STUDENTS AS CO-CREATORS

A Disciplinary Research Collaboration

360 Immersive Storytelling

Artefact Link:

https://mattymattmatt.github.io/theVibe360/

Matthew Hollick,

Christian Acheampong,

Mahdi Ahmed

Daphne Economou

Jeffrey Ferguson

School of Computer Science and Engineering Academic Year 2020-2021

A STUDENTS AS CO-CREATORS PROJECT
UNIVERSITY OF WESTMINSTER

Table of Contents

A STUDENTS AS CO-CREATORS PROJECT
UNIVERSITY OF WESTMINSTER⌗

1. Introduction and Problem Statement

Open days provide a vital insight for students and parents about the next step in their education and play an 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 requires 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 more 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 has 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]. YouTube and Facebook now support 360-degree video increasing the 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 narratives [4] offers a unique opportunity for creating a compelling, emotionally engaging and longer-lasting impact on the audience through the users' active role in experiencing the content. Narrative creates this action of participation engaging the user more fully in the content. 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 journalism looking at the empathetic response to certain short-form journalistic stories [5].

2. Background & Aims

This project focused on evaluating 360-degree immersive storytelling as a tool for creating empathetic responses. 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 a student open 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 aspects of daily student life at the University. The paper presents 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.

The project aims are clearly defined by the two 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).
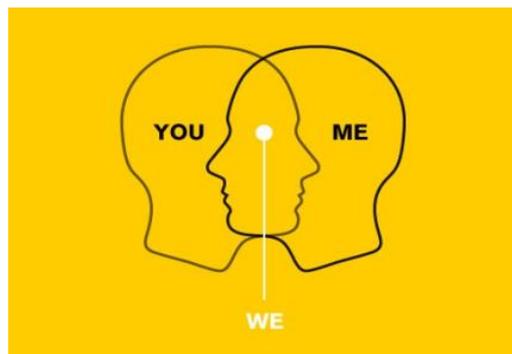
Fig. 1. The figure depicts empathy in product design meaning that designers should feel, give and receive unity with the users [8].

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.

3. Proposed research methodology

The proposed methodology to study the and forementioned research questions 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 studyand, and it discusses the challenges we faced for the implementation of the prototype due to the social distancing measures imposed by the pandemic.

4. 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).
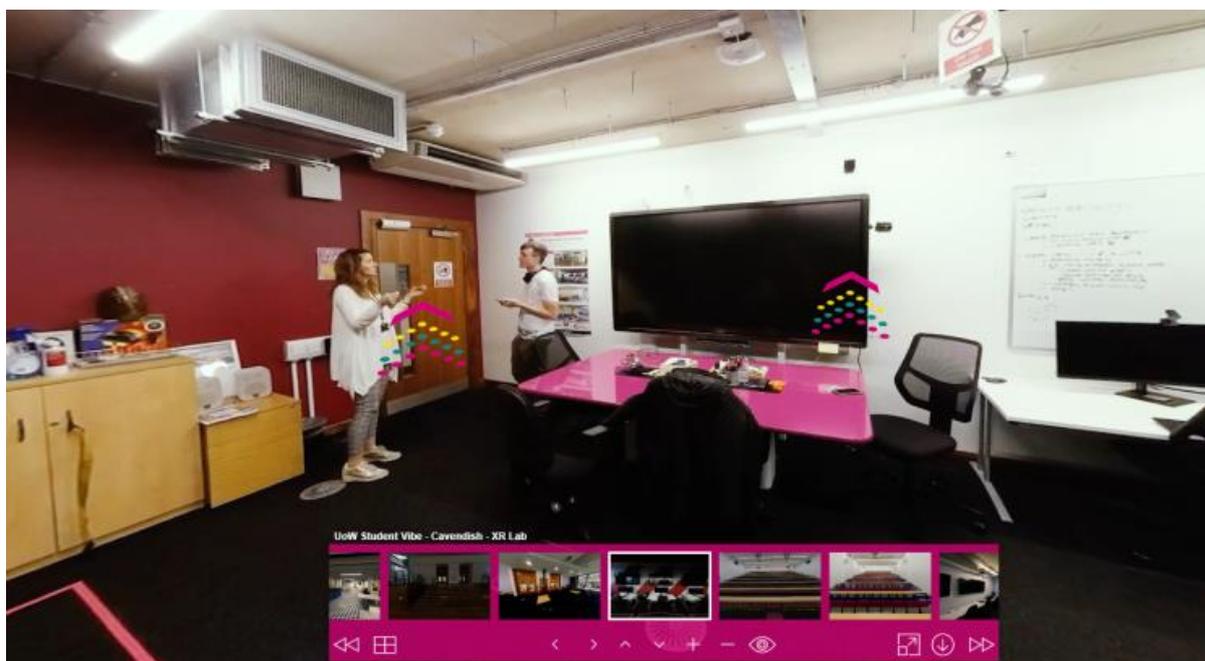
Fig. 2. Prototype A – capturing students within the scene as actors.

