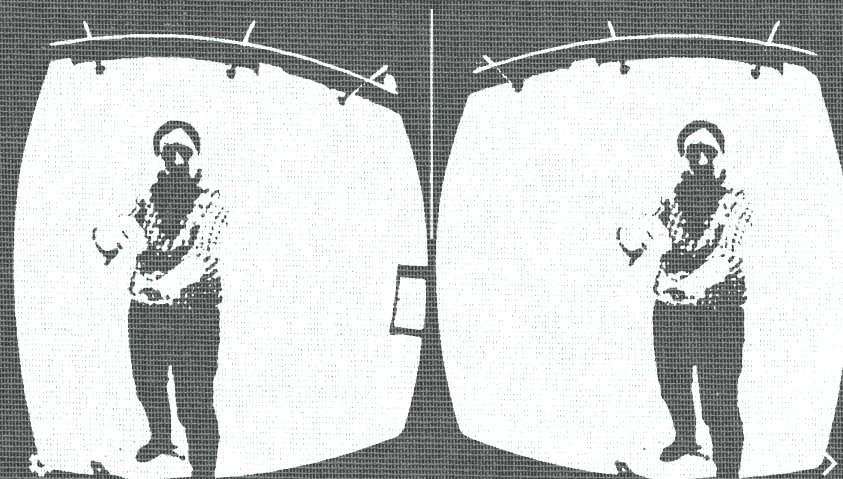


*Wonder VR* offers new insights into the potential of Virtual Reality (VR) to improve patients' experience and wellbeing in acute hospital settings. A collaboration with Dementia Care nursing staff and a Nurse Consultant at Imperial College Healthcare NHS Trust (ICHT), the project received the National Dementia Care Awards 2019 award for Outstanding Arts and Creativity in Dementia Care and *The Guardian* University 2020 Teaching Excellence Award.


The practice research responds to the broader context of an increasing ageing population in the UK, resulting in long hospital stays with risks of depression, isolation and diminished wellbeing. Using 360-degree VR (VR360), enhanced by facilitated intersection with the 'real world', the practice creates bespoke videos that offer older patients temporary respite from the hospital ward through experiencing places that are significant for them in terms of familiarity, memory or aspiration. The immersive, affective experience of VR360 counters patients' lack of autonomy and sense of isolation thus improving their stay in hospital and increasing their wellbeing.

The practice is delivered through a developmental, collaborative and person-centred methodology. Patients participate in the creation of their own VR360 video, which further contributes to their sense of autonomy and, therefore, their wellbeing. The project has engaged with 10 patients across Charing Cross, St Mary's and Hammersmith hospitals, which form ICHT. This multi-component output comprises 7 bespoke videos, 2 demonstration videos for patients, 1 annotated training film of the practice to train nurses and to share the research with other medical staff, a peer-reviewed article in *Contemporary Theatre Review* (2020) and a framework of best practice for ICHT outlining the methodology and its capacity to deliver a person-centred approach attending to the needs of the individual patient. The output is also accompanied by contextual information.


Wonder VR



Nicola Abraham

Materials which comprise or support this submission can be found inside the box or on the USB drive  embedded in the box's interior lid. Within this publication, references for components of the submission are found in the right margin using a lettering system A–I. Items marked with an \* are components of the output, all other items are contextual.

An instruction video for the VR Headset can be found on the USB.

- A\* Bespoke VR360 patient videos, first iteration (on VR Headset)
- B\* Bespoke VR360 patient videos, second iteration (on VR Headset)
- C\* Video for VR360 patient demonstration (on VR Headset)
- D\* Video for patient demonstration with real-world interaction in VR360 (on VR Headset)
- E\* Annotated training video for ICHT staff (on VR Headset)
- F\* Framework of best practice outlining the practice methodology
- G\* Peer-reviewed article: Abraham, Nicola. 2020. 'Wonder VR: Interactive Storytelling through VR360 Video with NHS Patients Living with Dementia', *Contemporary Theatre Review*, 30(4): 474–489
- H Video of presentation at the *Being Human: Different Stages* festival 
- I Blog post published on *The Cultural Capital Exchange*

Further information on these materials can be found on the reverse of the box's interior lid.

Nicola Abraham

## WONDER VR

Creating bespoke VR360 with NHS patients to improve patient wellbeing in acute hospital settings

The Royal Central School of Speech and Drama,  
University of London

WONDER VR: Creating bespoke VR360 with NHS patients to improve patient wellbeing in acute hospital settings

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She has developed participatory projects within a range of community contexts, currently focused on Applied Theatre and Digital Technology projects including Virtual Reality 360 videos within NHS acute hospital contexts. Her research and practice offer inclusive pedagogy based on reciprocity that sees patients living with dementia as artists and active citizens. This underlying approach has evolved to develop responsive projects that support patients who are often socially isolated to engage in creative practice that is person-centred, cognitively stimulating and full of wonder.

