Accessible Immersive Learning in Art and Design

an Erasmus Strategic Partnership

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Case Study

A Beginner's Guide to Teaching (with) Immersive Technologies

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Contents

1. Case Study aims:

As per the aims of the Accelerate project, the broad aim of this Case Study is to document and reflect on the potential of immersive technologies as part of Art and Design learning, with a particular eye on experimentation and exploring of the creative possibilities of immersive technology as part of a university learning and teaching settings.

Specifically, the focus of this Case Study is to consider and recommend effective pedagogic practices for teaching a module both *about* and *with* immersive technologies, specifically for the benefit of lecturers looking to experiment with these technologies for the first time.

The development of a level 6 (20 Credit) Immersive Media module aims to equip students to harness immersive media technologies such as virtual and augmented reality as emerging forms of media communication, marketing, and inclusive audience development. The immersive industry is growing at a fast pace, with over a billion augmented reality (AR) users and 200 million virtual reality (VR) users worldwide. In a communications setting, particularly, research tells us that consumers are far more likely to respond to advertising that makes use of immersive technologies as part of their marketing strategy. At the same time, the likes of VR and AR have proven to offer more inclusive ways of engaging media audiences. In response, this module provides an understanding of the emerging role of these kinds of immersive technologies across the contemporary creative and cultural industries, based on the latest research and cutting-edge R&D emerging from Bath Spa University's multi-million-pound innovation projects: The South West Creative Technology Network, the Bristol+Bath Creative R+D Partnership, and MyWorld. The module equips students to create augmented reality content, utilising open-source digital tools. Students will gain an added insight into the behaviours of immersive and creative technology audiences, learning innovative and research-informed strategies for communicating new ideas through new forms of immersive media technologies. As part of the delivery of the module, students are also given the opportunity to experience a lecture and workshop inside Mozilla Hubs, an open-source immersive platform, as well as to try out top of the range Oculus VR headset (as provided through the Accelerate project).

In line with this central aim, there are three strands to this Case Study:

1. What kinds of **teaching and learning methods** might be utilised when introducing students to the world of virtual and augmented reality experiences? What kind of **pedagogic practices** can be utilised using these immersive technologies, and what, in turn, do these technologies offer to students in terms of teaching and learning?

2. What is the value of using **online open-source immersive platforms** such as

Mozilla Hubs as part of university-style lecture and workshop delivery? How might such platforms be utilised alongside traditional in-person teaching delivery methods?

3. What form should an **immersive technology-led summative assessment** take, particularly for students new to these technologies? And how can **immersive technology-led student projects** open up solutions to accessibility challenges?

2. Methodology:

The methodology for the Case Study is based on standard module design principles combined with approaches from practice-based research to inform the proposed summative assessment item. Research insights also fed into the methodology.

As part of the development of the Case Study, consultation with University of the Arts London colleagues involved online discussions and at Accelerate events about the pedagogic potentials of immersive technologies. Specific discussions involved a focus on augmented reality (including the sharing of projects led by each institution) as well as the value of Mozilla Hubs in teaching and learning. These discussions fed into the design of the module.

2.1: Teaching VR and AR experiences to students new to these technologies

With regards to Q1, a session was devoted to giving students the opportunity to try the university's Oculus VR headsets. This was a structured session whereby students took it in turns trying out three VR experiences: *Invasion!*, an Emmy-winning family VR short film narrated by Ethan Hawke; *Mission: ISS: Quest*, a VR game where users take a trip into orbit and experience life on board the International Space Station; and *Notes on Blindness*, a VR documentary taking users on an emotional journey into a world beyond sight.

These three experiences were designed ideal for newcomers to VR, since they represent different media approaches to VR (film, game, documentary), as well as different formats within the medium of VR itself: e.g., an Activity Simulator (what Catherine Allen and Dan Tucker (2018) describe as a VR or AR experiences that 'entertain, inform or educate by presenting a simulation of an experience one might have in real life'); a Short Fiction ('invites users to experience more classic stories that are told in an immersive way' (ibid., 2018)), and a Perspective Shifter ('aims to change user attitudes and values, often by enabling them to enter another person's body or experience a slice of another's life' (*ibid*.))

