

Journal of • Virtual Worlds Research

jvwr.net

ISSN: 1941-8477

Impact - Educational Cases

September 2019 Volume 12 No. 2



Cover: Photo by stokpic from Pixabay

Volume 12, Number 2

Impact – Educational Cases

September 2019

Editor In Chief

Yesha Sivan

CUHK Business School
The Chinese University of Hong Kong

Issue Editors

Michael Thomas (Prime)

University of Central Lancashire, UK

Tuncer Can

University of Istanbul, Turkey

Michael Vallance

Future University, Japan

Coordinating Editor

Tzafnat Shpak

Cover image: Photo by stokpic from Pixabay



The JVWR is an academic journal. As such, it is dedicated to the open exchange of information. For this reason, JVWR is freely available to individuals and institutions. Copies of this journal or articles in this journal may be distributed for research or educational purposes only free of charge and without permission. However, the JVWR does not grant permission for use of any content in advertisements or advertising supplements or in any manner that would imply an endorsement of any product or service. All uses beyond research or educational purposes require the written permission of the JVWR. Authors who publish in the Journal of Virtual Worlds Research will release their articles under the Creative Commons Attribution No Derivative Works 3.0 United States (cc-by-nd) license. The Journal of Virtual Worlds Research is funded by its sponsors and contributions from readers, with main sponsorship by i8 Ventures.

Journal of • Virtual Worlds Research

jvwr.net

ISSN: 1941-8477

Volume 12, Number 2

Impact – Educational Cases

September 2019

Their Memory: Exploring Veterans' Voices, Virtual Reality and Collective Memory

Iain Donald & Kenneth Scott-Brown

Abertay University

Abstract

This paper focuses on the virtual reality (VR) project *Their Memory* and details the development and evaluation of virtual reality environments and experiences with respect to its impact on young people (14-35 demographic) with the narratives of veterans in Scotland. As part of the AHRC Immersive Experiences program *Their Memory* was created to explore how game design techniques and immersive technology could be used to enhance existing historical research and enrich narratives to bring expansive experiences to hard-to-reach audiences. The project worked directly with the veterans' charity, Poppyscotland, to create an environment and experience that would resonate with new audiences, and explore documentary and storytelling techniques for the commemoration of war and conflict. The design of the project evolved through co-design sessions with veterans and young people and culminated in the creation of a short, thought-provoking, narrative-driven experience. The VR experience enabled players to connect with the memories of veterans in Scotland and exploring the different conflicts or situations they experienced and how they make sense of them. The project brought together cross-sector expertise to research how immersive experiences can help memory-based organizations in engaging with wider audiences, raise awareness, and diversify current learning outputs. The paper details the design and development of the Virtual Reality project, through co-design, and how this engaged the audience and evolved the experience created. The paper includes a summative evaluation of events conducted with schoolchildren to assess the project and concludes with how the project evidences impact upon audiences and the potential for both technology and the experience.

1. Introduction

Their Memory is a collaborative, interdisciplinary project by academics, game developers, third sector and end-users (quadruple helix) based at Abertay University that developed a virtual reality experience to explore how game design and immersive technology can be used to enhance existing historical research, expand narratives and bring rich, expansive experiences to hard-to-reach audiences. Virtual Reality (VR) has emerged as a powerful tool for storytelling that is increasingly used by researchers (Thomas et al., 2018), journalists (Mabrook & Singer, 2019) and museums (Carrozzino, Colombo, Tecchia, Evangelista & Bergamasco, 2018) to deliver short, immersive and impactful stories across a range of diverse topics. Working with the veterans' charity, Poppyscotland, and game development companies, Ruffian Games and Pocket Sized Hands, the project developed a short thought-provoking, narrative-driven experience that enabled players to experience the memories of veterans in Scotland, exploring the different conflicts and situations they have experienced.

The purpose of *Their Memory* was to create an application that was engaging and delivered an experience that would alter opinions towards how veterans and veterans' charities are perceived. The project also considered how remembrance and commemoration are changing. As the two world wars fade from living memory, society is increasingly looking to young people to carry the memory of the wars forward. For military charities that are tasked with supporting veterans and ensuring these memories do not fade, it is increasingly challenging to engage with not just young people but the under-35 demographic. There are specific challenges ranging from the impact of austerity, a perceived lack of awareness of conflicts post-1945 and the perception of remembrance as a tool to promote militarism, nationalism, and war (Snowdon, 2015). *Their Memory* sought to explore how Virtual Reality could be used to engage young people with the memories of veterans and raise awareness of their needs. Increasingly how we engage with the existing historical narrative and remembrance activities of conflict is being shaped by generations that have little direct experience of war but face a digital world where the visual imagery of conflict is more accessible than at any previous period. From news and propaganda presented via print and screen media through to the virtual playgrounds of *Battlefield* and *Call of Duty* young people and society, in general, are surrounded by war. Yet, we often know little of the impact it has upon those that served.

Working directly with veterans and co-designing with the target audience the project aimed to present authentic memories in virtual reality to create a greater sense of immersion. The design concept that developed focused not on traditional experiences of conflict but on experiencing Poppyscotland through the perspective of those veterans employed in Lady Haig's Poppy Factory. The VR experience shaped around each veteran's desk and the memorabilia and associated memories that they had of service. By placing the player in an immersive environment, the project aimed to foster a deeper understanding and sense of empathy with veterans and the organizations that support them (McMahan, 2003; Steuer, 1992; Witmer & Singer, 1998). In bringing together cross-sector expertise to research how immersive experiences could help memory-based organizations, such as Poppyscotland, the project looked to compare people's sentiment before and after VR experience and attempted to determine whether VR experiences could engage with wider audiences, raise awareness of partner organizations' goals and diversify the current learning and commercial outputs.

2. Context

The United Kingdom Research and Innovation (UKRI) is the body that works in partnership with universities, research organizations, businesses, charities, and government to promote research and innovation. The UKRI defines impact as "the demonstrable contribution that excellent research makes to society and the economy" (UK Research and Innovation, 2019). This includes, but not limited to, the creation and dissemination of new knowledge and innovation, product invention, company spinouts, and start-ups, improvement of public services, policy or quality of life. The expectation is

that academic research has an impact beyond academia. However, it remains challenging to know what the actual outcomes will be at the start of a project (Belfiore, 2015). Research is a process of inquiry and impact is typically a gradual process with project outputs overlapping and taking place often beyond the allotted project timeframes. It is increasingly common to consider that outcomes and impact to be considered as part of the research process and not just as the publication of the results. In considering the impact of *Their Memory*, this paper emphasizes the importance of co-design with the partners, target audiences, and the veteran community. Indeed, the process demonstrates that while impact can be viewed through the lenses of public engagement and media awareness, the participatory process via co-design can be an essential component in creating meaningful dissemination experiences (Sanders & Strappers, 2014).

3. Veterans' Charities in the 21st Century

In 2011, The Royal British Legion (TRBL) identified the 2010s as a decade of change. In addition to the economic challenges created by the significant cuts in public spending and the 'age of austerity,' there were significant changes to the delivery of welfare services and social care in the UK through the 'Big Society' initiative. Responsibility for welfare was increasingly placed upon local authorities and the voluntary sector; at the same time, the National Health Service (NHS) was to undergo significant structural change (TRBL, 2011). The decade would also see significant changes in the demographics requiring support as people lived longer. Although the total number of veterans was forecast to decline, the demand for support was forecast to increase, and the nature of the support required was more complex. In 2017, the Soldiers, Sailors, Airmen and Families Association (SSAFA) predicted the total veteran community to fall from around 6.2 million to 4.75 million by 2025, yet demand for their services will continue to increase (SSAFA, 2017). They also note that the changing demands have seen the number of those aged under sixty requiring support has doubled from 30% to 61% and is again expected to increase. Herman & Yarwood (2015) regard the bridging of the military-civilian divide as important for continuing the "discursive and practical performance by the third sector, state, and former service personnel" and noted that it remained a significant factor in shaping identities and relations. Hines, Gribble, Wessely, Dandeker, and Fear (2014) have demonstrated that while the UK public has high regard for the Armed Forces, there was little support for the more recent missions in Iraq and Afghanistan. They also noted that the public generally made a clear distinction between the politics of the mission and the individuals serving on it. With regard to these and the shifting perception of the hero, victim, and villain myths that could be propagated, these could potentially result in the military-civilian gap becoming a gulf.

