

Work-In-Progress Paper: 360-degree immersive storytelling video to create empathetic response

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Abstract— Open days are organised by Universities to give potential students the opportunity to visit the University premises, talk to staff and student ambassadors and develop a sense of how it feels to study at a University something difficult to be conveyed via a prospectus. However, visiting open days requires investing time, travelling and can be expensive. The recent years there has been an increasing demand for open days to be delivered online. The social distancing measures imposed by the COVID-19 pandemic enforced this mode of delivery of open days as the only option. Many Universities created VR campuses to help students experience their campuses, but those fail to capture the actual vibe of a place and lack of empathetic response. New tools such as 360-degree immersive storytelling video (VR) and 3D interactive media present new opportunities for effectively delivering open days capturing not only a realistic representation of the place, but the actual feel of a place. This paper presents work-in-progress focusing on studying if 360-degree immersive storytelling video can create empathetic response. It achieves this by creating a 360-degree immersive storytelling video that effectively and realistically captures student life. This paper presents the project motivation, discusses the proposed research methodology, presents the research instruments and finishes with expected contributions to knowledge and future work.

Keywords— 360-degree immersive video, storytelling, branching narrative, empathetic response.

I. INTRODUCTION AND PROBLEM STATEMENT

Open days provide a vital insight for students and parents about the next step in their education and play important role in making an informed decision on which university to study. Open days offer the opportunity to visit the place (the University, as well as the local area), the Department, look at the facilities, talk to staff and student ambassadors, find out what is like to study there and get an accurate first-hand account of the university life. However, visiting open days require a great family effort and expense and they are time-consuming. Over the last few years there has been an increasing demand for open days to be delivered online. Universities have been creating VR campuses, videos and slideshows offering alternative ways of helping students experience their campuses. The social distancing measures imposed by the COVID-19 pandemic enforced this mode of delivery of open days as the only option.

New tools such as 360-degree immersive video (VR) and 3D interactive media present new opportunities for providing engaging and memorable solutions that could be used effectively for delivering open days. 360-degree videos, or immersive videos, or spherical videos, are panoramic video recordings using an omnidirectional camera, or a collection of cameras. 360-degree immersive videos place the user in

the scene by filling the viewers' entire field of vision and creating the illusion of presence [1]. The user/viewer have control of the viewing direction of the scene and they do not necessarily follow the director's frame shot, providing in this way a more personalised and realistic experience [2]. There have been successful examples of 360-degree video in businesses, events and trade shows. For example, the Thomas Cook Try Before you Fly campaign, showed that people who watched the virtual holidays were more likely to buy a holiday [3]. With YouTube and Facebook now supporting 360-degree video there is a potential of user engagement by placing the viewer at the centre of the story offering the opportunity for 360-degree videos to reach millions of people. 360-degree video coupled with storytelling and branching narrative [4] offers a unique opportunity for creating compelling, emotionally engaging and longer lasting impact to the audience by offering the opportunity to take an active role in experiencing the content and making them feel like taking part in the action and the narrative. However, apart from studying analytics data for views and visits of 360-degree videos uploaded through social media channels, there is not much information about the effect those videos have on users, nor on how to measure this effect. One such attempt is reported in the area of journalism looking at the empathetic response to certain short-form journalistic stories [5].

This work-in-progress project focuses on evaluating 360-degree immersive storytelling video for creating empathetic response. It uses as case study the effective creation of open day material that realistically conveys student life. Specifically, it builds a 360-degree immersive storytelling video capturing student day at the University of Westminster and it uses current students to evaluate if they empathise with the material and if those effectively and accurately capture a student day life at the University. The paper presents that project research questions and the proposed research methodology to address those questions. It describes the prototype that has been designed and the challenges we faced due to the unprecedented conditions imposed by the Covid-19 pandemic. The paper finishes by presenting the expected contributions to knowledge and future work.

II. RESEARCH QUESTION

The project is driven by the following research questions:

RQ 1 Can 360-degree immersive storytelling video can be effectively used to create user empathetic response?

Empathy is defined in the Oxford dictionary as “*The ability to share someone else's feelings or experiences by imagining what it would be like to be in that person's situation*”. Empathy in User Experience (UX) is the

ability to “fully understand, mirror, then share another person’s expressions, needs, and motivations”[6][7] (Fig. 1).