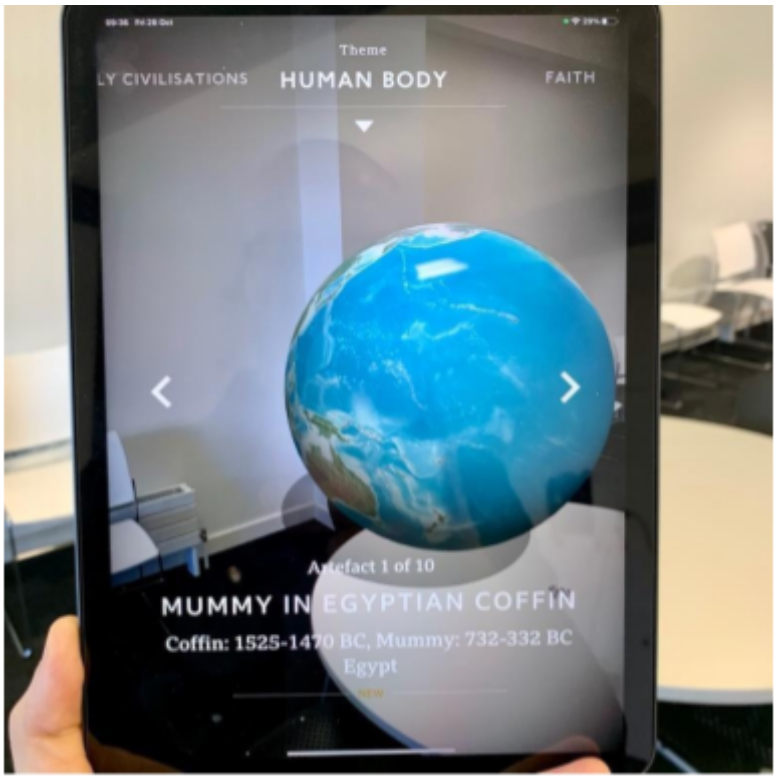
BSU student Daisy Hadley trying out VR

The experience of this VR content was framed alongside a central question for students to consider: to what extent should virtual reality be considered a new medium, one that comes with new categories, formats and genres? Students were therefore asked to consider this question when inside the headset, as well as to reflect on the session's research-led provocation: that is, that VR's storytelling power is often profoundly philosophical by nature, having the potential to transform how we see the world around us as well as those closest to us (Freeman, 2020). To enable students to reflect on this question, they were introduced to research suggesting that VR can be best understood in terms of psychological concepts, namely VR as 'empathy machine', VR as 'context effect', and VR as 'flow state'. Chris Milk introduced the idea in 2015 that VR is a medium best understood as that which affords users to step inside the shoes – and thereby the minds – of other people, and the immersive nature of VR is arguably more successful than, say, film at triggering an empathetic response from audiences (Milk, 2015). Context effect, meanwhile, is an aspect of cognitive psychology that describes the influence of environmental factors on one's perception of a stimulus. Context affect is known to alter the perception of an artwork: for example, a piece of art presented in a museum setting is far more likely to be rated as more interesting than if it were presented in, say, a lab setting. Some have suggested that the act of placing users inside a VR experience has the potential to change perceptions, too.

Meanwhile, in positive psychology, a flow state (also known colloquially as being 'in the zone') is the mental state in which a person performing some activity is fully immersed in a feeling of energised focus, full involvement, and enjoyment in the process of the activity. Some suggest that immersive experiences are capable of generating this state of mind.