Perspective taking in modern contexts can be difficult to engineer and sustain, particularly with the image-focused younger generations who are engaged on social media and image projection. For these groups (and indeed for any groups) taking an alternative point of view can be very challenging. However, VR presents a unique opportunity for participants to take on an unfamiliar point of view and immerse themselves in unusual or previously unexperienced situations. The technology specifically enables the creation of alternate realities and promotes the deep immersion in the lived experience. This is a significant departure from narrative accounts or documentary methods that can end up being relatively dry and academic in scope. Tantalizingly, the use of VR has been linked with an increase in the ability for it to promote empathy in specific others (van Loon et al. 2018).

3.1. Emerging Technologies

Virtual reality and augmented reality (AR), after years of research and development, are on the cusp of mainstream adoption. The combination of immersive video capture and dissemination via mobile technologies is already proving to be particularly exciting for fields as diverse as medical training and journalism. VR and AR offer the potential of bringing audiences closer to a story than any previous platform. In this regard, they have the potential to enhance real-life narratives by offering

audiences both the experiences and the environments of the cataclysmic events of the past century that our veterans experienced. VR enables the developer to recreate experiences that are difficult to comprehend and to places that are out of reach for most of us. The potential exists for creating experiences such as the Armistice in 1918; or the outbreak of the Second World War a generation later; and on to the wars and conflicts whose significance may have diminished but which cast a long shadow whether that be Korea, Malaya, Kenya, Northern Ireland, Iraq or Afghanistan. AR has the power to bring images, artifacts, or maps to life. Potentially engaging people with their community in new ways and on a completely different level. AR also has the potential to create innovative overlaps with history and community, enabling us to relate the big events and experiences at a local level. In exploring the development of immersive VR experiences created for the First World War centennial, organizations have largely focused on the use of the two technological advances to deliver experiences that are more cinematic than interactive. The new generation of headsets, together with cameras that can record a scene in a 360-degree, stereoscopic video, have been used to create documentary experiences (Argyriou, Economou, Bouki & Doumanis, 2016; Elmezeny, Edenhofer & Wimmer, 2018). Examples include the BBC *Easter Rising: Voice of a Rebel* (Conroy, 2016), Royal British Legion's *Passchendaele 100* (2017) and Kallisti Media's *Soldiers Stories* (2013). Each of these innovations has allowed audiences to more richly experience the lives of others. The project also borrowed heavily from established storytelling, filmmaking, and narrative design techniques and best practice (Bordwell, 2008; Brooks 2003; Cohen & Shires, 1998; Dowd et al., 2013; Miller, 2013; Pausch et al., 1996; Ryan, 2015). The underlying research indicated that the best means of achieving effective multidisciplinary content creation is to take experts from each domain and co-create content for specific needs and purposes.

3.2. Interdisciplinary Research

Their Memory brought together academic expertise across several disciplines, including games, history, education, and psychology through two organizations: Abertay University and Poppyscotland. The project directly connected with the creative industries for design and technical expertise with the industry partners Ruffian Games and Pocket Sized Hands. The project created an opportunity for each organization to build upon their own areas of expertise while learning from each other. As the lead partner, Poppyscotland had rich archives and direct access to veterans' experiences, but they also had very specific constraints in that any VR experience would be limited by physical space, health and safety concerns, and required short play sessions. The latter was a practical consideration of showing groups round Lady Haig's Poppy Factory (a ten-minute experience could take a group of 12 over 2 hours to experience), so there had to be a design that allowed for people to swap in and out without tutorials and still to have the core experience. For the industry partners, exploring how non-games and non-technical focused organizations interact with technology would potentially open up other opportunities.

4. Methodology

To create an artifact that addressed these issues, the project had to consider different design aspects and potentially different perceptions of what the experience would be. From a technical standpoint, the design of the project had to discover how best to inform users on how to make use of the latest VR technology and features. The goal to deliver an experience that could be used in a museum-type setting also had to consider the length of play, player orientation, ease of use, and deployment by non-technical staff. To achieve this, the project made use of two main methodological approaches: Co-Design and the Design Council's Double Diamond (2007). These combined to provide an iterative process that allowed the project to evolve in response to co-design, usability testing, and differing partner perspectives (Vaajakallio & Mattelmäki, 2014). This was important for the project team as there were different approaches to innovation. For Poppyscotland, this included introducing

new methods for engagement and potentially to suggest new approaches. In contrast, working with industry to introduce different sectors and potentially generate new areas of content production. Co-design was integral to the process as it created the potential for a partnership between users/players, professionals and community partners, with all working together in the design and development process (Sanders & Stappers, 2008).

4.1. Co-Design

The project incorporated two co-design sessions to bring additional insights and opinions to the creative process. The opinions that we gathered from these were fundamental in shaping the VR experience. The first was run with prospective audience members in the 21-35 age bracket, and we emerged with the initial concept that would become part of the final, built product. The design concept that emerged from this session moved the focus away from conflict situations and towards experiencing Poppyscotland through the perspective of those veterans employed in Lady Haig's Poppy Factory. The second co-design session was focused more directly on the harder-to-reach audience of 14-16 year-olds (see Table 1) and helped evolve the concept into interacting with memorabilia that each veteran had at their desk.

Table 1: Co-Design Participants Breakdown

Co-Design Session	Audience Members	Veterans	Project Team	Total Participants
1 - Students	20	3	4	29
2 - Schools	12	2	3	17

4.1.1. Co-Design Session 1

The first co-design session was undertaken with postgraduate students (from across the Arts, Humanities, and Social Sciences), game developers, project partners, and veterans assisted. The goals of this session were for the project team to determine what additional challenges might emerge from designing with the audience and veterans but also to determine what they considered may be the way to engage with memories of war and commemoration. The co-design was very much exploratory but identified the need for more specific sessions. It was clear that to make an engaging experience, we needed to listen. The project team took the opportunity to design and explore, knowing that many of the initial ideas would be thrown away. The key point that arose out of Co-Design Session 1 was the change in focus away from the visualization of conflict environments and instead - focus on the wider narratives. The stories that the veterans recounted varied from the mundane activities that military routine involves or how service shaped future careers through to amusing anecdotes and the personal accounts of involvement in military campaigns. The outputs of the first co-design led directly to the formation of a concept based around the Lady Haig's Poppy Factory and were followed up with visits to Lady Haig's Poppy Factory to discuss veterans directly their experiences. See Figure 1: Initial block out of Lady Haig's Poppy Factory.



Figure 1: Initial block out of Lady Haig's Poppy Factory

4.1.2. Co-Design Session 2

The second co-design session brought in eleven teenagers, one teacher, and two veterans. They were each presented with the opportunity to play the rudimentary prototype, and feedback was invited for the design, together with their understanding of VR technology and existing knowledge of past conflicts. While waiting to use Virtual Reality, the young people were able to hear the experiences of the veterans and ask any questions they had. In small groups, they then discussed what they had experienced and providing feedback on whether the prototype was effective or not. Overall the session demonstrated that the design was intuitive, especially for players who had never tried virtual reality before. Players were able to quickly adapt to using the motion controllers and to understand the core mechanic of picking up an object to trigger audio clips. See Figure 2: Initial prototype of desk layout.