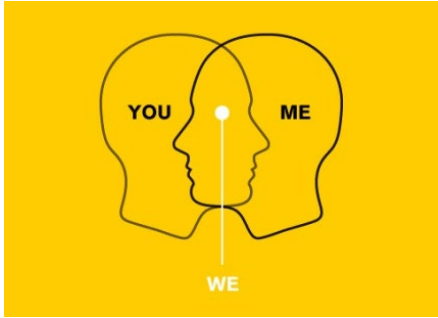


Fig. 1. The figure depicts empathy in product design meaning that designers should feel, give and receive unity with the users [8].

RQ 2 The effect of immersive and non-immersive format in creating a sense of presence, or producing a sense of connection, or emotional impact between users and story subjects in 360-degree immersive storytelling video.

This project is student led, funded by the “students as co-creators” project at the University of Westminster. The University’s objective of this project is to use knowledge gained to support the marketing team to effectively reach potential students, as well as support the effective creation of other digital resources with educational and social perspective and maximise their reach. The students are perfectly placed as designers in this project as they understand the user objectives of this project.

III. THE PROPOSED RESEARCH METHODOLOGY

The proposed methodology to study the aforementioned research question and address the project aims based on:

- a) building two 360-degree immersive storytelling video prototypes following a small group of students capturing their life experience at the University: (a) one where actors playing the students are recorded within the 360 video scene, this should lead to a more natural immersive experience (see Fig.2); (b) students’ experiences are integrated in the scenes as video interviews (see Fig.3);
- b) designing a procedure for the creation of the 360-degree immersive storytelling video follows the systematic approach suggested by the Immersive Video Interaction Design framework (iVID) and applying design guidelines for 360-degree immersive video experiences proposed by Argyriou [9];
- c) using students as designers to capture user requirements;
- d) measuring user satisfaction using the User Experience Questionnaire (UEQ)[10];
- e) evaluating immersive user experience by using the Immersive Experience Questionnaire (IEQ) [10] followed by an interview formed with questions created based on empathy mapping [7].

The following section presents the 360-degree immersive storytelling video prototypes that have been created to support this study and it discusses the challenges we faced for the implementation of the prototype due to the social distancing measures imposed by the pandemic.

IV. PROTOTYPE DESCRIPTION

Two 360-degree immersive storytelling video prototypes are being created to serve as research instruments facilitating the study. The use case is related to a student day life, so the material can be effectively used to support Open days. Video recording have been creating following a small group of students studying Computing at the University of Westminster. Recordings cover the entrance of one of the University campuses in central London, common areas where students meet and socialise, the library, lecture theatres and selective labs (see Fig. 2, 3, 4).

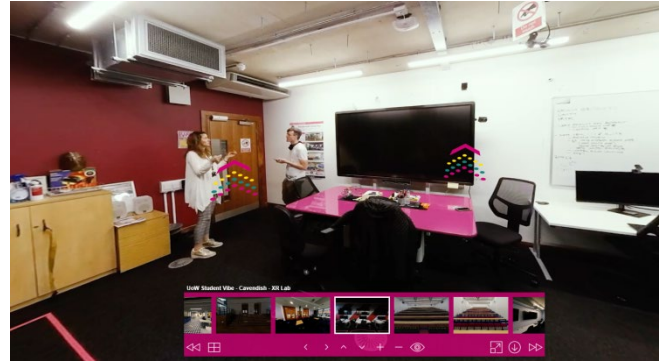


Fig. 2. Prototype A – capturing students within the scene as actors.

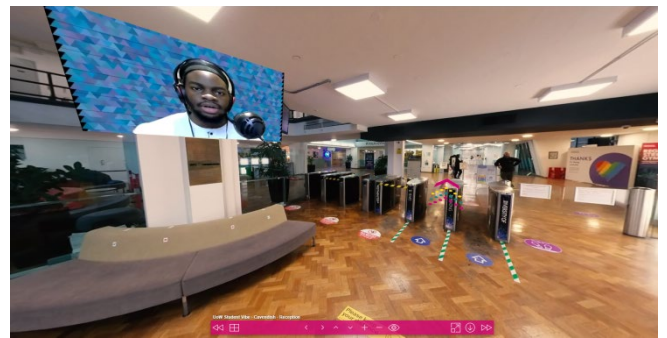


Fig. 3. Prototype B – integrating videos in the 360 scene capturing student interviews talking about their experience studying at the University.

