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

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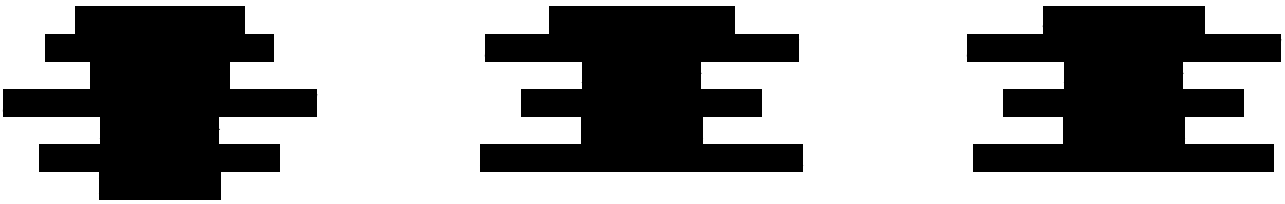
# 360-degree immersive storytelling video to create empathetic response



*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 which is difficult to be advertised via a prospectus. However, visiting open days requires investing time, travelling and it is expensive. The resent 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 project 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 and it evaluates this with real users. The paper presents the project motivation, aims and objectives, discusses the proposed research methodology, presents the research instruments and finishes with the expected contributions to knowledge and future work.**

***Keywords— 360-degree immersive video, storytelling, branching narrative, empathetic response (****key words****)***

## I. INTRODUCTION AND PROBLEM STATEMENT

Open days provide a vital insight for students and parents about the next step in their academic career 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 it's like to study there and get an accurate first-hand account of the university life. However, visiting open days require a great family effort, time-consuming and expense. 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 to create 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 the investigation of the analytics for views and visits of 360- degree videos uploaded through social media channels, there in not much information about the effect that these 360-degree videos are having 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 a student's day at the [redacted] and it uses current students to evaluate if they empathise with the material and if those effectively and accurately convey 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).

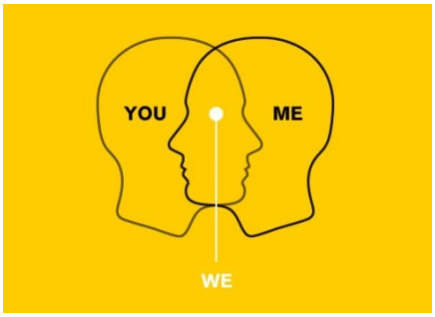



Fig. 1. The figure depicts empathy in product design means that designers should feel, give and receive unity with the users of the application [8].

*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 of the [redacted]. 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 Rsearch Methodology

This paper proposes a rigorous methodology to study the aforementioned research question and address the project aims:

a) it builds two 360-degree immersive storytelling video prototypes following a small group of students capturing their life experience at the University: (a) one where students are recorded as actors within the scenes; (a) students experiences are integrated in the scenes as video interviews;

b) the design 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 applies the design guidelines for 360-degree immersive video experiences proposed by Argyriou [9];

c) it uses students as designers to capture user requirements;

d) it measures user satisfaction by using the User Experience Questionnaire (UEQ)[10];

e) it evaluates 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 those serve as research instruments to support 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 [redacted]. Recording cover the entrance of one of the University campuses [redacted] common areas where students meet and socialise, the library, lecture theatres and selective labs (see Fig. 2, 3, 4).

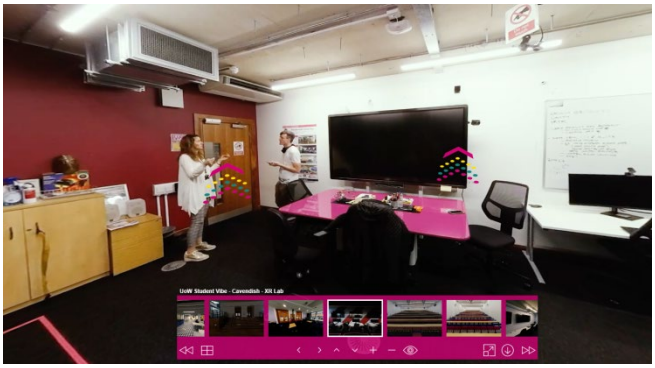


Fig. 2. Prototype A – capturing students within the scene as actors.

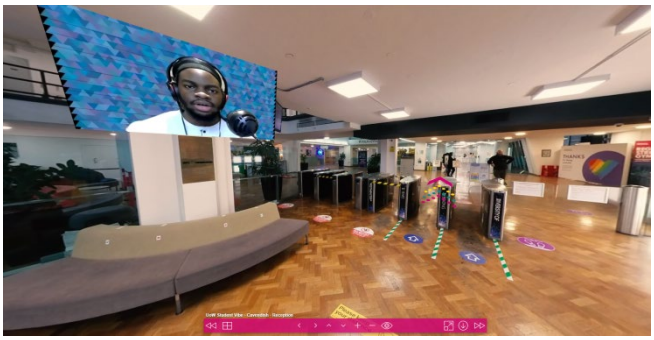


Fig. 3. Prototype B – capturing students expeience as videos integrated in the 360 scene.

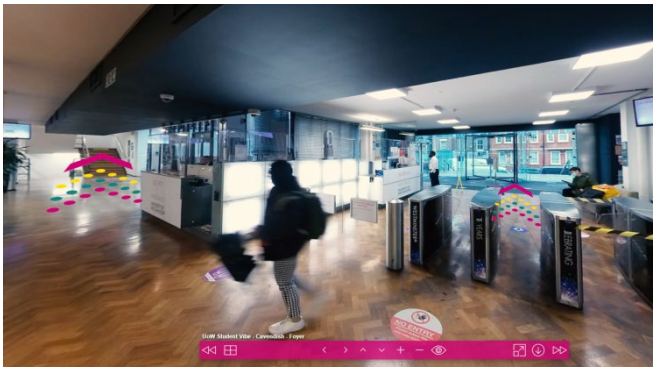


Fig. 4. Arrows allow navigation in different story branches.

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 allow users to go to the next or the previous scene, or to jump to the 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 immersive 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 students within the scene as actors interacting with each other portraying their daily routine within the University (see Fig 2). Users can choose the sequence they want to experience based on the branching narrative, 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 in those areas, video recording of student interviews have been embedded in the 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 360-degree immersive storytelling video captures and realistically 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. 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;
- develop evidence based analysis evaluating if 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 us 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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