These three conceptions framed the way that the VR demo experience was delivered, before a group discussion took place at the end of session, prompted by these questions:

- Which of the three experiences was your personal favourite – and why?
- How did each of the three experiences make you feel? Can you characterise the emotions you felt in each case, e.g., relaxed, thoughtful, anxious, in awe?
- Did you feel more or less engaged than, say, when watching a Netflix series? Why?
- Does the concept of 'empathy machine' still seem like a suitable way of judging VR?
- Does the concept of 'context effect' still seem like a suitable way of judging VR?
- Does the concept of 'flow state' still seem like a suitable way of judging VR?
- Ultimately, to what extent do you agree with the idea that VR – as a medium – is best understood as that which can transform how we see the world around us?



Civilizations AR app

A very similar approach was taken when teaching students about the world of augmented reality experiences, this time introducing students to key concepts before asking students to download specific AR apps and having a full- group discussion. Key concepts included 'playground effect': in marketing, research shows that the use of immersive technologies such as AR filters during the early stages of the customer purchase journey (i.e., when customers are still searching for a specific purchase solution) can influence not only the level of customer creativity, but also the anticipated satisfaction from the creative solution itself (see Hilken et al, 2017). In marketing, this is called the 'playground-effect' of the customer's AR-enabled creativity, in reference to how physical playgrounds allow safe exploration and playful creativity. The ensuing discussion revolved around the following two questions:

- How does AR enhance the historical and educational ambitions of the projects?
- Based on these apps, is there anything that AR can offer historical and educational projects that cannot be achieved using more traditional media?

Dinosaurs 4d+ app

Civilizations AR app

2.2: The value of Mozilla Hubs as a mode of lecture and workshop delivery

With regards to Q2, an entire week of teaching took place online via Mozilla Hubs. The session was framed as an exploration of what online open-source immersive platforms like Mozilla Hubs can accomplish in terms of university-level teaching and learning. Mozilla Hubs is a VR chat room designed for every headset and browser, but it is also an open-source project that explores how communication in mixed reality can come to life. Anyone can step inside one of the pre-built virtual rooms or they can build one from the ground up. This session was devoted to exploring the value of Mozilla Hubs as a tool for delivering university-level lectures and workshops, running alongside in-person module delivery.

This Is Your Country Too in Mozilla Hubs

To facilitate the session, we used a real- world R&D project as the VR chat room called *This Is Your Country Too*, designed by Avin Shah. *This Is Your Country Too* is an Arts Council-funded project that manifests as a 3D storyboard published on Mozilla Hubs and is an adaptation of the BBC radio play of the same name. The project asks: How do we write more diverse VR gaming experiences with more dramatic storytelling? It is a push for a new kind of collaborative model for immersive storytelling, one where VR designers, writers and theatre actors

BSU student Ella Cooms trying out AR

all come together inside a virtual space and co-design the storytelling experience.

In terms of delivery, the session in Mozilla Hubs thereby served simultaneously to introduce students to a Mozilla Hubs case study whilst being asked to reflect on the value of learning about this case study whilst inside Mozilla Hubs itself. In other words, what does being inside Mozilla Hubs add to the act of learning about a Mozilla Hubs-based project?

2.3: Designing an immersive technology- led summative assessment

With regards to Q3, the following summative assignment brief was formulated for the students to do:

> *This Assessment sees students working in groups to design, produce and promote an Augmented reality trail aimed at students and running across a university campus. The chosen group projects will be based on the most popular student pitches from Week 6, when students present their idea for a new AR trail based on their earlier research and reflections documented in their Research Blog. The focus of the AR trail can be wide-ranging but must operate as some kind of educational and/or entertainment experience for students. The purpose of the AR trail is to experiment with the potential of AR technology to communicate messages to audiences.*
>
> *All students will be trained in building AR content, e.g., Adobe Aero, and must work as a group to produce a range of immersive media content that functions coherently as a single trail. The AR trail should focus on a defined subject, have a clear aim and message, and should be carefully designed as an immersive storytelling experience. The trail will run as a live AR experience across some part of Newton Park campus, and all students must deliver a walkthrough of their AR trail to their peers, using this time to present their observations and reflections about how their AR trail was shaped by the research, analysis and insights published in the Research Blogs.*

Since this project will indeed run as a live AR trail, students are also expected to design and produce a suite of marketing content in order to promote the AR trail to fellow students. Students should use the R&D insights of Immersive Promotion Design (to be taught on the module) as key inspiration for this marketing content.

