thersites JOURNAL FOR TRANSCULTURAL PRESENCES & DIACHRONIC IDENTITIES FROM ANTIQUITY TO DATE

STOCKS, CLAIRE, BIRLEY, BARBARA AND COLLINS, ROB

(VINDOLANDA TRUST AND NEWCASTLE UNIVERSITY)

Stories from the Frontier: Linking Past and Present at Vindolanda through Digital Gameplay, in: thersites 8 (2018), 97-109.

KEYWORDS

Vindolanda, App, Game, Mystery

ABSTRACT

'Stories from the Frontier' is an Arts Council England (ACE) and Roman Research Trust funded-project which will change how visitors engage with the ancient world at the Roman site of Vindolanda, Hadrian's Wall. Using the latest research and advances in gamification combined with original artwork and 2D animation, the project will create a game for smart phones that will integrate the normal segregation of material culture from site display by transferring knowledge through gameplay. Aimed at 7-11-year olds and their families, the game tells the stories of real people and objects from the past in a fun and innovative way. While on site, users will play 'detective' to solve what happened to the child skeleton (c. AD 230) discovered in the army Barracks at Vindolanda. This case study describes the results of the development of the prototype for the game including test workshops.

1. The Skeleton under the Floor…

ROMAN Vindolanda is part of the UNESCO World Heritage Site of Hadrian's Wall, though the site pre-dates the construction of the Wall. A fort was established by the Roman army during the Flavian period of occupation in Roman Britain in the 90s AD, possibly earlier.[1] Initially consisting of wooden structures, multiple phases of building activity saw a series of discrete forts, culminating in the construction of a stone fort and accompanying vicus (town) built c. AD 220, which featured among other establishments a large bath-house and tavern. The site fell into disuse after the end of the Ro-man period in the 5th or 6th century, but extensive remains are still visible to this day and the site itself shows evidence of occupation up to the 9th century. Currently, the site is managed by the Vindolanda Trust, and it remains an active excavation site (notable discoveries in recent years include a pair of boxing gloves and a bronze hand that was most likely attached to a pole and served a cult function).[2]

During the 2010 excavation season, archaeologists made the unexpected discovery of the remains of a child's skeleton, in a shallow grave under the clay floor of one of the 3rd-century barrack rooms. Due to the poor preservation of the skeleton in the ground conditions some tests such as DNA were inconclusive.[3]

Initial analysis of the skeleton's jawbone and teeth indicated that this was a child aged around 8-10 years old. Since the skeleton was that of a prepubescent, it was difficult to determine whether it was male or female, although more recent bone analysis has indicated that this was probably a skeleton of a young girl, with the isotopes in the teeth indicating that the child lived in the Mediterranean region before moving to Vindolanda around the age of 7. There is no evidence of traumatic injury, and no sign

[1] [1] For an overview of the site of Vindolanda and its history see especially R. Birley (1977) and A. Birley (2002).

[2] In recent years, finds have included a pair of leather boxing gloves in the 2017 season (http://www.vindolanda.com/_blog/press-releases/post/rare-ancient-roman-boxing-gloves-uncovered-at-vindolanda/, sourced 12/02/2019), and a bronze hand in the 2018 season (http://www.vindolanda.com/_blog/press-releases/post/bronze-hand-discovery/, sourced 12/02/2019).

[3] See, for example https://www.bbc.co.uk/news/uk-england-tyne-11324607 (sourced 12/02/2019).

of ill health, but she was found in a foetal position, possibly indicating that her hands had been bound.[4]

This is the extent at present to which the science available allows us to identify this child and what happened to her. Her life, as well as her death, remains a mystery. However, the discovery of the remains under the floor of a barrack room inside the fort is in stark contrast to normal and expected burial practice of the period. The child should have been inhumed or cremated in a burial ground outside the settlement at Vindolanda. The fact that the body was deposited in an unexpected location suggests irregular circum-stances surrounding the child's death, and murder or manslaughter are a probable reason.

With the project 'Stories from the Frontier', we aim to give this child – and others like her – a voice, creating an interactive game that will engage children aged 7-11 and their families with the ancient world by using the trace remains of our cultural heritage to bring that world to life.[5] The fate of this child was not a happy one, but the game does not focus on how she died, but rather on how she lived, creating a 2D animated environment in which users of the game can experience life at the Roman Fort of Vindolanda and make choices as to which part of the site they wish to visit and which clues they wish to collect. The results of our test workshops have been extremely positive, indicating that children love the mystery-based narrative as well as the opportunity to be involved in telling their own stories.[6]

2. Discovering Vindolanda: Identifying the target au-dience and creating a story

The prolific availability of smart phones and tablets determined the platform interface that guided the design process for the game. In addition, as-

[4] Research on the skeleton was conducted by Dr Trudi Buck; a more detailed overview of her findings are contained in the 2010 excavation report for Vindolanda.

