish family with a member visiting from abroad
Total Number	4 in total
Relationship	A sister (younger) and brother (older) with their two spouses.
Ages	30, 32, 35, 35
Gender and Name	Ben Clark (male) and his wife Aylin (female), her brother Burak (male), and his wife Nisa (female) hosting them
Country of Origin	Burak, Nisa and Aylin are all from Turkey originally, but Aylin lives with her husband Ben in England.
Occupation	Burak is a carpenter and his wife Nisa is a chef. Aylin is in the publishing industry and Ben is a lecturer in Psychology at the University of Leicester.
Language	Turkish (except Ben), and English fluently
Hobbies/ Interests	(1) **Burak** is a hard worker and has an old laptop which he uses for emails and that's about it. Most business is done over the phone. He enjoys reading and goes to the library every week to browse. (2) **Nisa** works at a little bakery and specializes in bread-making. She is good friends with her sister-in-law Aylin and it was her idea to take them all to the site this visit. (3) **Aylin** moved to the UK to study at the university in Leicester where she met Ben and was hired straight out of university into the publishing industry. She loves to read, attend concerts of all sorts, and is very sociable. She is the most technologically skilled in this group. (4) **Ben** stayed on at Leicester University after graduation, quickly securing a lectureship. He is always making jokes and is really passionate about sport, specifically football. His family back home is staying abreast of his trip to see his wife's homeland through social media. This is only his third trip to Turkey.
Technology	Burak has a Nokia. Nisa has an older Android phone. Aylin has the newest iPhone and Ben has her old iPhone 5.
Group Goals	Nisa and Aylin want to have a good time out, and are looking forward to studying the information available. Ben is keen to ask lots of questions (he's

	naturally inquisitive, although he doesn't necessarily have a penchant for history). Burak just wants to spend time with his family.
Challenges and Frustrations	This group moves at very different speeds: Nisa and Aylin move slowly through the site, reading most of the signs, but they do not ask many questions. Ben asks lots of questions to the guide but doesn't look very closely at what is around him. He also only speaks English, and their are no English speakers or experts on site to help him. The site guards don't necessarily have up-to-date information on Çatalhöyük's recent excavations - and what they do say is minimal because they are not fluent in English. Burak wants to move quickly through the displays but must wait patiently for this family to catch up. Given that they also have to stay close to the guard for the tour, Burak is feeling frustrated about the pace.
Group Needs	The group aims to have an enjoyable day out. Ben wants to take pictures for his family back home - and maybe for his students too, if anything is relevant. He's keen on capturing the experience. His inquisitive nature means he's also always asking questions. The site's guards need tourists to stay on the path and steer clear of the archaeology as it is fragile and easily destroyed.

4 Hunterian Museum Antonine Wall Personas

Name	**Mary Paterson**
Picture	
Age	70 years old
Gender	Female
Background	Scotland. Born in Glasgow. Lives in Glasgow's affluent West End. She is a widow. Her husband died over 10 years ago. Since then she has become very active socially within Glasgow and has joined several societies.
Occupation	Retired History High School Teacher
Language	English
Hobbies/ Interests	She is a Hunterian Friend and is also a keen member of the local history club. As well as visiting local museums and galleries in Glasgow she regularly travels to Edinburgh to see temporary exhibitions. She likes to knit and is interested in crafts and making things.
Technology	She has as an iPad but is not very comfortable using it and sometimes gets confused about technical things. She has an email, Skype and Facebook account, set up for her by her granddaughter. She checks emails every couple of days but is wary of Facebook. She doesn't post on it very often but reads material related to her interests.
Goals for the Visit	She wants to have a shared experience with her granddaughter that they will both enjoy. She wants to pass onto her grandchildren, Annie and Callum, her love of objects and appreciation of the stories they can tell us. She wants to learn more about domestic life along the AW. She would like to be able to plan for future visits with her family and friends.
Challenges & Frustrations	She likes to be able to concentrate on the objects on display and is unsure of how technology can help her enjoy an exhibition.
Individual / Social	She will be visiting with her granddaughter Annie. She needs to keep her entertained but does not want technology to "spoil the essence of the museum experience."

Interaction Needs	

Name	**Annie Paterson**
Picture	
Age	15 years old
Gender	Female
Background	She was born in Newcastle where she lives. She is about to start her A-Levels next year. She has a ten year old brother. She loves her granny but misses her friends when she visits. She is deaf from one ear.
Occupation	Pupil at a local high-school.
Language	English
Hobbies/ Interests	She doesn't like museums. Communicating with her pals, mainly on social media, is very important. She is thinking of taking Art and Design and Graphic Communication as two of her A-levels. She has a ten year old brother, Callum. She loves her granny but misses her friends when she visits.
Technology	She has a quite decent android smartphone and wants to get an iPhone 6. She is constantly on her phone. She has Facebook, Instagram, Snapchat accounts .
Goals for the Visit	She wants to keep Granny Mary company and do something nice with her. She must be able to share her visit with her friends.
Challenges & Frustrations	When she is visiting Granny Mary in Glasgow they always go to museums and cultural sites. She finds museums boring and would prefer to be hanging out with her friends on Facebook. She is sometimes frustrated because her grandmother is "slow" with technology
Individual / Social Interaction Needs	She uses a hearing aid. She will be visiting with Granny Mary. She is bored of the same exhibits and wishes that there was something new each time she visits. She would like to be able to capture and share her experience as well as access and muck around with it after her visit.

Name	Susie Wong
Picture	
Age	21
Gender	Female
Background	From San Francisco, USA. She is a Hunterian Museum University Student Educator (MUSE) and regularly gives tours about Hunterian displays.
Occupation	Museum Studies full-time postgraduate student at Glasgow University.
Language	English. Mandarin.
Hobbies/ Interests	She likes travelling and is interested in exploring other cultures. She is interested in migration, intercultural dialogue, and social integration
Technology	She uses Facebook, Instagram, Tumblr (and has set up a MUSE FB group to coordinate with the other MUSEs); she reads and occasionally writes blogs related to her MUSE activities. She has a MacBook air and an iPad. She uses email frequently and skypes often with her family at home in San Francisco and her grandfather in China.
Goals for the Visit	As a MUSE, she has not done any Antonine Wall tours yet and wants to learn more about the subject as she is keen to start giving tours on it very soon. She is interested, in particular, in Roman religion and belief as this is related to her undergraduate dissertation topic.
Challenges & Frustrations	She is impressed by the diversity and size of the Hunterian collections but thinks that the displays on their own do not bring out sufficiently the personal and emotional element. She would like to be able to: a) engage more actively with diverse audiences about the collections; b) act as a mediator between curators and other specialists and visitors; as well as c) encourage visitors' own contributions when interacting with the objects.
Individual / Social Interaction Needs	Apart from her own personal interest in the subject, Susie also has a role as a mediator, as she plans to deliver guided tours of the Antonine Wall display.

Name	Carlos Garcia
Picture	
Ages	25 years old
Gender	Male
Background	He is Spanish and lives in Madrid.
Occupation	Engineering Erasmus exchange student
Language	Spanish. Basic English
Hobbies/ Interests	He is visiting the University of Glasgow for one semester. He is very sporty and has already joined the university football and basketball clubs. He is a keen photographer. He doesn't visit museums in general. He is keen to improve his English and maybe… find a Scottish girlfriend. He has been to The Hunterian once as part of his orientation to Glasgow. He is excited about how things are constructed so has shown some interest in how the Antonine Wall was built.
Technology	He is very good with specialised CAD software and has a smartphone and a heavy-duty laptop. He is on Facebook and What's App.
Goals for the Visit	He is doing something about building materials as part of his studies and he wants to have a quick look at the Antonine Wall again in case it is useful for his engineering modules. He would like to have fun during the visit and meet new people
Challenges & Frustrations	He feels museum visiting should not be a lonely activity where you seem to be in the school classroom learning about uninteresting things. He doesn't understand all the text in the display
Individual / Social Interaction Needs	He doesn't want to be bombarded by too much information on topics he is not interested in. He would like to interact with other visitors (girls if possible).

Name	Callum Paterson
Picture	
Ages	10 years old
Gender	Male
Background	He was born in Newcastle where he lives. He is Annie's brother and Mary's grandson. He is dyslexic.
Occupation	School Pupil
Language	English
Hobbies/ Interests	He likes to construct and build things. He is a big fan of Lego and Meccano. He also likes to play Minecraft and is fan of the creator, Stampylongnose. He loves football.
Technology	He has access to the family PC at home that has parental controls set up. He uses Skype to keep in touch with Granny Mary and his sister Annie when she is away.
Goals for the Visit	To share the visit with Annie and Mary while he is at home. He would like to be creative and build something (either on the computer or with his hands) that he could keep and play with (either physically or digitally).
Challenges & Frustrations	He loves Glasgow and Granny Mary's baking and is a bit upset that Annie is visiting without him. He has asked for a souvenir from their visit to the museum. It takes him a while to read text and prefers to get information in other forms. He finds using technology usually a useful aid and gets frustrated when he is not able to customise the interface he uses.
Individual / Social Interaction Needs	He doesn't want to miss out on anything cool. He likes to be able to customise the interface on the devices he uses. He would like to be able to see from home what Annie and Granny Mary are doing during their visit, communicate with them, as well as get close-up views of the exhibits. He would like to build things (both physically and digitally) related to the Antonine Wall and be able to invite his friends to play with him.

5 EMOTIVE 1st User Workshop, Glasgow, February 2017

5.1 Day 1. Çatalhöyük experiences and scenarios

The 1st Emotive User Workshop conducted in February 2017 and reported on in D3.4 aimed, in part, at developing initial prototype emotive experiences for visitors to Emotive's two principal cultural partner sites, the Hunterian Museum in Glasgow, Scotland (specifically its Antonine Wall exhibition) and the archaeological site of Çatalhöyük in Turkey. Using an authoring strategy applied in previous CHESS and Emotive activities, groups of workshop participants were assigned personas and tasked with designing a relevant Emotive experience for that persona.

We do not repeat here the detailed workshop description presented in D3.4, but rather summarise the specific outcomes of each group design activity, starting with Çatalhöyük below, and subsequently, the Antonine Wall.

5.1.1 Group 1 designing for the Ford-Jones Family

- Roleplaying adventure
- Emotional tagging & matching of objects and visitors to one another
- Push notifications (from the system and from other visitors on site themselves)
- Pre-visit personalisation
- QR codes

This group structured their design around the poor technological support at the site, recognising the need to provide strong pre- and post-visit experience. On-site experiences would require that all material be downloaded in advance of a user's visit, and QR codes were discussed as a means to activate the appropriate parts of this downloaded material. The focal persona in the Ford-Jones Family was recognised as the daughter Abigail, who wants to become an archaeologist in the future. This led the group to decide that the experience would revolve around users assuming the roles of archaeologists who currently work at the site. Specialities within archaeology (e.g., archaeobotanist, osteoarchaeologist, pottery expert) could also be assigned to users in order to promote collaboration and communication between them, emulating the model applied in the Çatalhöyük Research Project itself.

The overarching vision for the experience was identified as follows:
Motivation... Create unique visitor experiences that repeatedly reward and trigger curiosity
Goal... Increase participation pre-visit, positive engagement while you are there and manage expectations
Visitor take-away... An emotional connection to the people who lived in Çatalhöyük
Balance... Roleplaying
Format... Adventure

Users, then, in their roles as archaeologists would be confronted by a predicament: their haunting by the ghost of a little girl, an old inhabitant of the settlement. That girl was separated from her twin sister (or brother) and is urging the archaeologists to find objects related to her so that their spirits can again be re-united. It was discussed that this "ghost" would approach the users through hints and obscure directions as to what they needed to locate. The fire in Building 52 might act as the cause of the separation between the siblings, as their house was destroyed and they were given to different families.

Whilst the concept was preliminary, the group discussed a series of requirements for the experience for its future development:

- Negative emotions
- The notion of emotional tagging of content by the users and matching them according to this tagging
- Safety concerns associated with engaging with strangers could be mitigated by getting status updates by other visitors
- Importance of pre-visit for profiling and personalisation, creating motivation to visit and enhancing curiosity and anticipation
- Need to 'touch' and not just be shown materials

5.1.2 Group 2 designing for the School Group

- Geolocated AR/VR
- Mobile photo taking and sharing
- Digital sketching
- Pre- and post-visit tasks

This group structured their design around an educational task (to be conducted using students' mobile phones) that would be assigned prior to arrival at the site, explored on the site itself, and then completed on return to the classroom. The group was inspired by several features of Çatalhöyük:

- Only two small areas of the entire mound have been excavated. The group wanted visitors to explore the whole mound rather than just the two areas.
- Residents of the site once entered and exited their homes through the roof of the buildings.
- Evidence from the site suggests an egalitarian social structure.

It was envisioned that the classroom would be split into 10 teams with each member of a team assigned an area to cover: Architecture/Civics, Geography/Archaeology, Social/Political.

Whilst the group's concept was never fully fleshed out, they suggested a general structure. Firstly, upon arrival at the site, groups would visit the reconstructed house and then view an introductory film that explained the site to the class. They would then set out across the site on a predetermined route where they would encounter several hotspots at which they would perform some task. With respect to architecture/civics, they might find an entrance to a home inscribed on the ground: the user would then deploy AR/VR on their phone to move their head from inside the house to outside where you can see the whole site as it might have been. The next marked hotspot would allow a view across the landscape and require the team to draw or take a picture relating to the geography/archaeology of the area. The next hotspot would relate to sociality, perhaps requiring the team to gather some item (e.g., bread) from another home and share it. They would then arrive at Building 52, where the tasks would come together in some fashion. They would conclude the visit by touring some additional hotspots, collecting relevant material, arriving back on the bus and then returning to the school to complete the final elements of the project.

5.1.3 Group 3 designing for the Demir and Clark Family

- Geo-located push notifications
- Mobile photo taking and sharing
- Third-person narration
- Interpersonal decision-making and reflection
- Digital voting

This group structured their design around a problem-solving task related to the fire in Building 52. They focused on enabling the visitors to leave with positive emotions, and to facilitate collaboration between the visiting parties. The experience was envisioned to unfold as follows:

- The four visitors start with the standard tour at the visitor centre. The aim here is to promote a sense of identity, so visitors are instructed to enter a pin on a world/Turkey map to indicate where they come from.
- The visitors are then instructed to pay attention to the Building 52 floor plan and take a photo of it.
- When the visitors are in front of Building 52 they get a nudge from their device that was used to take the photo at the visitor centre. A narrator asks the group to take a look at the area in front of them and see if they can make out anything unusual. The group then may notice the discoloration of the floor. In any case, the narrator points out this fact and briefly sets the scene for the fire that took place there.
- To achieve personal engagement, the group is asked to reflect on a fire they may have witnessed. They are asked to discuss between them "if your house was one fire, what would you save?"
- Then the group are reminded of a few facts they have already seen in the visitor centre: (a) the society was egalitarian, (b) people lived in very close proximity and in mixed groups. Using only these facts and what they can see in front of them at Building 52, they have to discuss and vote on the cause of the fire and if it was deliberate or accidental.
- After casting their vote, the group is presented to some further clues: (a) the fire had a lot of oxygen available and burned quickly and extensively, so the roof was most likely knocked down in preparation for the fire, (b) usually, during a deliberate fire, the tools and food reserves inside the house would have been removed, but in this case they were left inside.
- After considering this new evidence, the group has to make their final vote. After this, they are presented with all the available clues and the narrator informs them that the fire cause is not known for sure.

5.1.4 Group 4 designing for the Sadik Family

- Georeferenced treasure hunt
- Digital capture / collecting of artefacts
- 3d printing of collected artefacts as souvenirs

This group structured their design around a treasure hunt. The group agreed on two major design goals:

- to provide an acceptable experience for the whole visiting family given their time and overall enjoyment of the site would be dictated by the youngest member of the family, a 2 year old toddler.
- make the site visible/ tangible because there is not much there. Provide ways for people to imagine because the site does not give much.

They then articulated the specifics of their experience as follows, noting that they did not have time to fully develop the concept.

Setting: The design group was conscious of wanting to maintain narrative cohesion, fiction vs. facts (and the danger of misinterpreting the Neolithic period). Solution: to set the experience in modern times with, for example, a character such as a " glamorous Indian Jones" or an alien. Also discussed the inclusion of a dramatic conflict, e.g. a natural disaster.

Format: Treasure hunt, site-wide starting once leaving the visitor centre - max duration of 1 hour but with the option of being extended. No single ending is possible, and no set route. Branching narrative. The experience can be repeated with a different outcome and a different route.

Task: Visitors assist the "glamourous archaeologist" character in collecting treasure/animal remains before a natural disaster strikes either as (1) digital hotspots that reveal more layers of information/stories/pictures or (2) physical reproductions (that are clearly reproductions) that are at points throughout the route (e.g., outside building 52) that could be scanned like a QR code (taking the cutie mark on My Little Pony as inspiration). The kids could "collect" items digitally with their technology and then take home the 3D printed souvenirs at the end of the visit (e.g., animals, beads). Collecting the objects is simple for young kids while there might be a narrative for the older kids/adults with 2 or 3 salient points.

Takeaways: Tangible souvenir - 3D printed, plus planting the seeds for future interest in the site and the time period.

5.1.5 Group 5 designing for the Ozan Family

- Chatbot
- Question and Answer activity
- Cross-institution participation

This group structured their design around the concept of a Question and Answer activity, designed to engage users through discussion of subject matter both related and unrelated to the site. Overall, the group wanted the experience to be engaging, to make the site less boring, to situate Çatalhöyük in the larger landscape, and to recontextualise people's understandings of the past. The group discussed the possibility of giving the site its own unique persona: what would this look like? who would it be? Who is the star or brand or identity of Çatalhöyük?

The group conceived of a wizard – someone close to the site, but removed, an outsider – an entity that could be all-knowing (or else claim no expertise), and not pre-conditioned to only address historic/educational subject matter. This character was not meant to be an authority figure in the sense of a curator or archaeologist – but something more accessible. Visitors could ask the wizard anything & the wizard would reply. This was inspired by a Science Museum event that one member of the design group mentioned, wherein people dressed up as a cockroach (or some form of insect) and explored the exhibits. Inhabiting that identity gave complete freedom to be and think as one wished. No one had expectations of a cockroach, nor did they understand the life of a cockroach, so visitors were at liberty to explore and behave openly and experimentally.

The on-site experience would begin on the bus en-route to site, with the 'wizard' providing relatable bits of information to users. For instance, when someone asked the typical question 'how much longer is it going to take to get there', the reply would focus on how long, in the past, it might have taken. Another question might be 'where are you from', which could be linked to replies relating to whatever would have been happening in that part of the world during the Neolithic period (in other words, not just exclusively focused on Turkey). Standing in front of particular houses at Çatalhöyük would allow an opportunity for other museums or collections elsewhere, which hold Çatalhöyük materials – or other relevant materials – to contribute to the conversation about furnishings or home life, etc.

While the group did not have time to fully articulate the experience, various possibilities for creating meaningful chat experiments emerged from the discussion:

1. Use of a playful, omnipotent, non-human (and perhaps non-gendered) force guiding the experience and posing and replying to questions - equivalent to the Science Museum's cockroach. For instance, the volcano (from Çatalhöyük's landscape)? A magician (which is slightly less gendered)? The 'voice of the mother goddess' or 'from the mouth of the mother

goddess'? The latter is heavily gendered & open to misuse, and yet it draws on an already universally-popular trope and would allow the deployment of emotion very obviously.