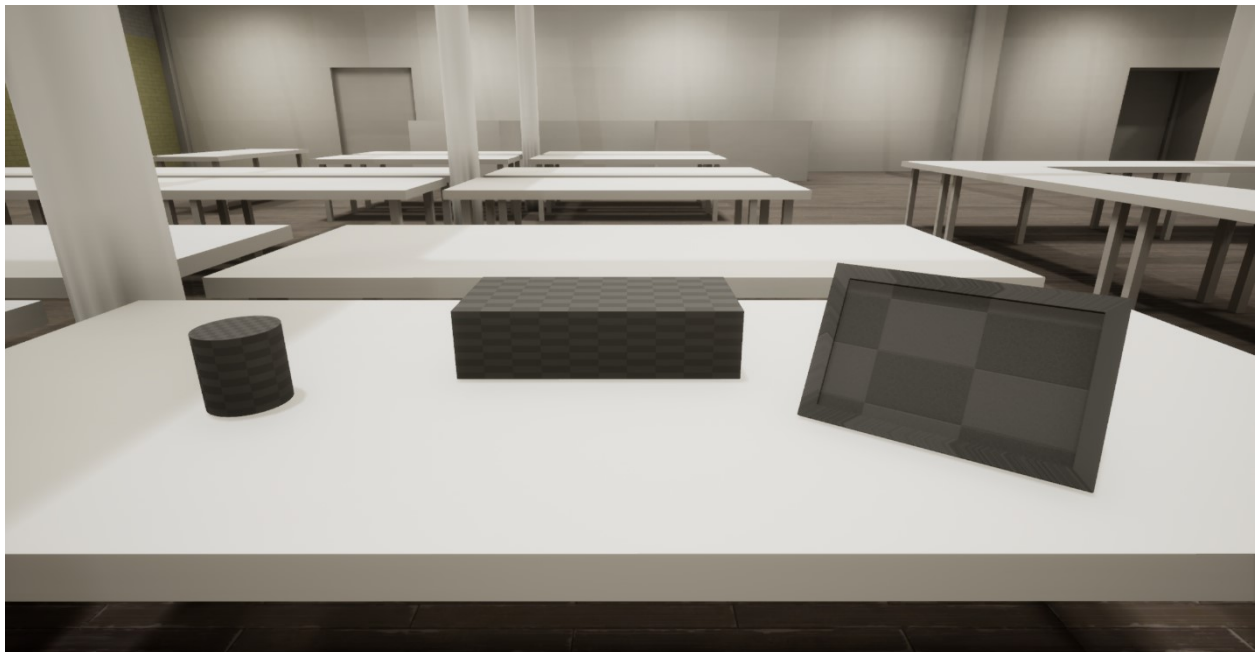


Figure 2: Initial Prototype of Desk Layout

The key findings of this co-design session demonstrated that players enjoyed the simple interaction with objects. That this basic mechanic had enough interaction to keep a player engaged with the experience supported the initial design input from industry, notably that the immersive nature and novelty of VR focus the player on the immediacy of space rather than the wider environment. For the project team, this focused future iteration on asset creation of objects and memorabilia. The virtual desks became more significant than populating the environment with clutter and machinery. The co-design also focused attention on the means of telling stories. Given the nature of the stories, the project had considered using voice actors and amalgamating memories to make these more coherent. Although voice actors were considered acceptable if they improved the overall quality, it was clear that it would raise issues with authenticity and the co-designers were unanimous in rejecting the idea of amalgamated memories. The co-designers also stated that they would feel cheated if they found out that the stories being told are made up. The last outcome of the co-design was a desire to expand the stories to include other voices, not just veterans. Although that was outside the scope of the project it helped shape the design to be more modular, so stories could be expanded if possible. The co-design session was followed up with further visits to Lady Haig's Poppy Factory to speak to the veterans and starting to select memories to explore.

4.2. Prototype Concept

The initial concept had largely considered the creation of environments that veterans had experienced voiced over by veterans' own accounts. The aim was to utilize existing oral history archive material in an immersive virtual reality. The players would be transported to the location and could see what the veterans saw. For example, an oral history account of a First World War veteran of France and Flanders could transport the player to witness the Battle of Loos or the Somme. However, initial conversations with all the partners quickly identified problems with that idea. From the availability of original content – film, images, and audio – to finding appropriate modern-day location images and video. Without knowing what the exact content or event to focus on would be, it became difficult to envision even the type of archive content that the project would have to work with. Further conversations with museums and archives demonstrated that there were multiple concerns over ownership, digital rights, and accessibility. Concerns ranged from what would be allowable under the GDPR rules, through to the complexity of permissions of use for a digital format that had not been envisioned when recordings were undertaken. Practical obstacles emerged where existing recordings were available through formats that were now incredibly fragile or inaccessible through the loss or breaking of hardware. Recordings made to tape in the 1970s and even those that were made to Minidisk in the 1990s were inaccessible due to lack of functioning hardware and fear that these recordings lacked backups and maybe damaged unless specialist conservation techniques were used. One significant challenge that emerged was that Poppyscotland is to refurbish Lady Haig's Poppy Factory in Edinburgh where the factory has been located since 1965. In addition to the factory, Poppyscotland had developed the idea for a Moving Poppy exhibit. This was planned as an 18-tonne vehicle with expandable space that would serve as both an exhibition focusing on the heritage of the poppy and a learning center. The project had always planned to develop a means of delivering oral histories for this exhibit, but it was only after it secured funding in March 2018 that a clearer plan materialized for what that should be. For Poppyscotland, research undertaken as to what visitors to Lady Haig's Poppy Factory enjoyed focused on two key elements. The first was to create a paper poppy and the second was to hear the stories of the veterans that staffed the factory. This acknowledgment provided the impetus to focus the oral history element away from existing archives and on the creation of new stories and a gamified environment (Liu & Zaffwan Idris, 2018).

4.3. Design Structure

In discussions with Poppyscotland, there became clear design features that would require innovative solutions. These included considerations of the time each player may want to experience the VR application and what other people would do while people experienced the app. It also defined core components of the message – this included relating the application to Poppyscotland's history and archive material, a connection to the First World War but more consideration of less well known or more recent conflicts, i.e., Korea, Falklands, and Iraq/Afghanistan. This highlighted the fact that since the end of the Second World War, there have been only two years (1968 and 2016) when there have been no casualties on operations (Farmer, 2017; Gov.uk 2017). Lastly, there was a desire to bring the stories up to date by developing around the memories of a veteran working at the Factory and the conflict in which they served, who can highlight how the poppy has helped them and would continue to help veterans in the future.

The design was further influenced from the co-design sessions. One of the key findings was from the prospective audiences and the veterans that the initial focus on visualizing areas of conflict or deployment was less popular with both groups. While there was a general acceptance that narratives around conflict should not be ignored the focal points that emerged were around why veterans had joined the service, what assistance they had received from Poppyscotland and the specific stories, memories, and mementos that the veterans wanted to recount. The design concept developed to focus on experiencing Poppyscotland through the perspective of those veterans employed in Lady Haig's Poppy Factory. Their stories demonstrated the diverse background with vastly differing and unique stories of the Armed Forces. Subsequently, the VR experience was designed to sit within Lady Haig's Poppy Factory and shaped around each veteran's desk. The player would embody veterans that produce the poppies in the factory, interacting with their stories via the personal memorabilia that each had on their desk. The array of objects placed on each desk would, therefore, be directly in front of the player, and as the player picked these personal artifacts up, each object would trigger an audio clip of dialogue relating to that memorabilia. In their own words, each veteran would explain the memory behind the object, and the player would be able to move to another desk to experience a different story. This modular idea allowed for the project to build upon an initial prototype to fully realize Lady Haig's Poppy Factory (see Figure 3: Final Lady Haig's Poppy Factory Layout) and add more stories with the addition of new objects as the opportunity arose (See Figure 4: Final Desk Layout).



