Contextualizing Collections: Using Virtual Reality in Archaeology Exhibitions

by Christie A. Ray, MA and Merel van der Vaart, MA

Not all museum objects are great works of art, exceptional examples of craftsmanship, or mementoes of world changing historical events. We as museum professionals know this, of course, but for our visitors it might be challenging to make sense of domestic objects that are not aesthetically pleasing or of uncertain historical importance. Especially for museums with historical collections, the same question can arise again and again: How can we engage our visitors with the tools or everyday household items that were used by people who lived centuries ago? In the Allard Pierson Museum (APM), the classical antiquities museum of the University of Amsterdam, we are considering this question as we plan the redevelopment of our permanent exhibition space. While many of the objects in our collections were once everyday items, it can be challenging for our modern visitors to interpret them. For example, visitors might struggle to associate a metal hook-shaped object with personal hygiene, while in Roman times the *strigil* was as ubiquitous as the towel is today. It was used in bath houses, or after sporting events, to scrape oil and dirt from the body. Objects like this make us reflect upon the visitor experience and ask ourselves how we can help our visitors understand the original uses for the objects in our collections.

Contextualizing Collections

One way to bring life to objects representing everyday activities is to contextualize them. Currently in the APM, this is primarily done through the use of text labels and pre-booked guided tours. The display of objects may be called traditional; most objects are placed in cases with similar objects found in the same geographical location and produced around the same time. With research by Bitgood (2000;1993), among others, showing that visitors' attention for text labels is limited and that interest is maintained longer in more varied exhibitions, we are now exploring the potential of other interpretation methods alongside text labels to help visitors engage with our collections.

One example of contextualization is to place Roman kitchen utensils in an exhibit resembling a Roman kitchen. This kind of physical contextualization can sufficiently inform visitors without requiring them to read lengthy texts. For the APM, however, this is not a suitable interpretation method. Exhibition space in the APM is

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This strigil from 5th century AD is approximately 10 inches long and would have been used for cleaning bigger body parts, such as the back. Courtesy of Stephan van der Linden, Allard Pierson Museum.

A visitor interacting with the first version of Etruscanning in the RMO. Courtesy of Daniel Plentinckx, Visual Dimension.)

limited, and exhibits of this kind generally require more space than more traditional displays.

More importantly, the APM is preparing to renew its permanent collections presentation, with a strong focus on flexibility of display and a desire to offer layered content. Physical contextualization of objects not only hinders a flexible presentation approach, it also provides challenges with regard to offering various layers of content. When a piece of Roman pottery is placed in a kitchen setting, it will be less obvious to talk about the way it was made, or its role in the museum's collecting history.

Therefore, the APM has decided

to explore the potential of virtual contextualization. In addition to the original object, visitors might access a virtual 3D replica of the object, which can be placed in one or more virtual contexts. The first trial of virtual contextualization of museum objects in the APM took place as part of the Etruscanning project. Etruscanning is a European research consortium funded by the European Union[1] that explores visualization techniques and 3D reconstruction in general, and visitor engagement with Etruscan tombs through virtual reality (VR) in particular. The Regolini Galassi tomb was the first test case.[2] Virtually restored replicas of the original contents were placed inside a virtual reconstruction of the tomb, allowing visitors to explore

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the tomb and its contents in their virtual form. The visuals were projected onto a screen in front of the visitor. To facilitate physical interaction with the tomb we used existing sensor technology developed for the gaming industry called Kinect.[3]

re-contextualizing everyday Roman household items. Seven objects from the museum's Roman collection will be virtually reconstructed and restored and placed inside a virtual Roman domus. Using a Kinect sensor, visitors will be

A visitor interacting with the second version of Etruscanning in the APM. Courtesy of Christie A. Ray, Allard Pierson Museum.

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The APM was one of several museums in which the resulting installation has been presented to the public.

Currently, the APM is preparing a second trial, under the working title "Keys to Rome," with the aim of virtually

invited to explore the *domus* and locate the virtual objects, while learning about the use and role of the objects in Roman life. Afterwards, they will be encouraged to view and explore the physical objects that are on display in the Roman gallery.

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**Visitor Experience of Virtual Contextualization**

In preparation of "Keys to Rome," a series of studies have been carried out on the Etruscanning installation with the aim of analyzing the visitor experience. We have identified three aspects that have a significant impact on the visitor experience of virtual contextualization: user interface design, visualization quality, and integration with collections.