The scale of the AR trail will vary and depends on group size. But as a general rule each student should take responsibility for producing the following materials:

- *One 'trigger image', e.g., a poster, to be positioned around campus and which works to launch your piece of augmented reality content.*
- *One piece of augmented reality content, e.g., a video, a set of images, a piece of audio, a 3D asset, which functions as part of a larger AR trail.*
- *One piece of marketing content, e.g., a short trailer, a set of posts for a social media channel, intended to promote the AR trail to fellow students.*

Collectively, everyone in the group should work together to ensure that each of these materials are co-designed as a single AR storytelling experience.

Augmented Reality Trail Marking Criteria:

1. *Design: Coherence of the overall AR Trail as an immersive storytelling experience, one that considers the relationship between physical and digital environments.*
2. *Innovation: Attempt to experiment creatively with the power of AR technology to promote a message in your own piece of AR content and its trigger image.*
3. *Walkthrough: Professional in-person walkthrough presentation, with observations and reflections on how the AR trail was shaped by research, analysis and insight.*
4. *Marketing: Quality of marketing content to promote the AR trail to students, demonstrating an understanding of the challenges of communicating immersive media to audiences*

3. Findings:

The following represents a summary of the successes and challenges of the module:

3.1 Successes and challenges

Teaching VR and AR experiences to students new to these technologies

With regards to Q1, it is first worth noting that, out of 14 students enrolled on the module, one 2 had previously experienced virtual reality before. All 14 had experienced some form of augmented reality prior to the module, even if that was simply an Instagram AR filter.

As such, the cohort of students in question required an introduction to immersive media: this included sharing research insights relating to immersive audiences, key trends across the sector, approaches to categorising different kinds of VR and AR experiences (e.g., genres, formats), and – perhaps most centrally in terms of the main aim of the module – concepts prompting a discussion about to what extent immersive media should be deemed a new medium in its own right. Prompting this discussion, for example, were creative workshops asking students to pitch an adaptation of *The Three Little Pigs* story for virtual reality, or to mock-up a theatre-style set plan for a scene from an analysed VR experience, focusing on how to build in a suitably VR-like sense of audience interactivity that affords narrative choice linked to the different kinds of audience roles available in VR. See below

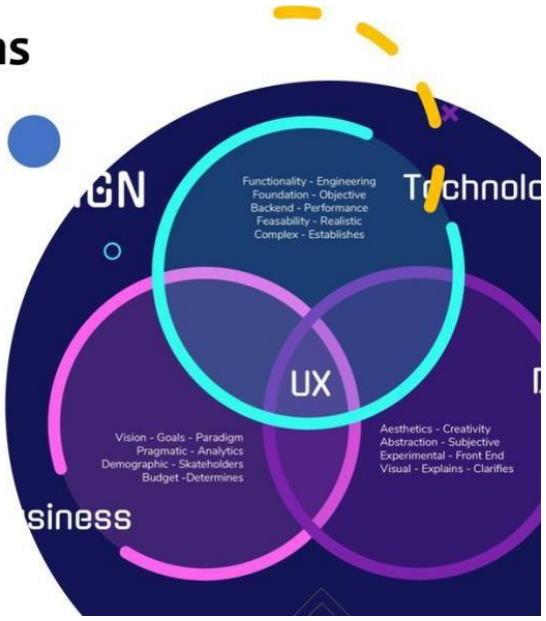
Task: Immersive storytelling task – adapting The Three Little Pigs for VR

Workshop Task 1 – 15 mins

In groups, map out all the demographics, personality types and interest areas that you think VR is capable of appealing to.

