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Supporting STEAM learning through student-developed Mixed Reality (MR) experiences

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Abstract:

Mixed reality (MR) provides new opportunities for creative and innovative learning. MR supports the merging of real and virtual worlds to produce new environments and visualisations where physical and digital objects co-exist and interact in real-time (MacCallum & Jamieson, 2017). The MR continuum links both virtual and augmented reality, whereby virtual reality (VR) enables learners to be immersed within a completely virtual world, while augmented reality (AR) blend the real and the virtual world. MR embraces the spectrum between the real and the virtual; the mix of the virtual and real worlds may vary depending on the application. The integration of MR into education provides specific affordances which make it specifically unique in supporting learning (Parson & MacCallum, 2020; Bacca, Baldiris, Fabregat, Graf & Kinshuk, 2014). These affordance enable students to support unique opportunities to support learning and develop 21st-century learning capabilities (Schrier, 2006; Bower, Howe, McCredie, Robinson, & Grover, 2014).

In general, most integration of MR in the classroom tend to be focused on students being the consumers of these experiences. However by enabling student to create their own experiences enables a wider range of learning outcomes to be incorporated into the learning experience. By enabling student to be creators and designers of their own MR experiences provides a unique opportunity to integrate learning across the curriculum and supports the develop of computational thinking and stronger digital skills. The integration of student-created artefacts has particularly been shown to provide greater engagement and outcomes for all students (Ananiadou & Claro, 2009).

In the past, the development of student-created MR experiences has been difficult, especially due to the steep learning curve of technology adoption and the overall expense of acquiring the necessary tools to develop these experiences. The recent development of low-cost mobile and online MR tools and technologies have, however, provided new opportunities to provide a scaffolded approach to the development of student-driven artefacts that do not require significant technical ability (MacCallum & Jamieson, 2017). Due to these advances, students can now create their own MR digital experiences which can drive learning across the curriculum.

This presentation explores how teachers at two high schools in NZ have started to explore and integrate MR into their STEAM classes. This presentation draws on the results of a Teaching and Learning Research Initiative (TLRI) project, investigating the experiences and reflections of a group of secondary teachers exploring the use and adoption of mixed reality (augmented and virtual reality) for cross-curricular teaching. The presentation will explore how these teachers have started to engage with MR to support the principles of student-created digital experiences integrated into STEAM domains.

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