ABSTRACT

The diffusion of the virtual and augmented reality (VR/AR) technological ecosystem into education is nascent. Research on VR/AR in Pre-Kindergarten to Grade 12 (PK-12) education has been focused on the technologies' effect on learning in various use cases. This study, grounded in Diffusion of Innovations theory (Rogers, 2003), uses a phenomenological qualitative research approach through interviews to understand the lived experiences and perceptions of pioneer teachers who have used VR/AR with PK-12 students. Critical trends and emergent themes within this study regarding pioneer teacher experiences of VR/AR adoption and integration surfaced through an inductive data analysis process. The introductory experiences of VR/AR impact teachers' perception of the ecosystems' benefits for teaching, launching their quest for information to narrow the knowledge gap that arises when adopting innovation. Pioneer teachers in this study use VR/AR in primarily two ways, for (i) The Exalted Journey (i.e., field trips to internal human spaces) and (ii) The Expression (i.e., student storytelling). Support from and access to funding provided by district/school leaders are critical for VR/AR adoption. Access to relevant content and VR/AR creation tools, bolstered by district-to-classroom level policies and protocols, proves essential for VR/AR integration in the classroom. Effective VR/AR classroom integration also depends on device availability, human resources, classroom structures, and classroom management. Teacher self-perception and educational context and philosophy affect teachers' propensity to embrace VR/AR for teaching and learning. Due to the COVID-19 pandemic, the use of parts of this ecosystem was halted, particularly immersive VR through a head-mounted display; the pandemic's long-term impact on VR/AR diffusion in PK-12 education remains uncertain. Access to VR/AR technology, inclusive of content and experience creation tools, classroom structures, resources, policies and protocols, teacher characteristics, and

leadership support are crucial elements for districts/schools to consider when adopting and integrating this ecosystem into PK-12 classrooms.

Keywords: *virtual reality, augmented reality, mixed reality, immersive technology, education, K-12 education, P-12 education, educational technology, instructional technology*