Figure 3: Final Lady Haig's Poppy Factory Layout

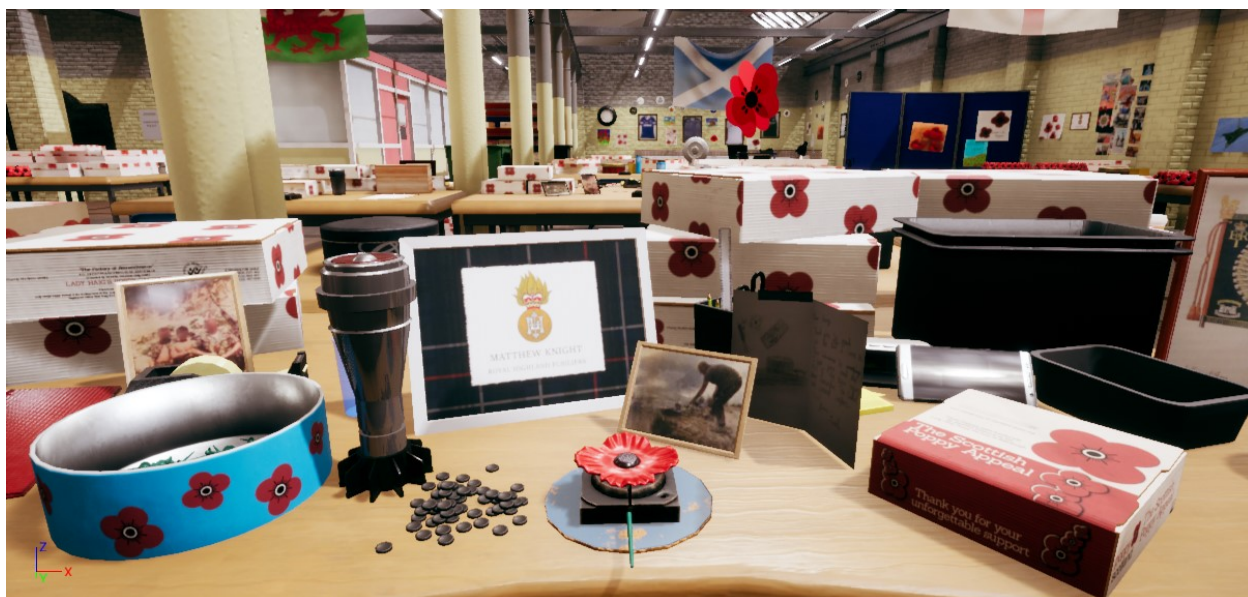


Figure 4: Final Desk Layout

The design was informed from other more static experiences such as *Job Simulator*, *Stories Untold* and *Oculus First Contact*. It also followed the advice from industry partners, to focus on providing interaction that gave the player immediacy. In VR experiences that have limited physical interaction with the environment, interactions that tend to work well are similar to those that work for 3D films. This included creating interactive elements that the player can bring up to (and around) the players head, directing attention in specific ways with clear signaling (Sheikh, Brown, Evans & Watson, 2016). This was achieved through the use of creating tactile virtual objects that highlighted green to the user to signal interaction. See Figure 5: Angled View of Desk Memorabilia



Figure 5: Angled View of Desk Memorabilia

Small interactions that make the player feel as though they are in the environment but not anything that will intersect or make the player look behind themselves. The idea of transporting from one desk to another allowed players to swap in and out of the experience without restarting the software (see Figure 6: Move Mechanic).



Figure 6: Move Mechanic

The use of flat polys to show the existing Poppyscotland video archive was also a design element that supported the veterans' dialogue without intruding by playing additional audio (see Figure 7: Archive rendered in *Their Memory*).



Figure 7: Video Archive rendered in *Their Memory*

4.4. Their Memories, Their Words: Interviewing the Veterans

A key element to making the experience meaningful was in delivering appropriate stories of short enough duration that they could be quickly transitioned between (Green & Brock, 2000; Haahr, 2018). There was a need for both sensitivity for those telling the stories but also in considering the potential audiences. The narrative episodes had to faithfully relate what veterans had experienced whilst remaining suitable for younger audiences. To enable this goal, an interview process was used to obtain information from the veterans. The interview format focused on questions that allowed the veterans to discuss their service in the wider context. The following questions were asked:

- Name, number, which regiment they served with.
- Why did you sign up?
- Where they served/visited.
- Do you have any stories of friendship and camaraderie?
- What was it like being away from your family?
 - How did this impact both yourself and the family?
- Do you have any particularly funny memories?
- Can you give examples of any difficult/negative memories?
- What was it like when you left the service?
 - Did you have any support?
 - Other jobs after leaving?
 - What was it like returning to your family?
- How did you end up working at the Poppyscotland factory?
- What does the poppy mean to you?
- Why should we remember?

Each veteran had such a unique backstory that through the interview process the project ended up with a diverse range of answers for each of the questions. Using the veterans' own voices was important in providing authenticity and the final selection of the audio vignettes was balanced with those that provided an insight into the range of experiences with more emotionally significant narratives that were difficult to retell. The project team was then able to ask additional questions on specific objects and memorabilia that the veterans had kept from their service and to attach these memories in the experience. For consistency, each desk contained objects that allowed the veteran to identify themselves (this was a framed image with the veteran's name) and how they came to be working for Poppyscotland at Lady Haig's Poppy Factory (represented by a poppy). Each other memory was directly connected to a memento that they saw as identifying a specific memory.

4.5. Oral History

The interviews and connection to objects resulted in the creation of a unique oral history archive. Throughout the process, it became clear that many veterans did not feel as though they had a story "worth" telling. In allowing them the space to record and retell their stories, the interviews allow the authentic voices of veterans to come through. The lived experience may prove valuable to future historians, in particular, the balance that the veterans presented both in the humor they found in serving

but also the high-risk situations they faced. From getting lost to not knowing how to use an iron through to meeting the US President and the camaraderie they found in serving. For the project team, the most obvious impact in these narratives was in emphasizing how much we ask of our Armed Services and yet how little we know of those experiences. The experiences may just be footnotes in the wider history but demonstrate the impact more personally. Two vignettes demonstrate this. In the first, a veteran of the Royal Highland Fusiliers, who in discussing a photograph of them serving, describes the scariest experience they had in the context of other arguably more traumatic events:

“In 1988 whilst serving in Redford Barracks in Edinburgh, terrorists blew up a Pan-Am jet over Lockerbie. My regiment was tasked with deploying to Lockerbie to recover the casualties of that terrorist incident. We were there ‘til Christmas Eve and despite the things I seen during that five days and my seven tours in Belfast and South Armagh, the scariest thing I’ve ever done was deliver a baby in the back of an ambulance during one of the ambulance strikes.”

In the second, a veteran of the Intelligence Corps, who connects a coffee cup to describing an incident experienced while serving in Bosnia and Kosovo:

“I think probably the worst experience I’ve had in my time in the Army was in Bosnia...we’d got news of a weapon cache in the mountains and just outside the camp there was a village there and they were very pro-forces. They liked us because we were there protecting them and as we were going out to the mountains in the morning, we went past them and were greeted by them all and they brought out coffee, and pastries, and gave us cigarettes and we had a nice little chat with them and what have you, seeing the kids off to school and things like that. We went up into the mountains, we found the cache, and about three or four hours later on...and we came down and...it was deathly quiet in the village there was nobody present at all. And then we came up to the village hall and we witnessed the devastation of Kosovo at full blast and it was awful, it was horrible to see.”

The development of *Their Memory* was completed in time for it to become part of the 2018 Scottish Poppy Appeal. The application was demonstrated at the launch event at the Scottish Parliament and garnered news coverage on BBC Reporting Scotland, BBC Radio, British Forces Broadcasting Service, Dundee Courier, and specialist technology publications. It made a ripple rather than a splash. However, the key element was to get feedback from the veterans and Poppyscotland and formally evaluate the application with the target audience of secondary school pupils.

5. Results & Discussion

For the veterans whose stories we told and the wider Poppyscotland team sessions demonstrating the application indicated that feedback was overwhelmingly favorable. Given the nature of the application and the fact that it told real stories, there was always a nervousness in whether the team had delivered. The fact that the veterans were impressed with the visuals and that it felt like the factory buoyed the team. It was best summarized by the Moving Poppy Outreach Project & Learning Officer stating, “It is a lovely, thoughtful piece of work which will be a really useful tool for us.”