For example, you might think VR appeals to male video-gamers, but what characterises this person – love of play, competitive? Who else might VR appeal to – thrill seekers, those wanting to escape reality? Does VR only appeal to 'players' – what about more passive audiences more interested in sitting back and watching films and TV shows?

Map these characteristics as a venn diagram.



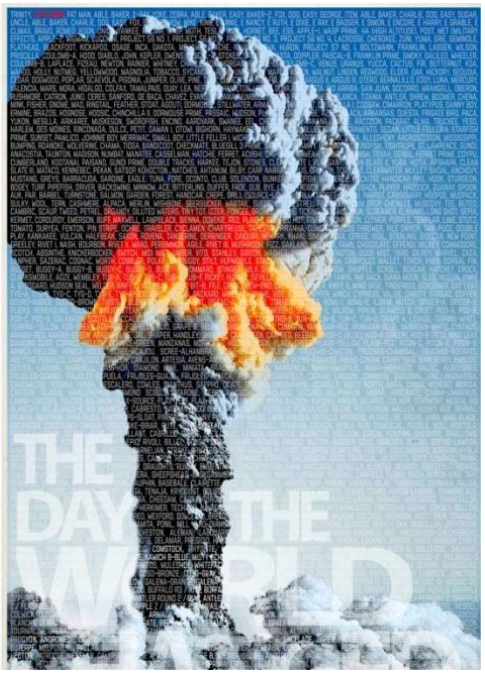
Task: Immersive audiences – mapping demographics for VR

Workshop Task 2 – 20 mins

In groups, design a theatre-style set plan for a scene from The Day the World Changed VR Experience.

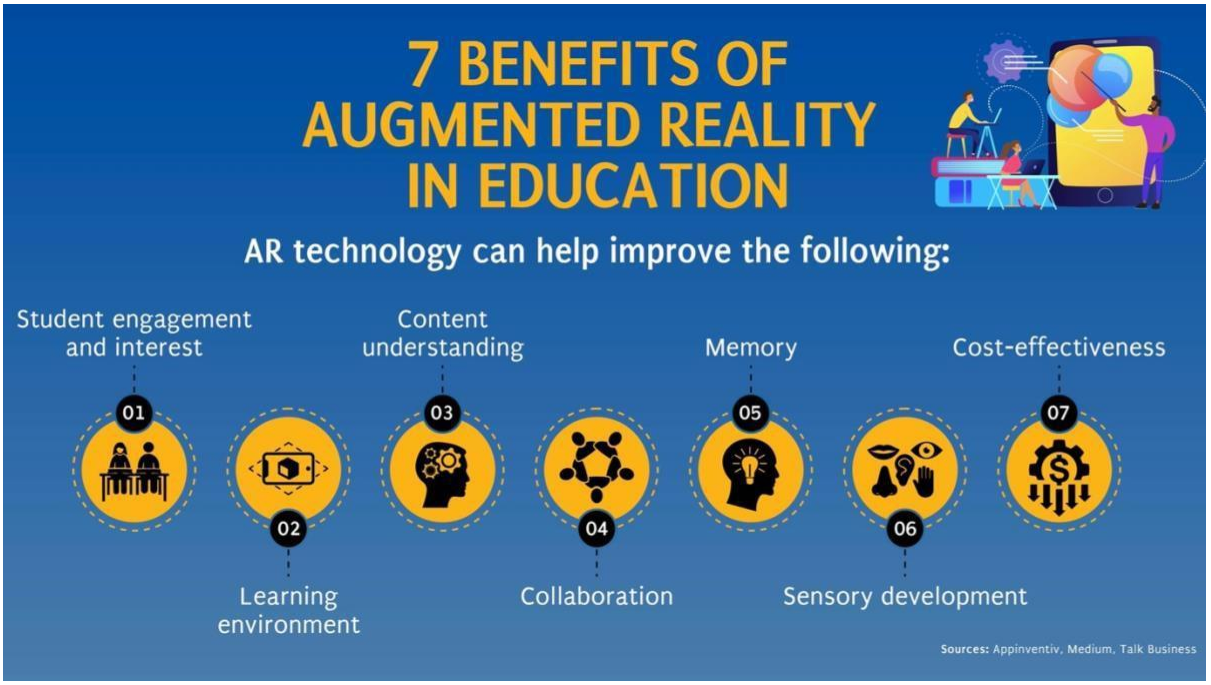
As part of this set plan, you should consider:

- What is your planned **audience role** within this VR experience and how will your set design and narrative choices reflect this audience role? (Think back to last week as well as your venn diagram)
- What kind of storytelling choices can you offer that will allow the audience to fulfil this role?



Task: Immersive space – designing a narrative setting for a VR scene

In short, when teaching a module on Immersive Media, especially to students largely unfamiliar with immersive technologies, it was key to balance different kinds of learning styles and activities, spanning research-based, audience-based and narrative-based perspectives. This allowed students to bring past knowledge into their study of VR/AR. Meanwhile, when integrating VR and AR experiences into the teaching of the module, what became apparent was that students immediately responded to the joy of this technology, serving to engage them fully. Beyond this sense of novelty, students also demonstrated several of what have been seen to be the key educational benefits of learning with AR, namely increased student engagement and interest, collaboration, and understanding:



7 Benefits of AR in Education

3.2. Student Evaluation:

The value of Mozilla Hubs as a mode of lecture and workshop delivery

In terms of learnings relating to Q2, part of the taught session in Mozilla Hubs involved gathering direct feedback from the online-immersed students about the future value of Mozilla Hubs as a learning and teaching platform. Below is a summary of the feedback:

Theme 1: A step-change in online lecture delivery

The first notable theme was the highly enthusiastic response from students in terms of the potential value of Mozilla Hubs as an alternative platform for delivering online lectures. The students in question are Level 6, meaning that their Level 4 university experience was affected by Covid-19 and saw much of their learning take place via Blackboard Collaborate.

As such, Mozilla Hubs was seen as a positive step-change should online teaching return:

- "*This would have been waaaaaaayyy better than just a standard video call like Collaborate or Zoom*."
- "*I think because it's more interactive it has less other typical distractions less of an issue, like going on your phone*."
- "*I think it's more visual and far more engaging than just watching the same screen throughout a lecture*."

Many of the students highlighted the idea that Mozilla is not only a more fun platform for online teaching delivery, but one that affords a more creative learning space that can, if designed appropriately, spark different ways of learning: "I like having an unrealistic environment rather than just remaking something like a classroom that you could have sat inside in real life anyway." … "Maybe from a learning point of view it could be useful for recreating historical events? You could roleplay characters and even mock-up new places."

Theme 2: Concern over conform and technical capability

However, a second notable theme was initial concern over the technical requirements of navigating Mozilla Hubs, as well as the related sense of not feeling entirely comfortable:

- "I like the interactive features like being able to fly, but I think this might have been confusing in my first year if I was doing lectures in here."
- "I like the interactive features too, but I don't have as many controls on my iPad, like I cannot fly."
- "It's definitely easier for those familiar with gaming controls – I've spent most of the time figuring out how to move around without walking into walls."
- "It's very strange at first, it didn't feel real."
- "I don't think it matters where it is – being virtual is such a shift no matter what environment you're in."

This Is Your Country Too in Mozilla Hubs

This Is Your Country Too in Mozilla Hubs

3.3 Key Learning: Designing an immersive technology-led summative assessment

In terms of learnings relating to Q3, a number of key insights emerged from teaching students the basic of AR content creation and producing an AR Trail across the university:

1. *Combined learning*

Augmented reality-based teaching has the potential to replace the old and obsolete techniques and textbook based reading. However, for beginners, educators should start with using a combined approach for both the AR-based learning and classroom-based learning. For example, the AR-based classes can be combined with worksheets and assessments to be able to get a clear comprehension of what the student learned. Equally, for the AR Trail assessment, students were asked to – and partly assessed on – their ability to think through the complex relationships between the physical and the virtual space and to design their AR experience across this liminal space, bringing real and unreal together.