2. Ability to ask questions and receive answers about anything: archaeology is not the focus, it is merely a complement to the whole.
3. A chatbot could be programmed with a series of simple questions/responses in the first instance, and from there be elaborated by, for instance, crowdsourcing of content (using Çatalhöyük's visibility and world-wide connections), or through working directly with some of the Çatalhöyük specialists (field directors, education officers, conservation experts, etc.).
4. Draw on interesting, experimental practice from chatbots & chat systems used in different contexts – not just cultural/heritage sector related.
5. Use of relatable ideas and feelings to guide the experience: How long is it going to take? Where are we? Why's it so hot? Who cares? Why are you so scared/angry/happy/bored? Why do I have to speak to that person? Where's the toilet? What will we eat for dinner? Why do I have to take a bath/clean my room/wash the dishes/go to bed? Structured around some of the mundanities that make up human lives in the present.
6. Experimentation with asking people about some of their beliefs and values in order to enable people to think about how the past might have been different (and hence why the present does not need to be as it is): family, dead people, equality, hierarchy, cruelty, kindness, violence, discrimination, bullying.

5.2 Day 2. Hunterian Antonine Wall experiences and scenarios

5.2.1 Group 1 designing for Mary and Annie

- Tablet based tour guide
- Sharing photographs via Twitter/Instagram

This group developed a tour guide app that could be used by visitors to the museum via an iPad or tablet. They were creating an experience for the personas of Mary and Annie visiting the museum together. Of interest to this group was thinking about how to link the past with the present, by perhaps linking the objects on display to an emotion or experience that visitors today would be able to share or relate to. The Roman distance slabs offered an example of this. The slabs contain the emblem of the legion that built a particular section of the wall: for example inscribed on the Braidfield Distance slab is Twentieth Legion's emblem of a hog which tells us they were responsible for building this section of wall. The group interpreted the legion's emblem as a visual emblem much like the Apple logo or the Nike swoosh. The tour guide mode of the app invites the visitor to find an object on display that could act as the visitor's own personal logo. The visitor is asked to take a picture of the object and then regroup in front at a statue to share their findings. In the dramatisation, the persona of Mary took a picture of the clay paw tile - this object resonated with Mary and her own dog who had recently died. Annie took a picture of an object that reminded her of a flower as she likes roses and it reminds her of the English rose since she was born in England. The emphasis of this experience was to relate the past with the present and trigger emotional reaction from the visitor. By focusing on the legion's emblems the group were able to make a link between the objects and then invite the visitors to find a connection with their own experiences.

Another element to the tourguide app focused on how to use objects to promote the role of women at the Antonine Wall and in the Roman Empire in general. Inspired by the hashtag used by women who marched in the January 2017 Women's March whereby women shared photographs of their marching shoes on Twitter (http://www.huffingtonpost.co.uk/entry/london-womens-march-marching-shoes_uk_587e3981e4b05f88cb56d065) the group came up with the idea of creating a hashtag for the Roman woman's shoe that is on display and ask people to contribute other photographs of their own shoes or women's shoes in other museum collections with the hashtag to build an online group and following and to politicise the objects . It would be possible to add other objects such as a medical spoon or the gravestone to showcase women's role and professions.

5.2.2 Group 2 designing hybrid experiences for Annie and Callum

- Virtual dress-up activity (slave, god, soldier etc.)

Annie who is at the museum selects an object related to a person (e.g. Verecunda's grave, or the Roman Gods depicted on the distance slabs) by taking a photo of it with her phone. She shares the photo with her brother who is at home and she asks him to design a pair of shoes for Verecunda to wear. To help him, she also sends him a photo of the shoes that she finds in the exhibition. She also designs the clothes, jewellery etc. When all clothes and accessories are designed by both of them, Annie takes a selfie photo on which a dress-up filter applies so she is 'transformed' into Verecunda or a Roman girl wearing the designed shoes and accessories. She can publish it on social media or even 3D print a copy of the jewellery.

- Build a construction (gravestone, wall, fort etc.)

Callum likes to build things so he'd really like to build a part of the Antonine Wall. On his PC screen he can see the site of the wall as it is today and some elements and tools he can use for the reconstruction. Annie who is at the museum sees several parts and tools that can be useful to Callum. She shares with

him photos of the columns and Ebutius hammer head that will help him to build the wall. When Callum finishes the construction he can clearly 'see' how the wall was like. He sends a photo of it to Annie.

- Play the game

Annie, Callum and their friends can play the Latrunculi game online. They can create their own rules each time and play again and again.

5.2.3 Group 3 designing for Carlos

- Personalised Tour
- Touch screen/ visitor's phone

This group focused on a modular tour for their persona which is structured around the personal information supplied by the visitor before he begins his visit or when he arrives at the museum. Based on this information the most "relevant" objects that match Carlos' interests are selected to form the basis of the tour. He is able to take snippets of information home with him in the form of "factoids" that are delivered to his phone during the experience. The experience happens via a touch screen in front of exhibits and via his phone. A further takeaway would be 3D printed souvenir of an object he is interested in. The group did try to include an emotion such as love or romance.
The visitor starts by giving some basic information: gender, age, and occupation.
The focus point of our experience is a touch screen in front of the shoes exhibit. There the visitor can see and interact with the 3D models of the shoes and also learn interesting factoids. These factoids may be sent to his phone when he has interacted with the shoes (as a nudge). So, a possible factoid is "Did you know that in a Roman camp you'd find not only men, but also women and children? Which of the shoes do you think belong to a woman and which to a child?" Because of his occupation as an engineer, the visitor would then be instructed to look at the hammer exhibit. After a short time, the visitor will get a nudge on his phone with a factoid about the hammer: "Have you noticed the worn top of the hammer? Who do you think used this hammer?". After a short time, the visitor will get a nudge with a relevant factoid: "Soldiers during peacetime were instructed to help with public works, so this hammer belonged to a Roman soldier". Finally, the visitor will be able to buy a digital (or physical) version of the board game on display. If he gets the digital version, he will be able to play it with other people that have bought it as well. And who knows, our persona might get to play a game with the love of his life.

5.2.4 Group 4 designing for Susie

- Avatar Soap opera around the Antonine Wall.
- Provided with an ipad from the museum
- VR

This would be timed, ticketed experience that lasts approximately 1 hour. Prior to visiting the museum, visitors are asked to upload a selfie to the website and apply a Roman filter to their image to create their avatar for the actual museum visit. When they arrive at the museum they are given a 3D print of their selfie/avatar. Visitors are put into groups and each assigned a character which they must follow/guide through an interactive story – a kind of soap opera – that takes place around the wall. Suzy then provides some guidance. She sets the scene, telling everyone a little about their character and motives. They all watch a short, dramatic video on their devices that starts off the story and gets the imaginations working. Then Suzy directs each visitor to stand in a different part of the exhibition space – it has been branded into 'stations' or areas – the graveyard, the wall, the local settlement, the stonemason's hut etc., for the purposes of the story. We begin. By scanning the Avatar each visitor is then launched into a VR scene that is related to a specific section of the display.
Each user is prompted to search for clues and answer questions to progress their character's narrative and by extension, learn about life at the time. Periodically they must seek each other out and figure out a puzzle together, so the experience is social and fun. As this is happening, Suzy acts as a narrator

and guide in the story. She watches people's progress and controls events via her iPad, which is in 'guide' mode. Over the 50 minutes, she introduces incidents that will shape the character's lives (e.g. bad weather, orders from Rome, time passing).
They then need to find answers to clues to progress their character's narrative. The guide, Suzy the MUSE, is able to disrupt the visitor's experiences by (e.g. bad weather, orders from Rome, time passing). Visitors follow the story, progressing their own narrative. There are twists and turns, unexpected events etc. At the end, their character reaches a point of closure, with perhaps a 'To be continued' element, so the story could be developed further at another point.

5.2.5 Group 5 designing for Carlos and Susie

This combination of personas was tricky to design for as they had to interact with each other and also the materials. How would the Emotive tools work for each persona was difficult for the group to consider.
This group did consider the idea that Susie would use the Emotive platform to tailor a tour for Carlos by asking him some questions about his interests when he arrives at the museum. But they felt that introducing technology at the very beginning of a museum visit might be a barrier for some people. So they developed their thinking to include an initial conversation between Susie and Carlos for Susie to glean some information about Carlos. For example by asking Carlos what he was studying, Susie could suggest at the beginning that he might be interested in the physical Antonine Wall, its construction and how it looked in its entirety during the Roman period, as this is not easy to visualise just by visiting the exhibition. This is where the EMOTIVE platform could be useful to help contextualise and give additional information not available in the display for example a VR reconstruction of the wall and the surrounding area.
It was at this stage that the group discussed the idea that visitors like Carlos having access to an EMOTIVE application would be very helpful if this would set objects into wider themes, offer context, link them with stories - for instance, emphasise how the shoes were worn by people - who were these people? The distance slabs could zoom out into a wider view of the wall, setting it into its wider context. It was the group's intention to bring these objects into the human context, to encourage empathy with the people of history.
A little into this conversation, however, the group thought it prudent to remind themselves that they were not just designing for Carlos, but for Susie as well. She was being left out of the design. It was here that the application became a kind of aid in tour guiding - with modes both for a visitor to use by themselves upon visiting (explore by group 3), and for a tour guide (Susie) using it as a tool to help create a tour that aligned with the interests of a visitor, as was our case.
This developed into a kind of 'choose-your-own-adventure' tour guide, which, after a few initial questions, could guide a tour guide and the visitor through the collection by linking objects in a kind of narrative. For example, beginning with the leather shoes, Carlos is introduced to different characters of the past. He chooses to follow the life of a Soldier, which led him to, for example, a distance slab; then, when he asked what kinds of things did the Roman soldiers do for fun, he was led to the board game, where he and Susie could either play together on the application or perhaps in real life.
This could incorporate digital visual aids as well as allow the interests of the visitor to guide the direction of the tour. A 'log the experience' feature would track the path taken through the museum by the specific visitor, objects chosen, how long each station took and other characteristics of the experience, for the guide to reference later, comment upon, add suggestions for improvement, etc. a feature which was much appreciated by the Hunterian MUSE guides and staff when this group's experience was later presented to the plenary during AW group activity 2.

Group 4 and Group 5 both introduced Susie's role and use of the EMOTIVE platform as a tour guide or in tour mode. This sounds similar to the role of the battle co-ordinator in the Bannockburn Experience.

6 EMOTIVE workshop with GSA MSc in International Heritage Visualisation students at The Hunterian Museum, March 2017

6.1 Introduction

Dr Stuart Jeffrey, Senior Research Fellow at Glasgow School of Art (GSA) and Pathway Leader for their new MSc in International Heritage Visualisation approached Dr Maria Economou from the EMOTIVE team and asked her to deliver a presentation at The Hunterian to a group of c.15 MSc students on how museums approach visualisation and interpretation on 23 March 2017. This presented a great opportunity to re-run the experience design activity for the Antonine Wall display that we had originally designed as part of the first EMOTIVE user workshop (day 2) in Glasgow in February 2017 with a different audience this time (younger on average that then February workshop participants; a mixture of backgrounds and interests combining archaeology and cultural heritage with video game design, 3D, visualisation programming and other digital skills). This would allow us to extend the evaluation of the object cards, personas, and overall experience design and evaluation methodology, as well as allow us to have input of more ideas for EMOTIVE experiences and scenarios from users who were themselves very close in their profile to some of the Hunterian personas we had designed (e.g. Susie and Carlos).

Figure 1: Maria Economou introducing the session within the Hunterian museum

6.1.1 Organisation & Goals

The UGLA team agreed to reuse the packs previously used for the EMOTIVE user workshop (including the 5 persona cards, 6 object cards and information sheets) and not to amend them in anyway. As there was a smaller number of GSA students attending than the previous workshop it was agreed to separate the students into 3 groups of 5 students, with each group focusing on a different set of personas. We included group personas (Annie and Mary; Annie and Callum) as these represented a mix of physically visiting the museum together and a hybrid experience. We chose Carlos as the 3rd persona as we wanted to see if the group would introduce Susie as a second persona or create a new persona for Carlos to interact with. In contrast to the Workshop in February the groups did not have a "subject specialist" or a representative of the Hunterian museums to answer questions about objects

or historical points. We were interested to see how the groups would approach the design of the experiences without somebody to "guide" or assist.

Introduction to the session: 10.05 -10.25 Maria Economou introduced the session by talking about how museums use digital visualisation as an interpretation tool before introducing the history of the Hunterian and explaining the breakdown of the museum's audiences in comparison to the art gallery. Economou explained that the Hunterian has approached digital visualisation in the upper galleries by installing kiosks that have a set narrative about a specific display. She explained some of the limitations museums have to deal with such as poor wifi connections, time constraints of visitors, for some visitors pure digital interpretation would be too much and how museums need to be prepared for technological obsolescence. She continued by explaining that the social context of a museum visit plays a large part in the visitor experience for example whether people visit as part of a couple or family, or group of friends, who will you meet there, is the museum busy? These social dynamics have shown that museum going is a social activity and impact on the overall experience.
Emotive 10.25 - 10.30 After this general introduction she then introduced the Emotive project, the technological and other cultural partners as well as the aims of the project, for example to explore the potential of personalisation of visitor experiences.
AW Display 10.30 - 10.35 She then briefly introduced the history of Antonine Wall, the context of the AW display and collection within the Hunterian.
Instructions for the exercise 10.35 - 10.45 The first activity was then explained. The students then split themselves into 3 groups (with different composition to the groups they are in for their course work) and were given the opportunity to visit the display and read the information packs and understand the aims of the activity. Some of the students who had arrived early for the session had already familiarised themselves with the display while others needed time to see it.

6.2 Activity 1 Brainstorming

TASK: Each group has to design an EMOTIVE digital experience for their assigned persona(s) that would inspire an emotive reaction to the Antonine Wall display.
Based on our experiences of delivering the first Emotive user experience design workshop in Glasgow in February 2017 we wanted to test the approach of appointing roles within the group such as scribe and facilitator. Since the time allocated for the design activity was shorter than the February workshop we provided more detailed instructions on how to go about the task with suggested timings for each step. (see appendix XX for activity instructions)

Figure 2: Group 2 working on their ideas within the AW display

From observation the groups appeared to approach the task differently, although it was difficult to see what their process was like as we were not a part of their group. Group 2 spent longer reading the material provided in their packs, while both Group 1 and Group 3 headed to the display to begin their

process there. By 11.10 all 3 groups were back in the seated area and were working through their ideas and designs. As the introductions had overran slightly Maria Economou and Hilary Young agreed to extend the brainstorming and design session to 11.30.

Figure 3: Group 1 brainstorming and developing their group idea

The instructions for the brainstorming task had asked each student to come up with several ideas individually that they would write down on post-it notes and add to the group's A3 paper, explaining their idea to their group, before choosing one to focus on and develop more together.. This worked to varying degrees. Group 1 had several ideas that they managed to develop into a one larger treasure hunt experience. While groups 2 and 3 seemed to focus on one idea and perhaps only developed this one idea as a group from the start.

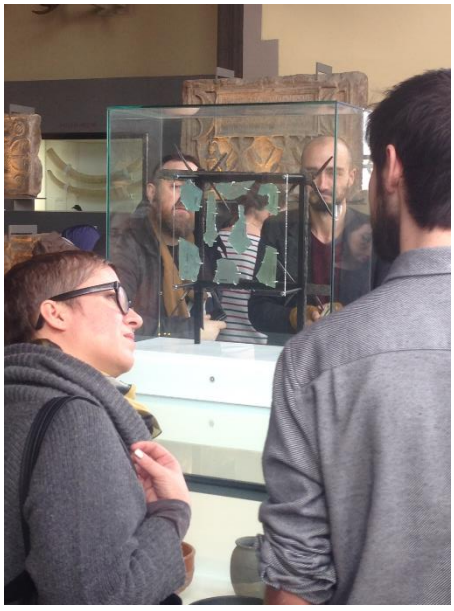
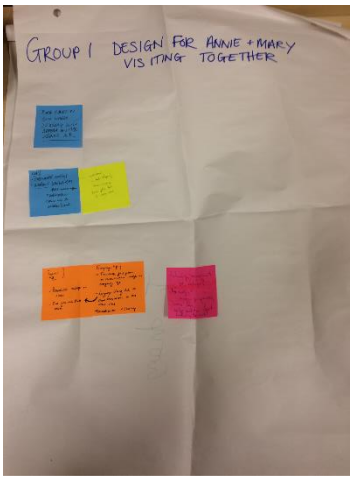
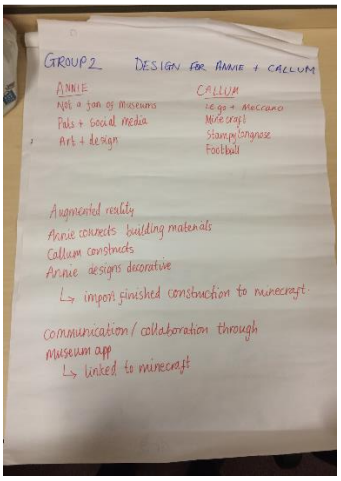


Figure 4: Groups 1 and 2 looking at the Roman window on display

6.3 Activity 2 - Dramatisation of design

Each group presented their design ideas in the physical space of the AW display area. Although we had asked for a dramatisation of their design in use by their assigned persona, the groups tended to give narrative explanations of their final design. This may be explained by the time limitations on preparing their dramatisation (group 1 mentioned in the feedback that more time to prepare their presentations would have been preferable); the AW display area was also very busy during the workshop which did make the display area noisy and difficult to move around during the presentations (a local Glasgow primary school were visiting the display during the session. Their teacher had set up activity stations in front of the distance slabs, and the firmus altars, while groups of pupils were looking the Roman shoes and other objects on display.)





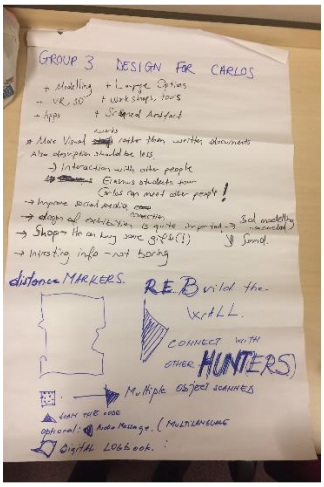


Figure 5: A3 papers showing the groups' ideas and designs

6.4 Emotive Digital Experiences

Group 1 - Design for Annie and Mary visiting together

This group considered the logistics of the pre-visit to the museum. Mary likes to plan trips in advance so she has already downloaded the app onto her phone before visiting and encouraged Annie to download the app too. The group felt that the museum would need to have devices already pre-loaded with the apps.

AR Window- bits of the glass that are on display would be part of a jigsaw/puzzle on the app. The visitor puts the puzzle together and then places their device in front of the window frame on display to be able to "see through" the window. There is potential for a hybrid experience - Callum could work on the puzzle remotely and then Mary and Annie would locate the physical object in the museum, take a photo or via video show Callum the window and show what he has unlocked by solving the puzzle. The group were asked how they would deal with representing the missing window fragments in the puzzle i.e. how important is it to differentiate between the original pieces that survive and the pieces that are missing that we would need to recreate in order to complete the window? The group felt it would be possible to make the puzzle only work when you put the pieces together in the way that they feature on display. A follow up question asked, completing the window provides a sense of achievement but what would you want to see when it's completed? The group had different ideas as to whether the window would look outside onto the Roman camp or look inside a Roman building. But because so little remains of the physical wall a view outside that recreates the wall and Roman fort would be interesting perspective to find within the museum display- linking the museum to the physical site.

