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"Saying that VR is isolating because it's immersive is a really narrow view of the world. The reality is we all have limits to our reality. And opening up more of those experiences to all of us, that's not isolating. That's freeing. - Mark Zuckerberg"

"Virtual reality is a denial of reality. We need to be open to the powers of imagination, which brings something useful to reality. Virtual reality can imprison people. - Hayao Miyazaki"

Virtual and Augmented reality

Mixed reality (MR) is where real and virtual objects are displayed together [1] and the designs and applications mixing these two qualities fall somewhere along the virtuality continuum [2]. Virtual reality (VR) and augmented reality (AR) technology has been primarily invented for games, but can have huge applications in other sectors such as training, education [3], sports [4], and medicine - helping to reduce post-traumatic stress disorder [5]. It is best used anywhere that traditional mouse and keyboard interaction is not suitable such as mobile and wearable technology [6].

Users are receptive to using VR as a learning tool [7], but the technology is still progressing to a state where it can be commonly used [8].

Whilst there is concern that virtual reality would take away the authentic, concrete real world experience and alienate the user from it [2], practically the latest virtual environments (VE) require less preparation time and resources, and provide an advantage of testing hypothetical situations without disruption in a community [9].

It may be that at some point humans can no longer tell the difference between what is and what is not physical in the perceptual sense, meaning the experiences for real, mediated, and virtual could all be identical [10]. Although, some users already consider a computer simulated view to be clearer and more usable than the plain camera view [2].

As a learning tool, the interface must have excellent mapping to better complete the mental model for how to perform the real-life actions [11], and the entire experience relies heavily on presence. In VR this is when a person behaves and responds as if they are in the place represented by the virtual environment [12]. Often contradicted by simulation sickness caused by latency and lag from the system [13] [14], or an overly limited gesture space [15].

Studies show that neither the perceived body size nor shape is as rigid as we may believe [16]. Even though watching a film does not create the strong illusion of owning and controlling a body that is not your own [17], simply perceiving a virtual body from a first-person perspective can create a sense of identification with an avatar [18], often even the persona of the avatar [19].

Mobile augmented reality [20] is now used for finding shop opening hours and bus timetables [21], but doesnt have to solely visual [22]. Mixing all the modalities [23] can offer additionally olfactory or auditory enhancements. A vibration belt has even been used as a haptic guide when visibility is impaired [24].

Intuitive controls are not always agreed upon [25] unless just basic movements like left right up down [26]. Many users find it difficult to explain what contributes to a successful 3D interface [27] therefore researching head tracking [28] and the practical

matter of performing actual evaluations can be quite different [29].

As the emotional experiences of fascination and amazement can be due to just the charm of a novel technology [30], a walkthrough method for evaluating virtual reality usability assessment, goal-orientated tasks, exploration and navigation, and interaction in response to system initiative is needed [31].

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