2. *Interactive sessions… from anywhere*

As established, AR-based classroom lessons make the students more interactive. When they are able to understand more, they are also able to think beyond the horizons of the classrooms. In turn, the most fascinating part about this application of AR is that one does not need to be physically present in a set location so as to be able to get the topics we need not be in contact with or need contact or need not be in any educational or a school setup to be able to learn. We also saw this kind of benefit via the use of Mozilla Hubs, which ran outside the classroom.

3. *Grasping complex concepts*

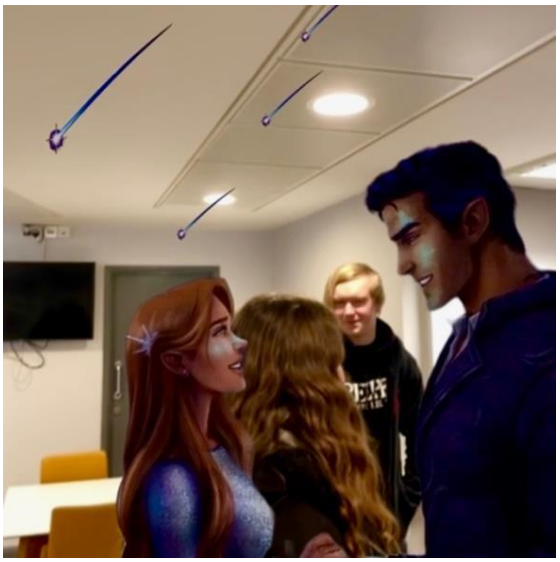
Interactive classes can turn student engagement high in terms of models and illustrated images and contents. Those content and images can help the students to understand and have an in-depth knowledge about the concepts which are generally hard and unclear to all the unexplained ways if explained by reading. For example, it became apparent during the delivery of the AR Trail assessments that students felt more comfortable delving into subjects such as the cerebral nature of immersive technologies and even challenging subject matters like mental health and ADHD in the context of education and reading projects.

Below I present visual documentation of the two AR Trail assessments emerging from the module. The first is a Library-set project that brings to life the pages of fiction using AR, aiming to support readers with particular learning difficulties unable to imagine the worlds of fiction. The second is an AR ghost story taking place across Newton Park campus, utilising AR as a tool for communicating the unsettling presence of ghosts, each sharing personal stories.

Both projects integrated physical media, such as bookmarks, posters and guidebooks.

AR Library Project

Still from Student AR Assessment: Library Project



Still from Student AR Assessment: Library Project

Still from Student AR Assessment: Library Project

Still from Student AR Assessment: Library Project

Still from Student AR Assessment: Library Project - Court of Wings

Still from Student AR Assessment: Library Project - Court of Thorns

AR Ghost Story

Still from Student AR Assessment: Ghost Story

Still from Student AR Assessment: Ghost Story

Still from Student AR Assessment: Ghost Story

Still from Student AR Assessment: Ghost Story

4. Recommendations

The following three recommendations emerge from this Case Study in relation to our aim to recommend effective pedagogic practices for teaching a module both *about* and *with* immersive technologies for the benefit of lecturers and students new to these technologies:

1. In terms of what kinds of teaching and learning methods might be utilised when introducing students to the world of virtual and augmented reality experiences, it is key that educators balance different kinds of learning activities in order to allow all learners to feel comfortable and confident when trying to make sense of the emerging nature of immersive technologies. Depending on the learning outcomes of the module, of course, these activities might be research-based, audience-based or narrative-based perspectives, as well as technical-based, where relevant. This balance aligns with well-established pedagogic theory suggesting that incorporating a range of teaching methods will better serve learners with different needs, similarly, the balance of digital (i.e., immersive technology-based) activates and more traditional, physical and in-person teaching saw students demonstrating several of what have been seen by researchers to be the key educational benefits of learning with AR, namely increased student engagement and interest and creative collaboration.

