

## Self-directed learning using VR: An exploratory practice approach

Mehrasa Alizadeh  
Osaka University  
[alizadeh.mehrasa@lab.ime.cmc.osaka-u.ac.jp](mailto:alizadeh.mehrasa@lab.ime.cmc.osaka-u.ac.jp)

Neil Cowie  
Okayama University  
[ncowie2012@gmail.com](mailto:ncowie2012@gmail.com)

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### Abstract

Virtual reality (VR) is capable of immersing users in a simulated environment that creates a heightened sense of presence (Baños et al., 2004) and embodiment (Kilteni et al., 2012), both of which play essential roles in the learning process (Makransky & Peterson, 2021). However, VR use in education is still at a preliminary stage and limited to early adopters. With the advent of standalone VR head-mounted displays (HMDs) and the shift to remote education due to COVID-19, it is now the right time to integrate VR into education and to explore its benefits and shortcomings.

To this end, the two teacher researchers launched a small scoping longitudinal study with a group of five volunteer participants (4 undergraduate and 1 high school student, 4 males and 1 female) to explore their perceptions and evaluation of VR for educational purposes. Following a self-directed approach to learning (Hammond & Collins, 1991) and an exploratory practice approach to research (Allwright, 2003; Hanks, 2017), the five students led by the two teachers contributed to the current study in three stages that began with immersive VR and moved to WebVR.

In stage 1, all the participants were given Oculus Quest 2 HMDs and trained how to use them. The students then looked for free VR apps that they found educationally worthwhile, explored them on their own, and documented their findings. During weekly meetings, they joined a shared virtual space on Engage, where they presented and discussed their findings. Through this activity, the researchers compiled a list of free apps that could be useful for education and investigated the affordances and challenges of HMD-powered VR. The students' responses in online surveys and focus group interviews revealed that the benefits of VR over traditional forms of EdTech included higher engagement, improved focus on task, lower anxiety, and more effective collaboration and team building. However, HMD-based VR induced varying degrees of cybersickness for most of the participants (Authors, 2021).

To tackle these challenges, the researchers switched to Mozilla Hubs, an open source WebVR platform. The students were asked to create their own Hubs rooms to introduce an aspect of their academic discipline to the group. They welcomed this change since Mozilla Hubs, although not as immersive, did not cause cybersickness but there was one primary concern regarding the excessive processing load on students' devices. Some had trouble entering Hubs rooms or could not turn on their audio. These issues led to stage 3 in which the participants used 360-degree cameras to take spherical photos and videos and create virtual tours on ThingLink. Three out of five students contributed to this stage creating virtual tours of a university campus, a park, and a horse ranch. They expressed positive opinions of ThingLink saying that it was intuitive, user-friendly and did not require much processing power. However, the degree of immersion and sense of presence was perceived as the lowest of all. This study provides valuable insights for educators willing to adopt VR.

### References

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