User Interface Design

While a simple user interface design can intuitively guide users through their interactive experience, a complex user interface can cause frustration or termination of interaction, which means it effectively acts as a barrier, preventing visitors from accessing the content they are seeking.
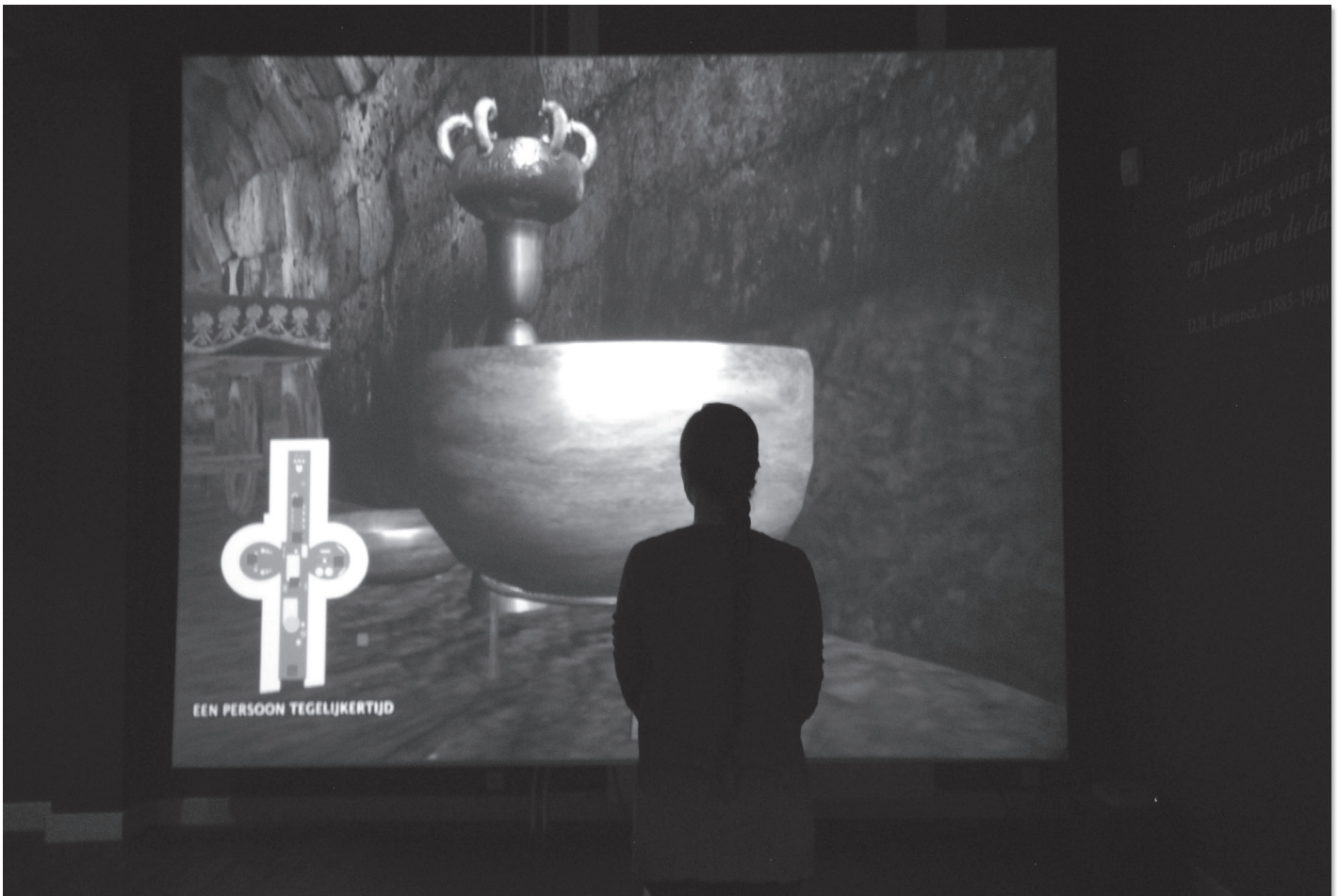