Acknowledgements: Thanks to the Dementia Care Team within Imperial College Healthcare NHS Trust, and particularly Consultant Nurse Jo James and Clinical Nurse Natascha Teszner, for supporting and implementing this project with me. Thanks too to our MA Applied Theatre students who took part in facilitating the project. Many thanks to Joe Parslow for his work collating the documentation and offering ongoing support for this artefact.

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## I Overview

This project is a multi-component output supported by contextual information. The output includes a range of VR360 videos that were created for patients, videos demonstrating to patients the interactive VR360 experience and the facilitated real-world interaction in VR360, an annotated training video for ICHT staff showing how the practice can be used to engage patients in immersive VR experiences, a framework of best practice for ICHT and wider NHS staff and a peer-reviewed article on the potential of the practice to improve subjective wellbeing of patients. The supporting information comprises a presentation at the *Being Human: Different Stages* festival 2019 and a blog post published on The Culture Capital Exchange (2020). The practice research was delivered during 2018–20 in collaboration with Imperial College Hospital NHS Trust (ICHT), supported by specialist dementia Nurse Consultant Jo James, Clinical Dementia Nurse Natascha Teszner, facilitated by MA Applied Theatre placement students from The Royal Central School of Speech and Drama, which I co-designed and implemented.

Currently in the UK, up to 60% of people admitted to hospital from the age of 65 or over will develop a mental health disorder during their stay. Depression is one of the most significant chronic disorders experienced amongst older people in hospitals (Tooke *et al.* 2018), in addition to loneliness, social isolation, delirium, agitation, uncertainty and worry. The practice, therefore, offers a much-needed strategy to improve patient wellbeing in acute hospital settings through non-medical intervention that also supports the NHS in improving patient experience and wellbeing. Diener *et al.* define wellbeing in terms of the importance of “characteristics such as a positive outlook, meaningful goals, close social relationships and a temperament characterised by low worry” (2002: 70), and the increase in wellbeing in participating patients is evidenced both in observations of the clinical team and the patients’ subjective accounts.

The research explores the benefits of bespoke VR360 videos created to improve patient wellbeing through positive affect by tailoring content to respond to the specific access needs, narrative ideas and places of significance of each patient. The patients participate, with support from facilitators and nursing staff, in the creation of the videos,

which are then edited and demonstrated to the patient, and the practice includes the development of enhancements to VR360 through facilitated interaction between the virtual and real worlds, such as interaction with a trained facilitator and sensory experiences of smell and touch (see [patient demonstration video](#)). The participation of the patients in the person-centred approach of the practice that listens and responds to their needs and their engagement in VR360 has further improved patient wellbeing through a greater sense of autonomy and self-worth. Place has a particular function within the practice as the patients have no access to locations beyond the hospital during their stay, and the locations of the films are chosen with the individual patient. They often chose places like home or other familiar places from which they are removed whilst in hospital, or places they have visited of which they have fond or significant memories or places of aspiration that they have longed to visit but never have. The experience of being transported to a place other than the hospital ward — a place of familiarity, memory or aspiration — via VR360 has benefits for patient wellbeing in terms of improved mood, a sense of joy or elation, excitement and engagement and reduced levels of agitation, which are further discussed in the [peer-reviewed article](#).

The research proposes VR360 as a complementary mode of care for patients in an NHS facing increasing scrutiny combined with funding cuts, whilst also answering calls to improve patient wellbeing, including reducing the effects of loneliness, social isolation and low mood. In the context of COVID-19, the practice has potential to address negative effects of social distancing, such as depression, isolation, limited mobility beyond the home and loss of autonomy. In 2019, the project received a National Dementia Care Award for its outstanding contribution in bringing the arts and creativity to bear on the challenges of dementia care in a hospital setting. In 2020, the project won the Teaching Excellence Award at *The Guardian* University Awards.

## II Questions, aims and objectives

The World Health Organisation notes that between now and 2050, the world population of people over 60 years-old will almost double from 12% to 22%. This will present a ‘top heavy’ population, with over 60s outnumbering children under 5 years of age. One of the fundamental impacts of this

## Overview

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FIG 1 Example VR360 with interaction, and inside view for VR headset

change in the proportion of over 60s will be the challenges facing health and social systems, which will need to be ready to adapt to this shift (WHO 2018). Within this context and in an NHS setting, the overarching aim of the research is to deliver meaningful and affective experiences through VR360 in order to improve patient wellbeing for older adults in acute hospital settings. In turn, this supports ICHT as they rise to the challenges of caring for older adults in a context of funding cuts and increased scrutiny.