AR Jewellery 3D replica of one of the rings would trigger an interaction with the display. Visitors would place their hands in box and another visitor would hold their device over the box/your hand will appear with AR jewellery. This could work as a collaborative AR experience for Mary and Annie as they would need to help each other. But could work for men/women/children with other types of jewellery or clothing or shoes. The application would have the ability to take pictures or download images of your hands with the jewellery on - especially for Annie, which she would then be able to share via social media.

Latin Translation A 3D model of the distance slab could be turned around, zoom in, look at the transcription, translate the transcription from latin to English and then write your own personal message and then translate it. Would need an external translator. Nice idea for personalisation. The group felt that the slabs are a key part of the exhibition, but are difficult to interpret well. In order to create a more social experience, there would be the potential to take a photo of Annie and Mary that they can share online /print or to show the slab via social media. Language using AR to show translations on the stone slab; Show translations on the stone slab: personalisation: sharing (GSA_Group1_1; GSA_Group1_2)

The group saw these three individual ideas fitting into what they described as an accumulative experience- not just one linear narrative/story to the experience. Visitors may get an alert as they come to different experiences. The experience would be more like a treasure hunt as opposed to a single story. Not a linear running thread or story but people can pick and mix. It's a small display so a longer narrative may not work so well. A treasure hunt format may be a better format for a smaller display. (GSA_Group1_3)

A further idea from the group addressed the craft interest of Mary that would allow her to "create" her own collection on her phone e.g. digital museum with shoes for example. Each time she visits the museum her collection of Roman shoes or Roman jewellery grows on her screensaver. This would act like an incentive to keep coming back to grow her own collection and share this with her grandchildren. Could be an activity for her group of friends also. Technology engagement for elders? Crafts - apps for growing trees' style (GSA_Group1_4)

Group 2 - Design for Annie and Callum (GSA_Group2)

This group focused on the Braidfield Distance Slab as it addressed both Callum and Annie's interests of building and crafting. Annie would scan the slab and it would read on the App and generate a 3D model so she could paint on it, colour it, hashtag to share her designs and add to an online gallery of other people's designs. It is important to be able to move the slab combined with the ability to design on the

slab and add her own artistic design to the slab. Annie designs decorative slab that Callum would then be able to import to Minecraft Augmented reality. It would be useful to have a scannable code to generate an area of Bar Hill Fort that Callum could add to Minecraft that would allow Callum constructs his own buildings. Annie and Callum would communicate and collaborate through the museum app.
Question: Would they be able to have a souvenir? Maybe Annie's design is the souvenir. Callum could integrate Annie's painted slab into his own buildings construction - collaborative element.

Callum and Annie's need: The group were unsure if Callum was allowed to use social media? How easily can he chat to Annie when she is in the museum and he is at home? Dyslexic- images/messages on slabs- design being augmented and creative, collaboration around it.

Group 3 - Design for Carlos (GSA_Group3)
The group started by focusing on the technical side of the objects on display because Carlos is interested in CAD and building. They initially focused on distance slabs but then honed in on making an entire virtual exhibition. Distance Markers - the overall concept is to **Rebuild the Wall and connect with other Hunters** (visitors). QR code multiple objects so people can scan and create their own VR museum- optional audio message when you scan the code as opposed to lots of written information (in various languages for tourists). A visitor would be able to virtually build the wall by scanning the objects on their own device. The idea is similar to Pokemon Go- catch them all and fill up a digital exhibition.

They also developed a **Digital Logbook feature** - guestbook where you can load your own messages about the objects this would allow people to interact and see what other people had commented. There would be a feature that would allow visitors to continue the discussion about the objects at home- new messages are shared with you at home via the platform. Adding info and sharing likes between visitors. Visitors would leave with info about the objects and what people think about the objects. This log would also provide information to the museum about what objects visitors like most or are talking about the most.

Carlos Needs: The group felt that Carlos would need more visual works rather than written documents and description should be at a minimum. Interaction with other people would be important for Carlos and so the social media connection would be important. The group felt that the info provided should be "interesting - not boring." The group did introduce Susie into their concept as well as trying to make Carol's experience more sociable with other visitors in other ways via the Logbook etc. Design of exhibition is quite important - 3D modelling connected - also sound. Shop - so he can buy some gifts.

Feedback Session on Experience Design (10mins)
Feedback from the groups was gathered via a brief 10 minutes face-to-face feedback session at the end of the workshop after the presentation of ideas. We had already drafted a series of questions to prompt feedback and we used these to gather responses verbally and take notes. (Hilary's research notebook)

Qu 1 What did you enjoy?
being here; the process of the activity was fun; enjoyed looking at the objects in a different way

Qu 2 What did you find challenging?
More time to focus on the presentation of our ideas would have been good but actually the time pressure was helpful as it made us more productive.
It was helpful to think about the personas [some had never worked with personas before].

Qu 3 Which of the 3 experiences presented would you actually like to use yourselves?
A couple liked the translation of the distance slab idea and the personalisation idea. And generally the group as a whole said they would like to try out any of the ideas that were put forward.

Qu 4 How did you **process the information** you needed in order to design your experiences? Did that work well?

Qu 5 Were the materials provided helpful or not?
Probe if necessary: Need for a subject specialist in the group? The groups felt that a subject specialist may have been too restrictive/authoritative. Another participant felt that the psychology of engagement with the display and the objects is needed in the first part of the design process and then it would be useful to introduce a subject specialist at the next design stage to add another layer.

Qu 6 How did you find the **parameters and brief** you were given?
Qu 7 Is there anything else you would like to share?

- Group 2 started by looking at the display and choosing their own object to focus on. They chose the pillars before realising that there were 6 object cards to focus on in the pack. They described this as an additional challenge and added another layer to the task as they had to think what objects other people/the personas would choose to focus on and not what they necessarily found interesting.
- Some of the groups didn't find the information sheets very useful. Whereas Group 1 found the contextual pictures (what the AW site looks like now) really helpful.

7 Museum Studies Course Digital Storytelling Workshop, University of Athens, December 2016 to February 2017

7.1 Introduction

December 2016 to February 2017 ATHENA supported the University of Athens course Museums and New Technologies in the context of the postgraduate "Museum Studies" program by giving several lectures on digital mobile storytelling in a museum context and supporting the students to create their own stories in the context of their course project. The stories would be authored to be used by the museums as digital guides for their content.
This process produced useful feedback both for the story authoring process and the experiencing activities available for the visitor.

7.2 Methodology

7.2.1 Procedure

During the semester the students were introduced to the concept of digital storytelling, and the ATHENA team presented lessons learnt and guidelines as had been identified so far. Taking this material into account the students were asked to form groups of 2-4 and start developing their project, focusing on the following:

- Creating user personas for their target visitors – uses of the storytelling app
- Conceptualizing the story they would create
- Developing the story using the ATHENA story prototyping tool
- Evaluating their story with museum visitors

To be able to use the authoring tool, the students participated in a two-hour workshop where they were given an interactive tutorial of the tool. Furthermore, to support the authoring process, 3 hours were dedicated to supporting the students in creating the basic structure of their story.

7.2.2 Users

The students, 12 female and 4 male, aged between 23 and 51, came from diverse backgrounds with their bachelor mainly related to archaeology, however in some cases also coming from engineering background. They formed an interesting mix of technological and theoretical expertise that lead to interesting different approaches.

7.3 Results

7.3.1 Storytelling experiences

An encouraging and positive result of this process was that all groups were able to design engaging storytelling experiences, appropriate for the museums they had selected to work on.
The students employed different approached which included:

- **Guided storytelling experiences** where the user followed a character inside the museum. This character or characters narrated the story.
- **Role playing approach**: The user is given a character role and is asked to make choices that affect the story outcome.

The students evaluated the stories in the museums with visitors with very positive feedback, in general. Some of the comments on possible improvements in some of the stories included the following:
Informational content. The content presenting information on the exhibits should not be too long and should be carefully designed. Long "academic" content is boring. Suggestions included to divide longer

content in sub-topics/themes and allow the user to select which parts to listen. The use of more interactive activities was also proposed.

Connection to space. In some cases the visitor had to stay too long in one place listening to content which was unrelated to the space or museum objects.

Navigation issues. One of the experiences was designed for the Museum of Dentistry of the University of Athens. The Museum is distributed in different rooms around the Department of Dentistry, making them hard to find without proposer navigation support, ideally indoors localization.

7.3.2 Authoring

All groups were able to implement their stories without significant issues with the story prototyping tool. They were supported when creating the structure of the story by ATHENA researchers and then they were able to continue working themselves. Several issues and needs were recorded during this process:

Experience visual design/layout. Some of the teams expressed the need to be able to edit the layout of the story, including colours, fonts, etc.

Branching points. Although the students were able to quickly comprehend how to implement the linear parts of the story, they were at points confused when having to implement complex branching structures leading to different paths/choices.

8 Digital storytelling experience evaluation at the Ancient Agora of Athens, December 2016

8.1 Introduction

This report presents an evaluation activity for the prototype storytelling experience “1001 stories at the Ancient Agora”, carried out on 21st December 2016 in Athens.

The prototype objective was to explore how the visitors of the Ancient Agora could be involved in an emotional journey to the past, going back in time to experience stories set in the Ancient Agora. Visitors walk around the Agora and experience stories explicitly written with the objective of striking emotional chords. Famous archaeological sites such as the Ancient Agora have a high dramatic potential that can help to humanize what is difficult to understand. Thus, the emotional aspect is central to this project: starting from a sentimental involvement, people are expected to get close to the ancient ruins and to arouse their curiosity.

Every story tells the visitor something new about the Agora, its monuments, the historical characters who lived there and the recent discoveries carried out by the archaeologists. Every story can be experienced by different perspectives that the visitor can choose according to her preferences. In this way, the story of a monument can be told by a child of the 3rd century AD or by an archaeologist of the 60s.

The focus of evaluation has been:

- Record user requirements in relation to emotive digital storytelling
- Usability and user experience issues;
- Storytelling issues;
- The potential of the stories in striking an emotional chord.

The next section presents the methodology for this user requirements and evaluation activity whereas the following one highlights the main results

Figure 6: Digital storytelling in the Athens Ancient Agora

8.2 Methodology

8.2.1 The site

The Ancient Agora of Classical Athens is the best-known example of an ancient Greek agora, located to the northwest of the Acropolis and bounded on the south by the hill of the Areopagus and on the west by the hill known as the Agoraios Kolonos, also called Market Hill.

The ancient Athenian agora has been excavated by the American School of Classical Studies at Athens since 1931 under the direction of T. Leslie Shear, Sr. The excavations continue to the present day.

After the initial phase of excavation, in the 1950s, the Hellenistic Stoa of Attalos was reconstructed on the east side of the agora, and today it serves as a museum and as storage and office space for the excavation team.

8.2.2 Stories

For the purposes of examining the use of emotive digital storytelling in the context of a large archaeological site, a storytelling experience has been created using the ATHENA story prototyping tool.

Under the title “1001 stories of the Ancient Agora”, the EMOTIVE team explored the idea of several independent short stories offered under a unifying theme, that of a developing love story between Ian, an archaeologist and a mystery woman, Eleni.

Two stories related to the Agora findings have been created as well, the story of the grave, and the story of the post-Herulian wall.

IAN AND ELENI

The first day of the Agora excavation, Ian, an American archaeologist of the 30s, met Eleni, a lady come from the future. They fell in love and every time they met, Eleni told to Ian some stories about the Ancient Agora. Ian was amazed, he couldn’t understand how Eleni knows all that stories. Eleni told him not to ask but to listen to her stories. At the end Ian asks again to Eleni, and she revealed him the truth. Although their relationship is going to be complicated, they decide to follow their feelings.

Figure 7: Ancient Agora story - The characters of Ian and Eleni

THE STORY OF THE GRAVE

The main subject of this story is a mysterious grave, found by the archaeologists in the 60s: inside the grave were discovered some atypical grave goods. Going back to 850 BC or following the archaeologists, the users know that the dead was a pregnant woman.

The objects found in the grave are now exhibited in the museum and the users experienced the story in front of the cabinet.

Figure 8: Ancient Agora story – Findings in the grave

THE STORY OF THE POST-HERULIAN WALL

The second story takes the cue from a late Roman wall erected near the most known Stoa of Attalos for telling some stories related to the sack of the city made by the Heruls in 267AD. Three characters provide three different perspectives on the late story of the Ancient Agora. The story concerns a little known event about the history of Athens.

Figure 9: Ancient Agora story – The characters of Ciriaco and Piero

The stories were implemented using the ATHENA story prototyping tool which was used to compile together, audio, video, text and images into a branching storytelling experience. Figure 10 presents example screenshots from the app.

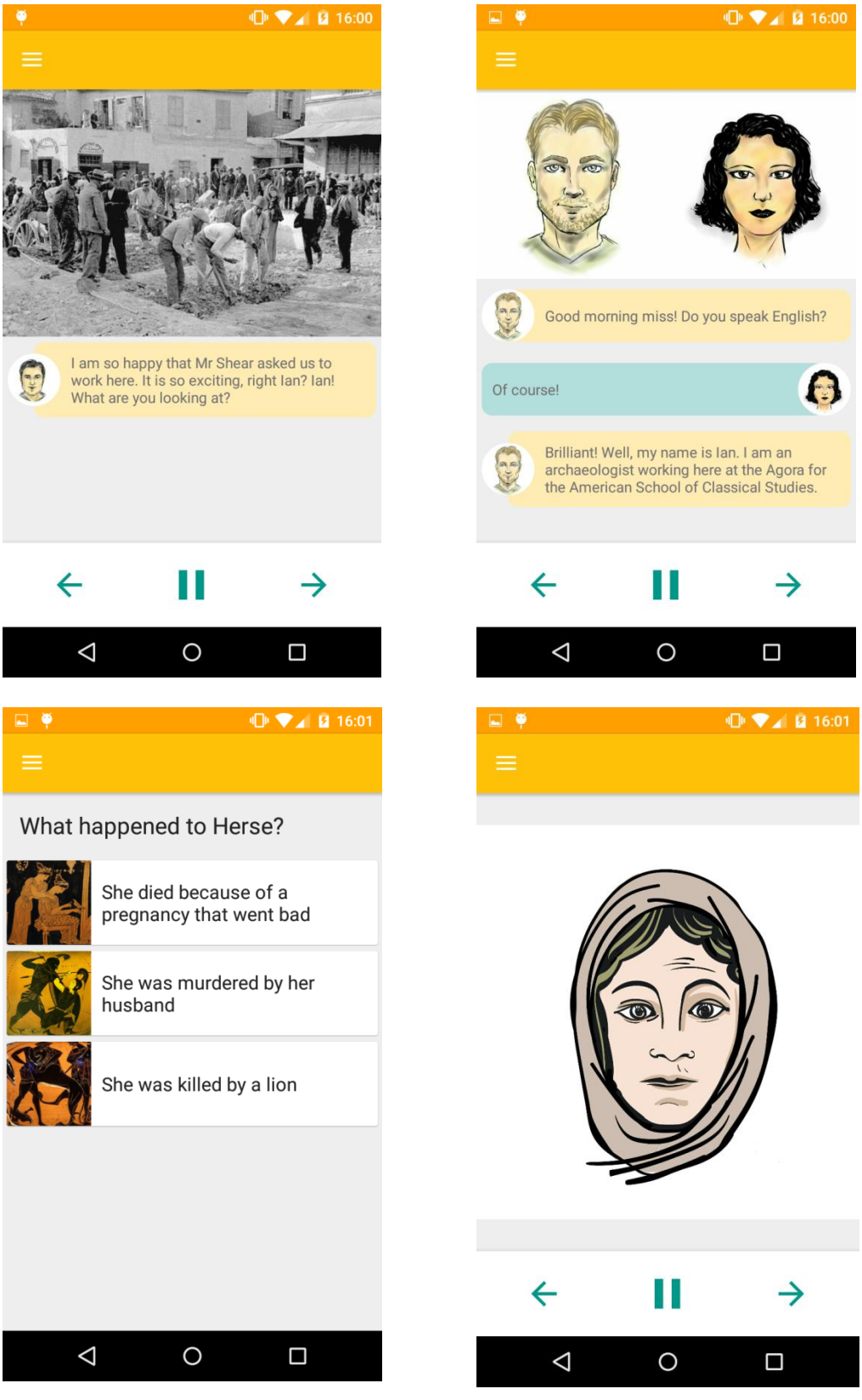


Figure 10: Athens Ancient Agora - Screenshots

8.2.3 Procedure

In order to evaluate this prototype storytelling experience, the evaluators invited users to experience the stories on site. Two of the users experienced the story using the same device, the rest individually.

While experiencing the story they were discreetly shadowed by the evaluators who recorded their reactions and comments. After the experience a focus group discussion followed, based on a predefined set of questions.

8.2.4 Users

Seven participants, 3 female and 4 male, experienced the two short stories, and the main story that connects them.

The group of users was diverse in terms of interests, age and educational background. It included computer science students and researches as well as two archaeologists and a museum digital installations designer. A good mix because some of them had already visited the Ancient Agora and other not.

Figure 11: Two users experiencing together the EMOTIVE prototype in the Ancient Agora

8.3 Results

The first evaluation of the prototype app "1001 stories in the Ancient Agora" seemed to be positive.

The users like walking in the Agora and experiencing stories: *"It's like being a time traveller and going back to the period you choose to visit."* Users were enthusiastic about the potential of the stories and the power of emotions to convey meaning through them.

Some users commented they would like to start the story, put the phone in the pocket and walk in the Agora listening to the stories, without being distracted by the screen.

Among the strengths of the prototype has been the possibility to choose different perspectives; the high dramatic potential available in the Ancient Agora; the possibility of moving from a place to another; the photos made available by the American School that can be shown on the screen.

Among the negative points commented have been the difficulty in orienting inside the site without an appropriate map or a geolocation service; searching for the starting point of the various stories; the excessive input coming from the use of the app and the listening to the audio at the same time.

The app prototype worked properly to the scope of experiencing the story from the beginning until the end. The interface was considered easy and intuitive to use.

In conclusion, the main concept at the base of the storytelling approach seemed to work. Storytelling and emotions arouse the curiosity of the users and engage them with the site. The participants

commented on several issues that could be improved and proposed features to be implemented. These are presented in the following table.