However, at that point, the team had only completed user-testing focusing on usability and functionality. In evaluating the application, it needed to be tested as close to the anticipated environment as possible. While the Moving Poppy vehicle did not exist, the next best solution was in a museum setting and with groups of S3-S4 pupils (14-16 year-olds). The evaluation was conducted at the National Museum of Scotland as part of a school visit to the WW100 Aftermath Event. The event examined the legacy of the First World War and was aimed at S3 pupils and above. The Commonwealth War Graves Commission, Poppyscotland and Legion Scotland provided workshops. The Poppyscotland workshop was focused on explaining the importance of remembrance then and now, and based around the use of *Their Memory*. During the event, approximately 90 young people

had the opportunity to evaluate the application with 53 completing a questionnaire of 43 questions. These were structured so that 25 questions were completed before playing the application and 18 after. Most questions used a 5-point scale with key questions being asked before and after to show any improvement in knowledge. Additional open-prompt, questions (Gabbert, Hope & Fisher, 2009) were used to garner design insights and qualitative feedback. The questions were structured to evaluate the audience awareness and attitudes towards virtual reality and gaming, Poppyscotland and lastly to see if playing *Their Memory* engaged them and may potentially change their perceptions.

5.1. Results – Virtual Reality & Gaming

Core questions the project team had were in the level of interest in virtual reality and gaming more generally. In response to the question ‘Have you tried VR before?’, 43 people (81%) had tried VR before, only 10 (19%) had not. However, in regards to VR ownership, the numbers were more or less reversed. When the question was asked, ‘Do you own a VR headset?’ then 45 (85%) did not, while only 8 (15%) reported that they do. This served to highlight the argument that a VR roadshow model of dissemination is of value. The cost and complexity of VR currently seem to inhibit domestic uptake of the technology, but knowledge and use of the technology are high. As has been seen elsewhere, the acceptance and engagement with VR technology are strong. The respondents also agreed that VR was a technology that would change the future of media entertainment. With most respondents believing VR will change the future of video games, 39 (74%) agreed or strongly agreed with this statement. Only 11 (20%) were neutral to this just 3 disagreed or strongly disagreed (6%). The influence of VR on Film/Television was slightly less expected with 6 (9%) disagreeing or strongly disagreeing, 17 (32%) neutral and 31 (59%) agreeing or strongly agreeing. Some of the current challenges for VR adoption were demonstrated by the lower number of respondents, with 24 (45%) who agreed or strongly agreed with the statement that VR is easy to use, but more (25, 47%) were neutral, and 4 (8%) disagreed. This was despite a majority, 38 (72%) agreeing or strongly agreeing, with the statement that they enjoy using VR. Although 15 (28%) responded neutral, nobody indicated that they did not enjoy using VR. More respondents, 44 (83%), agreed that they would like to use VR again, while only 9 (17%) responded neutral and again nobody imagined they would not use VR again.

In regard to gaming more generally, and the answer to the question ‘How often do you play video games?’, 37 people, (70%) played video games at least sometimes or more often. Almost half, 25 (47%) played often or very often, while only 12 played seldom (23%), and 4 never played (8%). Specifically examining video games with the theme of war and conflict, 16 (30%) did not enjoy playing video games themed around war and conflict; 13 (25%) were neutral to the question while a total 24 (45%) strongly agreed with the statement ‘I enjoy playing video games themed around war and conflict? (*Call of Duty*, *Battlefield*, etc.)’. However, it was clear that they regarded games as entertainment rather than factual. While many of the participants enjoyed and played war-based video games only a minority, 5 (9%) agreed with the statement that ‘Video games accurately represent war and conflict’; 21 (40%) disagreed or strongly disagreed with the statement, and 27 (51%) were neutral to this statement. This clearly indicates that the sample were sophisticated users of video games and can suspend disbelief and take a narrative and entertainment-based approach to the consumption of content. In regard to using games for education and learning, the majority - 31 (59%) agreed or strongly agreed with the statement ‘Video games are a good tool for educating and learning’. Only 8 (15%) disagreed or strongly disagreed, and 14 (26%) were neutral to the statement. This result serves to highlight the broadly positive attitude to the use of games technology in education.

5.2. Results – Poppyscotland and Veterans

Impact related awareness questions were grouped, with some administered prior to participants engaging in the experience and others posed after the experience. 5-point Likert scales were used, depending on the questions. For example, responses to awareness questions could be posed on the

scale: Very Unaware, Slightly Unaware, Neutral, Slightly Aware and Strongly Aware. Other items assessed the degree of agreement with statements and had the scale: Strongly Disagree, Disagree, Neutral, Agree & Strongly Agree.

The 'within-subjects' design of this part of the study allowed for the assessment of experiences using ratings on these 5-point scales to several questions posed before and after the experience. By assessing the opinions of the same participants pre- and post-experience, it is possible to make statistical inferences about the change in views in the participants. This contrasts with a 'between-subjects' design, which would require separate participant views to be assessed before and after the experience. By using Likert scale questions, it is more appropriate to use non-parametric inferential statistics rather than independent or paired samples t-tests. The within-subjects nature of the contrasts between sentiment before and after means that a 'repeated measures' statistical test is needed. In this case, because the design is within-subjects, it is appropriate to use a Wilcoxon Signed Rank test, as opposed to a Mann Whitney U test which would require two independent groups (e.g., Field, 2017).

Prior to the VR experience, when asked 'How familiar were you about Poppyscotland before today?' 35 (66%) were aware or strongly aware, while only 14 (26%) were unaware or very unaware. The remaining 4 responses (8%) were neutral. After using the VR, users were asked 'How aware are you of Poppyscotland after today's experience?' Both questions use the same awareness-based Likert scale, the most appropriate inferential statistical test to compare variance between the two samples is a nonparametric test (because it is a Likert scale). Because the same participants are tested on both questions, the variance between subjects is the same, and so a within-subjects test is used (e.g., Field, 2017). Accordingly, a Wilcoxon Signed Rank test showed a significant change in responses on the awareness scale $Z = -3.74$, $p < .001$.

Post experience participant awareness of Poppyscotland was a third higher, numbering 50 (94%); and of these 24 (45%) were strongly aware, an increase of 5, and those slightly aware increased by 10 to 26 (49%); only 2 (4%) were neutral down from 9, and only 1 remained unaware (2%), down from 5.

Regarding current poppy purchase behavior, in response to the question 'I have bought/worn a poppy' almost half (49%) of the participants indicated they had bought a poppy extremely frequently or very frequently (26 people). This was one more than the 25 who indicated 'frequently or occasionally' (47%), while only 2 respondents (3%) indicated that they had never bought a poppy. This demonstrated that although half the sample bought poppies extremely frequently, there exists scope for further increase in poppy wearing for around half the sample. It was notable that only a very small percentage never wore poppies, and this gives an indication of how culturally ingrained it is. In asking the same question after the playing of *Their Memory* there is a clear shift in the pre- and post-experience ratings. It is clear from Figure 8 that occasional purchasers have shifted to a preference for more frequent purchase. A Wilcoxon Signed Rank Test found the responses significantly different $Z = -3.26$, $p = .001$. Although the frequency of 'never' responses remained at 2 (4%), Occasional purchasers dropped from 12 to 3 (9%), Frequent increased by 2 to 15 (38%), Very Frequent remained the same at 11 (28%), and Extremely Frequent Increased by 7 to 22 (42%).

