Language Arts Lessons

Using Augmented and Virtual Reality in the Language Arts Curriculum

Jackie Marsh and Dylan Yamada-Rice

This column outlines key principles that should underpin the use of augmented and virtual reality in the language arts curriculum.

A seven-year old girl, Jade, is taking part in a virtual reality maker-space workshop in a primary school in Sheffield, run as part of a project called Makerspaces in the Early Years: Enhancing Digital Literacy and Creativity (MakEY).[1] Drawing on her experiences of play in her immediate environment, captured using an iPad camera, Jade has created an imaginative playworld using collage materials pasted onto a printout of one of her digital images. She has now been asked to create her playworld virtually, using the Google Tilt Brush program. Jade dons an HTC Vive headset that is connected to a laptop, and she grasps a controller in each hand. She is now immersed in the virtual world and can only navigate the physical classroom environment through touch, along with some supportive guidance from adults who support her if she appears to be unsteady on her feet. Jade's hands wave about in the air as she twists and turns; she is creating her playworld as if she is standing physically inside it, with her virtual drawing displayed on the laptop screen for observers to see in real time (see Figure 1). Another child in the same class, recounting her own experience of this process, exclaimed, "I saw heaven!"

[1]Makerspaces in the Early Years: Enhancing Digital Literacy and Creativity is a research program funded by EU H2020 involving projects conducted in seven countries. This case study was developed by Bobby Nisha and Bryony Olney, both of the University of Sheffield (http://makeyproject.eu).

Figure 1. Drawing in a virtual world

This vignette outlines the potential that Virtual Reality (VR) has for fostering children's creativity. Augmented Reality (AR) and VR technologies have become popular over recent years. VR offers a simulation of a three-dimensional image or environment that allows interaction with people wearing specially designed glasses or headsets, thus enabling the user to feel immersed in the virtual world. AR consists of a blend of the physical world and virtual world. In this blended reality, three-dimensional images or environments are projected onto a physical object, but users are not immersed in the same way as they are with VR experiences.

The list of possible uses for AR and VR is growing. In a research project we conducted (Marsh et al., 2015), a sizeable minority of parents of children under five reported that their children used AR

apps (24 percent in total: 18.5 percent on tablets and 5.9 percent on smartphones). More recently, Dylan was involved in a study that revealed 25 percent of children aged 8–12 surveyed in the US and 18 percent of children of the same age in the UK had experienced Virtual Reality (Yamada-Rice et al., 2017). This is an area that will undoubtedly grow in significance as further apps are developed that utilize the technology.

There are several apps that offer valuable opportunities for teachers to embed AR and VR in the literacy curriculum in meaningful ways, such as Aurasma, CoSpaces, Layar, Zooburst, and Google's Expeditions, Tilt Brush, and Blocks. If these apps are to help promote such creative learning, we believe that five key principles need to underpin their use, as detailed below.

Principle 1: *The use of AR and VR needs to lead to literacy experiences that are rich, meaningful, and build on the affordances of the technology.*

This principle is foundational in order to avoid a common pitfall of technology use in classrooms: focusing on the AR and VR technology itself rather than on learning. It would be easy to get swept away by the innovations around blended and virtual reality, given that they often do have a "wow" factor. For example, we introduced four- and five-year-old children in one class in Sheffield to the colAR App (see Figure 2), which enabled them to color printed

Figure 2. Using an augmented reality app

pictures of Pudsey, a bear used in a national charity campaign. As these fieldnotes suggest, the use of the app proved to be exciting for them:

> Children were able to choose a picture of Pudsey to colour in. They then took turns using the tablet to create 3D images of Pudsey, which then moved in some way. For example, one picture linked to the tablet represented Pudsey at a disco, dancing to music (including an impressive back flip), whilst another picture linked to an image of the bear playing a guitar, with rock music emanating from the app. The children were entranced, saying such things as, "He's alive!" It was not possible to manage the activity in a way that enabled one child at a time to interact with the app in isolation. Rather, the children clustered around the tablet, and at times, the crowd was two or three deep. I sometimes struggled to support children in holding the tablet above their picture, which was placed on the floor for ease of use, as my arms and elbows were jostled by an exhilarated crowd who were trying to get a closer look at Pudsey, brought to life by the app. There was great excitement, and the activity had to be extended across the session to enable all the children who wished to participate to do so.

Other AR apps also have potential for extended learning. *Aurasma*, for example, is an app that enables the user to layer a Web-based text or artifact onto a physical text or artifact. This was used to good effect in the primary school involved in our 2015 study, which used the app to link videos of children orally re-telling stories they had written to the actual physical texts. At a parents' evening, parents used their own smartphones to hover over the *Aurasma* logo on their children's written stories, enabling them to then watch the videos that popped up.

