Primary Principal's Sabbatical Report

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Title and Focus;   Interactive video floor projection

About the author; I have been the principal of Northcote School for the past 12 years and past principal of Suburban School, in Kaikoura, and Orepuki in Southland. I have taught in a number of schools around the South Island and have 40 years working in education. Northcote School is a low decile school in Christchurch with around 130 – 150 students, with an even spread of pakeha and Maori students along with a number of other ethnicities.

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Preamble; A presentation by a fellow principal in 2015 covered a trip to schools in England. In one of the clips I spotted children interacting with floor projection. The possibilities of using this in education here in New Zealand interested me. There seemed to be little if any knowledge of this within NZ. The more I delved into this area the more I could see huge potential for engaging children in learning.

Interactive floor projection is where a video is projected onto the floor either from an overhead or wall mounted data projector and a sensor senses the position and action of a person standing in the video projected image. A computer connection delivers the image. The image moves, changes, provides answers or information depending on what the person does while in the projection beam.

Christchurch schools are being rebuilt, re-designed and refurbished after the earthquake of 2010. I see spaces being created in the 'Modern Learning' designs for children to work in communal areas. Often these spaces are underutilised and I considered how this projection might be useful to provide learning and motivating activities in these areas.

In this modern environment I am challenged to provide new and alternative ways to engage students and extend their learning. 'Interactive floor projection' is an exciting concept with huge potential in New Zealand education. This technology is prevalent in some countries overseas but appears new to New Zealand.

In recent years there has been an explosion of digital signage advertising and informing the public everywhere we go. The quality of this has improved massively and we expect to see everything in high definition, spectacular quality and amazing colour. There are daytime screens on buildings which are viewable throughout the day in all lighting conditions. Technology is continually evolving and we need to look at how this can impact of schools and learning.

Questions that needed answering;
What hardware did I need?
Was this technology going to have the powerful drivers that I hoped for or was it going to be too expensive, a waste of time or a five-minute wonder?
Could MLE communal spaces be maximised in terms of enhancing student engagement and progress using this technology?
What is the extent of 'floor projection' use within New Zealand?

How is it being used?
What potential/impact does this have on student learning and engagement.
What is the set up cost?
What programmes are available and from where?

Methodology and Findings;
A search on the internet on 'floor projection' brings up a large number of resources. Many of these are only designed for commercial advertising. Finding a place to view these in action and with children interacting has been a challenge without travelling half way around the world. A number of IT companies have 'floor projection' clips on their website but this may not be their core business and in fact may just be attached from another website, and talking with them provided me with insufficient information to move further.

I managed to visit a company in Melbourne, Australia named **'interactivity.com.au'**. They specialise in designing interactive programmes. Many are used in shopping malls using an interactive touch screen. They had 46 inch touch tablets…………impressive.
It was the interactive video projection that I was focussing on. They had their own dedicated mini-computer called a 'gigabyte brix' with 12 interactive programmes. To set up you need the computer, an infrared panel which sends infrared beams onto the floor image, and a tiny camera which views the floor image. When you break the infrared beams the computer programme responds. The cost was around $5500 which included the software, computer, camera, and programme licensing with a further $1500 yearly for 24/7 content management and support with the possibility of further interactive games as they were developed.
I was able to see several places where this was operating, in a library and a shopping mall. Adults and children were actively engaged with the projected activities. In one case there was an interactive wall display (9m x 2m) which was displaying an Australian bush scene which was well used by passers-by.

tiny computer   infrared unit   camera to monitor movement
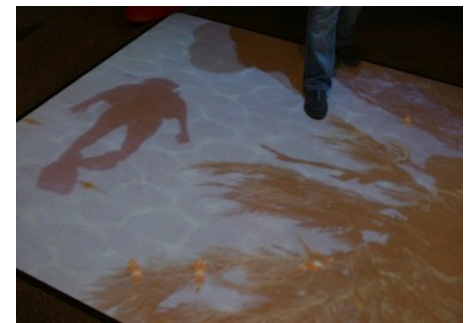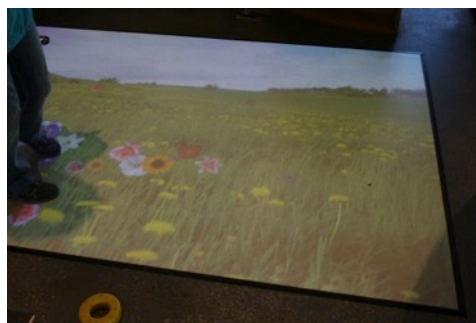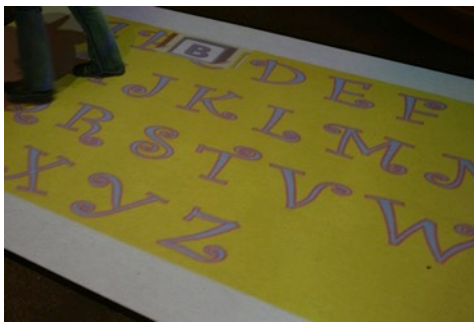
Set up

A 9x2m interactive wall display using 3 projectors in Australia

Some interactive floor projection observed in a library in Melbourne Australia.