In this research, I asked:

- 1 *What can VR360 video offer for older adult patients with limited mobility and experience of social isolation during long hospital stays?*
- 2 *What qualities and capacity might place in VR offer to improve patient experience of acute hospital settings in order to increase wellbeing?*
- 3 *How might Philip Fisher's concept of 'wonder' (1998) as a type of affect in the aesthetics of rare experience be mobilised in a person-centred approach to the creation of bespoke VR360 video?*
- 4 *How might VR360 video be enhanced through real-world interactions within virtual spaces?*

To address these questions, as the practice developed, the following objectives emerged:

- To fully engage patients in the practice;
- To create bespoke VR360 videos through a person-centred approach where patients are listened to, the practice remains fully responsive to patients and the patients input directly to the process of creation;
- To ensure VR360 is accessible and comfortable for patients to avoid delirium or confusion or any other potential ill-effects;
- To explore ways of enhancing VR360 through interaction with the real world;
- To adopt place as the focus of the creation of the videos in order to maximise its potential in VR360 to bring about positive affect and thereby improve wellbeing;
- To develop a methodology that allows for knowledge exchange with the collaborators in the NHS at ICHT, whilst also remaining responsive and reflexive to embedded processes of observation and review as the research progresses.

The practice is informed by scholarly research in order to conceptualise the potential of VR360. This has enabled me to build a theoretical framework (described in the peer-reviewed article) to accommodate the responses of the patients to their bespoke VR360 experiences observed during the practice, which often indicated excitement, awe and intrigue. To better understand the connections between the patients' responses and increased wellbeing from engaging with VR360, I drew upon Phillip Fisher's (1998) concept of 'wonder', questioning the potential of VR360 as a new type of technology that might create the criteria of 'newness' that Fisher identifies as the prerequisite for experiencing wonder in the positive terms in which he defines it. I connected this idea with existing research on subjective wellbeing to fully apprehend the relationship between wonder and wellbeing as they are embodied through the medium of VR360 in the practice. The direct and inseparable correlation between practice and theory is an essential and fundamental part of *Wonder VR*; without the practice, there would be no research outcome.

The practice has created the first type of bespoke VR360 for patients in acute hospital contexts focussed on experiences of wonder in the improvement of subjective wellbeing. In addition, the potential of VR360 to bring about positive affects, such as wonder, has been enhanced through intersections between VR360 and the real world. VR360 is not usually interactive, but introducing a facilitator to interact with the patient during the VR360 experience or using touch and smell provides a further level of immersion that strengthens the patient's sense of the 'real'; in turn, this increases positive affect and wellbeing (see patient demonstration video and peer-reviewed article). In the context of a growing elderly population combined with funding cuts and increasing scrutiny in the NHS, the research evidences the capacity of creative practice to make timely and productive non-medical interventions to improve patient experience and wellbeing.

### III

## Context

*Wonder VR* seeks to deliver solutions to challenges in health and care provision — specifically regarding the issue of wellbeing for older adults during long hospital stays — in an increasingly ageing society through the creation of immersive experience in VR360. It rises to the urgent challenge



FIG 2 Patient wearing VR360 headset and facilitator

acknowledged by the WHO in their 2018 report entitled *Global strategy and action plan on ageing and health*; that is, in a period where the world's ageing population is increasing, to prepare societies for the care of older people in time for the current generation entering this age bracket. Longer lives will create important opportunities for older adults to experience more of life, such as changing careers and pursuing new hobbies and interests, but these opportunities are dependent on good health and wellbeing (WHO 2020). The health concerns associated with ageing mean that there will be greater demand on healthcare systems to ensure they fully support and care for the needs of older adults. The significance of the practice in increasing wellbeing is heightened in the current context of COVID-19, where older adults have also been isolated at home, rather than specifically in an acute hospital setting, and those other than older adults have experienced isolation and its attendant negative impacts on wellbeing.

The practice makes an advance in the use and enhancement of VR in hospital settings and in its nuanced person-centred approach to creating accessible, responsive, interactive bespoke experiences to address the consequences of long hospital stays specifically focussing on the wellbeing of patients through non-medical, creative, complementary interventions. This is the first project to engage patients in this way, and it has revealed how VR can have positive impacts on patient wellbeing.

VR has been used in health contexts for medical training and rehabilitation, but it has not previously been used to impact the subjective wellbeing of patients through the creation of bespoke VR360 videos for individual patients. Fernando Aparicio *et al.* (2012) explore the use of VR specifically in the rehabilitation of patients to improve balance following falls and in training for surgeons (5508). Sally Hughes *et al.* (2017) term this approach 'exer-gaming' and note that it can be used at home and in hospitals. Referring to a project by Mirelman, Rochester and Maiden, Hughes *et al.* elaborate further on the use of VR as a strategy that may help to better prepare older adults for navigating risks and avoiding hazards in their own home environments by increasing cognitive and spatial awareness. Both approaches offer opportunities for advancement of knowledge, learning and development of skills through VR, but neither focus on the creation of person-centred, bespoke VR360 experiences specifically designed to address the improvement of patient wellbeing during hospital stays. Hughes *et al.* and Aparicio *et al.* offer practical interventions that are connected to a patient's physicality or a surgeon's study, but do not account for the potential of VR in the

