Recreating Past and Present: An Exceptional Student-Created Virtual Heritage Experience

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Figure 1: *Screenshots from the "Exercise Smash" virtual heritage experience. Left: landing a Valentine DD amphibious tank on the beach in Studland Bay in the south of England; Right: virtually diving to the wreck of one of the seven Valentine DD tanks that sank in April 1944.*

Abstract

We present an outstanding undergraduate student project in the form of a virtual heritage experience, created by a multidisciplinary group of six 4th semester undergraduate students from a range of computer graphics related programmes of study, ranging from 3D art and design to graphics software development. The "Exercise Smash" application allows participants to take part in a 1944 military exercise that was held in preparation of the D-Day landings in Normandy, during which several amphibious tanks sank, and then to dive down to the tank wrecks on the modern-day seafloor. The virtual heritage experience was presented during a public event at a military history museum and has also been demonstrated at an archaeology conference, being well-received in both cases.

1. Introduction

Most undergraduate as well as postgraduate degree programmes include at some point in the programme a group project – sometimes involving students from different programmes and disciplines [Bid11], and sometimes grouping students at different levels of study (e.g. undergraduate and postgraduate students). In computer graphics and animation degree programmes with a production focus, such group projects usually result in the creation of an animation or a digital game. In rare instances, computer graphics related group projects involve a cultural heritage context, one such project being the "Exercise Smash" project, which we describe here.

2. Project Context – 2nd year Undergraduate Group Project

The "Exercise Smash" virtual heritage experience was completed within "The Group Project" course, a 10 ECTS common course in the students' 4th semester in the computer animation undergraduate framework of the National Centre for Computer Animation at Bournemouth University [CMA10]. The course aims to introduce collaborative working practices to students from three Computer Animation programs across the computer arts and technical specialisms – the latest iteration of a course that we have previously described [And13].

Working in teams to complete an animated short or an interactive piece (e.g. a computer game), students develop so called 'soft skills', such as communication and interpersonal skills, alongside production skills throughout the CG pipeline. Each student takes a lead role such as animation or technical direction for instance, alongside minor roles relevant to the production. Participants are allocated to groups according to their strongest skill-sets and are expected to collaborate to complete an animation short or interactive work with their team within a four month timeframe. Whilst many

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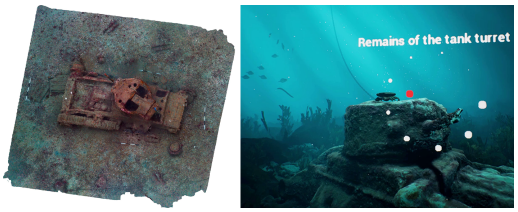

Figure 2: *Left: photogrammetry of one of the tank wrecks, provided by the maritime archaeologists who surveyed the wrecks; Right: the same tank processed for use in the Unreal-Engine and integrated into the virtual environment – note the fishes in the background, modelling several marine species found around the wrecks.*

of the project proposals are pitched by the students themselves, every year we aim to include live briefs from outside companies and organisations or research projects. Previous examples include advertising campaigns for 'Red or Dead' fashion manufacturers or an animated award ceremony ident for the Krazsna Kraus Foundation.

3. The Exercise Smash Virtual Heritage Experience

In the case of "Exercise Smash", the development of the project was prompted by a request from maritime archaeologists who had surveyed the wrecks of several amphibious tanks (Valentine DD – Duplex Drive) that had sunk during a landing exercise in April 1944 – "Exercise Smash I" [His19]. On the basis of photogrammetric models of the tanks supplied by the archaeologists (Figure 2), the students created a virtual heritage experience, akin to a cultural heritage serious game [AML*10], which they developed using Unreal Engine 4 (https://www.unrealengine.com).

The virtual heritage experience includes two scenarios, depicting the past and the present (Figure 1). In the past, users of the application take part in the "Exercise Smash" training exercise where they have to try to take a Valentine DD tank from a landing craft to the beach. Success, i.e. landing the tank on the beach, or failure, i.e. sinking of the tank, is not predetermined and depends on the player's skill in steering the tank through the sea (with simulated waves). After a tank has either landed on the beach or sunk, the virtual heritage experience takes players to the present where they can then take part in a virtual dive to the tank wrecks, allowing players to experience a "living", fully simulated underwater virtual environment where they can interactively explore all seven submerged Valentine DD tank wrecks.

3.1. Public Presentation/Exhibition of "Exercise Smash"

One incentive that greatly motivated the students was the prospect of their work being publicly exhibited – similar to the student projects reported on by Romero et al. [RTP*14] – and "Exercise Smash" was presented to a large public audience during "Tankfest 2019", a three-day event organized by and held at The Tank Museum in Bovington, UK (https://www.tankmuseum.org), which hosted about 24000 visitors in 2019, many of whom enjoyed the virtual heritage experience. Subsequently, the project was also presented and demonstrated at an archaeology conference [AC19], where it was very well-received by the attending archaeologists.

4. Discussion

The development of the application was very well executed and the number of game assets produced exceeds what would usually be found in a group project of this type (3d game), the quality of the produced assets – with exceptional attention to detail – being much closer to commercial quality than would usually be expected from 2nd year undergraduate students.

The end result is one of the best interactive applications that have been produced for the 2nd year group project since the course was created more than two decades ago. Archaeologists who have seen and tried out the application have noted that it appears much more polished than comparable applications they are familiar with, resembling a commercial computer game, and it has been well received by members of the general public.

The student's commitment to the project and pride in their work has also prompted them to keep improving the project in their spare time, addressing some of the feedback they received from the audiences at the presentations. We can look forward to the results.

5. Acknowledgements

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References

[AC19] ANDERSON E. F., COUSINS T.: Interactive presentation of archaeology in the historical context and the present - virtual heritage experiences that blend tangible and intangible cultural heritage. In *CAA-UK 2019: annual meeting of the UK Chapter of Computer Applications and Quantitative Methods in Archaeology* (2019). 2

[AML*10] ANDERSON E. F., MCLOUGHLIN L., LIAROKAPIS F., PETERS C., PETRIDIS P., DE FREITAS S.: Developing serious games for cultural heritage: a state-of-the-art review. *Virtual Reality 14*, 4 (2010), 255–275. doi:10.1007/s10055-010-0177-3. 2

[And13] ANDERSON E. F.: Student Project - Racing Launcher Game. In *Eurographics 2013 - Education Papers* (2013). doi:10.2312/conf/EG2013/education/007-008. 1

[Bid11] BIDARRA R.: Interdisciplinary Game Projects: Opening the Graphics (Back) Door with the Soft Skills Key. In *Eurographics 2011 - Education Papers* (2011). doi:10.2312/EG2011/education/009-016. 1

[CMA10] COMNINOS P., MCLOUGHLIN L., ANDERSON E. F.: Educating technophile artists and artophile technologists: A successful experiment in higher education. *Computers & Graphics 34*, 6 (2010), 780–790. doi:10.1016/j.cag.2010.08.008. 1

[His19] HISTORIC ENGLAND: Valentine Tank Assemblage, Poole Bay. National Heritage List for England, 2019. URL: https://historicengland.org.uk/listing/the-list/list-entry/1459754. 2

[RTP*14] ROMERO M., THURESSON B., PETERS C., KIS F., COPPARD J., ANDRÉE J., LANDAZURI N.: Augmenting pbl with large public presentations: A case study in interactive graphics pedagogy. In *Proceedings of the 2014 Conference on Innovation Technology in Computer Science Education* (2014), ITiCSE '14, pp. 15–20. doi:10.1145/2591708.2591727. 2