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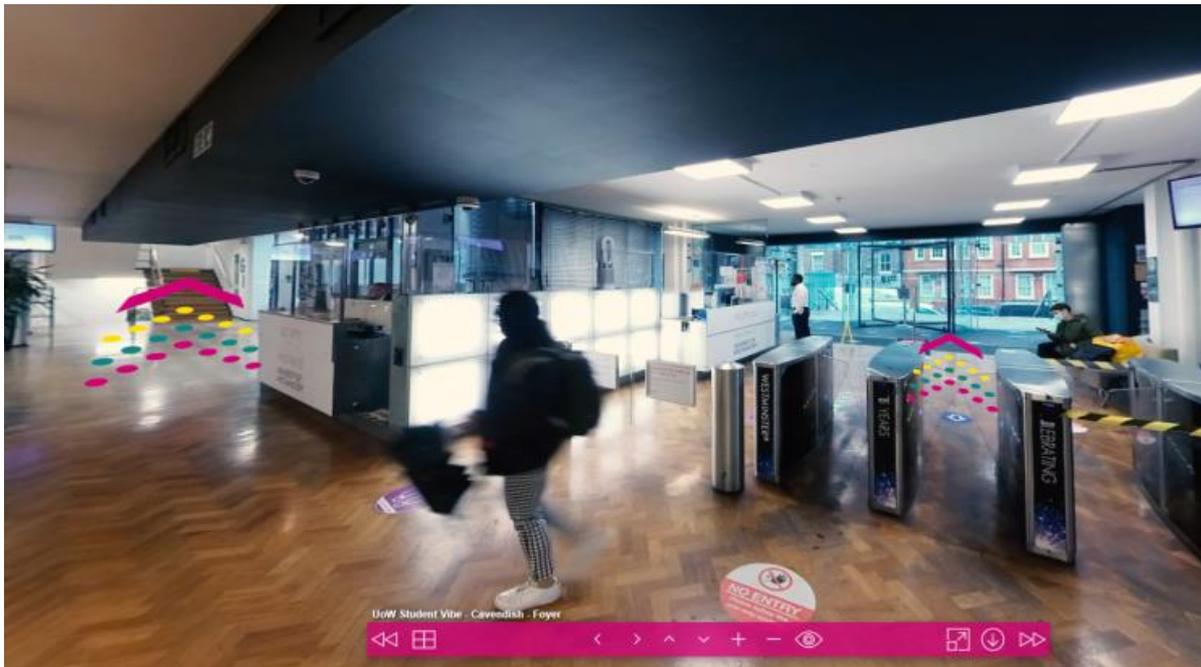

Fig. 4. Arrows allow navigation in different branches of the narrative.

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

A STUDENTS AS CO-CREATORS PROJECT
UNIVERSITY OF WESTMINSTER⌗

(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 also enables users to zoom in on 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 have been captured with an Insta360 Pro Spherical VR 360 8K Camera enabling very high-quality video recordings. The 360 prototypes were implemented using Krpano[12].