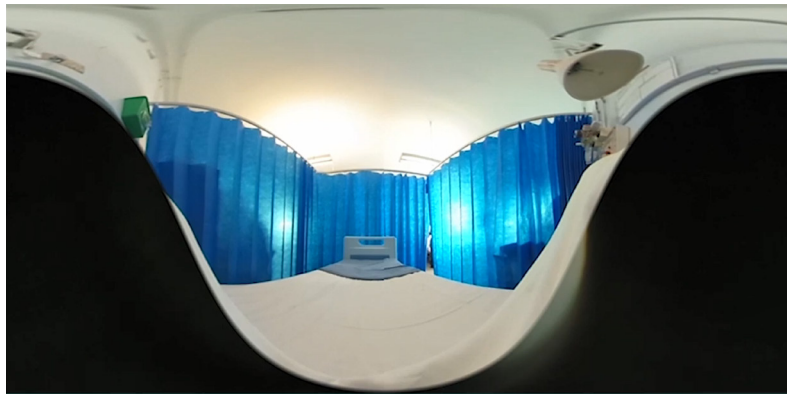
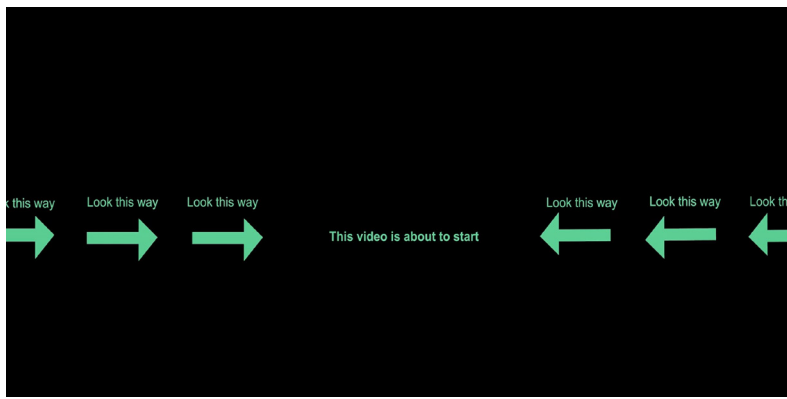


FIG 3 Flattened VR360 footage: Beach in Thailand



emotional and social wellbeing of patients, a new insight that this practice has identified and responded to.

In order to increase patient wellbeing, the practice maximises the capacity of place to bring about affect through immersion in enhanced VR360. In the context of the immersive experience in VR, Mel Slater (2009) proposes the concepts of ‘place illusion’ to describe the sense of ‘being there’ and ‘plausibility illusion’ to explain the suspension of disbelief whereby the events are accepted as actually taking place (355). In this practice research, it has become clear from patient responses that a combination of Slater’s concepts is enabled when an experience within VR360 offers the participant engagement of their senses and points of interaction with the real world through a facilitator and the senses of smell and touch.

There is practice research that has begun to create elements of interactivity which are built into applications but not connected directly to the physical, real world. Helena Daffern *et al.* (2019) consider the potential of VR technology in the context of wellbeing and the benefits of group singing. Referencing the research of Karl-Erik Bystrom *et al.* (1999), Daffern *et al.* discuss the importance of creating an environment that allows for interactivity: “Interaction between singers is a key element of group singing and is likely to affect the quality of the VR experience, as realistic interactions within a VR environment are connected to the level of presence experienced by the user” (2019: 9). However, their research is focussed on interaction between the real and the virtual worlds via audio only. Through using timed direct interactions between the facilitator and the patients, and sensory experiences of smell and touch, this research has developed new practices to enable greater interactivity in VR through intersection of the real and the virtual worlds.

The practice attends to the potential affect of immersion in places that have significance for the patients (see peer-reviewed article). Places are chosen by individual patients, and these have included places like home or other familiar places from which they are isolated during their hospital stay, places they have visited previously and of which they have fond or significant memories or places of aspiration that they have longed to visit but never have. Patients have responded to the VR360 experience with excitement, intrigue, joy and awe. In this respect, Fisher’s category of ‘wonder’ has provided a useful theoretical framework to better understand the affect experienced by the patients. He defines wonder as follows: “[...] with wonder, above all else, there is the address to delight, to the bold youthful stroke, to pleasure in the unexpected

and in the extension of means outside the limits where they might be thought to come to an end” (1998: 6). The practice has demonstrated the potential of VR360 to offer moments of wonder to patients through the ‘newness’ of experiencing places of familiarity, memory or aspiration through immersive, interactive technology.

The responses of the patients involved in the practice, then, are prioritised not only in terms of the potential to increase wellbeing, but also in the person-centred approach the practice adopts. The ways in which the practice investigates the research questions moves beyond the self-reflection of the researcher as a facilitator who negotiates narratives and ideas with patients and towards developing an understanding of how the practice research might meet the needs of those to whom it is designed to respond; that is, patients and nursing staff. Sally Mackey (2016) asserts that it is essential to focus upon ‘other people’ as the centre of the research rather than on the practitioner as facilitator-researcher or pedagogue-researcher. Accordingly, the relationship of action and reflection are vital components in the process of developing, creating, editing, showing, reviewing and improving the VR360 videos for patients. In this case, the practice is further nuanced by close observations of patient responses to the VR360, in addition to medical perspectives on the value of the project in increasing patient wellbeing and the responses of Applied Theatre practitioners to a creative process of making that honours the needs and ideas of the patient within each individual video.

