Lessons in the Metaverse: Teaching University students about Virtual Reality from within Virtual Reality

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SUMMARY

There is considerable potential in the education sector for the use of immersive virtual worlds to enhance student learning and engagement. This paper outlines five key recommendations for teaching University students in future 'Metaverse' contexts. These guidelines are based on video/survey data collected from 266 students during a module that has run predominately in virtual reality for the last three years, as well as the reflective experiences of the teachers.

KEYWORDS

Virtual Reality, The Metaverse, Higher Education, Student Experience

What is 'The Metaverse'?

The Metaverse is a term that originates in the 1992 book Snow Crash by Neil Stephenson referring to a future computer-generated universe *beyond* the physical world. Whilst precise definitions are currently lacking, there is an emerging consensus that several components are required for a true Metaverse (Dionisio et al., 2022), including: *Immersive realism* – users are psychologically and emotional engaged; *Ubiquity* – virtual worlds are accessible to all; *Interoperability* –users can move seamlessly between 'locations'; *Scalability* – capable of being accessed by whole populations.

When one considers the rapid rise during the Covid-19 pandemic in the maturing of immersive technologies, such as Virtual and Augmented Reality (VR/AR), together with more widespread access to social VR platforms – it is apparent that aspects of the Metaverse are already in place. Moreover, arguments have been made that a manifestation of the Metaverse is inevitable given the fact that humans evolved to comprehend the world through first-person experiences in spatial environments, rather than the flat 2D environments currently offered by computing and communication devices/systems (Dionisio et al., 2022).

Use of Virtual Worlds in Higher Education

A fundamental element to the Metaverse will be virtual worlds, defined as "*Shared, simulated spaces which are inhabited and shaped by their inhabitants who are represented as avatars*" (Girvan, 2018, p. 1099). In this respect, the education sector is widely seen as a potentially huge consumer of virtual worlds – enabling improved access of students to learning (from wherever in the globe), as well as enhanced flexibility in how/when learning is undertaken – Lee et al. (2021). Moreover, from a learning theory perspective, the widespread use of virtual worlds in education potentially provides numerous benefits, related to experientialism (learning while doing),

socialisation (learning with others, including empathic understanding) and contextualization (learning in authentic/relevant environments) – Radianti et al. (2020).

In the Higher Education sector, there is emerging recognition that students need to be prepared better for their future digital working/leisure lives – by gaining a deep understanding of what it means to design, build and then be immersed and interact in virtual worlds (Lee et al., 2021). Nevertheless, previous Human Factors work related to virtual worlds in education has largely focused on one-off/solo experiences with immersive technology, usually from the perspective of training (discussed in Lee et al., 2021) - neglecting the complex social interactions that will arise when students and teaching staff interact as avatars across a long-time period.

The Nottopia experiment

At the University of Nottingham, a persistent, fantastical virtual world (referred to as Nottopia) has been used as the primary approach to teaching for a specific module for the last three years, initially conceived in 2020 at the outset of the Covid-19 pandemic but continuing beyond. The module is taken predominately by final year undergraduate and postgraduate taught students in Mechanical Engineering, Product Design, Human Factors and Ergonomics and Human-Computer Interaction (49 in 2020/2021; 95 in 2021/2022; 122 in 2022/2023) and concerns the Human Factors design issues for immersive technologies. Consequently, it is a perfect test-bed module to understand the social behavioural issues regarding students and teachers interacting over an extended period (three months of a semester) in virtual worlds. Nottopia can be accessed on desktop and mobile devices, but increasingly is being accessed via VR headsets either loaned to students or already owned by them. Teaching activities have included lectures (delivered either live in VR or pre-recorded) complimented by highly interactive seminars utilising a range of approaches, such as treasure hunts, design workshops, show and tells, 'fireside' chats, virtual field trips, etc. Sessions have been recorded (60 hours of video data) and students have been surveyed (40% response rate).

Five key guidelines for teaching in the Metaverse

Results from this research have already been reported extensively in Burnett, Harvey and Kay (2022). Here, we will summarise some key learnings, based partly on the formal data collected, but predominately on our reflections as teachers within this highly novel context. Subsequently, the following five basic recommendations/ guidelines are proposed of relevance to any practitioner considering the use of virtual worlds in their pedagogy:

1. *Contextualise* your virtual teaching space - immersing students in environments that are consistent with the topic under consideration to encourage creativity of thought.
2. Maximise the *3D capabilities* of virtual worlds - allowing students to engage with objects in new and empowering ways, e.g. by viewing from unique perspectives, resizing, etc.
3. Empower your students with *appropriate levels of freedom*. Virtual worlds afford freedom in movement (e.g. flying) - but universal access to these superpowers can distract from learning outcomes and need to be granted where relevant, and managed when of benefit.
4. Exploit the fact that virtual worlds can be *persistent and editable*. Unlike most real-world classrooms a virtual world teaching space can be available 24/7 for students and also available long beyond the running of a course, e.g. to demonstrate a cohort's work. It can also be editable either by a teacher or potentially by students – to be more relevant to what is being covered that week and/or encourage students to learn throughout a week.
5. Don't just revert to everything you do when teaching in the real-world. It is natural/easier to resort to traditional approaches to teaching, even in a virtual world (e.g. 2D lecture slides on a screen). Nevertheless, it is important ultimately to be creative and consider how the technology affords *radically new activities* of benefit to student motivation and learning.

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