An example of the quality of the visuals for the first version of Etruscanning. Courtesy of Daniel Plentinckx, Visual Dimension.
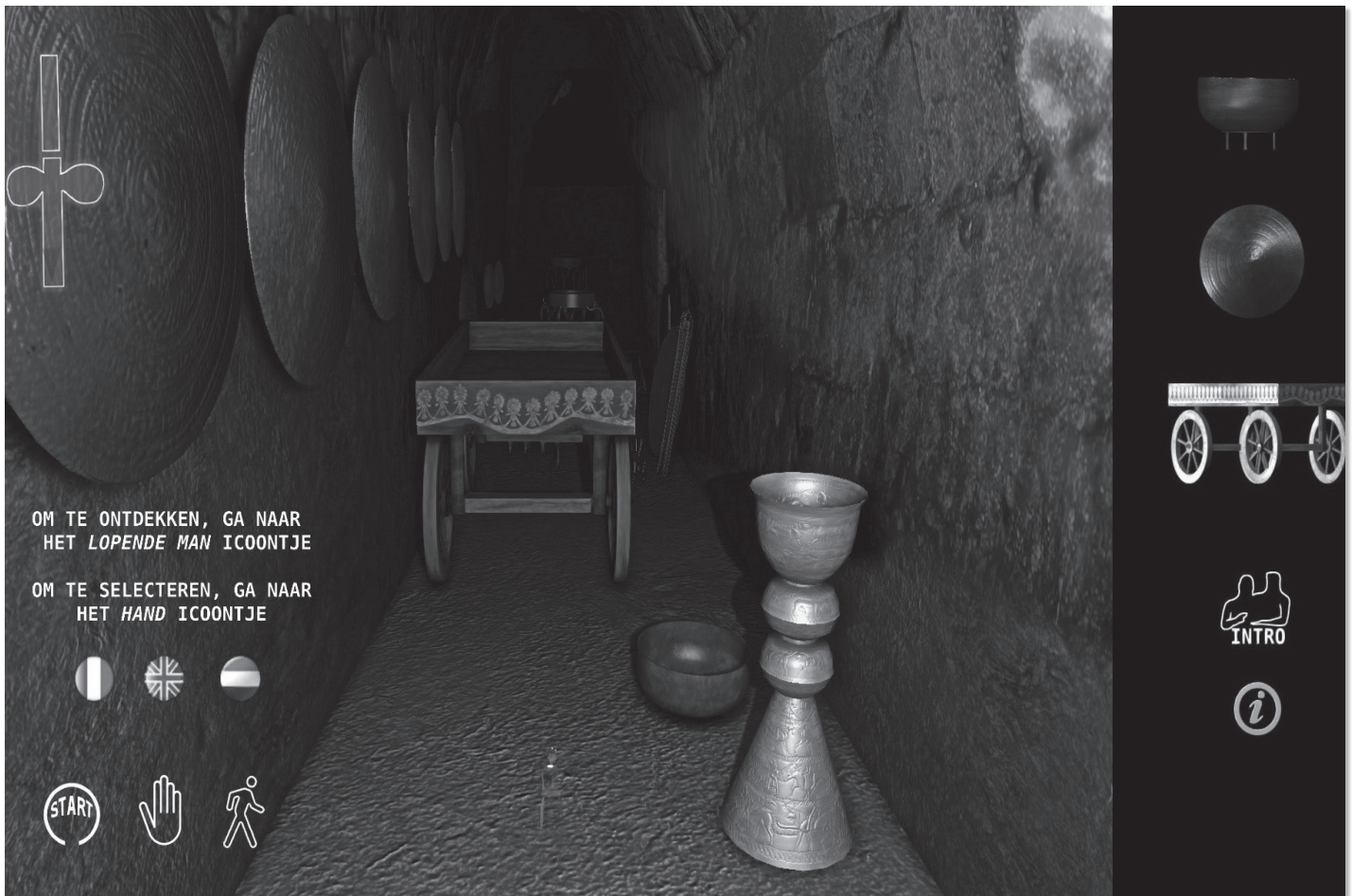
A screenshot of the second version of Etruscanning, showing the high visual quality of the objects and additional ambient light. Courtesy of Daniel Plentinckx, Visual Dimension.