## IV Methodology

The practice in terms of its methodology is essentially and fundamentally developed through the ongoing collaboration with NHS staff at ICHT. In particular, the collaborative process of observation and review embedded within the practice has enabled the research to evolve through the pluralism of understanding from medical and non-medical perspectives. Remaining responsive to the patients’ needs and ideas in order to translate these into affective VR360 experiences has also required a methodology that evolves and develops as the practice progresses. The project has 4 phases (see v. Timeline), which largely map to stages of planning and logistics (Phase 1: September 2018–January 2019), implementation of the practice in the first



iteration (Phase 2: January–March 2019), implementation of the second iteration (Phase 3: October–December 2019) and dissemination (Phase 4: November 2019–December 2020).

The practice has been developed into a framework of best practice to disseminate and share the methodology with the team at ICHT specifically and within the NHS more generally, and to facilitate further practice that seeks to develop VR360 through a person-centred approach in other areas of research and other disciplines.

To address the research questions, it was imperative to ensure that the selection criteria for patients' participation in the project was deliberately broad to enable patients who were on the medicine for the elderly wards to take part but also to include patients who were experiencing long stays, had experienced a fall, UTI, schizophrenia, who seldom had visitors, who were worried about moving to care homes or who had experienced strokes, for example. This range of criteria meant we were better able to understand the broader significance of the research for patients with varying access needs and mobility. The common factor for all patients was that they were part of the medicine for the elderly wards in St Mary's, Charing Cross Hospital or Hammersmith hospitals. The project has engaged with 10 patients in total; the numbers of patients involved and VR360 videos created are a function of the labour-intensive process that is required to work closely with the patients in order to provide fully bespoke experiences.

Work with the patients begins with the Clinical Nurse identifying patients who may benefit from participation using the purposefully broad criteria outlined above. Once patients are identified, the Clinical Nurse holds initial conversations with them to ensure full understanding of the project and establish their interest in taking part. The next stage of the process involves the Clinical Nurse and Applied Theatre facilitator getting to know and building trust with the patient by asking questions about the patient's hobbies, areas of interest, places that were important to them or those they would like to see and stories from their life-experience. The Applied Theatre facilitator is supported in this process by the Clinical Nurse who helps to generate ideas and engage the patient with

← FIG 4 Flattened VR360 footage: London park

whom they have already built a relationship through their usual duties of care. Once ideas are generated, the patient is re-introduced to the aims of the project and introduced to VR360 on a tablet via YouTube to demonstrate what VR360 looks like and the nature of the VR experience. Patients are then invited to view a demonstration VR360 video using the VR headset. It is important to note that not all patients opt to view VR360 this way, which is why we also use tablets or smartphones to ensure the patient experiences VR in the way they feel most comfortable.

To translate the ideas provided by the patients into VR360, the Applied Theatre facilitator proposes an overarching concept to incorporate the ideas, stories and requests of the patient to think through logistics for filming. For example, considerations have included how to show movement without causing discomfort for patients by walking slower than usual to keep the camera level and using direct address to the camera so that the patient does not feel abandoned in the virtual location. The Applied Theatre facilitator then films and collates VR360 footage to put together the often-simple experiences the patients request in their films.

Editing takes place once the footage is captured in the location specified by the patient, and it includes important elements of the discussions in the planning phase of the project, particularly to prevent confusion or disorientation as a result of patients engaging in VR360. Accordingly, a shot of the ward from the perspective of a bed at sitting height showing the blue curtains drawn around the bed — a ritual we complete when showing the films back to the patients — is edited in at the start of the video. This avoids patients feeling disorientated and confused when wearing the VR headsets by starting each film in the same location the patient experiences prior to putting on the headset; that is, their bed and the bay they are in. Music, chosen by the patient or informed by requests and preferences from the patient for their film, is gradually faded in. This acts as a signifier that the film is about to begin. The scene then gradually fades into the location chosen by the patient to slowly move from the 'real' and 'familiar' world of the ward into VR. The end of the film reverses this approach, gently dissolving the scene and fading out the music to signify a return to the real world of the ward. The continuity avoids confusion or disorientation for the patient during the VR360 experience.

At the point where the bespoke VR360 film is demonstrated to the patient, the process is reviewed in order to feed in observations and documentation to the development of the practice and to allow for project

evaluation from the Clinical Nurse, responses and feedback from patients and feedback from the Applied Theatre facilitator and the Nurse Consultant. Advancing the practice in response to the collaborative observations of both medical and non-medical partners in the project also required observations to be evaluated and reviewed to decide upon ways to progress and develop the practice. The project has also been documented, and the findings evidenced, through observations of patient responses and self-reflective accounts in both informal field notes and formal semi-structured interviews to facilitate review and in order to gauge the value of the practice from a medical perspective. These accounts ensured critical interrogation of observed patient responses throughout, and they have been integrated into the peer-reviewed article. The consistent process of review, evaluation and development supported the creation of the training video for nurses and the demonstration videos for patients, and also formed the basis of the framework of best practice.

