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In this column, we explore the issue of teachers and technology—not just as it relates to CALL solutions, but also to Internet, software, and hardware concerns that all teachers face. We invite readers to submit articles on their areas of interest. Please contact the editor before submitting.

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Using MAVR to Bring New Dimensions to the Classroom

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Mixed, Augmented, and Virtual Realities (MAVR) is not a new concept or area of study, but it is an area that is beginning to be implemented at a larger scale in many other fields. Environments that employ these tools and concepts are being applied to medicine, engineering, and education. There are many working in this area connected to language education in Japan; the authors and many others are working to form a new JALT Special Interest Group, the MAVR SIG. The following is a primer to the current state of the research into MAVR and a discussion of where the field may be headed. Please contact the authors if you are interested in getting involved in the MAVR SIG.

Augmented Reality, Virtual Reality, Mixed Reality: How Are They Different?

Augmented reality (AR), virtual reality (VR), and mixed reality (MR) represent stages or layers of digital content integrated into the real world as displayed in Figure 1 (Milgram & Kashino, 1994).

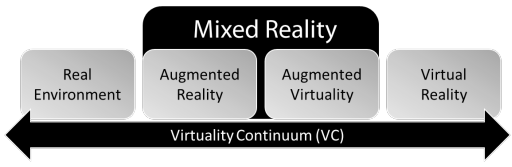

Figure 1. Milgram and Kashino's (1994) reality-virtuality continuum.

Augmented reality has more of the real world represented than virtual; the opposite is true for augmented virtuality which is mostly a simulated environment. An example of AR in this context would be a heads-up-display in the cockpit of a commercial airliner. The view out the front of the aircraft is augmented with information from the various flight instruments. Also, a more popular example would be the popular game that swept around the world in 2016, Pokémon GO, in which real environs were augmented with Pokemon characters for players to catch. An example of augmented virtuality might be a digital map of an area that is enhanced with pictures and videos from respective locations in that area. Using Milgram and Kashino's (1994) continuum, educators can now start to think about how much learning can benefit from simulation versus real-world interaction. Some affordances of AR over VR are a connection to the real world and the inclusion of face-to-face interactions.

What Has MAVR Got to Do with Language Teaching?

Integrating MAVR technologies into education has evoked growing interest among researchers and practitioners. Cheng and Tsai (2013) discussed the potential of integrating augmented reality into science education, allowing students to get a first-hand experience of objects or phenomena that cannot be seen with the naked eye. The application of MAVR in education is not limited to teaching science, but has reached humanities and arts as well (Bacca, Baldiris, Fabregat, Graf, & Kinshuk, 2014). Augmented reality techniques can in general lead to enhanced understanding of content, improved memory retention, better task performance, and increased student collaboration and motivation (Radu, 2014)— all factors which would seem to be desirable for successful language learning. Enhanced student motivation and collaboration can be attributed to the novelty of the experience as well as the possibility of adopting a more active type of learning in which students can move around the classroom.

Li, Chen, Whittinghill, and Vorvoreanu (2014) compared AR-enhanced to traditional classes and

demonstrated the positive impact of augmented reality integration into teaching mathematics and geometry. With regard to language learning and teaching, Barreira et al. (2012) reported their findings of using an AR-empowered game called MOW to teach animal names in English and Portuguese to children, indicating that those who learned through the AR game outperformed their counterparts who had learned the same material in a traditional manner. However, the potential of using MAVR technologies in language education remains an under-researched area (Godwin-Jones, 2016). Establishing the link between the two disciplines of MAVR and language education is also promising in that there are strong theoretical connections between second language acquisition and augmented/ virtual/ mixed reality, through which one could create contextualized, situated, task-based, or project-based language learning experiences in the real world (Godwin-Jones, 2016).

How Can MAVR Be Experienced?

MAVR can be practiced and applied in the classroom through two main platforms, namely educational gaming and learning materials. Several apps and wearable devices can be used to design game-based tasks and create augmented realia to experience MAVR. An increasing number of AR applications are now on offer, allowing users to experience the real world augmented by overlaying computer-generated content such as text, graphics, animation, sound, video, or GPS data. For instance, Aurasma is one of the most frequently used AR apps, available as a free download for both iOS and Android. It uses image recognition technology and geo-based information to detect real-world images or objects (triggers) and superimpose media (e.g., overlays) on them. The Aurasma Studio lets users create and share their own AR content, called Auras, in a user-friendly environment. A TED Talk demonstration of Aurasma showed how easy it is to make AR assets and "seamlessly animate the world as seen through a smartphone" (Mills & Roukaerts, 2012). Examples of other AR applications include Wikitude, Layar, and Augment. With minimal programing skills, AR applications can also be developed in game development platforms like Quake Engine and Unity 3D (see Figure 2).

To explore VR and MR, headsets or Head Mounted Displays are often used. Google Cardboard, one of the simplest virtual reality headsets, turns a smartphone into a virtual reality headset by rendering a stereoscopic vision for the viewer. It can be used in English classrooms to take students on virtual trips around the world. More recent technological innovations include the Oculus Rift and the HTC Vive. Microsoft's HoloLens is another leading system integrating both AR and VR and presenting the user with a mixed-reality experience.

Figure 2. Screenshot of the first author using Unity 3D-developed AR application.

Future Vision

In more recent attempts to employ MAVR, researchers here in Japan have tested slightly more involved implementations of AR in several different learning environments. There have already been uses of AR to connect online supplementary materials to language textbooks for a freshman English class in Japan (Hawkinson, 2014a, 2014b). Other projects related to education here in Japan include integrating AR into a new student orientation seminar and at larger scale events such as TEDxKyoto (Hawkinson, Stack, & Noxon, 2015). MAVR technologies are anticipated to become an integral part of future classrooms as AR/VR/MR-enabled devices get smaller in size and more affordable.

This area of research is exciting as it mixes areas of educational psychology, learning technology, and brain science. Mixing realities has meaningful implementations in the short term, and it seems this could be a new frontier in language education and learning in general. Those who are interested in exploring this growing new area of language learning should consider joining the MAVR SIG and check out the MAVR-related presentations at PanSIG 2017, IAFOR ACTC 2017, JALTCALL 2017, TEDxKyoto 2017, and our SIG forum at JALT2017.

Links to Related Articles

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