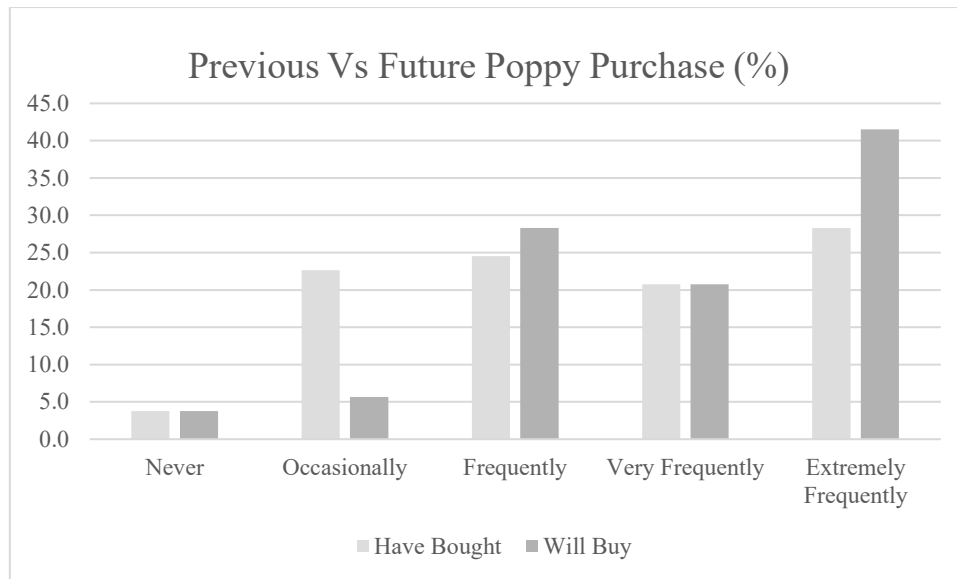


Figure 8: Chart showing % responses to the statements ‘I have bought/worn a poppy’ and ‘In future I will buy or wear a poppy’.

In order to determine how aware respondents were of remembrance, the questionnaire asked, ‘Remembrance Day is which day of which month of each year?’. From the sample, 83% correctly identified 11th November as Remembrance Day, a further 7.2% identified November as the month meaning that 90% of the sample were aware of the significance of November as the month for Poppies. Only 3 individuals did not respond (5%); nobody got the date wrong.

Only 4 of the respondents indicated that they had visited Lady Haig’s Poppy Factory (7.5%) and of these, only 1 respondent had visited ‘frequently,’ the others only ‘occasionally.’ This indicates the need for a mobile facility to take Lady Haig’s Poppy Factory out on the road since it is not practical for many to visit. It does also indicate the scope for increasing visitor numbers using a mobile road ‘show system.’ After the experience, the intention to visit Lady Haig’s Poppy Factory is significantly higher (Wilcoxon Signed Rank $Z = -6.19$, $p < .001$). With 94% (50) indicating that they would visit at least occasionally, and 54%, (24) indicating frequently, very frequently or extremely frequently. See Figure 9 for comparison pre- and post-experience.

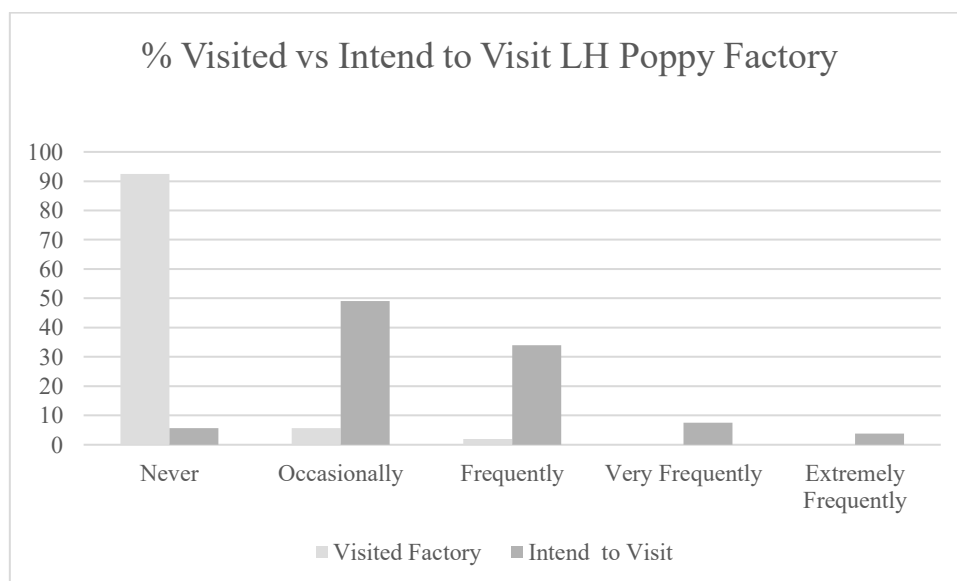


Figure 9: Chart showing % of Responses to the Statement ‘I have previously visited Lady Haig’s Poppy Factory’ and ‘I intend to visit Lady Haig’s Poppy Factory,’ assessed before and after the experience respectively.

Participants were assessed on pre- and post- experience on the question ‘How aware are you of the challenges that veterans face?’. Data is shown in Figure 10. After the experience, ‘not aware’ responses changed from 3 (6%) to 0. ‘Slightly aware’ from 7 (13%) to 1 (2%), ‘neutral’ responses reduced from 14 (26%) to 4 (8%) and ‘slightly aware’ went from 21 (40%) to 25 (47%) with ‘very aware’ increasing from 8 (15%) to 23 (43%). A Wilcoxon Signed Rank Test found a significant difference between pre- and post- experience ratings to this question $Z = 4.59$ $p < .001$. This means that the experience significantly increased awareness of the challenges veterans face.

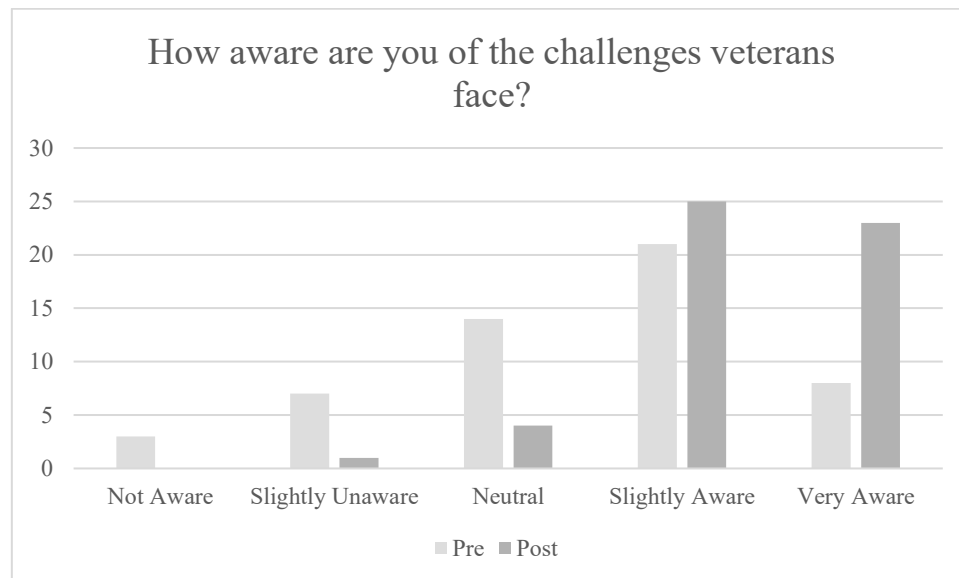


Figure 10: Chart showing Responses Frequencies to the Statement ‘I am aware of what the challenges that veterans face’ before and after the experience (n=53).

In the Pre-Play section, answering the statement: ‘I am aware of what Poppyscotland does’, only 4 people (8%) disagreed or strongly disagreed with this. 22 (41%) were neutral, while the majority 27 (51%) agreed or strongly agreed. In the post-play responses, 43 (81%) declared awareness, 7 were neutral (13%) and only 3 were now slightly unaware (6%). Figure 11 shows the pre-and post-play awareness statements for the 53 participants. There was a significant increase in awareness of what Poppyscotland does, post play Wilcoxon Signed Rank Test $Z = 1-3.25$, $P < .0001$. There is clear evidence for the need for Poppyscotland to engage the public further in raising awareness with almost half the sample unaware or neutral to the statement about awareness of Poppyscotland activity.