The following example of the person-centred approach at the heart of the project demonstrates the ways in which the practice brings about increased wellbeing. One patient told facilitators he used to walk through Epping Forest every week with his wife for many years following a particular route they both enjoyed. Then he experienced a major stroke, which led to paralysis. Unable to walk again, he was told he would need to move to a care home. This caused much upset and uncertainty about what life would now be like for him and for his wife. When he requested a video of his walk through the forest, we recreated this walk for him with a facilitator talking directly to the camera about the history of the forest (FIG 5). To provide further points of interactivity between the real and virtual worlds, we collected artefacts from the forest, such as leaves and pine cones, and used aromatherapy oils that smelt of pine to create interaction through scent and touch so that he could not only see the forest but sense it. The experience through VR360 improved the wellbeing of the patient by providing him with a virtual reality of a place that he associated with many years of happy memories and giving him respite from the physical and psychological confines of the hospital ward through a virtual experience that he could revisit whenever he wished.

To enhance patient wellbeing, then, the practice has explored ways in which points of interaction between the real and virtual worlds can be integrated into VR360 experiences. This heightened immersion involves an interaction between the virtual world in the headset and the exterior real world through facilitated interactions with people, objects, scent, touch, texture and temperature.

Further technological methodological concerns were the focus of early planning discussions. In this phase, the following were identified as significant challenges.

#### Technical concerns:

- ⦿ How can we ensure VR360 is an accessible medium for patients to engage with?
- ⦿ Should we make an archive of videos or bespoke experiences for patients?
- ⦿ How do we avoid causing delirium/confusion from the use of VR360 as an immersive tool for patients?

#### Practical concerns:

- ⦿ Will patients want to engage with this new technology?
- ⦿ Will patients find VR360 beneficial and what will that look like?
- ⦿ How do we ensure our approach is person-centred for patients?

Thinking through these concerns allowed the team to derive the following solutions to the points above. First, the filming height of the camera should be that of the patient when sitting up in their hospital bed to avoid jumps in distance between the starting point of the patient's distance between the bed and the floor and the camera's filming height between the lens height and the floor. This will avoid a sudden and potentially disconcerting change of position in the physics of the film. Secondly, bespoke videos are essential to ensure the project follows the person-centred ethos of the Dementia Care Team. It is also important to ensure patients have autonomy in the research project; that is, that they feel listened to and their ideas are 'heard' through being directly incorporated into the video created for each individual. This places a limit on the research in that this is not a large-scale project with 'mass-produced' creative outputs, but one that offers a person-centred practice which supports the work undertaken by the Dementia Care Team. Thirdly, patients were identified to take part in the project by the Clinical Nurse and they were then asked if they would like to participate in the project to gauge interest. Following this point, VR was introduced to patients as per the stages outlined above. Finally, the Clinical Nurse observed and noted patient reactions to VR in each case to think through the benefits of VR360 for those who had opted to take part. The impact of the project is documented in the peer-reviewed article.



FIG 5 Flattened VR360 footage: Epping Forest

In the first iteration, 3 VR360 videos were created using HD VR360 via the Ricoh Theta S camera, the most advanced camera from Ricoh at that point. In the second iteration, 3 4K VR360 films were created with a higher quality camera. The Applied Theatre facilitators were fully trained in using the technology in terms of both filming and editing and the NHS staff were familiarised with the cameras and the VR headset in order to ensure the patients engaged with the practice and could do so without risk of discomfort or harm. In addition to the 7 patient videos created during the practice, creative outputs include 2 videos to demonstrate VR360 to the patients and 1 annotated training video to facilitate sharing with other NHS staff and train nurses in the practice.

## V

## Timeline

This project was created in 4 phases:

## Phase 1

2018 2019	September– January	<p>Planning in consultation with Clinical Nurse Natascha Teszner and Nurse Consultant Jo James, who also heads the Dementia Care Team for ICHT;</p> <p>Challenges presented by VR360 identified and solutions devised;</p> <p>Clinical Nurse and the Applied Theatre facilitator trained in using the technology.</p>
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## Phase 2

2019	January– March	<p>Implementation of the first iteration of the project with 4 patients;</p> <p>Patients identified with the support of the Clinical Nurse;</p> <p>Patient ideas and narratives gathered in conversations with the patient;</p> <p>Filming and editing VR360 to create 4 bespoke VR360 videos;</p> <p>Clinical Nurse, Applied Theatre facilitator and myself reflect on and evaluate the process and consider developments following review.</p>
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## Phase 3