Table 1: Athens Ancient Agora evaluation – reported issues and proposed solutions

Issue ID	Title	Description	Proposed features
AAA01	Geolocalization	Users had difficulties locating the points of interest on the schematic map offered and also identifying the best route towards these points of interest.	Geolocalization is a crucial point for a mobile storytelling app situated in a cultural heritage site, especially a large archaeological site. The user needs support to (a) locate points of interest, (b) find her way towards these points (c) orient herself, etc
AAA02	Quiz template	The current implementation of a quiz offering a question and several options was not very effective, as for the wrong answers the user did not get any feedback.	The Quiz activity is a useful feature in this context and an appropriate activity template should be created. In some cases it would be needed to provide textual and audio feedback both for the correct and the incorrect answers.
AAA03	Interacting with images	The users would have liked to be able to manipulate and interact with the image that they are viewing	The users proposed different possibilities for interacting with an image on the mobile device screen: (a) zoom in and out, (b) pan, (c) view additional information on particular points of interest on the image.
AAA04	Character avatars	All participants liked the characters present in the stories and mentioned that their sketch avatars made them more “real”. They would have liked more background information on those that it was missing.	
AAA05	Use of the screen	Some users commented they would like to start the story, put the phone in the pocket and walk in the Agora listening to the stories, without being distracted by the screen.	Users would like minimal visual assets while exploring a cultural site, especially an outdoors archaeological one. Emphasis should be given on sound.
AAA06	Sound vs text	Some users would have liked textual support, others felt it would be distracting.	There is a personalization preference to be taken into account in this case, some users prefer to read while listening to the info, others prefer only to listen. Making the text available as is, or adapted seems to be an issue not only of the story context but also the user preferences.
	Photos vs sketches	Some users liked a lot the photos, others preferred the sketches, as they felt that the	

		sketches provided a unified esthetics approach and allowed the imagination to work more freely	
	Narration vs dialogue	All of the users liked the mix between dialogue and third person narration	
	One vs different narrators	The users were confused by the use of different third person narrators. They would have like one only. They would prefer this to be the main narrating character, introduced also in the main story, Eleni.	
	Story structure	Users liked how the stories are structured, the possibility to choose amongst short stories and perspectives of particular characters. They would prefer even more targeted stories and the possibility to experience all of the perspectives.	
	Story length	The users found positive that each story was short in duration	
	Dates	The users were not able to recall most of the dates of historical events that were cited, especially if cited just once, users couldn't remember them. Someone didn't mind, others would like the dates to be highlighted in some way.	Dates should be cited in moderation as in general the users do not seem to recall or pay attention to them. However in some cases these are significant as they set the story context and in these cases they should be highlighted more.
	Emotive aspects	The main over-arching story was in fact a love story. Some users liked love stories and this one in particular, whereas others proposed a different overarching with a different theme	Emotive storytelling aspects are subject to personalization and should take into account the user profile and preferences
	Fiction vs facts	Some of the users did not prefer the presentation of a story based on fictional characters. They would have liked the main characters to be historical figures that could be easily identifiable.	

	Humour	Humorous elements like the “Hey boss” phrase with a heavy Greek accent received very positive comments.	
	Connection to the cultural site	The Temple of Hephaestus, selected as one of the points where the user can listen to one of the stories is distracting because of its monumentality. It is unrelated to the story, however users focus on it..	The location selected for the user to experience a specific story should be relevant to the story and direct the user to interact with the space. Otherwise the attention of the user is divided between the two and the story antagonizes the archaeological site.
	Connection to the cultural site	Some of the users expressed the wish to be able to visit the grave of the pregnant woman, mentioned in one of the short stories.	Important elements in the story, related to the archaeological site, should made accessible to the users, either with directions to visit or offering material to visit them virtually if this is not possible.
	Connection to the artefacts	All of the users liked the fact that they were able to get in the museum and see the objects mentioned in the story. Some of them had difficulties in locating them within the exhibition space.	Navigation is crucial in order to connect the users with the artefacts the story refers to. Several solutions need to be investigated, to identify the more appropriate in each case.

9 Digital storytelling experience evaluation at the History Museum of Athens University, November-December 2016

9.1 Introduction

In order to build upon and explore the research work that took place during the CHESS project, the ATHENA team collaborated with the museum experts in the History Museum of the University of Athens to create a storytelling experience that would guide the visitor through important exhibits of the museum, offering a complete thematic tour related to the first years of the establishment of the Athens University.
This section presents the methodology and results of the evaluation of the produced experience, identifying specific user needs that can promote an interactive storytelling approach in the context of a cultural institution.

9.2 Methodology

9.2.1 The site

The History Museum of the University of Athens is housed in an historical building in the traditional Plaka area of Athens, which is the Old University of Athens. It is a building with more than 300 years of history, one of the last of the pre-ottoman era. In this building, since 1837 the First Athens University was established, which was moved after 4 years in its new building. The museum was established in this building in 1987.

The permanent exhibition is housed in the first and second floor of the building and includes university professor portraits, books, photos of university life, rare scientific instruments and other important heirlooms of the University.

9.2.2 The story

The ATHENA team, in order to explore a guided mobile digital storytelling approach in the Museum, designed a 45 minute experience (Figure 124) where the visitor is guided through the museum through her mobile.

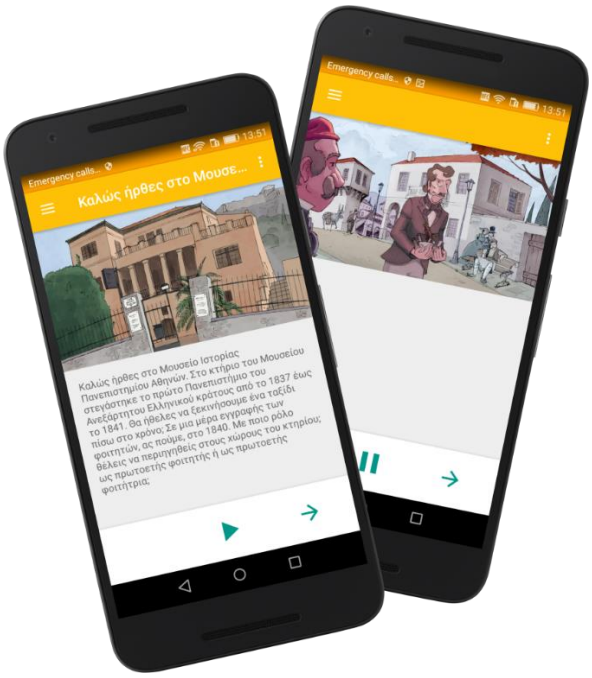


Figure 12: The storytelling experience for the History Museum of the University of Athens

The story starts with young Emmanouil facing an important dilemma: Is he to become a pharmacist like his father and inherit the family business and his approval or go to Law School and follow his own dreams, to become an important figure like his role model, the politician Kapodistrias? The user of the App follows Emmanouil (Figure 13) on his day of registration in the University and his attempt to find a way to follow his dream.

Figure 13: History Museum of the University of Athens - Emmanouil in front of the room with dentist instruments

Through this story the visitor is guided to important exhibits of the Museum, following Emmanouil towards the conclusion of the story. The information for the exhibits is provided through a narrator personified by the owl (Figure 14).

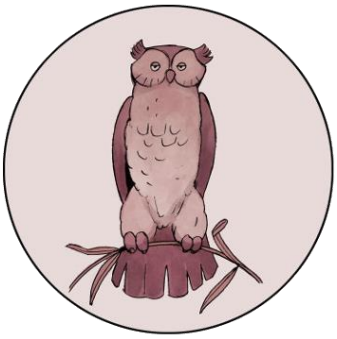


Figure 14: History of the University of Athens experience - Avatar of the owl as a narrator for the informational content of the story for the

9.2.3 Procedure

The story has been created with the ATHENA story prototyping tool and was fine-tuned through several iterations of testing the story on site. Finally, the story has been evaluated with selected visitors of the museum, who were asked to test the app and then provided their feedback through a semi-structured interview with the evaluators.

The interview was based on a questionnaire created with the purpose to record the user perspective on various aspects of the experience, including the story plot and its presentation, the informational content, the user experience of the App and the general approach itself.

9.2.4 Users

The App was tested by 28 visitors in total, including 18 adults (9 male and 9 female), between ages 27-50 and 10 teenagers (6 male and 4 female), 14-15 years old.

The users presented a diverse background and attitude towards cultural institutions, ranging from museum enthusiasts to visitors that professed that they are "dragged" by friends and/or family to visitor a museum.

9.3 Results

The users who experienced the mobile storytelling prototype provided diverse and interesting feedback, which is summarized in this section.

NEED FOR DIFFERENT EXPERIENCE TYPES

The approach adopted for this experience was to create a guided, linear experience, directing the visitor to go through all the museum galleries, and focusing on specific exhibits in each one. Interestingly, this approach seemed to work mostly for the less interested/museum-motivated visitors. As one of the visitors commented "*Emmanouil kept me company and guided me to the most interesting aspects of the museum.*" And another: "*I would like to visit museums only with this type of app. Otherwise I am too bored.*"

Another part of the visitors expressed the need for a more exploratory/gamified approach: "*I would have liked to experience the story as a treasure hunt, it would keep my interest more and help me interact with space.*"

On the other hand, some of the visitors felt that strictly following the story was restrictive. They expressed the need to be able to find out more about the rest of the exhibits in a gallery, those not included in the storytelling experience. These users approached the issue by pausing the app to look at the exhibits that caught their interest and then continuing when done.

There were even those that they would have preferred to explore the museum on their own by being offered informational content on demand.

"KEEP IT FOR LATER" OPTION

Some of the users who expressed the need for more informational content on exhibits not included in the story, proposed the use of a "keep it for later" option. This option would allow the visitor to select interesting exhibits in an "inventory" thus being able to review them later, maybe after the visit.

QR or NFC codes were also proposed as a means to collect informational content for interesting exhibits.

EXPERIENCE DURATION AND SKIP OPTION

When asked about the duration of the story all users felt that it was not too long. 7 even mentioned that they would have liked it to be longer, with more details on the informational content.

Most users commented positively on the optional informational content offered and the possibility to skip it if it was not interesting enough. In this sense the users did not feel bored or pressured.

STORY VS INFORMATION

As already mentioned, the user perspectives as to the balance between informational content and story plot varied. Some of the users were able to spent time in the museum and enjoy it only because of the story whereas there were some that felt that they would easily replace the story with more informational content. Those expressed the need for a strictly informational approach: "*The owl was the best, I really loved it! Go owl!*" However, they explained that they liked the way the information was offered, through interesting facts and anecdotal stories, often enriched by quotes of the historical figures.

Some of the users who would have liked the story to be based on real and not fictional characters.

VISUAL VS AUDIO EXPERIENCE

Most of the users really enjoyed the animation presenting the story explaining that it made the historical period the story takes place in come to life: "*It helped me make the past more tangible"*. However, some mentioned that they would have liked to be able to *"put their phones in their pockets"* and be guided around the museum only through audio.

Some users commented that an audio visual experience would be mostly needed for informational content that is related to processes, as is the case of demonstrating the use of scientific instruments.

CONNECTION WITH SPACE AND ARTEFACTS

Some users commented on the "absorbing" power of the mobile device, some users felt that they were too occupied in the screen of their mobile and as a result they felt a bit disconnected from the space itself, which is an historical monument. AS they were guided to look and explore the artefacts through the "owl" sections of the content, this issue was not noted similarly for the artefacts themselves in this case.

Navigation in space, although given only through audio instructions, slight hints in the animation and almost no real photos of the space and exhibits, was sufficient. Almost all users were able to navigate from one point of interest to the next and locate the exhibits.

Some users proposed that the objects that form part of the storytelling experience should be marked with a specific notation.

THE NEED FOR MORE "INTERACTION"

Several users expressed the need for "more interaction". When prompted they explained that this comment does not mean they would like to "interact more with the mobile screen, on the contrary". Prompting further for clarifications resulted in a need for "interaction" in different levels:

- **Interacting with the exhibits**: Several users felt that complex exhibits like scientific instruments would be better showcased through an interactive activity explaining their different parts and their use.
- **Interacting with the story plot**: As already mentioned, some of the users felt that the story was too guided. They had no actual control on the plot itself. Their role in the story was that of a spectator, in fact, a fellow student of Emmanouil with the sole possibility to follow him around. Some visitors, especially with more pronounced gaming background felt restricted by this.
- **Interacting with space and artefacts**: Many users expressed the need for more freedom to explore the space and exhibits that were not part of the story plot. The guided approach followed did not allow for this free exploration and the users who in fact did it, they paused the story and explored by themselves. These users proposed that this possibility should be provided through the app rather than antagonizing it.

COLLABORATION – SOCIAL INTERACTION

Several users expressed the wish to experience the story with their friends, while visiting the museum. AS they would very rarely visit alone, they would have liked to interact with their company at some points during the story, be able to discuss parts, solve riddles together or decide how to proceed.

IMPLICATIONS FOR THE AUTHORING APPROACH

The iterative design process employed to design and implement the History Museum experience provided valuable insight as to authoring methodologies and needs at each phase of the process and lead to recording author needs and guidelines.

An important issue evident at Day 1 of the process was the strong need to be able to establish a common understanding between all involved experts on what is our objective, what is the actual experience offered to the visitor.
Without a pre-existing notion of how a mobile storytelling experience would look like and without a clear definition and guidelines, ATHENA researchers reverted to describing the concept not in terms of what it is, but of what it isn't: The experience is not a web-based virtual museum one, it is not an audio guide. It is not a multimedia presentation...
Showing examples of stories developed within CHESS was helpful, however as it was later realized it irrevocably set the story designers towards a specific experience type, that of a unique, long and guided storytelling experience.

10 DialPast Course Digital Storytelling Workshop, Norwegian Institute, August-September 2016

10.1 Introduction

In the context of a DialPast Course that took place in Athens on 29 August to 3 September 2016 at the Norwegian Institute [1], course attendees participated in a half day hands-on workshop where they were asked to use ATHENA's story prototyping tool to create a storytelling experience for the Archaic Gallery of the Acropolis Museum.

10.2 Methodology

10.2.1 Procedure

For the authoring exercise, the users had been divided into groups and had been asked beforehand to prepare the concept of their story using a simple worksheet. During the workshop, after a brief demonstration of the tool, they were asked to implement their story concept.
An evaluator was present in each group, to offer support with the use of the tool and record user comments, difficulties, etc.
At the end of the Workshop, each group presented their story, and they were asked to provide their feedback on the tool and process in a focus group discussion and with individual questionnaires.

10.2.2 Users

A total of 13 individuals representing 10 different universities from Iceland, Germany, Sweden, Denmark, Norway, the UK and Greece participated in the workshop. The majority of participants were in the process of completing their PhD studies, and had enrolled on the DialPast programme because of an explicit research interest in digital archaeology. Only a handful of participants had vested concerns in public engagement, storytelling, museology or heritage, however all used museum collections in various aspects of their careers, and many had been involved in some form of public dissemination of knowledge. These individuals were split into four groups by the workshop leader prior to arriving in Athens, with an aim of creating teams balanced in terms of expertise, gender and nationality.

10.3 Results

This section summarizes the results of the Workshop in terms of the user's perceived value of digital storytelling in an archaeological context, and on the features that the users would have liked to have available in a storytelling authoring tool.

10.3.1 Storytelling in Archaeology

Scoping work for the Emotive project at Çatalhöyük in 2014 and 2015 (Roussou et al. 2015) highlighted the constructive impact of storytelling activities on archaeological research itself. Archaeologists who were asked to take on the role of story authors at Çatalhöyük - designing the plots and writing the scripts for prototype mobile experiences on site - reported that the real potential of the authoring process was its ability to enable specialists to think differently about the archaeological record, potentially shifting the nature of their research questions, analytical frameworks and academic explanation. So whilst visitor engagement might be positively affected by the eventual use of such stories on site, archaeologists too might profit from the earliest stages of the storytelling process: namely, story writing as a methodology for facilitating archaeological interpretation.

1 http://www.hf.uio.no/iakh/english/research/dialogues-with-the-past/courses/theorising-digital-archaeology.html

These findings were echoed to some extant at the Norwegian Institute in Athens workshop, where participants reflected on storytelling's various strengths and complications. As one individual remarked, "Assembling archaeological fragments into stories based both on evidence and playfulness can function as a medium for integrating specialist accounts, contradictions, unsolved mysteries, group dynamics and other marginalia that sit uncomfortably inside the archaeological archive." Another commentator extended this line of thinking in noting, "This workshop forced me [to deal] with archaeological storytelling in an active way, which is completely new for me. The exercise made me [think] to [a] different level of description and interaction between me, the display and the public. As [an] archaeological specialist I think I should try to integrate digital storytelling in my work. That would give me a much broader perspective on my interpretation process." Indeed, some reflected on an almost existential level about the benefits of the methodology, writing "There are no specific disadvantages in a storytelling exercise and this experience in particular. I can see multiple advantages in exercising with storytelling for the profession and from an academic point of view. It helps structuring the logic behind the narrative process that is part of every human creative process." And others discussed its productivity for very specific audiences, saying "The process is so much fun! The most useful aspect of the tool may be the process of making the stories. Could use this as a tool in schools for example as a way to discuss historic events."
A minority of participants hesitated slightly about the effects of storytelling on matters of accuracy and integrity: "Storytelling may lead the specialist into an uncomfortable situation when the narrative begins to suggest things about the past that the evidence does not support. Nevertheless, the benefits of the practice do very probably outweigh that issue." Rather, the majority attended to the advantages of stories for a variety of different contexts. As one individual described, "It was a very good experience in the sense of getting a better handle on communication with the public through storytelling, and what forms that can take, the delivery method and style of storytelling. It is a complicated story/relationship we are trying to get across and perhaps this is not always possible through the particular medium. It brings the archaeologist voice a little closer to the ear of the public which is always a good thing, right?"

10.3.2 Authoring a storytelling experience

Through using the story prototyping tool, the users offered useful insight on aspects of the tool that would need improvement as well as additional functionality and features that could be incorporated in the tool to make the storytelling experiences richer and more appealing.

INTERACTIVE ACTIVITIES

The users expressed the need to be able to author and add to their experiences more interactive activities. Several ideas were offered, all of which included a more active role on the side of the user. Some examples mentioned were:

- Augmented reality activities that enhance the exhibits in space
- VR activities that show exhibits in their actual context of use or in their original form
- Interaction with the elements in a photo, selecting parts of the photo, zooming in, getting more information on them
- Possibility for the users to add their own photos
- Possibility for the users to comment
- Affecting the story plot, leading thus to personalized outcomes

GEOLOCALIZATION

Localization of the user in space, both outdoors and indoors was considered to be a very useful feature.

OVERVIEW OF THE STORY STRUCTURE

The authors would have liked the possibility to have different overview options for the whole story structure in different levels of detail, as needed, to be able to view the story branches for example and zoom into specific nodes.

TIMED EVENTS

A proposed feature was to be able to author timed events that will take place during the experience at pre-designed points in time or after another specific event has taken place.

PREVIEW

The authors requested a preview feature to be able to see the whole experience or the parts they choose within the authoring tool.

11 Evaluation of authoring and using CHESS collaborative experiences built for Çatalhöyük, 2015-16

11.1.1 Case study 1: designing and testing collaborative experiences on site

INTRODUCTION

People typically visit museums and heritage sites in groups, who interact in different ways and build meaning together. A growing line of research now focuses upon digital technologies as a means to enhance this social context. However, mobile devices are considered antithetical to social interaction, as the privilege individual experiences. In order to investigate how to author and evaluate digital stories that promote social interaction, in 2015 we restructured and extended the experience built for Çatalhöyük in 2014. The results of these investigations were presented at the Museums and the Web 2016 conference: http://mw2016.museumsandtheweb.com/paper/cultivating-mobile-mediated-social-interaction-in-the-museum-towards-group-based-digital-storytelling-experiences/

STORY

The story focused on Building 52, a special building at Çatalhöyük. Two main characters—Abla, a Neolithic woman, and Archie, an archaeologist from the Çatalhöyük excavation team—remember their experience in relation to this house, offering information about its use, significance, and the mystery of its destruction. The two characters narrate their stories in an interleaved way, providing two different perspectives on each of the main topics covered throughout the experience.
To create the story, we formed a multidisciplinary authoring group composed of several archaeologists from the site, interaction designers, and researchers and technical experts from the CHESS project. Inspired by techniques used in Communicative Language Teaching —an approach that emphasizes interaction as both the means and the ultimate object of study—several interaction points were added, including information gap, reasoning, and opinion gap tasks. While most applications assume that users will spontaneously initiate social interaction, in our experiment, we decided to follow a different direction: users were explicitly prompted to communicate or/and collaborate when an interaction point was reached. Our main purpose was to study user reactions and emotions towards such prompts.