5. The study

This study evaluates how effectively and realistically 360-degree immersive storytelling video captures and conveys student life, creating an empathetic response to the user. It also studies the effect of the 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 a desktop browser; Group 2 – prototype A using HMD; Group 3 – prototype B in a 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.

6. Contributions & Challenges and Discussion

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.

The greatest challenge of this project was related to the social distancing measures imposed by the pandemic and the impact this had on the video recordings required for the creation of the prototypes to support the study. The University campus, although open to allow the recordings, was not busy as usual and fails to capture the real vibe of the place. During 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 needed and 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 for a smoother more comprehensive user testing experience.

7. Lessons Learned

The group has developed a deeper understanding of 360 interactive media and the extent to which it can be utilised to influence user decisions through empathy. It would have been a significant project if we had been able to derive qualitative and quantitative results from the study to highlight to what degree this is possible. In addition, as a group, we learnt a considerable amount in relation to the digital processing of 360 video and the requirements of rendering this content to the user over the internet.

There was a considerable amount of development that could be done in regard to an HSL server to service high definition frames of 360 video to the users. The project lacked expertise in this regard which jeopardised our ability to render the scenes to the user with enough clarity of picture and narrative flow to conduct our quantitative study.

8. Group Reflection

Upon reflection, it would be valid to say that this project was a success, but the degree to which this was a success could have been larger if the external conditions in which we executed this project were improved. Due to the volatile conditions, this pandemic has presented us, a lot of time was spent "pivoting" the project, leading to new problems arising. For example, with the current direction this project went in, to optimise the 3d environment for users, running it from an HSL server was needed. Furthermore, the new direction this project took led to the required skills being out of scope for the current capabilities of some of our team members, resulting in more time needed to upskill in parallel with the running of the project to everyone's schedule remotely.

9. References

[1] F., Nielsen, "Surround video: a multihead camera approach", The Visual Computer, 21, pp. 92–103 (2005).

[2] "Virtual reality in education and training", Ellicom Training Trends, 2017 [available online at: ellicom.com/blogue/ellicom/virtual-reality-video-360/, last accessed 14/02/2021].

[3] Thomas Cook Virtual Reality Holiday 'Try Before You Fly'[available online at: https://visualise.com/case-study/thomas-cook-virtual-holiday, last accessed 14/02/2021].

[4] C., Moser & X., Fang "Narrative Control and Player Experience in Role Playing Games: Decision Points and Branching Narrative Feedback.", in: Kurosu M. (eds) Human-Computer Interaction. Applications and Services. HCI 2014. Lecture Notes in Computer Science, vol 8512. Springer, Cham. (2014) https://doi.org/10.1007/978-3-319-07227-2_59

[5] A., Dan & F., Katharina, "Walking in Another's Virtual Shoes: Do 360-Degree Video News Stories Generate Empathy in Viewers?", Report, Tow Center for Digital Journalism, Columbia University, 2018.

[6] S., Gibbons, "Sympathy vs. Empathy in UX", Nielsen Norman Group, 2019.

[7] S., Gibbons, "Empathy Mapping: The First Step in Design Thinking", NN/g, 2018. [available online at: https://www.nngroup.com/articles/sympathy-vs-empathy-ux, last accessed 14/02/2021].

[8] M., Batagoda "Empathy and product design" 2017 [available online at: https://uxplanet.org/empathy-and-product-design-669d71236fb2, last accessed 14/02/2021].

[9] L., Argyriou, "Design methodology for 360-degree immersive video applications", PhD 2020.

[10]   User Experience Questionnaire [available online at: https://www.ueq-online.org/, last accessed 14/02/2021].

[11]   C., Jennett, A.L., Cox, P., Cairns, S., Dhoparee, A., Epps, T., Tijs, & A., Walton, "Measuring and defining the experience of immersion in games." International journal of human-computer studies, 66(9), 641-661, 2008.

[12]   https://krpano.com/hom