A World of Experience - using immersive technologies in the SpecialEd Classroom

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1. Introduction

1.1 The context of my project – setting the scene

For the last decade, I have been working with learners with special educational needs (SEN) funded under the Ongoing Resourcing Scheme (ORS), which supports NZ learners with high to very high needs. To qualify for ORS support, a learner must have either ongoing extreme or severe difficulty in the areas of learning, hearing, vision, physical or language use and social communication, or moderate to high difficulty with learning, combined with very high or high needs in any two of the following areas: hearing, vision, physical, language use and social communication. Many of my learners rate high for Autism Spectrum Disorder (ASD), which can affect communication, social skills, and behaviour.

1.2 The first spark

Prior to becoming a teacher, I worked in the IT sector for many years. I have a strong interest in E-learning, DigiTech, and emerging technologies. In 2017, I started a new position as the Specialist ICT teacher at Allenvale Special School, working across the school with 150 ORS funded learners. When I arrived, one of our teachers was trialling Virtual Reality (VR) activities to help with behaviour and self-regulation. I noticed how well our learners responded to this technology. They seemed very motivated and engaged. Even learners who barely tolerated hats or headphones were happy to use VR goggles to experience VR content.

This made me wonder how else we could utilize this technology. I felt it could be a really powerful teaching tool for us. Learners with special educational needs often cannot access learning the same way their mainstream peers can. Consequently, they can miss out on valuable experiences due to their physical or cognitive challenges. Wouldn’t it be great if we could use new technologies to help? Immersive technologies might be able to offer authentic learning opportunities that fostered experiencing, creating and interacting. I really wanted to pursue this further, and although other projects got in the way, I never forgot my interest in this area and waited for an opportunity to try it.

Fast forward a couple of years, and I was lucky enough to be selected as one of the 2019 Dr Vince Ham eFellows with a proposal to conduct an action research project on Immersive Technologies in a special education context. Becoming an eFellow, and feeling that someone else saw value in my idea, was very exciting for me – and I now had the support and time to start exploring my hunch.
2. My Research project

2.1 Methodology

2.1.1. Designing my project

Before I started delving deeper into my research, I discussed my idea in detail with my colleagues. This was a very crucial step for me – it helped me find out more about my learners, their classroom, and the teachers’ expectations from my project. I also talked to my learners about it and contacted my learners’ whanau to let them know about my project and to get feedback from them. This (and support from my CORE tuakana) helped me shape my ideas, my research questions, and my project.

2.1.2 My Research Questions

My final research questions were:

I. How might immersive technologies be used in a Special Education context to enable meaningful learning opportunities by bringing the ‘outside world’ into the classroom?

II. How can our learners use these tools to share their own environment and experiences?

III. What impact does the use of these technologies have on learner engagement?

These questions reflected my initial interest in bringing the world to the learners, and them sharing theirs, but they also opened opportunities for me to explore their response to the use of this technology.

2.1.3 Establishing a Baseline

Before the research began, I took some time to start getting to know potential subjects by setting up a DigiClub for all interested learners. Most were between 9 and 13 years old. This allowed me to observe learners to establish a baseline of assessments and evaluations.

I also developed an assessment tool to record observations about:

- learner focus/motivation
- self management
- how they related to others
- engagement levels
- how they felt about each session.

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1 (learner-centered learning focus, connected to learning aims or objectives, purposeful)
This assessment tool was based on the Leuven Scale (Laevers, 2005), which is used to measure wellbeing and involvement (usually in early years settings). Children are scored on five levels of each dimension - learners that score highly should be more confident, engaged, ready to learn/interact.

![Leuven Scale for Involvement](image1.png)

**Figure 1: Simple rendition of the Leuven Scale of Engagement (Wells, 2015)**

![My Assessment Sheet](image2.png)

**Figure 2- My Assessment Sheet**

### 2.1.4 Designing the Sessions

When I originally thought of my project, I was inspired by the use of VR. However, the aim of my project was not only to answer my research questions, but also to create a basic toolkit for teachers that would allow them to try this themselves. Most of my sessions therefore used an iPad, and commonly available apps. I felt that this approach would make my project replicable and sustainable, and in keeping with some of the principles of the CORE eFellowship: to be curious, experiment, innovate, and create something of value with and for others.

### 2.1.5 Learning Arc

I selected apps that would create what I thought would be a logical, progressive arc for my learners. The learners would move from simple tasks, familiarizing them with the technology, to more complex tasks that would give them the opportunity to experience, explore and create. After my ‘baseline’ phase, the DigiClub sessions progressed along this arc, with individual learners having the chance to work with each app for at least 2-3 sessions (1-1 and in groups).
2.1.5 Introducing the apps

Each app was selected to teach a specific range of skills, build knowledge and confidence.

1. Osmo
Osmo Tangram combines tactile exploration with virtual responses: children create shapes with real tangram tiles, and the iPad records/responds to their work and helps them complete increasingly difficult tasks. I chose this app to teach the children that the device would react to physical prompts in the ‘real world’. It also allowed them to explore the limits of the device, and how to use various features of the iPad.

2. Quiver
Quiver uses special colouring pages/images to trigger an augmented reality (AR) response. For example, children colour in a circle, and once the page is scanned with the iPad, the design appears as a 3D sphere on the screen, which they can then interact with. Again, it allows learners to explore and experience simple AR experiences triggered by their actions.