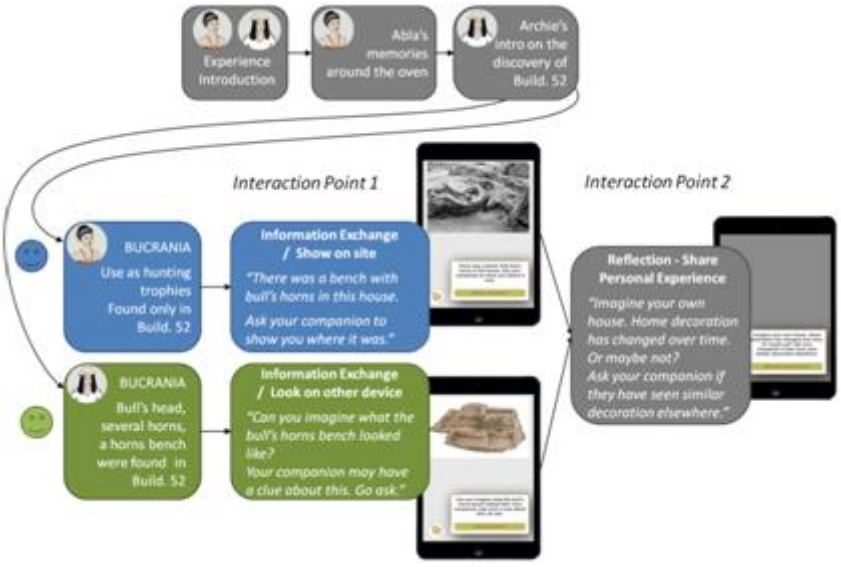


Figure 15: Interaction points in the "Bucrania" topic

Also, we deliberately decided not to forcibly synchronize the users' devices, since we wanted to let the users decide whether they actually wished to engage in the interaction points or whether they preferred to adopt an individual experience, at their own pace.

Figure 16: Interaction points in the "Destruction of Building 52" topic

Besides narrative variations, we also experimented with different types of interaction in order to investigate their implications for users' physical, verbal, and interpersonal communications.

PROCEDURE

The experiment took place in late July to early August 2015 at the archaeological site of Çatalhöyük in Turkey. In order to examine our prototype from the points of view of usability, interaction design, and heritage interpretation, we opted for a heuristic evaluation approach with a small set of evaluators from computer science and archaeology. On-site testing was conducted in groups of two users.
After a brief introduction to the experiment and signing the consent form, participants were taken to the site, in front of Building 52, which was the focus of the storytelling experience. Each user was given an iPad with headphones. All sessions were video-recorded by the experiment facilitators. After the end of the experience, users were led to the site café, where a semi-structured interview took place. A set of thirty questions helped gather their general impressions and opinions about the story plot, the social aspects in general, and the different kinds of social interaction introduced by the particular activities.

USERS

The evaluation involved sixteen participants (ten female and six male), between twenty and thirty-five years old, with English as their first or second language. Participants were selected based on three criteria: familiarity with the use of mobile devices for leisure and entertainment; familiarity with the other participant; and expertise either in mobile computing or archaeology.

RESULTS

Both interviews and observations indicated that our participants received positively the use of system-driven interpersonal interaction at cultural heritage sites. Participants considered social interaction enhances engagement, understanding, and reflection. It also gives a feeling of active participation. On the other hand, interaction with the system enhanced interaction between individuals. Users were excited to actually bring their devices together as a method of communication and interaction between them. Asking users to choose an object for their companion's burial was one of the most successful activities. When asked if they would choose to experience this type of interaction at cultural

heritage sites in the future, the majority replied positively, even if it was evident during observations that they were still uncomfortable with open social interaction inside a cultural space.

On the negative side, some users felt they would have appreciated some feedback from the system: 1) confirming the answer to the questions it posed, and 2) informing about the synchronization of the experience in terms of content and development in time. Some users also felt that the collaborative activities were disjointed from the main story flow, and in some cases even disrupted it. On the other hand, some users felt that given the current state of technology, more interaction with the device was needed. Finally, two paired participants referred to situations of awkwardness and forced behaviour.

CONCLUSIONS

Our intent with such a mobile-mediated experience was to help break down some of the interpretative barriers experienced (and often reproduced) by visitors at Çatalhöyük and beyond. Mobile technologies deploying system-driven interpersonal interactions are in a privileged position to begin shifting visitors' pre-visit expectations about the experience.

As a general guideline, if social activities are to be included in a mobile experience, they should be made explicit and explained to users early on. For example, introductory collaborative activities could be added at the beginning of the experience to "break the ice" and familiarize the participants with the interpersonal interaction elements they will later encounter. As noted during the experiment, users seemed to appreciate clear instructions in interpersonal interaction, even in cases where the assigned task was to reflect about the content.

From our experiment it was also clear that the partial information exchange approach must be carefully designed. There should be a clear objective for the exchange, beyond simply having users repeat information to one another. It should also be justified within the narrative flow, in order to ensure smooth transitions between different parts of the experience. Further, partial and conflicting information should be followed by information exchange activities to explore this conflict.

Regarding synchronization, seamless ways, whether on the back-end system or integrated in the story plot, should be found to keep users in sync as much as possible. In the latter case, activities to be completed or displays could appear in the "waiting time".

Finally, to ensure balance between the application's prominence and social interaction, the system should not leave questions unanswered, but provide feedback immediately so that visitors verify their activities. On the other hand, visitors' exchanges can be integrated as feedback into the system to affect the subsequent development of the story. Dynamic events could be added at very specific moments to enrich the content. Strong emotional, transcultural activities may also reduce expectations from the technology.

11.1.2 Case study 2: designing and testing collaborative experiences in the lab

INTRODUCTION

To explore further the conclusions obtained with the previous case study, a follow-up evaluation was organized during December 2015 and January 2016 at the Human-Computer Interaction and Virtual Reality Lab of the University of the Peloponnese. The lab conditions would help explore more in depth the social dimension of the experience.
This study was partially published as: Vayanou, M., Katifori, A., Antoniou, A., & Chrysanthi, A. (2016). Collocated Interaction in Cultural Storytelling Experiences: How to Coordinate Visitor Actions? In 19th ACM conference on Computer-Supported Cooperative Work and Social Computing (CSCW '16). ACM.

11.1.3 Story

The evaluation was based on the experience created for the on-site condition. The story focuses on Building 52, a special building in the Çatalhöyük site. Two main characters, a Neolithic woman and an archaeologist from the excavation team narrate in an interleaved way their experience with this house. Audio narrations are accompanied by one or more images and the user can interact with them primarily by zooming in and out.

The experience combines moments of isolation and of social encounter. Verbal communication between visitors is facilitated at several points of the experience via visual prompts that ask users to: consult their companion to answer questions; reflect and discuss with their partner about particular issues; share personal memories; express their own ideas/arguments; and choose a virtual object and offer it to their partner.

In this case, we decided again not to enforce synchronization since we wanted to let the users decide whether they actually wish to engage in the social interaction activities or whether they prefer to adopt an individualized experience, following the storyline in private.

11.1.4 Procedure

Aiming to investigate and analyze the benefits of provoking verbal communication and physical interaction between the users, we compared the social storytelling experience to the individual one that was originally authored for the site of Çatalhöyük on 2014 (see Annex, section 12) To that end, 10 groups participated in the baseline experience and 10 groups in the social experience, while the exact same procedure was followed in all cases.

Upon arrival, participants were shown a short documentary on the Çatalhöyük Neolithic settlement. Then they were given two tablets and were asked to experience the stories presented in any way they wished as if they were actually visiting together the site, ignoring the experimental setting. Then the researchers left the participants alone. Each session lasted for about 10 to15 minutes. After it was finished, the participants answered a post experience questionnaire followed by a short interview in which they were asked to describe in detail their experience.

11.1.5 Users

20 couples of Greek ethnic background participated in the experiment. The sample comprised 34 male and 6 female, aged between 18-25 (32 participants) and 26-35 (8 participants). All of them were students at the Department of Computer Science and Telecommunications of the University of the Peloponnese.

11.1.6 Results

Figure 17: Students of the University of Peloponnese experiencing collaboratively the Çatalhöyük story

Eight out of the ten couples who experienced the social version had a synchronized experience. This is a promising result concerning our non-strict approach to synchronization. We observed different behaviours, which can be summarized as follows: in most cases, participants were casually aware of the other's pace, through sporadic glances and comments; at the opposite side, although the experience included direct prompts for interaction, participants decided to completely disregard them or did not feel confident enough to explicitly pursue interaction.
In the case of the baseline version, which originally aimed at an individual experience, we observed similar behaviours: in most cases, couples synchronized their experiences by glancing at each other's screen and checking that they were at the same point before continuing; on the contrary, some participants were focused on their own device and did not make any attempt to synchronize throughout the whole experience.

11.1.7 Conclusions

The conclusion from this study is that synchronization in social experiences is crucial, as its lack may seriously affect absorption and engagement. However, the presence or absence of social interaction does not depend exclusively on explicit system-driven synchronization, but also the users' personality and relation needs to be taken into account. To this end, other system-driven synchronization paradigms need to be investigated.

12 CHESS early experience authoring approaches and lessons learnt, 2012-2015

12.1 Introduction

The CHESS (Cultural Heritage Experiences through Socio-personal interactions and Storytelling) research project[2] explored different aspects of digital interactive and personalized storytelling. The research prototype developed within CHESS included a number of tools designed to transform traditional story authoring into the design and implementation of personalized, interactive, rich-media mobile applications for museum visitors. During the visit, the CHESS system used personalized information to create customized stories that guided visitors with mobile devices through the exhibition, deploying simultaneously multimedia, games, and Augmented Reality (AR). The three-year development of the CHESS project resulted in a fruitful collaboration between technical (research and industrial) and cultural partners, during which important insights into how cultural institutions perceive and adopt innovative mobile guide technologies were gained. These insights led to the development and testing of the story prototyping tools that are currently available to authors of various cultural institutions within the context of EMOTIVE.

This section presents these previous approaches to authoring mobile interactive digital storytelling experiences in cultural heritage settings, which explored the advantages and limitations of the CHESS approach and constituted the base upon which the work is developed within EMOTIVE.

12.2 Exploring different approaches to authoring

Three case studies are presented in this section, starting from the initial "production chain" approach, presenting authoring workshops and concluding with the iterative design one.

12.2.1 Case study 1 – The "production chain" approach

The initial approach followed early on in the CHESS project was the "production chain" one. Involved experts had to work mostly isolated from one another, without a clear initial idea of the end outcome, the storytelling experience.

In the Acropolis Museum, archaeologists were employed to collect interpretation material on the exhibits and themes relevant to the selected Archaic Gallery. They produced a comprehensive almost 100 page document which was then delivered to the story writer. The story writer produced stories inspired by the archaeological material. These stories were given to the museum curator responsible to situate them in the Gallery and make sure that each part of the story takes place to the appropriate location (staging phase). Lastly, asset designers produced images, videos and sound related to the story and produced the final experience.

This process highlighted a set of shortcomings including the following:

LACK OF A COMMON VISION

The experts involved, from the archaeologists to the visual designers and programmers who implemented the story did not initially share a common vision as to what the result would be. As the approach would produce a "new" experience for the Museum, a personalized, interactive, digital storytelling one, none of the involved experts had a clear idea of how this experience would be. Each one approached the issue through her own perspective and the medium they felt more comfortable with. Archaeologists produced scientifically sound texts, the writer produced a textual story narrative,

[2] http://www.chessexperience.eu

the museologist placed it in space per exhibit and the asset designers produced images and animations having in mind a multimedia production.

LACK OF CONCRETE GUIDELINES

This initial approach for story design and implementation in cultural context highlighted the lack of specific and detailed guidelines for each step of the process, starting from the collection of the interpretation material to staging of the story in space and to the creation of assets and the compilation of the end experience.

LACK FOR SPECIALIZED AND SIMPLE TO USE TOOLS

Lacking appropriate and specialized tools to support the multi-step story creation process, the experts at each phase reverted to "traditional" generic tools, including pen and paper approaches, word or excel documents etc.

The CAT authoring tool developed within the CHESS project to support story design and implementation was never adopted by the story creators due to its high complexity and exposing of the underlying complex story model to the authors.

12.2.2 Case study 2 - Authoring workshops

Another approach that has been employed and explored for the creation of interactive, rich-media museum stories is that of authoring workshops (Roussou et al., 2015). Digital narrations were authored by different experts (museum educators, archaeologists, designers, writers, media producers, and other related professionals), who were brought together and collaborated in numerous intensive hands-on participatory design workshops. The events were monitored in order to evaluate both the usability of the digital storytelling tools and to study the emerging methodologies for story creation.

Two of the cultural sites these workshops took place were the Acropolis Museum in Greece (http://www.theacropolismuseum.gr/en), whose permanent exhibition includes finds from the Athenian Acropolis and its slopes and Çatalhöyük in Turkey (http://www.catalhoyuk.com/).

ACROPOLIS MUSEUM WORKSHOP

A hands-on group activity workshop held at the Acropolis Museum in September of 2013 aimed at evaluating the entire story authoring process. The workshop involved CHESS project members, staff members of the Acropolis Museum and of the Acropolis Restoration Service, as well as a number of invited "external" contributors. Participants were pre-assigned to one of two groups so that each group included individuals covering key areas of expertise. As a result, each group was comprised of two archaeologists, a museologist, a writer, an expert from the creative industries, an educator, and a host-archaeologist. Additionally, the two groups were supported in the authoring and production of the storytelling experiences by individuals with expertise in audio recording, image processing, etc.

Participants greatly enjoyed this creative process, and because the conceptualization of the plot had taken most of their time, they decided to continue working on their stories after the workshop had concluded. In the following days, they had group meetings, and e-mail and file exchanges. In fact, the groups ended up engaging in an informal "competition", each aiming at completing the best story first. Consequently, a follow-up workshop was convened two weeks later, in October 2013, in which the two groups came together to present their stories and discuss the issues and shortcomings of the process.

CATALHOYUK WORKSHOP

In July 2014, a digital storytelling workshop was organized at the Visitor Centre of the Neolithic settlement of Çatalhöyük. As an active archaeological site, specialists congregate there annually to conduct field and laboratory-based research. Accordingly, the workshop's participants comprised 17 members of Çatalhöyük's various specialist teams, including conservators, media specialists, resident artists, IT specialists, heritage students and archaeologists of different background (with concern for visual interpretation, architecture, stone tools, human and animal remains, stratigraphy, excavation, botany and geology, etc.). These specialists are only rarely directly engaged in interpretative work for non-specialist audiences at Çatalhöyük, hence their gathering together at the site offered an opportunity to rethink both the visitor interpretation approach, and also the dynamics of professional collaboration itself.

Figure 18: Participants brainstorming and storyboarding during the authoring session at the Visitor Centre, Çatalhöyük.

Information related to Building 52 was compiled from annual reports, diaries, the local site database, and associated publications, and separated out into a plethora of stand-alone, self-contained units (Figures 6 and 7), coded by colour (one colour for each theme), with basic conceptual and/or semantic links between each. Groups were distributed copies of these theme cards, a page of paper outlining the requirements of the authoring process, alongside auxiliary graphic material for enabling note-taking and storyboarding.

The 'theme card' concept enabled different experts to choose from one or more themes (colour on card) and various segments of information (cards) in order to draw together diverse events into one coherent narrative about Building 52. It is interesting to note that these 'themes' (effectively containers of information) were designed to correspond not necessarily to historical topics (as in the case of the Acropolis Museum), but either to types of archaeological evidence (e.g., the 'artefact theme', 'building construction phases theme', 'human remains theme', etc.), or to a series of broader hypotheses about the building as expressed by archaeologists in their reports and publications.

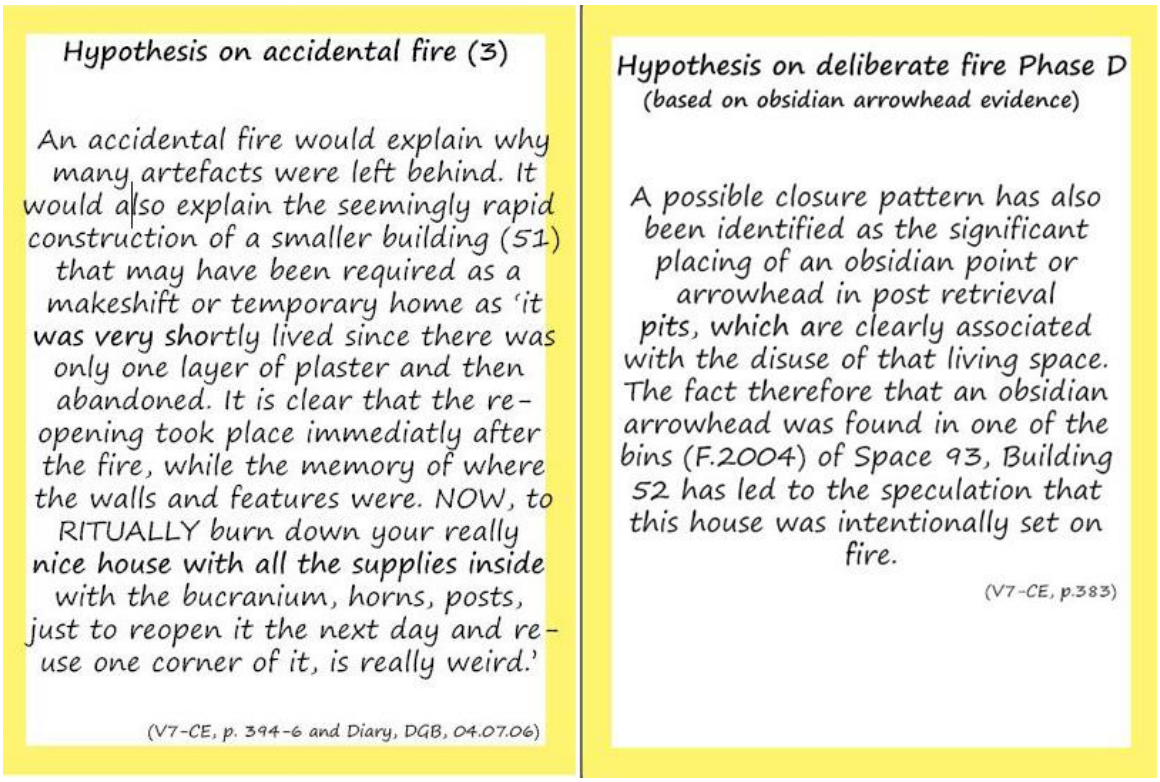


Figure 19: Cards used for the theme of 'Fire Debate'. The left card includes different types of evidence from different resources that support the hypothesis of 'accidental fire' in Building 52, while the right card includes a single source of evidence to support the hypothesis of 'Deliberate Fire' in the same building.

Overall, the storyboarding session (Figure 18) lasted approximately two hours and in the end each group presented their story to the full workshop audience. From there, one of the three stories was selected as the basis for a digital storytelling demo application. The story plot was further developed in order to serve specific requirements of the visitor experience and engagement with the archaeological site and its features (based on six years of qualitative and quantitative data collection with stakeholders). The written script was transcribed, and an audio recording of it was prepared, as well as two avatars, and a variety of specialist field imagery related to the story. These assets were integrated into the CHESS Project's authoring tool, resulting in an interactive narrative that was accessible via tablets on site. Nine video-recorded test-runs of the technology with members of the site team and visitors were conducted, followed by audio-recorded evaluative interviews with participants.

Based on our observations and feedback sessions, participants had different uptake and interaction with the theme cards and chose different approaches for crafting their stories.

CONCLUSIONS

Personas seemed to be very comfortably adopted and used in this design domain in order to better take into account the visitor perspective.