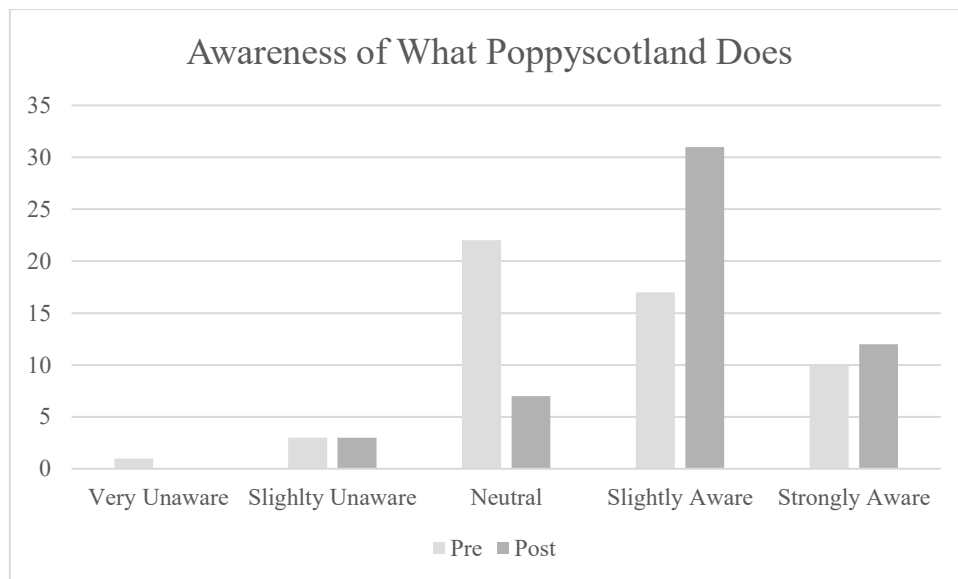


Figure 11: Chart showing response frequencies to the Statement ‘I am aware of what Poppyscotland does as a charity’ before and after the experience,’ n=53.

In response to the question, ‘How would you rate your overall experience with *Their Memory*?’ In response to this, 48 (91%) were positive with 37 (34%) finding it very engaging and 11 (21%) slightly engaged. Only 4 (8%) neutral and only 1 found it unengaging (2%). A key successful part of the experience is the link between the objects and the memories. 45 (85%) of the participants agreed or strongly agreed with the question ‘How would you rate the connection of the object to the memories?’ 8 (15%) were neutral but not a single participant found it unengaging. How would you rate the veterans’ stories? In response to this question, 48 (91%) found these very engaging (31%) or slightly engaging (14%). Only 4 *8% were neutral and only 1 found them unengaging (2%).

There were four education related questions asking: 1) ‘We should continue to remember war and the veterans of war’; 2) ‘I am aware of the conflicts that Britain has been involved in since WW2’; 3) ‘I have been educated about the first and second world wars at school’ & 4) ‘I have been educated about the conflicts Britain has been involved in after World War 2 at school’.

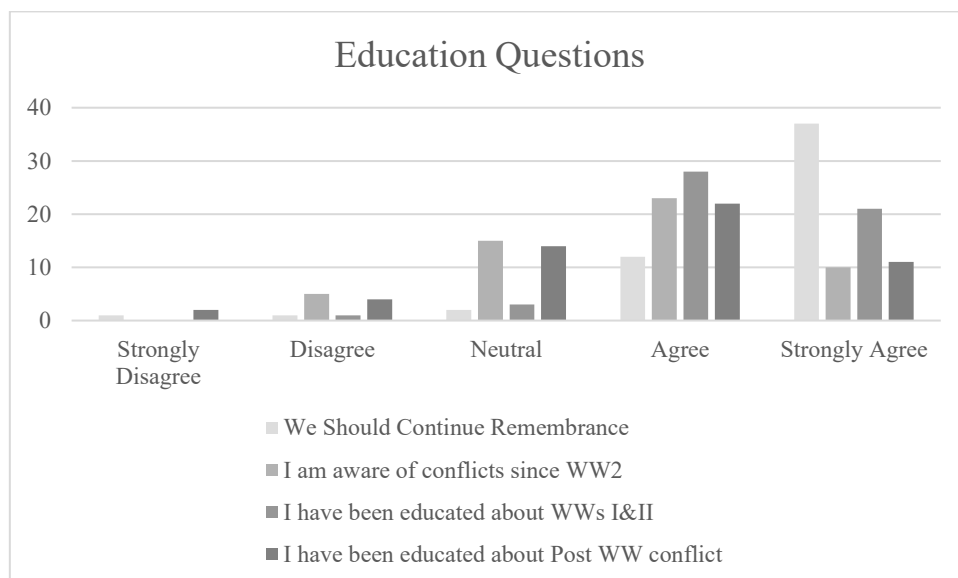


Figure 12: Chart showing response frequency to 4 questions on remembrance and education, n=53. (See Text).

The responses are shown in Figure 12 above. The clear result is that, in each case, the majority of students agreed or strongly agreed with the statements. The strongest agreement was with the statement that we should agree with remembrance. The slightly lower responses for the other three questions indicates the appetite and need for continued activity from Poppyscotland.

A related question asked about sentiment towards the potential negative role of remembrance. The majority of respondents disagreed with the statement that Remembrance Glorifies War and Violence. 30 (57%) strongly disagreed or disagreed with the statement. 14 (13%) were Neutral, and only 9 agreed or strongly agreed (17%).

A series of 3 questions were related to the realism and immersion of the experience. The first was, 'If you have visited Lady Haig's Poppy Factory, does the experience look like the factory?' Only 19 participants had visited the LH Factory but of these, 15 (79%) found it slightly realist or very realistic (37% & 42% respectively). Only 4 (21%) responded neutral and nobody found it unrealistic. The second was 'How detailed are the models and objects in *Their Memory*?' 52 people responded to this question out of 53. Of these, 2 (4%) were neutral, 28 (54%) found it slightly realistic and 22 (42%) said very engaging. Meaning 96% found the objects realistic. In response to the third question 'How would you consider the stories provided in *Their Memory*?'. The majority of respondents rated the stories provided in *Their Memory* Realistic: 48 (91%): 35 (66%) rated very realistic and 13 (25%) slightly, only 5 (9%) rated neutral and nobody rated them as unrealistic. Overall, the evaluation demonstrated that *Their Memory* was effective in raising awareness, engaging the audience and encouraging a change in the perception of veterans and Poppyscotland.

6. Conclusion

Their Memory demonstrates that a co-designed VR experience has significant potential to impact attitudes and behaviors of the target audience. The project design and development were directly influenced by co-design with potential audiences, veterans, game developers, and the third sector. The project evaluation evidenced that impactful design can shape audiences and that the potential for both VR technology and less gamified experiences can be fulfilling. The novelty factor that VR applications first experienced is being replaced with increased expectations that the technology will consistently deliver an experience that audiences desire to spend time in and with (Roll, 2017). However, work is still required to understand the long tail of impact and certainly, the potential commercial benefits have not yet been realized. Instead, the impact on Poppyscotland is clearer. *Their Memory* has brought stories of veterans alive for those who might not otherwise be able to access them, using technology that most people still have limited experience of. This combination arguably creates something completely novel. For Poppyscotland all audiences that they have shown – regardless of whether they are experienced with technology or not - have been impressed with what has been created. This, in turn, has brought an experience that is potentially ground-breaking to a very traditional organization. For the project team, the next step will be to consider how the application can be used or shaped to inform new memory models such as the recent work on agonistic memory by Bull & Hansen (2016). Models such as this consider both politicized representations of past conflicts, while acknowledging the challenges of recent civic and political feelings as well as the individual and collective agency. In the meantime, this paper serves to provide a case study on the co-creation of a VR experience with the purpose of engaging young people to engage with remembrance and commemoration.