Two versions of the virtual reconstruction of the Regolini Galassi tomb have been on display in the APM. The first version provided navigation by means of a map of the tomb placed on the floor in front of the projection screen. If a visitor stepped onto one of the marked hotspots on the map, this would trigger a short story and visualization of an object from the tomb. Although the user interface was very simple, it also offered visitors little control over their experience. The aim of the second version was to give visitors more freedom to explore the entire space of the tomb and the objects inside. As a consequence, a more complex user interface was introduced. The user's location in the physical space would trigger either the 'navigation' or 'object selection' mode. A number of pre-defined arm gestures would then make it possible to either navigate the virtual space or select an object to find out more about it.

By observing museum visitors, we found that the simplicity of the interaction in the first version, coupled with the automatic trigger of the object storytelling, meant that users found interaction to be quite easy and would interact with the installation for 10–12 minutes (average). The second version of the installation offered users a more flexible, personalized interactive experience, hypothetically offering access to more content. However, the complexity of the user interface meant that many users would require more time to understand how to use the installation. Without clear instructions, many users of this second version quickly became frustrated with the complicated interaction gestures and terminated their interaction after between 1–3 minutes (average), thereby limiting their access to informative content. Through a focus group meeting and by observing users, we found that providing instructions for this installation would help prepare visitors for

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interaction, while re-introducing hotspots on the floor would make it easier to choose between the two different modes.

Visualization Quality

As the visual quality of virtual environments and objects improves and evolves in gaming and entertainment industries, the public similarly expects higher quality VR. Museums too will have to match these expectations.

Between the first and second versions of the Etruscanning installation, the image quality was improved. The virtual objects in the first version of the installation were less detailed. As such, users would often comment that the visual quality did not compare to their experience with games or entertainment. Additionally, although the installation was presented in close proximity to the original objects that had been found in the tomb, the inferior quality meant that visitors rarely recognized the real objects as being the source for the visuals in the installation. For the second version, all objects had been completely digitally restored, and users quickly recognized the improvement in quality, especially the additional atmospheric elements which were added, such as soundscapes and ambient lighting. This improved quality allowed visitors to become more immersed in the virtual environment.

Integration with Collections

The placement of technological installations within (traditional object-centric) exhibition spaces can have a powerful impact on the museum experience.

The Etruscanning installation was

originally integrated into an Etruscan exhibition in two museums in the Netherlands; the APM and the Rijksmuseum van Oudheden (RMO), in Leiden. While the same installation was used in both locations, the physical placement of the installation within the exhibition space was quite different. In the APM, the installation was placed in a small but separated room along the main visitor path, in close proximity to real objects which were visualized in the installation. By contrast, in the RMO, the installation was placed in a large room that also contained several display cases of objects and an introduction video being projected onto a large screen.

Feedback from users who experienced the installation at the RMO often commented that the audio from the nearby introduction video conflicted with the Etruscanning installation and that the lighting from the exhibition was too bright. Alternatively, the more closed-off space used for the installation in the APM was darker and quieter, creating a more immersive experience for users. To bridge the gap between the virtual experience and the original museum objects a close proximity of the installation to collections can provide an opportunity to relate the virtual objects to the authentic objects more easily. This means museums are faced with the challenge of somehow combining an environment designed to create an immersive interactive experience with the availability of original museum objects.

Integration of such an installation into an exhibition is not just important in relation to the physical space, but also to the informative content. The Etruscanning

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application was developed especially for the Etruscan exhibitions in the APM and RMO, which meant we were able to write the content in such a way that it complemented the information provided in the exhibition. Through comparative evaluation with visitors to the exhibitions, we were able to show that visitors identified the content in the exhibition as providing the clearest information about Etruscan civilization, while the installation provided the clearest contextualization for the objects (Pescarin et. al., 2012; Pietroni et. al., 2012). This shows that the installation and the exhibition complemented each other, creating a more complete contextualizing experience for the museum visitor.

Conclusion

Virtual contextualization offers great opportunities to help visitors engage with archaeological collections. Through studies and focus groups, the APM has identified three aspects that can significantly affect visitor engagement. Firstly, a simple and intuitive user interface design with limited opportunities for interaction is more successful than a complicated user interface that provides visitors more freedom to explore and personalize their experience. Secondly, museums need to meet the visitor expectation for high quality visualizations that are already the standard in gaming and entertainment industries. Finally, in order for visitors to see a relationship between the virtual experience and physical museum objects, a clear integration of their experience with the exhibition context and physical objects is paramount. Further research by the APM will focus on the relationship between physical and virtually restored objects, as experienced by visitors. ✳

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