3. DoInk
DoInk is a green screen app that lets the learners put themselves into different environments of their choice, and to explore different virtual effects by creating layered images and videos. Fostering creativity and learner voice, it was very popular.

4. Merge Cube
The Merge Cube is a 3D object that acts as an anchor or trigger for virtual objects. As each side of the cube renders a different view of the object, it allows children to ‘pick the object up’ and look at it from all sides with the help of a device.

5. DevAR
DevAR is a simple app that allows users to place a number of preselected virtual characters in their own environment. They can then direct movements and actions of their selected character and take photos and videos.

6. Tour Creator
Tour Creator is a free app that uses 360 degree photos to create custom VR tours. This is an excellent tool to collect learner voice: I took a 360 degree photo of our playground and then worked with children to highlight what features were important to them.
2.1.7 Communication

Many of my learners are non-verbal or need some sort of Augmentative and Alternative Communication (AAC) system. For this project, I designed a set of Boardmaker symbols to create visual timetables for each session, scaffolding the learners so they could work more independently.

Figure 4: Using a Visual Time Table
3. Emerging outcomes and findings

Did my project answer my research questions? Well I think it is beginning to:

I. How might immersive technologies be used in a Special Ed context to enable meaningful learning opportunities by bringing the ‘outside world’ into the classroom?
   Overall, immersive technologies are an effective tool to bring the outside world into the classroom. I liked the differentiation it allowed; it was easy to let learners follow their interests, and it tied in well with class topics. This is a particular strength of this technology for all sectors, but it is especially useful for Special Education as it opens up new ways of accessing content.

II. How can our learners use these tools to share their own environment and experiences?
   This is something that was emerging throughout my project. Giving learners as much choice as possible made it possible for them to have a voice, to share what interested them, and what was important to them. I especially liked Tour Creator as a way to share how they experience their world, and I would love to explore this further.

III. What impact does the use of these technologies have on learner engagement?
   Over the course of this project, I saw learner engagement improved markedly. Partially, this could be due to the fact that they generally like to work with digital devices, but from my data I feel it went further than that. Their on-task time, motivation and focus was measurably increased, and learners often chose to stay on task even if given the opportunity to ‘veer off’. There was also an increase in communication (especially with peers), evidence of more creativity, and independent exploration. Learners shared what they were doing at home, with friends and teachers, and were keen to participate. The feedback from teachers has been very good.
4. Recommendations from my project

I found this project very rewarding, and my learners loved it, so I would encourage anyone to take the plunge. Although I would like to give the impression that my research project was all smooth sailing, I inevitably hit some bumps in the road, or even roadblocks. Maybe highlighting some of these potential pitfalls and celebrating the successes could help other teachers thinking of trying something similar. Here are some of the key learnings for educators who may want to try a similar project:

4.1 Just have a go

My most important message to other educators is: Have a go! Trying new things can be scary even if you feel confident with the technology. You do not have to be an expert or a tech whiz to try this. Take the opportunity to learn and innovate with your learners, and if it does not work out, try something else.

4.2 Be prepared

Be as organized as you can and then some more? Have you got a space organized and set up? Is it familiar and are distractions managed? Have you got your props/tools ready? Too many items/choices can be distracting – try to limit those. Are your apps working? On every device? Are your devices fully charged? An equipment failure can have an impact on your learner’s ability to self-regulate.

4.3 Build those relationships

Take time to get to know your learners. This is especially important if you are not their ‘normal’ teacher. If you know your learners better, you can plan lessons that suit them. Get to know their teachers/classroom routines: this will help build trust and reduce anxiety.

[Image: www.adventuresofateachermom.files.wordpress.com/2018/01/img_2088.jpg]
4.4 Set your learners up for success

Think about who you will be working with, and help them prepare coping strategies for success/failure. I found a visual chart of Zones of Regulations that was extremely useful. This included a discussion about where we are sitting today (including the teacher); how we would feel if things didn’t go to plan; and, how we would cope with disappointment. Share your expectations, but scaffold everything – make sure you present information in different ways to make it accessible to all (Universal Design for Learning principles can be really helpful here). And ask, is your learner in the right space? Let them make a choice, and have a plan B to do something else – maybe next time will be different.

4.5 Be willing to give up control

Being willing to give up control was one of the things I personally struggled with. After I spent ages preparing and planning a session, I want to make sure things go ‘according to plan’. But in many of our DigiClub sessions, things went quite differently. I could never predict what would interest a particular learner most. I found that when I ‘let go’ a bit, and encouraged my learners to just have a go, I saw much more engagement, creativity and joy. Let them own their session, and enjoy!
5. Conclusion: Where to from here?

I feel that this research has been successful as a first step. I have navigated various pitfalls, and have added to our teaching and learning toolkit. I have made a first attempt at answering my research questions, but it also gave rise to more questions and ideas. I would love to try this with learners of different ages, over a longer period, adding more sessions and apps to add depth. I would also like to explore the use of this technology for communication, gathering learner voice, and for teaching social and life skills and practicing everyday situations before experiencing them ‘for real’. My next step is to repeat this project again, and this time, include more learners and teachers, but also to think about how we can expand it.

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6. Bibliography

Links to Apps:
Quiver http://www.quivervision.com/
DoInk http://www.doink.com/
Merge Cube https://mergevr.com/cube
DIY Merge Cube template/resources: https://sites.google.com/view/gabehaydu/resources
DevAR https://devar.org/
Tour Creator https://vr.google.com/tourcreator/
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