References

- Argyriou, L., Economou, D., Bouki, V., & Doumanis, I. (2016). Engaging Immersive Video Consumers: Challenges Regarding 360-Degree Gamified Video Applications. *2016 15Th*

International Conference on Ubiquitous Computing And Communications And 2016 International Symposium On Cyberspace And Security (IUCC-CSS). doi: 10.1109/iucc-css.2016.028

- Belfiore, E. (2015). 'Impact', 'value' and 'bad economics': Making sense of the problem of value in the arts and humanities. *Arts and Humanities in Higher Education*, 14(1), 95-110. doi: 10.1177/1474022214531503
- Bordwell, D. (2008). *Poetics of Cinema*. New York: Routledge.
- Brooks, K. (2003). *There is nothing virtual about immersion: Narrative immersion for VR and other interfaces*. [E-book]. Retrieved from <http://alumni.media.mit.edu/~brooks/storybiz/immersiveNotVirtual.pdf>
- Bull, A., & Hansen, H. (2016). On agonistic memory. *Memory Studies*, 9(4), 390-404. doi: 10.1177/1750698015615935
- Carrozzino, M., Colombo, M., Tecchia, F., Evangelista, C., & Bergamasco, M. (2018). Comparing different storytelling approaches for virtual guides in digital immersive museums. *Lecture Notes in Computer Science*, 292-302. doi: 10.1007/978-3-319-95282-6_22
- Cohan, S., & Shires, L. (1998). *Telling Stories: A theoretical analysis of narrative fiction*. New York: Routledge.
- Conroy, A. (2016). The BBC and Virtual Reality - BBC R&D. Retrieved from <https://www.bbc.co.uk/rd/blog/2016-06-the-bbc-and-virtual-reality>
- The Design Process: What is the Double Diamond? (2007). Retrieved from <https://www.designcouncil.org.uk/news-opinion/design-process-what-double-diamond>
- Dowd, T., Niederman, M., Fry, M., & Steiff, J. (2013). *Storytelling across Worlds: Transmedia for creatives and producers*. Burlington: Focal Press.
- Elmezeny, A., Edenhofer, N., & Wimmer, J. (2018). Immersive storytelling in 360-degree videos: An analysis of interplay between narrative and technical immersion. *Journal for Virtual Worlds Research*, 11(1). doi: 10.4101/jvwr.v11i1.7298
- Farmer, B. (2017). Forces have first year since 1968 with no one killed on operations. *The Daily Telegraph*. Retrieved from <https://www.telegraph.co.uk/news/2017/01/01/forces-have-first-year-since-1968-no-one-killed-operations/>
- Field, A. (2017). *Discovering statistics using IBM SPSS*. London: SAGE Publications Ltd.
- Stories Untold*. (2017). Retrieved from <http://storiesuntoldgame.com/>
- Gabbert, F., Hope, L., & Fisher, R. (2009). Protecting eyewitness evidence: Examining the efficacy of a self-administered interview tool. *Law and Human Behavior*, 33(4), 298-307. doi: 10.1007/s10979-008-9146-8
- Green, M., & Brock, T. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology*, 79(5), 701-721. doi: 10.1037//0022-3514.79.5.701
- Haahr, M. (2018). Reconciling immersion and presence: Locative game mechanics and narrative techniques for cultural heritage. *Virtual Creativity*, 8(1), 23-37. doi: 10.1386/vcr.8.1.23_1
- Herman, A., & Yarwood, R. (2015). From warfare to welfare: veterans, military charities and the blurred spatiality of post-service welfare in the United Kingdom. *Environment and Planning A: Economy and Space*, 47(12), 2628-2644. doi: 10.1177/0308518x15614844

- Hines, L., Gribble, R., Wessely, S., Dandeker, C., & Fear, N. (2014). Are the armed forces understood and supported by the public? A View from the United Kingdom. *Armed Forces & Society*, 41(4), 688-713. doi: 10.1177/0095327x14559975
- Job Simulator: the 2050 Archives*. Owlchemy Labs. (2016). Retrieved from <https://jobsimulorgame.com/>
- Liu, S., & Zaffwan Idris, M. (2018). Constructing a framework of user experience for museum based on gamification and service design. *MATEC Web of Conferences*, 176(04007). doi: 10.1051/mateconf/201817604007
- Mabrook, R., & Singer, J. (2019). Virtual reality, 360° video, and journalism studies: Conceptual approaches to immersive technologies. *Journalism Studies*, 1-17. doi: 10.1080/1461670x.2019.1568203.
- McMahan, A. (2003). Immersion, engagement and presence: A method for analyzing 3-D video games. *The Video Game Theory Reader* (1st ed., pp. 67-86). Abingdon, Oxon: Routledge.
- Miller, C. (2013). Digital storytelling: A creator's guide to interactive entertainment. Burlington: Focal Press.
- Oculus First Contact*. (2016). Retrieved from <https://www.oculus.com/experiences/rift/1217155751659625/>
- Passchendaele 100*. The Royal British Legion. (2017). Retrieved from <https://www.britishlegion.org.uk/remembrance/ww1-centenary/passchendaele-100>
- Pausch, R., Snoddy, J., Taylor, R., Watson, S., & Haseltine, E. (1996, August). Disney's Aladdin: First steps toward storytelling in virtual reality. In *Proceedings of the 23rd Annual Conference on Computer Graphics and Interactive Techniques*, 193-203. doi: 10.1145/237170.237257
- Roll, N. (2017). VR and AR: More than just cool? *Inside Higher Ed*. Retrieved from <https://www.insidehighered.com/digital-learning/article/2017/07/12/vr-and-ar-more-just-cool>
- Ryan, M. (2015). *Narrative as virtual reality 2: Revisiting immersion and interactivity in literature and electronic media*. Baltimore: John Hopkins University.
- Sanders, E., & Stappers, P. (2008). Co-creation and the new landscapes of design. *CoDesign*, 4(1), 5-18. doi: 10.1080/15710880701875068
- Sanders, E., & Stappers, P. (2014). Probes, toolkits and prototypes: three approaches to making in co-designing. *CoDesign*, 10(1), 5-14. doi: 10.1080/15710882.2014.888183
- Sheikh, A., Brown, A., Evans, M., & Watson, Z. (2016, September). Directing attention in 360-degree video. *IBC 2016 Conference*. doi: 10.1049/ibc.2016.0029
- Snowdon, A. (2015). Why remembrance is a political issue. Retrieved from <https://www.counterfire.org/articles/opinion/18056-why-remembrance-is-a-political-issue>
- Soldiers' Stories*. Kallisti Media. (2013). Retrieved from <http://www.kallistimedia.com/2013/10/05/soldiers-stories/>
- SSAFA: The Armed Forces Charity. (2017). Our strategic review for 2017-22. Retrieved from <https://www.ssafa.org.uk/about-us/reports-and-publications>
- Steuer, J. (1992). Defining virtual reality: Dimensions determining telepresence. *Journal of Communication*, 42(4), 73-93. doi: 10.1111/j.1460-2466.1992.tb00812.x
- The Royal British Legion & Centre for Future Studies. (2011). *Legion welfare in the 2010s: A decade of change*. Canterbury, Kent: Kent University.

- Thomas, A., Kumar, A., Krehel, R., Vasey, K., Khoo, E., Marsh, T., & Junting, B. (2018). Oceans we make. *SIGGRAPH Asia 2018 Virtual & Augmented Reality On - SA '18*. doi: 10.1145/3275495.3275513
- UK Ministry of Defence. (2017, March 30). UK armed forces deaths in service: 2016. Retrieved from <https://www.gov.uk/government/statistics/uk-armed-forces-deaths-in-service-2016>
- UK Ministry of Defence. (2018, March 27). UK armed forces deaths in service: 2017. Retrieved from <https://www.gov.uk/government/statistics/uk-armed-forces-deaths-in-service-2017>
- UK Research and Innovation. (n.d.). Excellence with impact. Retrieved from <https://www.ukri.org/innovation/excellence-with-impact/>
- Vaajakallio, K., & Mattelmäki, T. (2014). Design games in codesign: as a tool, a mindset and a structure. *CoDesign*, 10(1), 63-77. doi: 10.1080/15710882.2014.881886
- van Loon, A., Bailenson, J., Zaki, J., Bostick, J., & Willer, R. (2018). Virtual reality perspective-taking increases cognitive empathy for specific others. *PLOS ONE*, 13(8), e0202442. doi: 10.1371/journal.pone.0202442
- Witmer, B., & Singer, M. (1998). Measuring presence in virtual environments: A presence questionnaire. *Presence: Teleoperators and Virtual Environments*, 7(3), 225-240. doi: 10.1162/105474698565686