In Christchurch we have a very good display at the **Christchurch Museum** in their 'discovery' section. A floor image of 3m x 2m. This is a German sourced programme and was set up 10 years ago. Four programmes run on a continual loop. There was a high degree of experimentation by the children and they were engrossed with the colour and action. Children displayed all the movements possible with them running across the projected surface, hitting, sliding and rolling to see the responses. Their interest was sustained over time. Leaves move away, fish swim out of reach and the water ripples as you walk across, flowers spring up as you walk over the image and insects, spiders, centipedes and cockroaches are uncatchable. There was a high level of sustained engagement and the children interacted with energy.

Projection was directed onto a white melamine type surface in each case.

'Luminvision.com' is a United Kingdom developer working out of Devon. Costs range from £1000 to £2000 with a £65 shipping costs. You get 60 activities. They have an Australia distributor but otherwise it's all from the UK. Their system requires AdVis (advanced interactive software) which they supply. They have installed their displays in many places around the world and offer a great backup support. They are also working in the education sector and providing programmes to complement school curricula. They also have some free standing units which are a plug and play system. Simple but as they are about waist height and placed close to the wall there is more shadowing by the person interacting with the floor image.

Overhead projection looks like the best way to go with minimal shadowing by the interacting person.

'Po-Motion' is now 'Lumo Interactive' and searching under either name works. They are based in Winnipeg, Canada. They have a team of 8, 2 designers, 5 software developers and 1 working on hardware. Like the others you need a computer, projector and sensor but the difference here is that they use a Kinect for Xbox sensor. It operates on both the PC and Mac platforms. The Kinect for Xbox tracks accurately and is very easy to set up. Their system/programmes need windows 8, 8.1 or 10, with a USB 3 port, and a graphics card that supports DirectX 11 with 2GB video RAM. The image is 4:3 ratio.

Cost is $40 – 150 US as a one off licence fee and games range from $7 – 32 US. (again a one off fee). There are over 80 floor projection games available with some aimed at the education sector.
The site has tutorials to guide set up and lots of advice, and printable user guides.
The programmes are all choose and download over the internet.

I have not managed to find a place to see the 'Kinect' sensor in operation but in talking with ICT experts they have said that it should work fine and as it is already available at a low cost, around $100. Po-Motion offers very reasonable programme costs. This is the cheapest system I have come across.

I can see that this interactive system has merit. Costs will dictate which provider is best to work with and the locality of that business will be important in support etc.

I had hoped to find an option in NZ or close to NZ with a system that would not be too expensive to get up and running. The cheaper options seem to be a long way from NZ but with today's connectivity with internet and streaming of data this may not be a significant issue.
The challenge now is to set up a working system in school and to engage with one or more companies to design more programmes to support the education needs of NZ schools.

It needs to be noted that what you see on the computer is sharp, clear, and intense but once it is projected onto a large floor surface this is reduced somewhat.

Conclusion;
'Modern Learning Spaces' in schools would be enhanced with interactive video floor projection and it is clear that children will be keen to interact with this form of media.
It is clear that little of this concept is available in NZ and hasn't found its way into NZ schools yet.
The issue still remains that the developers' focus is on fun/games with children's interaction and enthusiasm high, but the support for 'learning' for children is low, until the software developers shift their attention to specifically target children's learning.

There are some fantastic software developers in NZ and getting them to develop educational programmes is all about costs. If there is a strong market for these programmes we would see programmes developed. Most of the large overseas companies are making their money with mostly fun activities without a strong focus on education. This is an area that will grow over time but is lacking at the moment.

Yes, a cheap set up can be done with low programme costs.
I hope to have a set up running shortly but my study is altering my direction.
I still intend to develop a basic interactive floor projection set up for our students and further analyse the students' interaction, engagement and learning over time….but,

I have connected with a NZ developer with a passion for interactive projection with a focus on education who is working on a high quality system that has sparked my interest. This uses floor based short throw projectors (about 30cm from the wall) and displays on the wall. There is no shadowing by the person interacting with the image as they are behind the projection. The image is around 2m long but can be extended to cover a 6m wall using multiple projectors. The programmes

being developed are creative and educational and can accommodate multiple users. The programmes would challenge children without set outcomes and there is a high educational value. I see this as a real leap forward but it will take more than one school's involvement to see this become a reality. To get this developed into an ongoing commercial viability it's all about cost and quantity. The more schools interested the more likely we can develop high learning activities using interactive video projection.

So…….. floor projection still has its place in engaging children but with limited learning opportunities at the moment and there is some shadowing by the participant from the overhead projector. My attention is moving towards wall projection and what this can offer children in terms of improved image quality, no shadowing by the participant, engagement and quality learning. My challenge has only begun.