2019	October– December	<p>Implementation of the second iteration of the project with 3 patients;</p> <p>The process from the first iteration was repeated to create 3 bespoke VR360 videos;</p> <p>Demonstration videos created to familiarise patients with the VR experience and to show them how interaction can increase engagement to improve the immersive quality of the experience;</p> <p>Training and familiarisation video created to demonstrate to nurses how to facilitate in VR360 experiences for patients.</p>	C,D E
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## Phase 4

2019 2020	November– December	Dissemination of the findings from the project;	
2019	7 November	National Dementia Care Award 2019 for Outstanding Arts and Creativity in Dementia Care;	
	20 November	Presentation of the project at the <i>Being Human: Different Stages</i> festival;	H
2020	March	Office of Students and Research England funding award for Student Involvement in Knowledge Exchange (£566,262);	
	June	Blog post for The Culture Capital Exchange;	I
	November	Teaching Excellence Award at <i>The Guardian</i> University Awards 2020;	
	December	Publication of peer-reviewed article;	G
		Framework of best practice shared with collaborators at ICHT.	F

## VI

## Findings

The practice demonstrates that VR360 has the potential to increase patient wellbeing in acute hospital settings (see peer-reviewed article). Older patients with limited mobility and experience of social isolation can benefit from immersive engagement with bespoke VR360 experiences through being transported away from the hospital ward to a place they miss or would like to visit, which improves their wellbeing through creating moments of joy in the recognition of a familiar or new space that breaks the

monotony of the wards. Place has a particular role to play in the practice; through affects of ‘place illusion’ and ‘plausibility illusion’, place has the capacity to reconnect the patients with a familiar place, to remind them of places they visited previously or to enable them to go to places they have only previously aspired to visit. Enhancements to VR360, such as real-world interactions with a facilitator or through the senses of touch or smell renders the experience still more affective. Increased wellbeing in the patients has been witnessed in observations and feedback from nurses and patients, where the improvement to wellbeing approaches Fisher’s notion of ‘wonder’ in the excitement, intrigue, joy and awe expressed by the patients.

During project evaluation, the Nurse Consultant said of the practice as a whole:

A big point [for the patients] is wellbeing, when they are in a very scary place, which sadly hospitals are for a lot of people, then we might just be able to give them something comforting, which can remind them about something that is close to home or a loved one so they feel more relaxed, like a meditation session. (2019)

Noting the immersion of one patient in VR and the improvement to her wellbeing during engagement in the VR360 video, the Clinical Nurse commented:

She was smiling, she was laughing, she was really like talking to the animals and making gestures with her hands indicating to the animal to come closer — she was very animal-loving so she enjoyed watching it. (2019)

Though patients’ experience improved wellbeing in the moment of engagement, the evaluation of the project in collaboration with the clinical team has demonstrated that the positive affects witnessed are often prolonged beyond the VR360 experience of the patients.

The collaboration and knowledge exchange between the medical and non-medical partners have provided a shared understanding of how the project could be continually advanced to improve its person-centred approach and how we could learn from each iteration to improve accessibility for patients. The project drew upon the expertise of NHS Dementia Care Team staff and my own practice as an Applied Theatre practitioner to identify and creatively respond to the needs and ideas of patients. I worked directly with a Clinical Dementia Nurse, who is a specialist in dementia care and has a strong interest in the potential of VR360 technology in healthcare

contexts and, from our discussions, I was able to design, create and critically review each iteration of the project to ensure each video experience was person-centred and responsive.

Indeed, a person-centred approach is integral to the practice because ‘listening’ and enabling the patients to ‘feel heard’ is significant in restoring a sense and feeling of autonomy for the patient. Both of these terms are synonymous with person-centred care as a practice that focusses on the wellbeing of each individual patient. The practice counters care that assumes what is good for the patient by drawing instead directly upon the patient’s expertise and engaging them in a creative process to enable them to demonstrate and develop their own creativity and growth. In turn, this leads to a greater sense of autonomy and increased wellbeing. The research has found that immersion in a ‘loved’ place or a location that holds fond memories or one that is new and aspirational for the patients has the affective potential to further increase patient wellbeing. The level of immersion and, therefore, affect, has helped patients feel an increased sense of self-worth and wellbeing from encountering VR360 as a wonderful respite from the reality of a hospital ward (see the peer-reviewed article which explores these connections in more detail).

The medium of VR itself is relatively new but not novel. It offers an immersive experience that we have learned creates improved wellbeing through removing barriers to patients experiencing places they miss or long to visit (see bespoke VR360 patient videos). When the experience is further enhanced through direct engagement with the facilitator during the VR experience or through stimulation of the senses of touch and smell, there are points of connection between the patient in the ward and the outside world. The immersive experience is heightened, which leads to greater affect, which in turn improves the patient experience and their wellbeing.