Principle 2: *The use of AR and VR in the classroom should enable children to engage in playful approaches to literacy learning in which meaning and affect are key.*

The importance of play for learning and for paying attention to children's emotional well-being is well-established. The use of AR and VR in the literacy curriculum can often be pleasurable and lead to fun and excitement; however, there is also a place for the exploration of more challenging emotions—such as anger and fear—through the use of these technologies in the classroom.
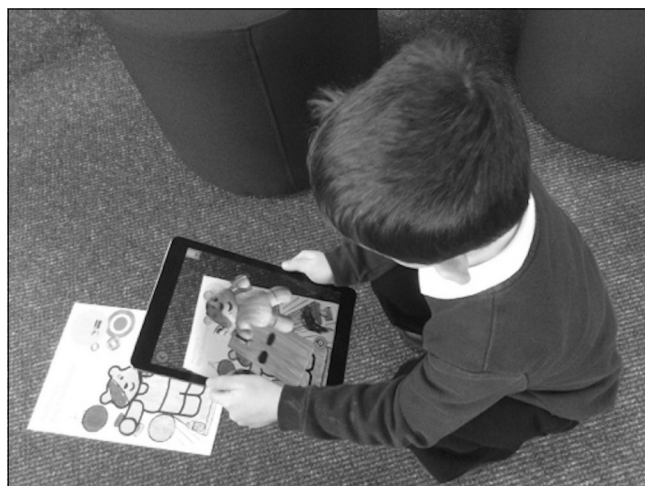
In Lee Parkinson's class of children aged six and seven in the UK, the use of VR headsets enabled students to experience vicariously a ride on a roller coaster; Lee used this as a springboard for writing about the feelings that emerged from this event. The pieces of writing ranged from expressing excitement about experiencing something virtually that the children were not old enough to encounter in the physical world, to fear as they sat in their virtual car at the top of the roller-coaster, ready to hurtle down a steep track. (See examples on "Mr. P's ICT Blog" at http://mrparkinsonict.blogspot.co.uk/2015/02/using-virtual-reality-in-classroom.html).

Principle 3: *The use of AR and VR in the classroom should lead to productive as well as consumptive practices.*

Because many of the AR and VR apps available enable children to encounter environments and experiences that they would not be able to engage in in everyday life, it would be easy to slip into a use of them that promoted these affordances above all others. However, children need opportunities to be creative and productive in their use of technologies, ultimately learning to produce multimodal texts that have a strong authorial voice. In MakEY, the international project that is currently exploring the value of makerspaces in early years classrooms, various members of the team in different countries are exploring how children can create their own VR worlds in which narrative and storytelling are key; as indicated in the opening vignette, Google's apps Tilt Brush and Blocks. These examples of multimodal authoring in VR indicate how the technology can be used to help students create, as well as consume, content.

Principle 4: *The use of AR and VR in the classroom should foster the development of critical literacy skills.*

Critical literacy is, as Souto-Manning and Yoon (2018) argue, a vital component of early years language arts practice. VR offers important potential in this area. For example, the VR app Google Expeditions features environments that have been adversely affected by climate change or by habitat destruction for profit, such as forests in Brazil. As part of a unit of study that includes the use of the Deforestation in Brazil app (which can be viewed using the inexpensive cardboard Google Glasses, with a smartphone inserted), children could be asked to consider a number of questions, such as: "Why is deforestation taking place in some parts of the world?" "What are the implications for wildlife and humans of what is happening?" Being immersed in an environment that is at risk could bring these questions starkly to life for the children.

Principle 5: *The use of AR and VR in the classroom should build on children's encounters with these technologies outside of the classroom.*

Children's multimedia and multimodal experiences outside of school are not always recognized within school. One way to avoid this mismatch is to build on children's popular culture experiences in meaningful ways. This can also be the case in relation to children's out-of-school uses of AR and VR. For example, the *Pokémon Go* phenomenon was one that touched on the lives of many children across the world. In a current study in the UK, we are exploring this technology as a means of linking children's physical playgrounds with digital representations of play in the past, developed through engagement with a repository of information about play collected by Iona and Peter Opie in the twentieth century (https://playingthearchive.net).

In conclusion, AR and VR can foster a sense of immersion in both known and unknown digital worlds; they can invite children into virtual journeys where they can imagine the world to be otherwise. Under the guidance of a creative teacher, this can lead to literacy learning that fosters a sense of wonder and excitement, bringing about meaningful outputs that cross both physical and virtual domains.