[5] Immersive game-play and VR/AR (Virtual/Augmented Reality) have been proven to engage, and by reflex educate, visitors to ancient sites and museums on a deeper level: see e.g. Ioannides, Magnenat-Thalmann, and Papagiannakis (2017).

[6] The ending of the game is deliberately open ended to reflect the realities of archaeological excavation. This open-endedness allows scope for the players to develop their own theories and hence stories about what might have happened to this child, an aspect that has also been explored in our workshops.

sessment of existing game apps made it apparent that hand-drawn 2D animation had two distinct advantages: first, it was cheaper than creating bespoke 3D computer animation; second, it did not as rapidly become 'old' or dated. Moreover, 2D animation works well in Vindolanda's rural location, where the site display of buildings and the uneven terrain would make a more immersive VR (Virtual Reality) approach unsafe for visitors. It will not require large amounts of memory or processor capacity on a smart phone or tablet and so can be quickly downloaded on site for free using the Wi-Fi provided at the Vindolanda entrance information point. Further guidance was provided through assessment of Vindolanda's visitor data. The Vindolanda Trust 2017 visitor figures show that approximately 100,000 guests visited the site. Of these, c. 10,000 attended on formal educational visits and an additional 10% were school-aged children visiting with families. Based on these figures we were able to estimate that up to 8,000 people per year would use the app, giving a total of up to 80,000 users over the envisaged life-span of the game (up to 10 years in its current format). In 2018, Vindolanda saw a drop in Key Stage 2 (aged 7-11) visits. Thus we decided to aim this game at Key Stage 2 students and their families to reinvigorate the school offer for this age group as well as to create a game that would tie-in with the UK national curriculum and so offer (quantifiable) educational value as well as entertainment. We hope that the game will inspire and motivate a new generation of future archaeologists and historians by teaching them critical thinking skills and deductive reasoning.

The game offers an immersive story in which users play 'detective', trying to solve the mystery of what happened to the child's skeleton discovered on site. The game begins in 2010, with the discovery of the skeleton and the archaeologists debating how it ended up in its current location, before going back in time to AD 230, the approximate date of the child burial. Now users of the game are introduced to its central characters as they accompany a military Tribune, Marcus, from the nearby Fort of Magna at Carvoran. In the game, Marcus has been requested by the owner of Vindolanda's bathhouse, Vitalis (portayed as an army veteran) to find some missing property: a child, who is a valuable slave at the bathhouse. The choice to make her a slave was deliberate, since this gives us an opportunity to discuss more sensitive and complex topics of the Roman world – topics that continue to have relevance today. Similarly, the characters that populate the game reflect the diversity and muticulturalism of Vindolanda at that time, giving children the opportunity to draw connections between contemporary and ancient

societies. The names selected for the characters are sourced from the Vindolanda tablets and other written records from Roman Britain; the name of the Fort's commander, Sulpicius Pudens, is even more specific, since we know that such a man commanded the garrison based there around AD 230. His name is recorded as the dedicatee of an altar to Jupiter Dolichenus, which was found on site at Vindolanda during the 2009 excavation season and which also features as an object within the game.[7] Though the inclusion of names from the Vindolanda tablets and other historic attestations are not in keeping with the chronology of the game, it was deemed that the use of names of 'real' people enhanced believability on the part of the user as well as potentially inspiring users to investigate these individuals beyond their occurence in the game.

Users of the game accompany Marcus around the site of Vindolanda, effectively playing the role of a Watson to his Holmes, as they learn more about the case and 'collect' artefacts.[8] Users can choose the order in which they visit locations on site and have the option of learning more about the places they visit as well as the objects they collect, both within the game and in the museum on site. Through the game, we hope to encourage children to learn more about the ancient world and Vindolanda in particular. To this end, we have three educational objectives:

• Visualise daily life at Vindolanda – children will learn about the real people named in the world-famous Vindolanda writing tablets;

• Highlight the social diversity of the period – the game's artwork offers a real reflection of the cosmopolitan atmosphere of Vindolanda through the game's characters, who come from all over the Roman world. Children will explore aspects of immigration and multi-culturalism, engaging with the issue of diversity within their own communities as well as within the community based at Vindolanda during the Roman period;

• Connect the consolidated remains of buildings on site to the museum objects on display – for example, children will learn about a dice game soldiers formerly played in the army barracks and will have the opportunity to play a similar numerical game on the app, before being encouraged to find the

[7] http://www.vindolanda.com/_blog/press-releases/post/vindolanda-Roman-Altars/ (sourced 25/03/2019).