The 'theme card' concept enabled different experts to choose from one or more themes and various segments of information in order to draw together seemingly unrelated events into one coherent narrative. From the storytelling perspective, it is interesting to note that the group that built the most coherent narrative was the one that used the prompts the most. This confirms the suspicion that designing engaging storytelling experiences in museums is not necessarily a matter of scientific expertise but of narrative methodology and creativity.

The collaborative authoring process in both cases was reported by participating experts as a very constructive and reflective method not only for crafting stories about the past in a creative way but also of making better sense of the data and thus, obtaining a better insight into and overview of certain aspects of their research, in the case of archaeologists, and better understanding of the interpretation material, in the case of the creative designers, story writers, visual artists, etc.

Both Workshops produced interesting story concepts and ideas, however their subsequent developments required dedicated work by different professionals.

Workshops are a fine brainstorming tool to produce experience concepts BUT not sufficient to create a complete experience.

12.2.3 Case study 3 – Iterative design through collaboration

An iterative collaborative design approach, bringing together different experts was applied in the Stedelijk Museum experience. The authoring of an interactive narrative for the Stedelijk Museum comprised of remote and on-site collaboration sessions between staff members of the Museum and ATHENA researchers (Figure 20). The Stedelijk Museum provided an extensive set of existing digital productions, including:

- information about the museum's artworks, which, in some cases, contain general, historical information,
- audio narrations (and some video productions), delivered by a human speaker and accompanied by images.

While the definition of a coherent plot, connecting and contextualizing the artwork-specific script pieces, was an important part of the scripting phase in the previous experiences, the participants at Stedelijk decided to minimize the creation of new script pieces and rather use the existing ones (along with their productions) instead, thus focusing on the staging on-site and production editing phases of the authoring.

Figure 20: Members of the Stedelijk Museum and the CHESS project collaborating on the creation of interactive guided museum visits.

Based on these requirements and constraints, the ATHENA team cooperated with the Stedelijk Museum to design interactive guided visits, evolving within the museum environment. To that end, the museum map was annotated with a set of selected exhibits. The digital assets (script, audio,

images, videos) that were more or less related to each exhibit were uploaded to a shared space and a flowchart was drafted. Then, through an iterative process of discussions and refinements over the flowchart and the annotated museum map, a first staged scripted graph was formulated (following the CHESS storytelling model) for the representation of the envisioned interactive guided tour.

The experience at the Stedelijk Museum, where again we find a different authoring context with different goals and needs, provided other insights about storytelling in museums. In this case, the authors did not invest that much in the initial scripting, but rather the emphasis was put on the staging and editing phases of the authoring process. The development of the experience and the results provide the following conclusions.

Firstly, the capacity of digital storytelling to link not only exhibits under different discourses, but also existing digital and analogue assets, which can be “recycled” into engaging narrations. This is important given the fact that digital productions still constitute a major economic and personal effort for museums.

Secondly, as previously mentioned, the importance of the physical environment and the requirements imposed by the fact that it is not a simple location, but a semantic space, already endowed with meaning. In this sense, visually drafting the story concept by means of graphs coupled with gallery maps appeared to be a powerful tool for collaborative design.

Lastly, the Stedelijk experience highlighted the need for a different experience type, different than the plot centric approach followed so far within CHESS.

13 Supported Technologies by EMOTIVE Consortium

This section describes the technologies offered by members of the Emotive consortium. For each technology, we present a short description and what an Interpretation Card needs to have to be usable by the relevant technology.

13.1 Virtual Reality / 3D Printing

Description Given a 3d model of an object (which we can create by scanning the relevant exhibit or by employing a digital artist) we can create a 3d printed replica of the object. For example, we can create a 3d replica of the Ebutius Hammer, which will have the same dimensions and completely resemble its geometry. This way the visitors can touch, manipulate, and examine the 3d replica of the Ebutius Hammer up close.
Furthermore, we can use a Augmented/Virtual Reality device to deliver a virtual reality experience. Through the AR/VR device the visitor will see the replica appears with a different texture. Keep in mind that 3D printed replica are usually texture-less, i.e., they have the same geometrical features as the original object but they have no surface texture and are only one colour (e.g., blue). Through the AR/VR device the visitor can see the printed object in full colour and with interesting textures overlayed on it.
Interpretation Card Requirements A card can be usable for virtual reality if it is related with an object that meets the following requirements: (a) it is medium sized so it can be held and manipulated easily, (b) it has interesting textures/colours that add to the interpretation, (c) this texture may evolve in time or change in appearance due to processes that add to the interpretation (e.g., the object was burned, and we can see how it was before and after the fire).

13.2 Partial Reconstruction

Description We can reconstruct walls/buildings/rooms that have been partially destroyed. The end result will be a 3d scene that shows the walls/building/room as it would be today if it has not been partially destroyed in the past.
The partial reconstruction technology leverages the current remains, which are scanned and used to create an Image-Based Rendering representation, giving the impression of 3D. As the research advances in the project, we will provide progressively more automated tools that help a digital artist create a consistent reconstruction with appearance that is consistent with the remains of today, but with the geometry of the site as if it had not been destroyed.
Interpretation Card Requirements A card can be usable for partial reconstruction if it is related with walls/buildings/rooms that are now partially destroyed, but for which we have access to considerable remains. These remains must be located outdoors. It is very useful if we have access to research or drawings of how the walls/buildings/rooms looked like in the past, i.e., before they were partially destroyed.

13.3 Exhibit Browser

Description An exhibit browser is an image of an exhibit / artefact that has interactive hotspots. The visitor sees this image on her mobile device and when she clicks on the interactive hotspots a sound is played or a pop-up text is displayed.
Interpretation Card Requirements A card can be usable for exhibit browsing if it is related with an exhibit that displays interesting details. For example, the Ebutius Hammer has an inscription and a worn-out tip. If we can locate on the exhibit part of the information we want to convey through the card, then the exhibit browser is a useful technology.

13.4 Highlight

Description Highlights will be used to indicate particularly interesting or exciting information that can be appreciated by a wide audience. Stories built around highlight Interpretation Cards will be used to re-engage visitors that may have become de-activated after a period of time, as part of our “boost me” functionality.
The “boost me” functionality will be our go-to way to ensure emotional engagement. The idea is that when a visitor requires “activation”, i.e., she is getting bored, she will use the “boost me” button. Then our algorithms will dynamically find and highlight short stories to recommend which match her preferences better and may be more “catchy” or engaging (e.g., a short story about “finding the hidden mystery of a Roman soldier”).
Interpretation Card Requirements Any Interpretation Cards that can be considered as particularly interesting and may appeal to a wide audience. They can be related to popular/exciting exhibits or the relevant interpretation information may be very interesting and engaging.

13.5 Interactive Book

Description Given the scanned pages of a book, we can create a browsable version of it that the visitor can leaf through in her smartphone. Each page can have interactive hotspots, as in the Exhibit Browser (see section A.3).
Interpretation Card Requirements The Interpretation Card must be associated with a book whose pages the museum can scan or take high quality photographs of.

13.6 Other

Description Anything the site experts can think of and may require technology to achieve it.

14 Çatalhöyük Experience and Interpretation Cards

This section describes the Interpretation Cards and Experience Cards for the Çatalhöyük Neolithic site. For the experiences, we focused on short story experiences and followed a more holistic approach: instead of creating only the Interpretation Cards that the short story experiences will be based on, we described in greater detail the overall visitor experience by also identifying pre- and post-visit ideas, and outlining what the actual visitor experience may be. In this way, we have elaborated the Interpretation Cards into more comprehensive Experience Cards, therein obviating the need for Card Sets. As Emotive develops, however, specific Card Sets may be created, and additional Interpretation and Experience Cards will be added.

14.1 Experience Card 1

Topic Life was built around death
Essential Information For people of Çatalhöyük there was no separation between life and death either in space or time.

Illustration by Kathryn Killackey

Interpretation / Context At Çatalhöyük, houses were built around human burials, which were located in the "cleaner" areas of the house and associated with wall decorations. These decorations consisted, amongst others, of animals' remains (mostly bulls' heads and horns). Human remains (mostly heads) were curated and exhibited in wall niches. On the other hand, houses followed cycles of building, life, demolition/abandonment, and rebuilding. A new house always followed the foot prints of the previous dwelling and burials as well as caches were remembered and reused across time.
Emotion Shock leading to appreciation, nostalgia, care, closeness, transcendence (not focused on sadness)
Genre Drama
User Action Çatalhöyükian houses are the narrators of this drama about life and death at the site. Visitors are the main characters in the houses' stories.
Exhibit Information Various buildings at Çatalhöyük demonstrate this tendency to craft life around death; for example, Building 132. Here, a large number of burials were found in the northeast corner of its main room. These, however, are all dated to the period after the abandonment of the building.

There is much evidence of wall collapse, decay and rebuilding in the later phases of use of this building (again suggesting that a process of 'forgetting' was taking place). After a period of time in which the northeast of the abandoned building was used for refuse deposition, a series of burials were interred. These were placed before and during the foundation of Building 77 that was built above Building 132, and it was the northeast corner that was to become the center of burial and ritual elaboration in Building 77. It seems, then, that Building 77 was constructed over a cemetery located in the northeast corner of the abandoned Building 132. A similar process has now been found in a number of cases, such as a plastered skull placed in a foundation burial in Building 53, and the cemetery found beneath the 65-56-44-10 sequence of buildings. Another possible example discovered in 2015 is the series of burials found beneath Building 17 in the South area. Although the floors of Building 17 remain to be fully excavated, there is much evidence that below this building there are midden layers into which elaborate burials were set. In one case, a thick layer of phytoliths seems to suggest a plank placed on or with the body. A very similar plank burial was found in the same building during excavations in the 1990s. Whilst we might instinctively suggest that Çatalhöyük consists of houses in which burials were placed, perhaps we need to reformulate this perspective and see the burials as primary, with houses built up around them.

Available Assets 3D images of burials; illustrations of burials and artwork; photographs of in-situ art and installations - all available on request from the Çatalhöyük Research Project.

Location / archaeological available remains As described under Exhibit Information, most houses at Çatalhöyük conform to this pattern of life built around death, meaning that many/any buildings on site could technically be deployed as the source for this experience. Visitors could choose to participate in this experience, then, at any of a number of houses.

Tech Suitability 1) 3D printing, 2) VR, 3) Exhibit Browser, 4) Highlight, 5) Other

Tech Comments 3D printing of bones and VR (to see re-plastering of skull); Exhibit Browser to show a house with burial, foundation burials, bones, dog, decorations, etc.; Highlight to go straight to a house displaying a feature that may be of interest for specific visitors given his/her initial profile.

Keywords / Themes Life/death, family

Reflection / Questions How do visitors feel about death and practices around them that are so different from their own?

Pre-visit experience Prior to arriving on site, visitors log in to the system and are guided through a series of prompts, firstly, to consider ethics / seeking permission from them to engage with the topic of death / preparing them to think through sensitive subject matter; secondly, to settle on the 3D printing of one of their own skeletal parts; thirdly, to hint at how these prints of parts will be used in the on-site experience (different things will happen in different locations).

Experience The visitor has a body part 3D printed, which is curated and passed on along subsequent visitors' experiences. The visitor enters the system and is told by the Houses (who are always there and see and contain everything) about the life and relevant symbolic events of his/her after-life and the life of his/her descendants. Different locations of the settlement contain different fragments of life: e.g., in one house, the visitor's skull was re-plastered and exhibited for some time; in another house, they put in a new bull horn installation after a successful hunting trip of a grand-child and extended family celebration; at the visitor's own house, a relative died last week, they re-opened the visitor's burial to deposit the new body, and they left a small offering to the visitor after taking another of his/her bones for a grand-daughter who will marry in another village in the plain to take with her; in another house, a grand-grandchild died after birth and was deposited as foundation for a house starting a new cycle; in the visitor's neighbour's house, the dog that was always around begging for food died, and the very last thing the neighbours did before demolishing the house (due for a new cycle) was to deposit the dog's remains in the oven; etc.

Post-visit experience Tracking of the afterlife of your 3d printed body part and/or tracking of the afterlife of other visitors who have participated in the experience.
Comments The aim of this experience is to immerse the visitor in a completely different relationship to death, such that they leave feeling not shock, nor sadness, nor gruesomeness, but a sense that death is a form of life and carries on - and is *shared* with others - through materials and memories over time and space.

14.2 Experience Card 2

Topic Communal values / Avoiding accumulation of wealth
Essential Information The people of Çatalhöyük went to great lengths to ensure the maintenance of an egalitarian society and cohesion amongst the population.

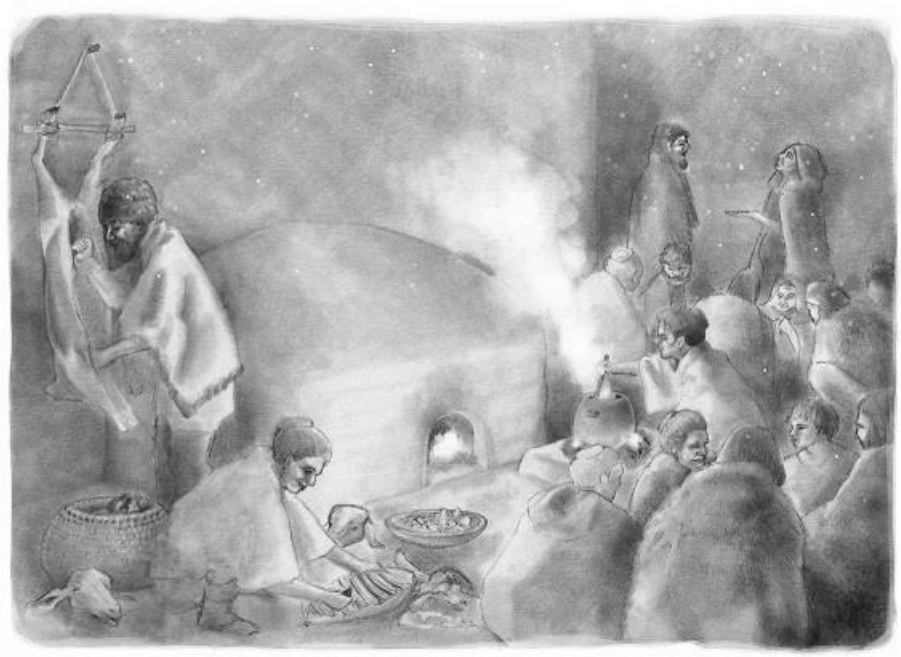


Illustration by Kathryn Killackey

Interpretation / Context Çatalhöyük was a communal society. People were dispersed from their biological families amongst the community, meaning that homes were shared by groups of unrelated individuals. We infer this, in part, from genetic studies of burial groups. To cement relationships, these groups: 1) took part in joint rituals in which wild animals were teased and baited and wild bulls feasted upon; 2) they distributed symbols across homes to connect people through iconography; 3) they exchanged the bones of deceased people between homes; 4) they "avoided" decorating the walls of the storage rooms in their buildings, perhaps in order to deemphasise the value of the stored goods.
Emotion The visitor is meant to leave puzzled or challenged about their understandings of social organisation.
Genre Soap opera
User Action System prompts you to take actions that might be unnatural to most users. You start by getting a 3D print of a stamp. As the system knows who else has chosen the same experience, they will be given the same stamps. You have to find them and your visit will be tied to theirs. How? By: giving one of your travelling companions to strangers at the site; giving away an object of personal importance to a stranger at the site; giving away some aspect of your personal identity (e.g., your Facebook profile) to a stranger; etc.
Exhibit Information Plastered skull in storage room in B132; missing bones in burials; exchange of children; interconnection of houses; anthropological information; caches; no decoration close to store rooms. A variety of exhibit options are available for realising this experience.
Available Assets Photographs of artefacts and skeletal remains; illustrations and 3D imagery/scans - all available on request from the Çatalhöyük Research Project.

Location / archaeological available remains burial, wall art, caches, bins, side room.
Tech Suitability 1) 3D printing, 2) VR, 3) Exhibit Browser, 4) Highlight, 5) Other
Tech Comments Voice and text prompts
Keywords / Themes Exploring ideas around risk, jealousy, love, sharing, possession and ownership
Reflection / Questions Experience is focused on triggering unusual or unnatural social interactions; we want to also prompt critical reflection on (and collect data on – perhaps through emoticons? Or through mixed icons/words?) the activities that we are asking of visitors: did you exchange your child with another visiting group? How did you feel when you gave away your personal possessions?
Pre-visit experience Visitor logs on (on site – or if remotely – then online), they are prompted in some way (by text, by emoticon, by voice) to upload into the system pictures of their Facebook profile, family picture, object of personal importance, and/or an expensive item they own. We won't say yet why we need them, they will learn on site/when they start the experience!
Experience System drives the visitors to go to particular locations on site where they can see certain generic things (pits, bins, art, walls); system then prompts them to take a particular action in the present with their body, their accessories, their 3d print, their family members or travelling companions - through this they are forced to consider certain themes (ownership, sharing, etc.); system then asks them to reflect on their reaction to these actions.
Post-visit experience Post visit experience would then allow visitors to see some of the remains/artefacts/evidence that supports these interpretations of the past.
Comments The experience is about using what visitors can see on site right now (which is virtually nothing) as a prompt to empower them to activate their imaginations, and place themselves in the position of doing what we think people of the past would have done. So the visitor uses their body, their accessories, their family and travelling companions in the present to think about typical behaviours and motivations that happened at Çatalhöyük. The focus is not on 'showing' evidence, or 'proving' through archaeological remains, but on present-day negotiations of specific concepts/themes.

14.3 Interpretation Card 1

Title Figurines and reverence

Essential Information: Figurines are relatively common finds at Çatalhöyük, but they have been subject to much fanciful interpretation. Despite popular wisdom, female figurines are not a representation of the mother goddess, but of old women who achieved high status. The site also features very elaborate male representations and less elaborate figurines representing animals (that some interpreted as toys).

Photograph by Jason Quinlan

Interpretation / Context: In the mid-twentieth century, archaeologists such as James Mellaart believed female figurines recovered from sites like Çatalhöyük represented fertility goddesses. This idea became popular in New Age culture, whose adherents celebrated the idea that ancient peoples were woman-centric and shared a cult of goddess worship. But over the past twenty years, evidence from Çatalhöyük and contemporaneous sites has undermined this interpretation. Nearly all such figurines have been found in garbage piles, as if they were built for a specific purpose—whether spiritual or playful—and then thrown away. They are also rarely built with bases, so they could never have been erected for display. Instead, they might have been passed from hand-to-hand, or perhaps worn as ornaments.

Exhibit Information: This particular figurine was discovered in 2016. It was carefully buried beneath a platform in a house, along with a valuable piece of obsidian. The statuette measures 17 centimetres (6.7 inches) long and weights one kilogram (2.2 pounds). It is considered unique due to its intact form and fine craftsmanship. Its position dates it to the late classical phase of occupation, roughly 8,500-8,000 years ago. Meskell and her colleagues suggest that female figures are likely representations of village elders, respected older women who had a lot of power in the community. She points out that their bodies are not youthful, and their bellies and breasts do not exhibit the roundness of pregnancy or fertility. Instead, their bellies and breasts sag. These are older women, their size possibly intended to convey the accumulation of wisdom—or continued prosperity. What makes this figurine different is that it was not found in a garbage pile, but instead it was carefully buried in a spot that may have been significant to residents of Çatalhöyük. This new figurine was found buried in exactly the same place that the dead were buried—under a platform on the floor of a house. The house itself had been rebuilt three times over the centuries, in what seems to be the custom at Çatalhöyük. The figurine was placed during the laying of a foundation for the third house. The builders dug a hole into the old

foundation, gently covered the figurine with two layers of clean sand and clay, and then built a whitewashed plaster platform on top.

