

# Twenty-First Century Immersion Technologies in Health Professions Pedagogy



**Catherine Hayes**

*University of Sunderland, UK*

## INTRODUCTION

*“Life is not a problem to be solved, but a reality to be experienced.”*

*Søren Kierkegaard (1813-1855)*

The justification of pedagogy in the context of Extended Reality (XR), which encompasses Virtual Reality (VR), Augmented Reality (AR) and Mixed/Hybrid Reality (MR) has become an ongoing source of complex ambiguity over the last decade, that the COVID-19 pandemic has only served to exacerbate (van der Niet and Bleakley, 2021). Ensuring the validity and reliability of XR experiences within health professions education remains central to the potential to rule out technologies as adjuncts to optimal pedagogic practice as an authentic means of providing insight and illumination of medical contexts, scenarios, and disease processes (McGrath et al, 2018). For the purposes of this chapter there will be four fundamental operationally definitive terms of what the umbrella term XR encompasses, firstly VR refers to the use of computer technology in the creation of simulated learning environments. Secondly, AR pertains to the addition of computerised content as an overlay to reality, which means that learners can actively interact both with real world and augmentations of it at the same time. Mixed or hybrid reality refers to the transection of virtual worlds and actual worlds, where physical and computerised objects can interact and exist concurrently. XR encompasses all of these and as a collective they have revolutionised health and medical training, particularly in relation to the practise of risk management and professional role identity in life and death situations, for example obstetric emergencies, as reported by Hayes, Hinshaw and Petrie (2018).

Training for the strategic management of risk in healthcare practice in situated contexts of healthcare provision has been a key focus in the use of XR in practice (Hilty et al, 2020). Not only does it involve rational aspects of cognitive knowledge or the purist demonstration of psychomotor skills and affective domain learning (Zulkifli, 2019). It also encompasses the intuitive, tacit and largely intangible intellectual instincts that develop with sustained experiential learning (Humpherys, Bakir and Babb, 2021). One of the key issues has been the challenge of assessing the last of these, what XR has enabled is the benchmarking of perceived levels of interprofessional and multi-disciplinary teamwork, where intuitive knowledge can be used to measure risk, regardless of the level of the organisational hierarchy within which personnel are employed (Goh and Sandars, 2020; Hayes, Hinshaw and Petrie, 2018). This chapter will explore the key epistemologies or ways of knowing, from a theoretical perspective, that can be used to ensure the level of authenticity necessary to highlight the pedagogical shifts in the application of

DOI: 10.4018/978-1-6684-7366-5.ch023

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learning theory which now characterise responsive curriculum design and adaptation to accommodate XR in practice.

## **BACKGROUND**

The ongoing pandemic, which on February 14<sup>th</sup>, 2023, had reached 755,703,002 confirmed cases and 6,836,825 million fatalities, has not only changed the world of education in its current form, but it has also likely altered its mechanism of delivery for the foreseeable future (WHO International Data, 2023). In practice the pandemic has seen universities close, a switch to hybrid models of learning and education, a social science, depleted in terms of its capacity to engage people in face-to-face meetings (Okoye et al, 2021). The plethora of academic articles surrounding online learning is phenomenal, but few address how a fundamental paradigm shift in Higher Education is implemented methodologically (Luctkar-Flude and Tyerman, 2021). What is usually described is a narrative description of the processual use of technological intervention, rather than any degree of alignment in terms of underpinning theoretical justification for implementation, or indeed the constructive alignment demonstrating best how processes of assessment can effectively be driven by complementary processes of teaching and learning (Moreira, 2020). The physicality of learning has also been altered beyond recognition, seeing people as upper torsos and faces has changed everyday interaction in the situated nature and context of learning, yet minimal evidence exists as to the long term impact of this on motivating, engaging and sustaining active processes of learning, teaching and assessment on an individual level (Park and Kim, 2020). By over reliance on the physicalism of the articulated voice and postural positions of the upper torso, executed in an atmosphere of scrutiny, learners have had to change their interaction so that their degree of interaction is heavily influenced and constrained (Obrad, 2020). Whilst predicting how global disease and inequality will influence the future of education, it is impossible to ignore potential challenges that lie ahead for Higher Education (Bevins et al, 2020). It is possible to inferentially predict that COVID-19 may be one of the first of a new generation of global pandemics that will need to be dealt with alongside dramatic changes in overall global warming, which will also ensure that populations which are densely populated suffer most severely (Negev et al, 2021). Alongside the issue of pandemic disease is the prospect of global catastrophes and natural disasters occurring far more frequently and necessitating support and address now. The progressive redevelopment of existing technology to accommodate this is more than apparent, so that learners can engage physically in medical and healthcare settings with less extensively sized equipment and a greater capacity to seamlessly integrated extended reality into all practice (Yigitcanlar et al, 2020). Geographically there are other issues at play, in terms of the accessibility of technology across global outcomes, with the result that some countries cannot be guaranteed adequate internet access, bandwidth or the cost of the technology products may simply be prohibitively expensive (Horton, 2021). Being cognisant of this necessitates ensuring both affordability and accessibility across the globe if the differential inequity between countries is to be addressed on an ongoing basis. Being able to standardise and regulate experience for learners is also of fundamental importance if equity and parity of experience are to be assured across these programmes (Crouch et al, 2021).

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