2. In terms of what the value is of using an online open-source immersive platform such as Mozilla Hubs as part of lecture and workshop delivery, it is undeniable that students found this platform to be a genuine step-change in terms of online teaching, especially given their past experience of Blackboard Collaborate and Zoom or Google Meet during the Covid-19 pandemic. Engagement and interest certainly increased by using Mozilla Hubs, as did a sense of play and creative thinking on the part of the students. However, there remains concern over technical requirements amongst some students, as well as a sense of not feeling entirely comfortable. Of course, not feeling immediately comfortable in immersive experiences is nothing new, and educators can remedy this concern by providing all students with very clear joining instructions as well as by designing a semi-structured session that, while affords play and creativity, is designed to guide students from one task to another.

3. In terms of what form an immersive technology-led summative assessment should take, particularly for students new to these technologies, it is key that educators encourage students to think carefully about the role of immersive technologies. In other words, why use immersive technology as part of a project – what does its incorporation add that wouldn't be possible without it? Teaching students all

aspects of what defines immersive technology as a medium (i.e., its sense of presence, liminality and embodiment, as well as its approach to story, interactivity, and even its philosophical potential to allow users to rethink how they see the world around them), is central to students understanding how and why immersive technologies can be used. Equally, designing marking criteria that assesses students on these range of factors (not just on technical elements), creates for a well-rounded brief that supports experimentation. For me, this included assessing (i) design, i.e., coherent of the storytelling across the AR Trail, (ii) innovation, i.e., experimentation with the power of AR, (iii) walkthrough, i.e., professional presentation of the AR Trail, and (iv) marketing, i.e., quality of marketing content to promote the AR Trial.

5. Next steps

It is hoped that university lecturers keen to learn how they might make use of immersive technologies and platforms in their day-to-day lectures and workshops will find this Case Study valuable. Delivering the new Immersive Media module on the Media Communications degree was a learning curve, but one that was very rewarding for staff and students alike.

Next steps will be to experiment with how immersive technologies can be integrated into a greater number of weekly workshop tasks (not just those where the specific technology was the focus), developing new strategies for making use of, for example, AR apps and Instagram filters within a diverse range of lecture topics. Equally, another next step will be to go further with the use of Mozilla Hubs, for example by organising a cross-university workshop session where students from multiple courses collaborate within a VR chat room

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Freeman, Matthew, Lammiman, D, Norrington, A, Smyth, N and Allen, C (2020) 'Immersive Promotion Bible', Immersive Promotion Design. Available at: https://www.immersivepromotion.com/immersive-promotion-bible

Resources

Civilisations AR. Available via Google Play: https://play.google.com/store/apps/details?id=uk.co.bbc.civilisations&hl=en&gl=US&pli=1
Dinosaur 4D+. Available via Google Play: https://play.google.com/store/apps/details?id=com.OctagonStudio.ARDinoVR&hl=en&gl=US
Invasion! Available via the Oculus store: https://www.oculus.com/experiences/rift/864116003696703/?locale=en_GB
Mission: ISS: Quest. Available via the Oculus store: https://www.oculus.com/experiences/quest/2094303753986147/?locale=en_GB
Notes on Blindness. Available via the Oculus store: https://www.oculus.com/experiences/quest/1946326588770583/?locale=en_GB
Super You AR. Available via the App store: https://apps.apple.com/us/app/super-you/id1511177538
The Day The World Changed VR. Available via Vimeo: https://vimeo.com/266724374
This Is Your Country Too. Available via Mozilla Hubs: https://hubs.mozilla.com/LaxA4Fn/enchanting-vibrant-park

BSU student Erin Dunn trying out VR

BSU student Theo Elderfield trying out VR