In comparison to this human-form figurine, representations of animals at Çatalhöyük are often given very different and specialized treatment. Bull horns are mounted on walls and next to doors, while some animal bones are embedded inside the plaster walls. Paintings of leopards, bulls, and other animals are given what appears to be special symbolic significance in homes.

Available Assets: Photographs, hand-drawn illustrations - all available on request from the Çatalhöyük Research Project.

Tech Suitability 1) 3D print

Tech Comments 3D printed figurine (male, female) whose head is replaced with the visitors' own / or, alternatively, 3D printed figurine of an animal of choice (bear, bull, wild pig)

Keywords / Themes: art; society; status; rituals; reverence

Reflection / Questions: (Especially for young visitors) while our society values youth and slim bodies, it seems that many communities in the Paleolithic and Neolithic gave the highest status to volumptuous elder women. We can hypothesise that their bodies were not necessarily seen as sexual objects but perhaps represented experience and wisdom. Animals, too, are subject to reverence: how do we show our respect to them today?

Comments: For more information, see: https://arstechnica.com/science/2016/09/amazing-intact-statue-of-a-woman-unearthed-at-the-neolithic-city-of-catalhoyuk-in-turkey/

14.4 Interpretation Card 2

Title Mirror, mirror in the stone...
Essential Information Mirrors made of polished obsidian were found in late Neolithic burials in 2012 and in burials belonging to levels VI-IV of Mellaart's excavation. Several hypotheses of use have been advanced, including application of facial cosmetics, divination, lighting fire, illuminating rooms, signalling.

Exhibit Information Obsidian mirrors
Interpretation / Context Recently, two clusters of Neolithic burials were discovered at the top of Çatalhöyük's North Shelter. One of these produced two beautifully made and complete obsidian mirrors. The mirrors are created by exhaustively polishing the obsidian surface with progressively finer abrasives. The end result is a surface that you can still see a face in. In Çatalhöyük's TPC Area, B.150, a piece of galena was found, shining and reflecting like a mirror inside one burial containing a female figurine and two blue beads. While the mirrors may have been used for the application of facial cosmetics, it is also possible they were used in divination or had some other function.
Previously, eight totally preserved mirrors made of obsidian had been recovered at Çatalhöyük, plus some broken mirrors, and some still showing perfect optical imaging quality. Most of them were recovered in particular burial contexts, especially of women. The finest of these was set into lime plaster. Some but not all obsidian 'mirrors' seemed to be related with skulls, azurite and ochre, beads, and hackberries. A kind of serial production is evident in their making, showing that the craftsmen of that time controlled the technology. For instance, experiments showed: first, the surface for the mirror was squared; then followed repeated working steps of cutting, grinding, and polishing using raw and fine whetstones, sand, clay, and water. The production of one mirror took about 7-8 hours.
Available Assets Photographs - all available on request from the Çatalhöyük Research Project.
Tech Suitability 1) Virtual Reality, 2) 3d Printing
Tech Comments Superimpose the real texture of an obsidian mirror, add the user's image
Keywords / Themes Burial goods/rituals, technologies, obsidian circulation, body fashion
Reflection / Questions We cannot avoid being impressed by the beauty and apparent technological complexity of these objects. Just like us –or even more than us– the people of Neolithic Çatalhöyük had time to observe, learn, test, and create - then admire their reflections.

14.5 Interpretation Card 3

Title: The wall paintings of Çatalhöyük
Essential Information: The site's first wall paintings were discovered by James Mellaart during his excavation campaigns between 1961 and 1965. They are elaborate; they present a variety of designs; they often are of a big size (covering an entire length of a room); and they have technical complexities. It seems that most of the buildings at Çatalhöyük had some form of painting, even for a short time of period before it was covered again with plaster. The wall paintings are a result of a process of different steps; plastering, burnishing, and then painting.

Hand paintings found in B.77.An example of a wall painting from Çatalhöyük.

Exhibit Information: A wealth of wall paintings have been recorded on site, some reproduced by artists for display in museums around the world.
Interpretation/Context: The wall paintings' scenes vary. They may depict hands, geometric motives (monochrome and polychrome-often in repetitive patterns, and mirrored), human figures (both male and female), landscapes, animals (including bear, deer, bulls, vultures and leopards) either alone or in bigger scenes like the site's famous "Bearded people baiting a stag" and "Hunting scene", made popular through dissemination in magazines and books.
These paintings are of great importance as they represent vivid elements of Neolithic peoples' lives that may reflect to their beliefs, their everyday and ritual activities, their social relationships etc. They are of especial relevance in that they were produced during a historical period when writing was non-existing.
Most of the paintings that have been found were painted flat. However, in the recent years the Çatalhöyük Research Project has shed more light on technique, showing that impressions were used in combination with painting to achieve the final artwork.
Available Assets: Photographs, illustrations and reconstructions - all available on request from the Çatalhöyük Research Project.
Tech Suitability: 1) Chatbot; 2) VR; 3) Exhibit Browser; 4) Highlight
Tech Comments: to be determined
Keywords/Themes: wall plastering and painting activities, communal activities, pigment, symbolism, rituals, everyday life
Reflections/Questions: We have a particular interest in exploring the topic of wall paintings through a chatbot, with attention to the interpretation and the feasibility of the paintings, as well as to the techniques that were used.
Do people today have such paintings on their walls? Does the material on which you are drawing shape your intent? For example, when painting on paper perhaps you don't pay as much attention to detail because the paper is easily discarded - but is it the same with a wall?

Comments: The topic of wall paintings is regularly discussed on the site's Facebook page, where audiences pose questions related to all aspects of the paintings' catcomposition and content.

14.6 Interpretation Card 4

Title: Archaeological process

Essential Information: The archaeological process is a continuous, laborious science which begins through reading and research, entails work on site, in laboratories, in archives and beyond, and draws together many different types of expertise to theorise about the past.

Interpretation/Context: People that are not involved in archaeology tend to believe that the archaeological process begins and end at the trench, while digging. Our interest here is in reviewing the many different stages and complexities of the archaeological process that emerge before, during and after excavation. The whole spectrum of preliminary research through to post-excavation analysis, interpretation, conservation and visualization of the site and its artefacts are of concern. The emphasis would be on the archaeological process in general, but with concentration and examples from Çatalhöyük specifically. In addition, we aim to supplement understanding of the methodology with discussion of both the tools used (including new technologies for recording and interpretation) and the various experts involved, from photographers to designers to osteoarchaeologists, surveyors, excavators, and more.

Available Assets: Photographs, diaries and related site records, illustrations, 3d models - all available on request from the Çatalhöyük Research Project.

Tech Suitability: 1) Chatbot

Tech Comments: While the archaeological process can be represented in many fashions, we envision a dialogue (with chatbot or experts themselves) to answer real-time questions

Keywords/Themes: Archaeological process, excavation, research, interpretation, stratigraphy

Reflections/Questions: The archaeological process itself may be best explained via reference to a specific find - e.g.; How did you find this bucranium? Did you search deliberately in that area or did you find it by chance? The conversation could proceed from there by indicating that the archaeological process has as a starting point: its research questions and research agenda. Guided by this agenda, the archaeologist excavates in a specific area for the specific reason, but sometimes during an excavation it is also possible to discover objects by chance.

Other questions, reflecting those commonly asked by visitors, might include: why do archaeologists establish a grid around their excavation area? Do they destroy objects/finds in the process of excavation? With which tools do they excavate? Do these tools differ in each trench? Do archaeologists record all of their findings? Where do they store all the finds?

We are interested too to explore ethical questions: why do the archaeologists not keep what they find for themselves? If I find an artefact by chance while on site (which is a possibility as the mounds are literally oozing artefacts), what should I do with it?

Comments: People, both on site and on Çatalhöyük's social media, are asking questions about the archaeological process. Some of the above questions, have already been asked on the Facebook page of the Çatalhöyük Research Project.

14.7 Interpretation Card 5

Title: Obsidian objects
Essential Information: A sharp volcanic glass, obsidian was a common raw material used at Çatalhöyük to make tools, weapons and sharp points. It was most likely extracted from mountains nearby to the site. But obsidian finds from Çatalhöyük speak to much more than toolmaking practices alone, indicating trade networks and symbolic interests from the past.

Exhibit Information Various obsidian finds from the past 50 years of excavation at the site.
Interpretation / Context: At first glance Çatalhöyük's volcanic glass might not seem to have much of a story to tell about the town and the people in it. However, the value of obsidian once depended both on trade networks and on the practical use of the tool. An important factor in terms of exchange and trade, its reflective nature also meant that obsidian was used to make mirrors, in addition to tools and weapons, showing an aesthetic importance as well as a pragmatic one.
Easier to work with than flint, it was through the controlled trading of obsidian that wealth could have been accumulated and distributed across the town. Within the site itself, archaeological excavations have regularly found obsidian near ovens in houses, which adds an interesting domestic relevance to the material.
Available Assets: Photographs, illustrations, replicas - all available on request from the Çatalhöyük Research Project.
Tech Suitability: 1) VR; 2) Highlight; 3) 3d Printing
Tech Comments: Consider some means to "Play" with an image of a current house to discover caches of obsidian inside.
Keywords / Themes: Obsidian; tools; trade; aesthetics; wealth; weapons.
Reflection / Questions: How much of the value was placed on aesthetics (its shiny surface) versus utility (its durable sharpness)? Does it matter? What does either answer suggest about the wider community?
Comments There is an opportunity here to combine this interpretation card with the mirror card and the experience card relating to communal values.

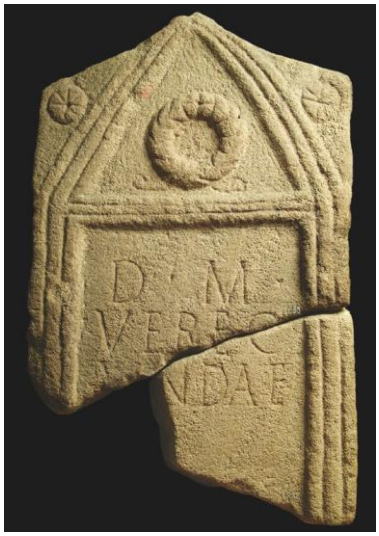
15 Hunterian Antonine Wall Interpretation Cards and Card Sets

This section describes the interpretation cards and card sets for the Hunterian Antonine Wall display. For the experiences, we focused on role-playing story experiences and collaborative location-aware games.

15.1 Hunterian Antonine Wall Interpretation Cards

15.1.1 Title Gravestone of Verecunda

Essential Information This stone commemorates the life of a slave woman called Verecunda.



Accession Number GLAHM F.38
Location and Date found if known Shirva Farm, near Bar Hill fort c.1728
Exhibit Information
Inscription: D M VERECVNDAE
Inscription reads: "To the spirits of the departed [and] of Verecunda"
Dimensions: H 0.91m x L 0.54m x W0.15m
The stone refers to the person who it commemorates only by the name Verecunda. Roman women were given both a personal name and a family name**.** As Verecunda had only one name mentioned on her gravestone, it is believed that she was a slave. We do not know anything about Verecunda's origins. It is possible that she came to be enslaved during the conquest of foreign provinces or was born into slavery. The erection of a costly gravestone, rather than a cheaper wooden equivalent, suggests that Verecunda was a respected member of her household.
Interpretation / Context As slaves were legally owned by their masters, many had to endure poor treatment. However, dependent upon the household, slaves could enjoy a better lifestyle than the freeborn poor. Female slaves were usually employed for domestic tasks such as cooking, or cleaning. Others worked as midwives or nurses. As slaves could spend their whole life working for the same family, it is understandable that bonds were formed. Many were not as fortunate as Verecunda – it was common for the ashes of the poor or enslaved to be placed in a pot and buried. Others were buried with no grave markers at all.
Available Assets

- Object photographs from the Hunterian
- Video of the 3d scans of the Verecunda gravestone is available at https://vimeo.com/136081274

The Hunterian provided access to the objects for the 3D scans to be done with the agreement that it would have access to the digital files afterwards for non-commercial use. These were created by the

Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) (who were contracted by HES to do the 3D work).

Related Assets

- Bar Hill flyaround -https://vimeo.com/102815441 A virtual reconstruction of the Roman fort at Bar Hill, showing the main buildings and the possible civilian settlement, (Created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) for HES)
- see http://www.antoninewall.org/media-galleries/bar-hill
- 3D reconstruction of an altar dedicated to Silvanus also found at Bar Hill Fort. The inscription read [D]EO SILV)ANO C]ARISTAN[IVS I] VSTIANV[S) PRAEF [C]OH I HAM V S L L M which translates as: Dedicated by Caristanius Justianus, prefect of the First Cohort of Hamii. The altar measures 0..92 x 0.45 x 0.26 m. Hunterian Museum - GLAHM F.24, owned and created by HES https://vimeo.com/98561638 (Created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) for HES)

Tech Suitability 1) Exhibit Brower, 2) Other, 3) Highlight

Tech Comments

1) The visitor can see a photo of the gravestone on her mobile and click on the inscription to learn more about it (e.g., that it reads "To the spirits of the departed [and] of Verecunda"). She can also click on the broken sections of the gravestone and learn that it was reused as building material by Caledonian settlers for a dwelling.
2) Apart from translation from Latin to English, offer users the possibility to write a sentence they want in English (or any other language?) and have it automatically translated to Latin. Offer users option to choose patterns, colours, and textures of what they would put on their own gravestone. Upload the personalised gravestone to an online gallery where the visitor can see their gravestone alongside other peoples. Share their gravestone via social media.

Keywords / Themes Religion, Death, Abandonment, Domestic Life, 'tumulus' - burial mound, Slavery, Women

Reflection / Questions

How did Verecunda feel about living in the frontier of the Roman empire?
What was her relationship with the members of the household where she lived?

Comments As the Romans believed that dead bodies had polluting qualities, cemeteries were always situated outside settlement walls. It is believed the gravestones were taken from the fort cemetery after the Roman departure from Caledonia, and were recycled as the supporting walls of an indigenous dwelling. This explains why they have survived in such good condition.

15.1.2 Title Gaming Board and counters

Essential Information This gaming board was found at Bearsden Bathhouse and Fort. Roman soldiers played games while bathing.

Accession Number GLAHM 138032
Location and Date Found if known Bearsden Bathhouse
Exhibit Information It is made from stone and is 16cm by 12 cm wide. It has a surviving pattern of 3x5 cells and resembles a modern chess board in design. It has been suggested that the board was used for the game *Latrunculi* (usually translated as "the game of little robbers") - a game of military tactics played using counters.
Interpretation / Context The Romans introduced board games to Britannia which would often have been played while bathing. The Romans were renowned for their hygiene practices. These were particularly important on the frontier provinces as disease was a major threat to the soldiers. As such, each fort had a bath-house for the soldiers' use. Gaming frequently took place in bath-houses. The bath-houses were also important meeting places where off-duty soldiers could meet to relax and socialise away from the stresses of fort life.
Available Assets

- 3D reconstruction of fragment of gaming board https://vimeo.com/129136077 (Created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) for HES)

Tech Suitability

1) Other 2) Virtual Reality and Partial Reconstruction 3) 3D printing

Tech Comments
1) The visitor can play a VR version of the gaming board. Rules at: http://www.aerobiologicalengineering.com/wxk116/Roman/BoardGames/latruncu.html
2) To be able to see the board in situ within a (2D or 3D) reconstruction of the Bearsden bathhouse, where this object was discovered.
3) Also, possibility to use the counters as tokens with embedded RFID technology to trigger actions on mobile device for individual or social interaction. Possibility to order this online or buy from museum shop as souvenir or present.
Keywords / Themes Frontier Life, Leisure, Games
Reflection/Questions
Was it only the Romans who would have played this at the Antonine Wall?
Did the local population play this game too?
What about women? Or was it only men's pastime? Would women have used the bathhouse?
Was there any betting involved with this game?

15.1.3 Title Shoes

Essential Information These shoes were worn by men, women, and children.



Accession Number
Man's shoe (F.1936.123) Child's shoe (F.1936.124) Woman's shoe (F.1936.126)
Location and Date Found Bar Hill Fort
Exhibit Information Over five hundred shoes for men, women, children, and babies were discovered at Bar Hill fort, abandoned in rubbish pits and ditches. The various sizes of shoes demonstrate that women and children were present.
Interpretation / Context The presence of children within the forts was not unusual. While officers could marry, soldiers were prohibited. However, they often formed relationships with local women. As a member of the aristocracy, the commanding officer was entitled to bring his family and slaves on campaigns. While it was permissible for centurions and superior officers to marry, infantry level soldiers were prohibited from taking wives. Nevertheless, it was common for soldiers to form relationships with indigenous women and marry according to local customs, probably encouraged by the fact that such unions were recognised by the Roman state upon the soldiers' retirement. Prior to Antoninus' rule, any offspring from these unions were given citizenship along with their father. However, the law was changed in AD 140 so that the children of those newly enfranchised were not granted citizenship. (Rather unfairly, the wives of auxiliary soldiers were not granted citizenship either before or after the change in law.)
Available Assets

- 3D reconstruction of lady's shoe https://vimeo.com/140404027 (Created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) for HES)
- 3D reconstruction of child's shoe https://vimeo.com/140054166 (Created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) for HES)
- Shoe reconstruction, Kinneil https://vimeo.com/106809732 (Created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) for HES)

Tech Suitability 1) Virtual Reality 2) Other
Tech Comments
1) - Show the shoe in perfect condition with the appropriate overlay textures
- Show it on the feet of a whole roman-indigenous family (provides human dimension).
2) - Use it as part of personalisation for gender and age ("choose the shoes which fit you") change the colour, add decoration
- Share your 3D personalised shoes in a gallery.

Keywords / Themes Family Life, Children, Women, Frontier Life, Citizenship, Local people, Dressing, Craftmanship, Design
Reflection/Questions
What happened to these families and relationships when the Antonine Wall was abandoned?
Did the local women and children follow the soldiers and return to Rome?

15.1.4 Title Gravestone of Salamanes

Essential Information This gravestone commemorates a boy named Salamanes.

Accession Number GLAHM F.37

Location and d

Shirva Farm, near Auchendavy fort c.1728.

Exhibit Information We know that he died aged fifteen as the numeral XV is inscribed upon the stone. The inscription reads:

"To the spirits of the departed. Salamanes lived fifteen years. Salamanes put (this) up".

It is believed that his father, who was also called Salamanes, dedicated the stone. Research conducted into the name Salamanes has revealed that it is Semitic in origin, so it is presumed that the family came to Britannia from the Middle East. We can only guess at why Salamanes and his son came to reside on the northern frontier. As no military rank is listed, it is assumed that the father was a merchant who followed the army on its campaigns. The presence of Salamanes and his family upon the Wall attests to the culturally diverse nature of both the army and civilian presence.

Interpretation / Context Roman religion was polytheistic by nature. Religious and political roles were often intertwined. Romans were generally accepting of Celtic deities as long as they did not interfere with Imperial propaganda. The commemoration of the dead was an important part of Roman culture. Due to the lengthy nature of army service, many soldiers died away from home.

Available Assets https://vimeo.com/210767852

Tech Suitability 1) Exhibit browser, 2) Virtual Reality, 3) Other

Tech Comments 1) Hotspots for Salamanes' name and preservation.

2) VR images as background for context, from graveyard to cellar.

3) As with Verecunda's gravestone, use translation from Latin to English and backwards for personalisation the gravestone, as well as select colours, textures, and shapes

Keywords / Themes Religion, Death, Abandonment of the Wall, Commerce, Travel and Migration

Reflection/Questions How would Salamanes family have travelled to Scotland? Where would they have lived at the fort in a tent similar to the soldiers? and how close to the Roman army?