For Further Reading

To date, there are few books that discuss the use of AR and VR technologies in classrooms. Therefore, we recommend reading the following books that consider the use of digital technologies more generally and that pay some attention to virtual environments.
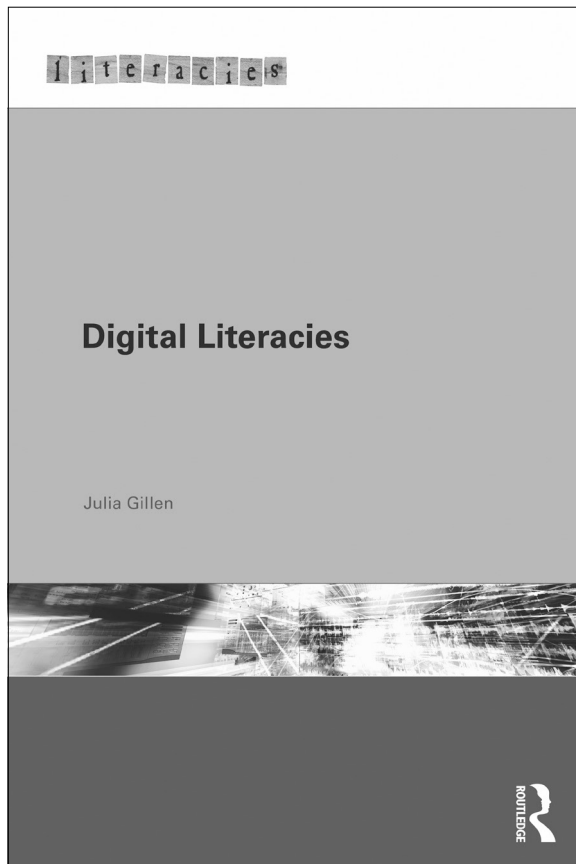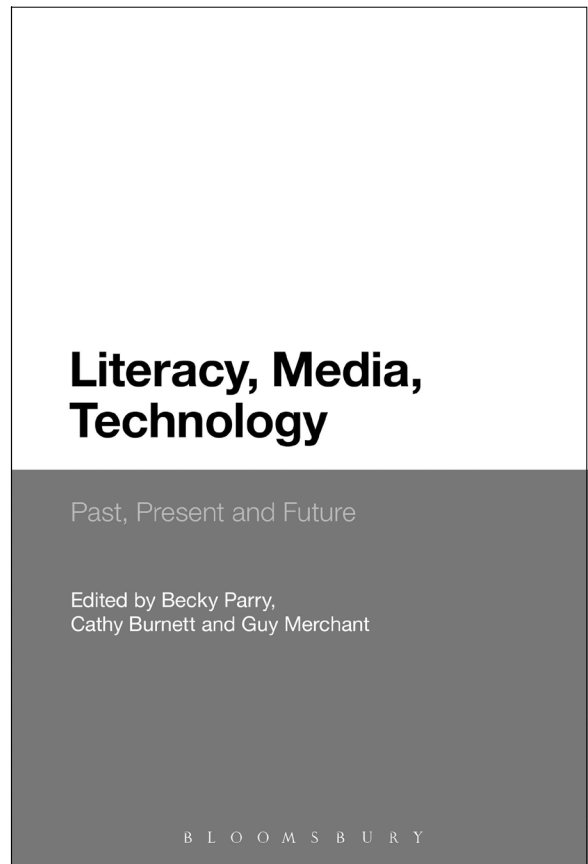
Gillen, J. (2014). *Digital literacies.* London, UK: Routledge.

> This book explores a range of ways in which digital literacies have transformed communication in contemporary societies, enabling new ways of meaning making to emerge. Exploring the potential value of the virtual domain in classrooms, Gillen discusses a fascinating project in which young learners engaged in literacy practices using Schome Park, an environment located in the virtual world Second Life.

Parry, B., Burnett, C., & Merchant, G. (Eds.). (2016). *Literacy, media, technology: Past, present and future.* London, UK: Bloomsbury Publishing.

> This book offers a range of perspectives on the use of technologies in the literacy curriculum, tracing developments across home and school spaces. The authors collectively discuss the continuities and discontinuities in digital literacy practices over time and explore a range of approaches to the use of technologies in the classroom that draw on popular cultural forms such as film, television, video games, and virtual worlds.

References

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Yamada-Rice, D., Mushtaq, F., Woodgate, A., Douthwaite, A., Harris, W., Holt, R., . . . & Whitley, S. (2017). *Children and virtual reality: Emerging possibilities and challenges.* Retrieved from http://digilitey.eu/wp-content/uploads/2015/09/CVR-Final-PDF-reduced-size.pdf

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