[8] Studies have shown that virtual acquisition and/or collection, including unlocking new content, functions as a reward-system that stimulates and sustains gameplay. See, for example, Richter, Raban, and Rafaeli (2015).

real dice in the museum. This explicitly attempts to bridge objects with space to help audiences understand a Roman sense of place, which is difficult due to the traditional display format of segregating site remains with museum-based object display.

3. Drawing Vindolanda: Designing a Game and Incor-porating Archaeological Evidence

Once we had identified our target audience and established the game's mechanic (a narrative-based story which allows users to choose where they want to go), we needed to select a style (genre of illustration) for the game. At the development stage (see above) we chose to use 2D animation for practical as well as economic reasons. Our artist then produced hand-drawn artwork in a variety of styles. In the end, we selected a vintage design (fig.1) that evokes the style of graphic novels/comics. The advantage of this style is that it will not date quickly, giving the Trust a more sustainable and resilient product, which is also cost effective. In addition, this style proved most popular with our test audiences, appealing both to our main target audience of children (aged 7-11) and accompanying adults.[9]

This style of artwork also lends itself to accompanying publication materials, notably a 20 page booklet that we will create to be sold on site at low cost. This booklet is also aimed at Key Stage 2 children, and will include artwork from the game as well as additional educational material on life at Vindolanda. Like the game itself, it will increase the site's educational offering for visitors in this age group.

Whilst the artwork is deliberately simple in design, with a limited palatte range that aims to evoke the tone of a graphic novel, the artwork is historically authentic within the limits of the medium.

Throughout the prototype stage, therefore, colleagues from Vindolanda and Newcastle University worked with our artist to ensure a finished product that reflects what a visitor to Vindolanda in AD 230 might have seen. Figs 2 and 3 below illustrate the evolution of this design process with respect to the army barrack block. Fig. 2 is a concept sketch by our artist based upon information such as excavated site remains, archaeological evidence for fur-

[9] On the importance of selecting an appropriate graphic style for computer games, see, for example, Lee, Gee, and Dolah (2016).

nishings, and art historical examples of similar structures. The concept balances between accuracy and provision of too much detail, such as individual paving stones.

Fig. 3 shows the finished drawing of the barrack building, in the style of the game. This final drawing reflects the feedback which our artist received from the team with regard to the layout and positioning of the barrack block. Of particular note is the extension of the building indicating the larger and more prestigious centurion's quarters and the shift of the numbers onto the doors. The artist also shifted the perspective of the viewer to better reflect the height of a child, reinforcing the interface between the game and the primary intended audience.

Initially the artist drew numbers for the doors on signs above the doors themselves. However, the discovery at Vindolanda of several wooden door panels, remarkably well-preserved and available for the visitor to see in the on-site museum, shows that the numbers of the barrack rooms were in fact etched onto the surface of the panels. During our first test workshop, we showed the children these two drawings and told them the design story behind them. Later in that same workshop one child – unprompted – drew one of these doors with a number in Roman numerals drawn on its surface, suggesting the potential that this game has for shaping childrens' understanding of the ancient world.

Finally, we produced a proof of concept image (fig. 4) for the game, which illustrates how this drawing of the Barrack block will be displayed on a smart phone or tablet. The aim is that a user of this game will visit the site of the barracks at Vindolanda and then be able to see a 2D reconstruction of that area on their phone whilst playing the game.

4. Bringing Vindolanda to Life: Test Workshops

The final stage of the game's protoype development included two workshops where we gathered feedback on the game's design and narrative from parents and children.

The first workshop was an art and design workshop where children met our artist, learned about the game's story, and were shown how to draw their own characters. This broke the design process down to its most simple elements, demonstrating to the children present that it was possible to draw buildings, people, and animals etc. by breaking them down into a series of shapes, thus demonstrating that anyone can draw. Feedback from this

workshop was gathered verbally from the parents and from the children via a questionnaire. The majority of parents supported the game's narrative without reservation, but a few suggested that the game come with a parental warning in light of the fact that the story focuses on an (implied) child murder. The questionnaire asked children to comment on what they liked or did not like by selecting from a series of emoticons. There was also an open question at the end where children could say what they did/did not like about the game. The emoticon responses showed that all bar one of the children (11 in total) liked the story and the majority of the open-ended comments asked for more information on the characters in the game.

The second workshop was an hour-long stop-animation workshop (Fig. 5). As with the previous workshop, children were first introduced to the game, its characters, and the story behind it. They were then asked to recreate a scene set at the West Gate of the Fort involving (LEGO) Roman soldiers. The children were told to create a scene involving Marcus the Tribune and the soldiers of the Fort. They were given complete freedom as to what scene they chose to depict. Using a series of speech bubbles, almost all of the groups (8 in total) chose to depict a scene involving a fight with varied levels of violence. Their gleeful approach to depicting the death and maiming of LEGO Roman soldiers illustrates that it is possible to educate children on complex and sensitive topics in relation to the ancient world (such as death and violence) provided that we do so in a manner that engages them with that world, but that also keeps them one step removed from it, e.g. assisting Tribune Marcus in the past, but from the vantage point of the present, thus replicating the process of a modern archaeologist.