Comments As the Romans believed that dead bodies had polluting qualities, cemeteries were always situated outside settlement walls. It is believed the gravestones were taken from the fort cemetery after the Roman departure from Caledonia, and were recycled as the supporting walls of an indigenous souterrain. This explains why they have survived in such good condition

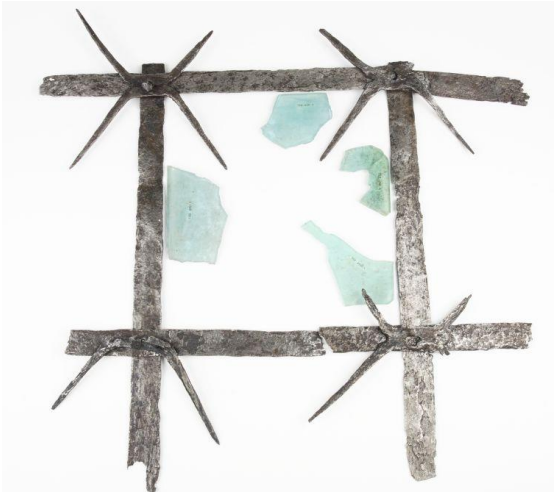
15.1.5 Title Braidfield Distance Slab

Essential Information This distance slab marks the completion of 3240 feet of wall by the Sixth Legion.

Accession Number GLAHM:F.9
Location and date found if known Duntocher, 1812
Exhibit Information
Dimensions: Height 0.76 m Length 1.19m Thickness 0.18m
Material: yellowish buff sandstone
Following the completion of each section of the Wall, the legion responsible erected commemorative stones to record the distance which they had completed. Each slab records a dedication to emperor, the legion which constructed the section and its distance. It is believed that the slabs were designed to be attached to the Wall or its associated buildings. The text is written in an abbreviated form of Latin common in Roman inscriptions.
Inscription reads The inscription reads: IMP C T AELIO HADRIANO ANTONINO AVG P P VEX LEG VI VICTRICS P F OPVS VALLI P MMM CCXL F which translates as "*For the Emperor Caesar Titus Aelius Hadrianus Antonius Augustus, Father of his Country, a detachment of the Sixth Victorious, Loyal and Faithful legion completed the rampart-work (over a distance of) 3240 feet*"
Interpretation / Context An overwhelming sense of pride in Roman achievement is evident in the imagery. Two winged figures of Victory hold up an inscription celebrating the 3240 feet constructed by the Sixth Legion, proclaiming the achievement for all to see and admire. On the left, Mars holds a spear and shield in reference to the triumphant army which achieved victory in name of their emperor. In a similar vein, Imperial Valour displays a legionary standard and sword on the right side of the slab.
Available Assets https://vimeo.com/129135898 (Created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) for HES)
Tech Suitability 1) Exhibit Browser, 2) Highlight
Tech Comments 1) Hotspots for inscription, figures, slab's meaning. Possibility to animate and bring to life the figures on the slab & annotate with information about Mars
Keywords / Themes Military Life, Frontier Life, Construction, Propaganda, Design, Craftmanship, Symbols, Religion, Belief
Reflection/Questions
Can you think of any current practices/objects like the distance slabs?
Comments Romans introduced reading to Britannia, therefore we can assume Caledonians looking at these stones would not have been able to read the text. It was therefore important to supplement any text with imagery which could be easily understood. The Braidfield distance slab has proved valuable as it confirmed the name which the Roman soldiers gave to the construction process - *opus valli*, or the work of the wall. We know that the soldiers referred to the Antonine Wall as *Vallum*, or Wall.

15.1.6 Title Window Grille and glass fragments

Essential Information These fragments of glass and iron window frame found near Bar Hill fort are from a Roman building, possibly the commanding headquarters or a commanding officer's house.



Accession Number: Window Grille F.1936.180 Fragments of Glass F.1936.238/1
Location and Date Found if known: Bar Hill fort vicinity
Exhibit Information Window glass from the headquarters buildings was found at all of the forts on the AW which have been excavated. More rare is the iron window grille. It is probable that the glass was set behind the grille in a wooden frame. Often a grille was used on its own. Glass was very difficult to make during this period as materials such as sand, salt and lime had to be exposed to extreme temperatures to fuse them together.
Interpretation / Context The Roman fort buildings were square or rectangular in shape. They were built from timber or local sandstone and were topped with a red clay tile roof. A square stone building with windows was an alien structure in the Scottish landscape dominated by various types of roundhouses, normally with only a door. The discovery of the window grille and glass demonstrates that the Romans also introduced windows to their buildings.
Available Assets

- Glass Window reconstruction https://vimeo.com/98563104
- Window fragments Bar Hill https://vimeo.com/98563103
- Bar Hill flyaround -https://vimeo.com/102815441 A virtual reconstruction of the Roman fort at Bar Hill, showing the main buildings and the possible civilian settlement, (Created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) for HES)
- Plus other 3D reconstructions of domestic objects e.g. cheese press, jewellery

Tech Suitability: 1) Other, 2) Virtual Reality and Partial Reconstruction
Tech Comments 1) Puzzle game for putting pieces together or in correct place,
2) When this is successful, then user is given option to look through the window (either towards the fields/fort or towards the inside of the house).
Keywords / Themes Fort Life, Architecture, Construction, Design
Reflection/Question
Who made these windows? The soldiers? Craftsmen they brought with them or local ones? How did they make glass? How different was a Roman dwelling to a local person's dwelling?

15.1.7 Title Tent Fragment and tent pegs

Essential Information Leather tent fragment and wooden tent pegs preserved in damp conditions and found at Bar Hill fort.

Accession Numbers: Tent F.1936.148 Tent pegs F.1985.284/1
Location and date found if known: Bar Hill fort
Exhibit Information The tent fragment and wooden pegs were found to the south of the Bar Hill fort, suggesting that soldiers stayed at this site during the construction of the fort. The discovery of such leather items from the Roman period is very rare. The survival of these materials was possible as the damp, anaerobic conditions in which they were found prevented their decay.
Interpretation / Context The soldiers slept in tents made of rectangular and triangular leather panels joined together to make waterproof seams. The tents were arranged in rows. The tents were held in place with wooden tent pegs. It is interesting that both the style of the tent and pegs are like their modern equivalents. As the tents were designed to sleep eight men it is estimated that it took the skins of 38 calves to create each one. When a soldier joined the army, he was required to pay for a stake of the tent which he would use. As might be expected, the legion's centurion occupied a much larger tent of his own.
Available Assets

- Bar Hill flyaround -https://vimeo.com/102815441 A virtual reconstruction of the Roman fort at Bar Hill, showing the main buildings and the possible civilian settlement, (Created by the Centre for Digital Documentation and Visualisation (CDDV) of the Glasgow School of Arts (GSA) for HES)

Tech Suitability 1) Virtual Reality, 2) VR / Partial reconstruction
Tech Comments 1) Overlay the right texture (e.g., colour) on the tent, 2) Partial reconstruction of the whole tent and show the reconstructed tent on site
Keywords / Themes Frontier Life, Military Life, Construction
Reflection/Question
What kind of relationships developed between the men who shared a tent? What would the camp have looked like? What would local people have thought when they saw the camp and rows of tents?

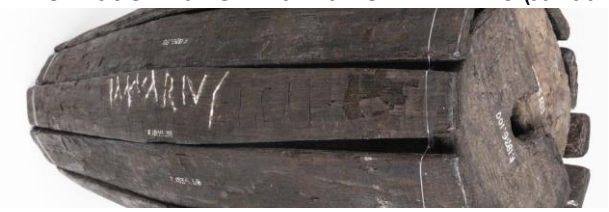
15.1.8 Title Clay tile with paw print

Essential Information This clay tile encapsulates a moment from fort life when a dog stepped onto a wet clay tile.

Accession Number: F.1982.93
Location and date found if known: Bothwellhaugh Fort, 1982
Exhibit Information It is probable that dogs were kept in the forts for hunting, a favourite pastime of the off-duty soldiers. We can imagine the flurry of activity as animals darted around the soldiers occupied in their daily tasks.
Interpretation / Context The existence of buildings with tile roofs along the Antonine Wall
Available Assets https://vimeo.com/137136880
Tech Suitability 1) Exhibit browser, 2) Highlights
Tech Comments 1) People are always curious about the dog breeds they had at that time. Add information and images about Roman dogs (e.g. Pompeii, http://arquehistoria.com/perros-y-mascotas-en-la-roma-antigua-12085)
Keywords / Themes Frontier Life, Construction, Animals, Architecture
Reflection/Question What kind of dogs did the Romans have? Did the dogs belong to the army or to the locals? Where they used to undertake tasks? Maybe this could be connected to other collections, e.g. Europeana about other animal's prints. What other animals were there around the fort?

15.1.9 Title Januarius Barrell

Essential Information Barrell with name IANVARIVS (Januarius) inscribed on one stave.



Accession Number F.1936.100
Location and date found if known: Bar Hill Roman Fort
Exhibit Information Made of wood
Interpretation / Context No dining hall for the soldiers has ever been found in a Roman fort so we have to make assumptions about where soldiers prepared their food and ate it. Based on the evidence from Bearsden Fort nearly within every room of the barrack-blocks remains of pottery were found, thus suggesting soldiers prepared their food, cooked it, and ate it in their barrack-rooms. Few cups were found, no knives, but many bowls and dishes. The soldiers were supplied with basic daily rations which included 3lbs of bread, 2lbs of meat, 2 pints of water, and one-eighth of a pint of oil. Each soldier was responsible for preparing and cooking his own meals. However, it is likely that soldiers banded together in groups according to their barrack-rooms. While the forts contained clay ovens for baking bread, it is likely that soldiers cooked their day-to-day meals within the barrack-rooms.
Available Assets https://vimeo.com/98562821
Tech Suitability 1) Exhibit browser, 2) Other
Tech Comments 1) Info about daily rations, cooking techniques, etc. 2) Prompt users to prepare their own meal with ingredients given and then give them different roman recipes
Keywords / Themes Food and Drink, Frontier Life, Domestic Life
Reflection/Question So what did the soldiers use to drink from? Did they use their hands to eat? What did Roman soldiers eat? How did they cook?

15.1.10 Title Jewellery

Essential Information Roman luxury items such as rings, beads, bracelets and fragments of mirrors were discovered around the forts of the Antonine Wall

Accession Numbers & Locations A.1980.15, A.1980.25, GLAHM:138042, A.1980.223
Leckie broch (A.1980.15; A.1980.25; A.1980.223), Croy Hill (GLAHM:138042)

Exhibit Information Jewellery and glass were prestige goods which would have belonged to the wealthier Roman fort inhabitants or perhaps were traded with local Celtic elites.

Interpretation / Context Luxury goods were useful items to trade or give as diplomatic gifts. Vanity items like the mirror and jewellery were often given as diplomatic gifts and were highly desired by the Celts. As these would have been obviously Roman in origin, they indicated to the local community that the chieftain enjoyed the favour of the Roman administration. In return, the Romans could peacefully extend their sphere of control through chieftains to their community. Many objects of Roman origin have been found to the south of the Antonine Wall, suggesting that the Romans enjoyed a relatively close relationship with tribes of southern Scotland. In contrast, relatively little has been found to the north of the Wall which indicates less contact.

Available Assets

- Object photographs from the Hunterian
- 3D model of Bronze arm purse https://vimeo.com/136907329

Tech Suitability 3D printing

Tech Comments To be worn and maybe embed RFID technology for social interaction and personalization

Keywords / Themes Luxury, Frontier Life, Design, Trade and Commerce, Celts

15.1.11 Title Ballista Ball

Essential Information The cracks on this ballista ball suggest the ball was heated until red-hot and then quickly cooled. One interpretation is that it was heated and then launched during an attack on a local settlement where the inhabitants threw water on it to prevent it starting a fire.

Accession Number A.1980.516
Location and date found Leckie Broch
Exhibit Information This ballista ball was discovered at the destruction level of the Leckie broch, a Celtic settlement near Gargunnock to the north of the Antonine Wall. Elite members of the local Celtic community resided in brochs. These were round stone towers with a straw roof, with one door and no windows. They were primarily built for defence. Ballista balls were fired from a catapult, thereby allowing the Romans to attack from a distance. It is likely that the ball was heated until burning hot before being fired at the broch's straw to set it on fire. The cracked surface suggests that it was cooled very quickly. The most likely explanation for the cracking is that water was thrown over the ballista ball while it was still hot.
Interpretation / Context Archaeological analysis has revealed that the broch was destroyed around A.D. 140, most likely because of a Roman siege. It is not known why relations between the two sides soured. However, Celtic iron swords and shields have also been found at the site which may suggest that the inhabitants were ready for an attack.
Available Assets

- Object photographs from the Hunterian

Tech Suitability 1) Virtual Reality, 2) Highlight
Tech Comments 1) Background context depicting a siege scene
Keywords / Themes Destruction, War, Celts
Comments This object was not discovered on the Antonine Wall but out with the wall's immediate vicinity suggesting it was involved in battle between the Romans and the local people at Leckie Broch.

15.1.12 Title Cheese Press [or mould?]

Essential Information A cheese press, found at Balmuildy.

Accession number: F.1922.602
Location and date found if known: Balmuildy Fort
Exhibit Information This cheese press is 8cm high by 17cm in diameter and made from clay. Without refrigeration, it would have been impossible to keep milk fresh and it was normal practice for milk to be converted into butter or cheese to enable long-term storage. Bacteria formed as milk warmed, causing it to curdle, curds and whey were separated, curds were treated by cutting and shredding to make hard cheese. They were then placed into perforated cheese press which allowed whey to be drained away and curds hardened into the shape of the press. Cheese is still made the same way today. Source: http://www.bbc.co.uk/ahistoryoftheworld/objects/uiPFEqFnS-W5zPR9X6ewUg
Interpretation / Context The arrangements for the provision of food are not known. While soldiers may have had the resources and land to cultivate a certain amount of produce some historians suggest that much was purchased (or appropriated) from the nearby Caledonian farming communities who survived by raising animals and harvesting crops.
Available Assets https://vimeo.com/135231985
Tech Suitability Other
Tech Comments Include video about how cheese is traditionally made
Keywords / Themes Frontier Life, Domestic Life, Food and Drink
Reflection/Question
What were meal times like on the frontier for soldiers? How would they have cooked? Did they cook and sit down to eat together?
Comments Due to the acidity of the soil at Bearsden Fort, where analysis has been carried out, there are few animal bones left. Written evidence and the discovery of animal bones at many other Roman forts do tell us that Roman soldiers did eat meat. That said, biochemical analysis of the sewage from the latrine at Bearsden Fort indicates that the diet was mainly plant based. Two different types of wheat were found: emmer could have been used for porridge while spelt was probably used to make bread. Analysis of residue in pots found at Bearsden demonstrated the existence of a third type of wheat, macaroni wheat. This may have been used to make pasta or porridge. It is likely that these wheats were imported. They would have been ground into flour using the querns also found in the fort. A range of wild fruit was eaten: bilberry, blackberry, raspberry and strawberry. Hazel nuts were also in evidence. The discovery of a hoe and a reaping hook, the latter found in the Bearsden barrack-block provide evidence that agricultural work was undertaken. Some food was imported, lentils probably from southern Britain, figs, dill, coriander and opium poppy from the continent- fig seeds were found in the sewage analysis. Some of the pottery found at Bearsden points to food being cooked on small braziers and might explain why no oven was found at Bearsden. Cooking on braziers is common in North Africa. It is possible that the soldiers brought this style of cooking with them from when they fought in North Africa. Or some soldiers married North African women or acquired North African slaves who in turn cooked in this style at the Antonine Wall.

15.2 Hunterian Antonine Wall Card Sets

15.2.1 Story A

Story A	Story Concept: A day in the life of a Roman dog or soldier or girl on the AW		
		Information Card Title	**Function**
	Card 1	Clay Tile with Paw Print	Character
	Card 2	Shoes	Prop
	Card 3	Tent	Setting
	Card 4	Braidfield Distance Slab	Event
	Card 5	Cheese Press	Prop

Story A Genre: Choose your own path / build your own adventure
Experience: The visitor chooses which perspective or role they would like to play, e.g., the dog or a Roman soldier or Verecunda. Each character can roam around the fort freely going where it wishes, and looking at various objects that are of interest along the way.
Emotion: this is variable depending on the choices the user makes and the character chosen but for example – if the dog is chosen the emotion attached to the narrative choices for this could be cheerful. The emotion attached to the soldier could be melancholy, lonely or bravery. The emotions attached to Verecunda's narrative could be – sad, lonely, caring.
Personas: Callum / Annie / Carlos / Susie

15.2.2 Story B

Story B	Story Concept: Preparation for battle on the frontier as seen from Verecunda's perspective		
		Information Card Title	**Function**
	Card 1	Verecunda grave stone	Character
	Card 2	Window	Setting
	Card 3	Cheese Press	Prop
	Card 4	Ballista ball	Event
	Card 5	Jewellery	Prop

Story B Genre: War
User Experience: The visitor role-plays the character of Verecunda, who is inside the headquarters building or the granary building and looking through the window. She is witness to the preparations for battle.
Emotion: Fear and worry about her safety
Theme: The role of women/slaves on frontiers
Personas: Mary / Annie / Susie

15.2.3 Game A

Game A	Game Concept: Building the Wall	
		Information Card Title
	Card 1	Ebutius' Hammer
	Card 2	Ebutius' Hammer
	Card 3	Braidfield Distance Slab
	Card 4	Januarius Barrell

Game A Collaborative Experience: Visitors need to work together to locate the various elements, tools and help that is needed to build the wall e.g. materials including stone, clay, turf, mortar, timber and rushes. The ramparts were built of turf and placed on a stone base formed of rough stones and held in place by stone kerbs. Roads and paths were formed of cobbles surfaced with a layer of gravel. A stonemason may be needed to create the stone kerbs. This could be played on site at Bar Hill For/ Bearsden. But there could be potential for this to be played in the museum as well, as an example of bringing the physical wall via VR into the museum.
Twists: The game might through up some interventions that impede the progress of the users- e.g. bad weather or different instructions from Rome.
Persona: Callum or Carlos.
See Group 2's experiences from User Workshop 1. This could be a hybrid game between Annie on site within the museum and Callum at home.

15.2.4 Game B

Game B	**Game Concept: Feed the God**	
		Information Card Title
	Referenced Card 1	Salamanes' grave stone
	Referenced Card 2	Jewellery
	Referenced Card 3	Bradfield Distance slab
	Referenced Card 4	Holy day

Game B Collaborative User Experience: The aim of the game is to locate the keys items needed to prepare for the Holy Day. Users need to work together to find gifts for the gods, prepare food and dress for the celebration e.g. putting on jewellery.
Context: Certain days would be special for the Roman army celebrated many 'holy days' throughout the year […] We know that two would have been especially celebrated at Bearsden , 3 January and 10 July. The first was the day when the army in every province paraded to seek the protection of the gods on their emperor and the Roman state, and receive their first pay of the year. The second was when they gathered to commemorate the accession of the emperor and take an oath of allegiance. On each day, an ox would be sacrificed to the Roman god Jupiter. (Source: David Breeze, Bearsden The Story of a Roman Fort, Archaeopress, 2016 p.58)
Emotion: uncertainty, hope, worry
Theme: Religious beliefs and multi-faith rituals; interaction between Roman and local groups
Personas: Mary / Susie / Annie / Callum