The research has been shared with patients and NHS collaborators at ICHT who have been directly involved in the project. The project has engaged with 10 patients across Charing Cross, St Mary’s and Hammersmith hospitals and with 1 Clinical Nurse and 1 senior Nursing Consultant at ICHT. 3 students from the MA Applied Theatre at The Royal Central School of Speech and Drama have engaged with the practice as facilitators. The research has been disseminated across ICHT and more generally, the NHS, through the framework of best practice. The research has been shared with academics in the fields of theatre and performance, and practitioners, directors and artists through the peer-reviewed article in *Contemporary*

*Theatre Review* (2020). Dissemination with the general public has been delivered through the presentation at the *Being Human* festival in November 2019, the TCCE blog post in June 2020 and the National Dementia Care Award 2019 for Outstanding Arts and Creativity in Dementia Care as well as the Teaching Excellence Award at *The Guardian* University Awards 2020, has further raised public awareness around the research.

The value of the practice has been recognised by ICHT staff who have participated in the project. Jo James, Nurse Consultant, identified the significance of the practice for patients with limited mobility, long hospital stays and experience of social isolation:

What has been powerful about this programme is the person-centred approach to it. The patients are co-designing the experience that they want and so it is born from a combination of the patient's wishes and imagination and the practitioner's skill both in listening and interpreting what has been expressed. It gives a chance for people without a voice to feel heard and to be creative in ways that have not been available before. (2019)

James' comments also highlight the added value of the collaboration between arts practitioners and NHS staff at ICHT. The collaboration has brought non-medical and medical practitioners and perspectives together to generate research that both rises to the challenges of health and social care in the NHS and demonstrates the potential of creative arts practice to provide solutions in a societal context.

The value and potential of the practice to deliver knowledge exchange and to impact student engagement has been recognised in the funding awarded by the Office of Students and Research England (March 2020, £566,262) to scale up the practice and provide students with opportunities for knowledge exchange and co-creation.

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## VII

## Bibliography

- Aparicio, Fernando, M. de Buenaga, V. Padrón, and D. Gachet Páez. 2012. 'Personalised Health Care System with Virtual Reality Rehabilitation and Appropriate Information for Seniors', *Sensors*, 12: 5502–16
- Bystrom, Karl-Erik, Woodrow Barfield, and Claudia Hendrix. 1999. 'A Conceptual Model of the Sense of Presence in Virtual Environments', *Presence: Teleoperators & Virtual Environments*, 8(2): 241–4
- Daffern, Helena, D.A. Camlin, H. Egermann, A.J. Gully, G. Kearney, C. Neale, and J. Rees-Jones. 2019. 'Exploring the potential of virtual reality technology to investigate the health and well being benefits of group singing', *International Journal of Performance Arts & Digital Media*, 15(1): 1–22
- Diener, Ed, S. Oishi, and R. Lucas. 2002. 'Subjective Well-Being: The Science of Happiness and Life Satisfaction', *The Oxford Handbook of Positive Psychology*, ed. by C.R. Snyder and Shane J. Lopez (New York: Oxford University Press), pp.187–94
- Fisher, Phillip. 1998. *Wonder, the Rainbow, and the Aesthetics of Rare Experiences* (Cambridge, MA: Harvard University Press)
- Hughes, Sally, P. Spadafora, L.E. Tsotsos, and K. Warren-Norton. 2017. 'Supporting Optimal Aging through the Innovative Use of Virtual Reality Technology', *Multimedial Technologies and Interaction*, 1(23): 1–7
- International Psychogeriatric Association. 2020. 'COVID 19 Webinar', 23 May 2020 <<https://vimeo.com/421959533/d91976b950>> [accessed 23 May 2020]
- Mackey, Sally. 2016. 'Applied theatre and practice as research: Polyphonic conversations', *Research in Drama Education*, 21(4): 478–91.
- Penney, Lauren. 2013. 'The Uncertain Bodies and Spaces of Aging in Place', *Anthropology & Aging Quarterly*, 34(3): 113–25
- Slater, Mel. 2009. 'Place Illusion and Plausibility Can Lead to Realistic Behaviour in Immersive Virtual Environments', *Philosophical Transactions of the Royal Society B: Biological Sciences*, 364(1535): 3549–57
- Tooke, B., L. Aimola, O. Corrado, M. Crawford, C. Hood, K. Plummer, and A. Quirk. 2018. 'Survey of Depression Reporting in Older Adults Admitted to Acute Hospitals' <[https://www.rcpsych.ac.uk/docs/default-source/improving-care/ccqi/ccqi-research-and-evaluation/depression-survey-report-older-adults-2018.pdf?sfvrsn=3ed9de11\\_2](https://www.rcpsych.ac.uk/docs/default-source/improving-care/ccqi/ccqi-research-and-evaluation/depression-survey-report-older-adults-2018.pdf?sfvrsn=3ed9de11_2)> [accessed 1 May 2019]
- World Health Organisation. 2018. 'Ageing and Health' <<https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>> [accessed 20 June 2019]
- World Health Organisation. 2020. 'What is the Decade of Healthy Ageing?' <<https://www.who.int/ageing/decade-of-healthy-ageing>> [accessed 20 August 2020]