VR for Diversity: *Amelia's Dream*

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Abstract. This demo is the first outcome of the research project *VR for Diversity*. The theoretical backgrounds for the project are shortly discussed and the concept for *Amelia's Dream* is presented. *Amelia's Dream* is a VR experience that is filmed using volumetric video capture technology, in which a young woman shares some of her dreams and concerns, relating to issues of gender equality. Focusing on how parasocial and physical interaction may impact the persuasive effects of VR, the research plan shortly elaborates on how the installation will be used for experimental studies into the possibilities of VR as a perspective shifter.

Keywords: VR · Media effects · Persuasion · Narrative interaction

1 Introduction

The VR experience that is demonstrated here is the first outcome of the *VR for Diversity* research project. The goal of *VR for Diversity* is to investigate the 'perspective shifting' affordances of VR by testing whether an interactive VR installation can have a positive impact on users' knowledge and attitude towards a topic. Our ambitions with the VR production *Amelia's Dream* are threefold: 1. it will be used for research into the effects of interactive virtual reality, 2. it enables the producers to experiment with the possibilities of volumetric video capture technology, 3. it will be presented to a general public at demo sessions and festivals, to inform them about the topic of gender equality. With this research project, we continue our investigations into interactive cinema and storytelling for VR [17–23].

2 The Concept: *Amelia's Dream*

Amelia's Dream is a VR experience that is filmed using volumetric video capture technology [6], in which the user enters the dream of a young woman. She will tease them a bit and have fun with her visitors, but also share some of her dreams and concerns. These concerns relate to issues of gender equality in contemporary society, focusing on how female politicians are confronted with online hate messages, how tools and articles are designed based on male standards and physique, and how female performers are often confronted with body shaming. To visualize her stories, the protagonist Amelia will be featured flying an airplane, reading online hate messages and performing as a ballerina.

Volumetric video capture technology enables the producer to experiment with the size of the character in relation to the user: while Amelia will sometimes appear to be of 'normal' size, she will also be featured in a much larger scale as her face appears behind a window, or much smaller when she performs as a miniature ballerina.

3   VR as a Perspective Shifter

Since the re-introduction of VR in 2014 there has been considerable attention to the possible positive effects of the medium, with many initiatives investigating the ways VR may be used to contribute to a better world. Big companies founded projects such as VR for Impact [24] and VR for Good [25] in which all kinds of installations were presented that explored the possibilities of VR to change attitudes or behavior among the audience. By 2021, a whole range of VR productions have been presented, that according to the Digital Catapult report on *Immersive Content Formats for Future Audiences* [1], can be included in the category 'VR as Perspective Shifter'. In most productions that fall into the category the user enters someone else's life circumstances, either via the simulation of inhabiting their body or by 'meeting' them. The result the creators aim for in their audience is a shift in perspective. This could be an invitation to reflect on a particular theme, contributing to a shift in world view, an increase in understanding, the fostering of empathy for a particular group of people, or simply a change in opinion or better understanding of an issue.

However, after analyzing a representative sample of 150 non-fiction VR titles released between 2012 and 2018, Bevan et al. [2] stated that the degree to which VR is capable of evoking emotional engagement and how audience members respond to content is far from clear. The authors claim that the biggest current challenge for VR content producers therefore is to recognize that providing an immersive 360° environment may in itself not be sufficient to make a viewer feel present in a story. The Digital Catapult report seems to underwrite this insight. It describes how in most of the installations that aim to work as a perspective shifter, the user rarely has any agency beyond looking around.

4   Interaction in VR

The early promise of VR was that it would allow audiences to experience and connect to reality in ways beyond what could be achieved with traditional two-dimensional film. In this vision, audiences would no longer be limited to being passive observers of the story; they could be embodied and feel present within the story world, potentially taking a much more active, interactive role. Bevan et al. [2] state that perhaps the greatest surprise of their exploration of non-fiction VR was that the amount of content that attempts to directly fulfill this ambition is actually very small. They conclude that in their sample the role of the viewer in VR was still mainly passive and observant, instead of actively participatory. Rose [12] has also pointed out that the potential for embodied interaction has not yet been widely adopted for non-fiction VR. She therefore claims that the possibility of VR as a medium that would enable the user to 'do something' within

the mediated world, instead of simply watching a troubling situation, could be exactly the distinctive feature that would allow us to think of VR as an experiential medium.

The term parasocial interaction is also defined as the 'pseudointerpersonal interaction' that occurs between mediated performers and their audiences [5, 7]. Mateer points out that the way viewers connect to characters in VR can be defined as social presence [10]. Cummings and Bailenson [3] state that the relationship between the immersive quality of a mediated environment and the level of (social) presence experienced by the user is often predicated on the assumption that greater system immersion causes greater user presence, which, in turn, enhances the applied effectiveness of the mediated environment. In their meta-analysis, they point out that immersive features such as the possibility to take action may be an important factor for users to perceive themselves as being located within a virtual space. In an overview of the literature around design for user engagement in virtual environments Sutcliffe points out that interactive features such as sliders, responsive objects and pop-up features allow the user to explore and control the virtual world and to become more "present" or immersed [16]. Hudson et al. [9] showed that immersion mediates the effects of interaction between users and the virtual environments with satisfaction and loyalty, supporting the notion that designing virtual environments with interactive features will lead to more immersive experiences. Based upon these insights, we hypothesize that physical and parasocial interaction can be expected to heighten the 'effectiveness' of a virtual environment.

5 Research Plan

With this installation, we aim to study a number of different concepts. During the experiments, the VR experience will be presented in two different versions: version A will be interactive, requiring the user to perform little tasks to move the narrative forward, such as opening a box to see the miniature ballerina, starting a sequence by pushing a button, or moving objects to facilitate the protagonist. In version B, the scenes will progress in the exact same way, but without user interaction. In this A-B test set up we intend to evaluate the user experience on the following dimensions, using scales that are based on the work of Roth and Koenitz [13]: social presence; spatial presence, agency/effectance, autonomy (perceived action possibilities), curiosity, enjoyment, satisfaction, (cognitive/emotional), empathy, affect and character believability. By comparing the outcomes for A and B, we hope to determine the impact of physical interaction in VR.

A second aim for our research is to verify the impact of eye gaze and attention: in some fragments the protagonist will look straight into the camera while sharing her stories, while in other fragments she will look in a different direction, for instance at her own reflection in a mirror. With this part of our research, we follow up on the work of Hartmann and Goldhoorn on the viewers' experience of parasocial interaction [8] and explorations into eye-gaze-based interaction for immersive virtual reality by [11]. The attention of the user will be operationalized by measuring head movement, which will enable us to determine whether mutual eye-gaze and shared attention leads to better story recall.

The third aim for our research is related to the persuasive impact of interactive VR. In their study into VR, presence and attitude change, Tussyadiah et al. [15] substantiate

the persuasive role of the medium, suggesting that the subjective experience of presence in VR can translate into real world attitude and induce behavioral change. With previous explorations into the persuasive effects of VR in the context of marketing and advertising in mind [14, 26], we intend to establish the user's knowledge and attitude towards issues of gender equality, before and after experiencing *Amelia's Dream*, to verify whether an interactive VR experience may have a persuasive effect on its users. For this goal we intend to implement items from the questionnaire as presented by Faddoul and Chatterjee [4].

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