The feedback that we received from the parents, however, reinforces the fact that any game that deals with violent subject matter, especially the death of a child, must be handled with sensitivity. Likewise, the children who participated in the workshop enjoyed producing scenes of violence because they had control over how those scenes were articulated as well as maintaining some distance from them: i.e. they never lost sight of the fact that this is a game and they maintained control over shaping its narrative. In light of this feedback, therefore, the child whose discovery serves as the foundation for the story is never depicted visually within the game, so allowing her to remain 'faceless'. Similarly, no scenes of violence are included and since the game begins in 2010 with archaeologists discussing how this skeleton came to be buried under the barrack room floor, we are able to

reinforce the distance between past and present. Finally, by building elements of narrative choice into the game, as well as leaving the possibility of what may have happened open, we allow children to inhabit the role of storyteller, thus maintaining some control and influence over how the story is told.

5. Conclusions

The successful testing of the prototype game 'Stories from the Frontier' illustrates the potential for offering children aged 7-11 years a game that is both entertaining and educational. Based on the site of Vindolanda, the game provides an engaging interface for the user that allows us as academics and heritage professionals to break down the boundaries that visitors face on three distinct issues. First, the game narrative digitally populates an 'empty' archaeological site, reinforcing that archaeology is about the human past and not only 'things'. Second, artistic representation of buildings in the game allows the player to examine and locate the consolidated 'ruins' on the ground with an interpretation of what the structure may have looked like when complete, supporting a deeper understanding of the site. Third, the inclusion of artefacts within the game creates a virtual bridge between the site and those objects on display in the museum, overcoming the dissonance created by the realities of curation and display of artefacts. These issues are often exacerbated in children. This app will immerse young people into its history, therefore, by linking the sites and artefacts through active story telling. Vindolanda is exceptional in its ability to provide an immense archaeological resource for its visitors. The link between the site and the active archaeology, along with the large onsite museum, which displays many unique objects, is unparalleled elsewhere in the Roman world. The workshops that we have run thus far demonstrate the appetite of children and families for this type of product, as well as affirming the potential educational and entertainment value of this game.

The completed Vindolanda game should be ready to download and play on site by summer 2020.

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Figures

Fig 1. Graphic-novel style; artist Gareth Slack

Fig. 2. Sketch of Barrack Block, artist Gareth Slack

Fig. 3. Finished Drawing of the Barrack Block, Artist Gareth Slack.

Fig 4. Proof of concept

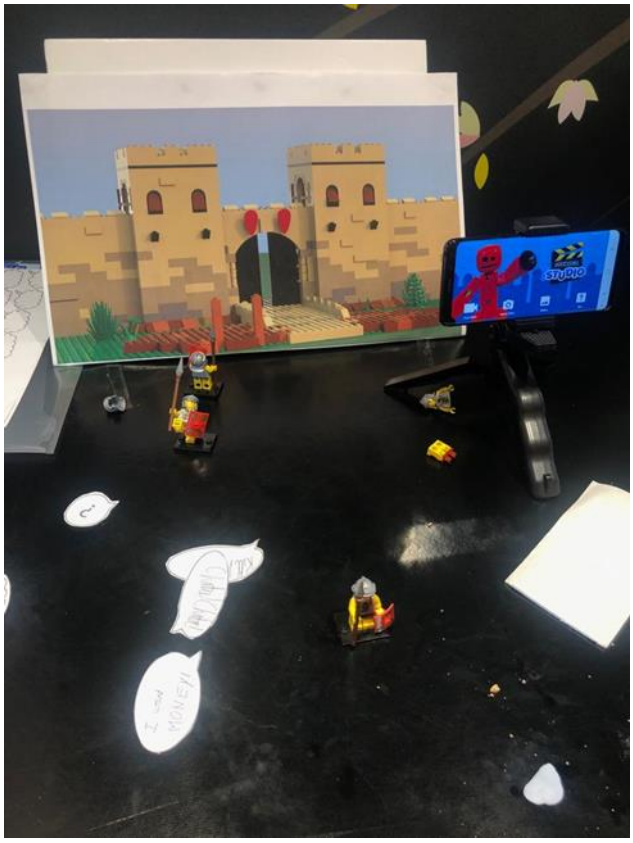

Fig. 5. Stop-animation workshop using the software *Stikbot*