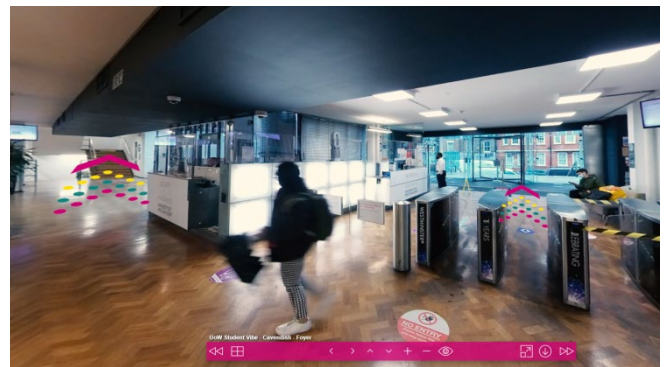


Fig. 4. Arrows allow navigation in different branches of the narrative.

The users can choose the angle to view the scene by moving the scene with their mouse if they experience it using a desktop browser, or by moving their head if they are using a head mounted display (HMD). The user can choose the order they want to visit the provided scenes and they can visit as many scenes as they like. Navigation is enabled by clearly located arrows in each scene (clearly shown in Fig. 2 & 4) and a menu integrated in all scenes that allows users to

navigate between next or previous scenes, or jump to a scene they want (clearly shown in Fig. 2). This menu enables also users to zoom in a scene's content.

To study the second research question and investigate the effect of immersive versus non-immersive format of 360-degree storytelling video in creating a sense of presence, connection and emotional impact two 360-degree immersive videos have been created:

- Prototype A – the branching narratives are created capturing actors playing the role of students within the 360 video scenes interacting with each other portraying their daily routine within the University (see Fig 2). Previous research has shown that the integration of actors within the scene captures users' attentions. In this study it will help us to evaluate if this design approach causes emotional response to users [9]. The branching narrative allows users to choose the order they want to experience the scenes, depending on the context and the students' dialogue.
- Prototype B - the branching narratives are created capturing the same environments as in Prototype A without the student actors. To capture student experience video recordings of student interviews talking about their experience studying at the University, using the physical spaces captured in the 360-degree videos have been embedded in respective scenes (see Fig. 3).

The 360 videos has been captured with an Insta360 Pro Spherical VR 360 8K Camera enabling very high quality video recordings. The 360 prototypes were implemented with krpano[12].

V. THE STUDY

This study evaluates how effectively and realistically 360-degree immersive storytelling video captures and conveys student life, creating empathetic response to the user. It also studies the effect of emotional impact of immersive and non-immersive format of 360-degree immersive storytelling video. We aim to recruit 80 participants to secure statistically valid results. The participants will split in 4 groups who will experience the prototypes as follows: Group 1 – prototype A in desktop browser; Group 2 – prototype A using HMD; Group 3 – prototype B in desktop browser; Group 4 – prototype B using HMD.

The participants will have to be current students at the University who can relate their day life at the University to the 360-degree immersive storytelling video created for this study and evaluate if it captures it realistically and truthfully. Those students will be asked to evaluate the accuracy of the prototype and evaluate their experience using the UEQ [10], the IEQ [10] followed by an interview formed with questions created based on empathy mapping [7]. The data will be analysed using statistical methods that could lead to significance of results.

VI. EXPECTED CONTRIBUTIONS TO KNOWLEDGE

The expected contributions to knowledge of this research impact the 360-degree immersive video educational, the user experience community as the study will:

- develop evidence based analysis evaluating if: 360-degree immersive storytelling video can be effectively used to create user empathetic response; immersive or non-immersive content or way of experiencing 360-degree immersive video experience affect user empathetic response;
- evaluate the use of iVID framework and Argyriou's 360-degree immersive video design guidelines to effectively create 360-degree immersive storytelling video that can create user empathetic response.

VII. CHALLENGES, DISCUSSION AND FUTURE WORK

The greatest challenge of this project was related to the social distancing measures imposed by the pandemic and the impact this had to the video recordings required for the creation of the prototypes to support the study. The University campus although open to allow the recordings it was not busy as usual to capture the real vibe of the place, as for this period of time the University operated with online learning. Thus, the recorded content did not capture what student life really feels and needs to be repeated. In addition although the actual study can be conducted remotely as the material can be accessed online, not all students that need to be recruited for the study may be familiar or have access to HMDs. Thus we need to wait until we are able to conduct the study in a lab environment where we can set the required conditions to support the recruited users to have a smooth user testing experience.

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