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Immersive Environments for Absolute Beginners

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Abstract. This presentation outlines a simple approach which focuses on small 'elements of immersion', such as 3D models, 360 photography and augmented reality. We outline how to review existing work and 'scatter' small elements of immersion throughout this. This adds value to work already completed and allows students to sample it in a new, more immersive, way. The aim is to show educators and content creators how to start using immersive techniques without embarking on large, complex, projects.

Keywords: Immersive Environments, Virtual Reality, Augmented Reality.

1 Background

A new wave of affordable Virtual Reality (VR) technology allows us to engage learners like never before. We can capture our environment using 360-degree photography, immersive video and 3D scanning. Create experiences using VR headsets. And combine the real world with the virtual using augmented reality.

But if you haven't previously used these techniques then getting started can seem daunting. This presentation shares our initial experiences of developing immersive materials for distance learning MSc courses.

We introduce some of the technology, resources and approaches that have shaped our thinking over the last 12 months with a view to encouraging others new to immersive environments to take their first steps.

2 Aim

In simple terms, immersive environments can be defined as a simulation that gives the sensation of physical presence. Loomis et al. explains; "Immersive virtual environments are virtual environment systems that amplify the effect of simulation by surrounding the user with numerous layers of sensory and perceptual information created by digital devices" [1].

Such words conjure up a vision of learners using specialised hardware to explore a vast virtual world. This is truly impressive, but for many educators, the opportunity to develop such material is out of reach. Creating large immersive environments are

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complicated projects. A wide range of skills are required to achieve this [2]. And these projects consume time, people and money, with typical costs ranging from £20,000 - £150,000 [3]. So, as a beginner, how can we take our first steps into this new world?

This presentation outlines a simple approach which focuses on small 'elements of immersion', such as 3D models, 360 photography and augmented reality. We outline how to review existing work and 'scatter' small elements of immersion throughout this. This adds value to work already completed and allows students to sample it in a new, more immersive, way. The aim is to show educators and content creators how to start using immersive techniques without embarking on large, complex, projects.

3 Method

The method we devised outlines how immersive environments can be explained in simple terms of 'objects' and 'places'. If we can identify real-world objects and places in our work, then we can start to understand how we can represent these online using immersive techniques. We define some key principles to guide the process.

For example, thinking about 'objects', you may start by identifying real-world objects used in the classroom. This could be a prop, a resource or some equipment. Consider how immersive techniques like 3D models and augmented reality might allow these to be shared online. When thinking about 'places', look for places which are difficult to reach in the real world. They may be too far away, too difficult to reach or too dangerous to visit. Techniques like 360 photography and video provide a means to resolve this.

This presentation outlines some practical steps to help develop immersive material using affordable technology. It offers an evaluation of 360 photography taken on the Ricoh Theta V camera and 3D scans produced using the Occipital Structure Sensor. It highlights freely available alternatives for developing immersive material with little cost, such as free photogrammetry software by 3D Flow to create 3D models and the TeliportMe app to take 360 photos. Examples of Augmented Reality developed using the free AR.js web-kit are shared, along with an overview of its strengths and weaknesses.

Finally, we highlight the importance of building experiences that can be accessed on tools learners already use – computers, tablets and mobile phones. This is important for our 'beginners' approach. We want our work to be accessible to the widest possible audience without expecting users to have specialised equipment. The 'small elements' of immersion we describe - 3D models, 360 photography and augmented reality – are simple enough to run on everyday devices. This certainly lowers the barriers to user adoption and participation.

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4 Summary

This presentation is aimed at educators and content creators looking to take their first steps in developing immersive material. We outline a simple approach which uses small ‘elements of immersion’ to add value to existing work. We highlight some practical steps and focus on building experiences for tools learners already use.

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