

Licking Planets and Stomping on Buildings: children's interactions with curated spaces in virtual reality

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Introduction

This visual essay draws upon data from a commercially-funded project on which I was a lead researcher (Yamada-Rice et al, 2017). The study was undertaken to develop a set of best practices for the production of Virtual Reality (VR) content for children. The project combined large-scale quantitative data from a global survey with qualitative methods used to observe and interview a smaller sample of 8-12 year-olds. There was also a health and safety element that tested for changes in vision and balance pre and post VR use. This article draws from the qualitative dataset that investigated children's interaction with a range of VR content and devices, the aspects that engaged them and how easy it was to use.

Like the graphic work of Jones & Woglom (2016) this visual essay is a 'mutating text' (p.1) that uses varied visual forms (graphic narratives, screenshots of VR content, line drawings and photography) to connect with and make visible aspects of children's engagement with spaces and objects in VR. The varied visual media I produced (of which only some are contained in this essay) provided insight into the meaning of the data through their use as either transcription, analysis or as a means of exploring its connection with theory. It is believed that the findings gained from these experimental ways of exploring the data could not have been achieved by using only one visual means. Thus it is my intention to present and discuss some of the variety of visual methods used in order to show how the combination provided 'material- discursive analysis...a materially rich and complex manner of inquiring into and analyzing' (ibid, p.2) children's use of virtual spaces. The findings of which ultimately link with theories of children's geographies that highlight how:

...investigations of people's sense of place remain an important avenue of inquiry to help understand how people develop relationships with their selves and with their environment.

(Bartos, 2013, p.89)

This special issue of *Children's Geographies* explores this in relation to the specific context of young children in museums. This visual essay makes a contribution to this field by providing knowledge of children's meaning-making and engagement with virtual environments.

Children's use of VR is both directly and more abstractly related to deepening our understanding of young children within curated spaces. Firstly, the museum sector has a growing interest in immersive technologies. VR is already used in a range of ways both to offer virtual experiences within the physical museum (e.g. The Franklin Institute) and to widen participation by offering off-site virtual museum tours (e.g. The British Museum). Additionally, emerging 5G technologies show early signs of making it possible to augment virtual three-dimensional objects into physical spaces. Thus illustrating a possible future in which knowledge about how children engage with virtual curated spaces might need further consideration by the museum sector.

At a basic level parallels can be drawn between children's experiences of traditional museum spaces and that of some VR content explored in the study presented here.

For example, *Google Earth VR*, like many museum spaces, has not been designed specifically for children and the space is highly curated. The Google content takes the user on a tour of famous world landmarks. Like the decisions made by museum curators as to how to group objects within a designed space (McDonald 2002), so too the Google creators have decided which cities the user should visit, and within them which landmarks specifically. At the other end of the spectrum the VR game *Job Simulator* (Owlchemy Labs) has been designed to encourage interaction with content and appeal to a younger audience. In this way it is comparable to museum collections that have been designed to include hands-on experiences for children.

While reflecting on VR content such as that above this article provides insight into how the findings about young people's engagement with virtual environments from the study I conducted are similar to those of studies that have considered children's interaction with physical museum spaces. For example, Dick's (2013) work has shown:

...that discovery centres are highly social spaces in which cognitive processing is only one aspect...[and] that the twin dimensions of the **social** and the **sensory** are also paramount in governing children's responses to exhibits.

(Dicks, 2013, p.301)

The remainder of this article is divided into two sections to provide more in depth illustration and discussion of how the VR study findings support those of Dicks (2013) that as with physical spaces (1) social and (2) sensory means were also paramount to the ways in which children engaged with virtual spaces and content.

Sensory Meaning-Making

The body, its movement and related senses has been documented as a means by which humans understand new experiences (see e.g. Longhurst et al, 2009). Also Hackett (2014) suggests movement is a 'key element' of young children's multimodal communicative practices, which includes 'place making activities' to understand museum spaces and their exhibits (p.5). In order to comprehend the role of movement to children's meaning-making in VR I produced a series of line drawings of a child's body when using *Google Earth VR*. These were traced at periodic intervals from screenshots of the video-recorded observations. The drawings were used to analyse the extent to which children's movement in VR was similar/ different to how they interact in other spaces. Simplifying the data by removing colour, sound and background details showed similarities with Hackett's (2014) work in museums that children were 'zigging and zooming all over the place'. When I animated the line drawings using stop-motion it further visualized how children's movement in VR is not dissimilar to how a dancer might communicate (Figures 1 and 2):

INSERT Figure 1



Figure 1: Line drawing used to understand children's movement in *Google Earth VR*
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INSERT Figure 2



Figure 2: Movement in dance. Image © Laurent Ziegler

The transduction of the video data into lines also drew on ideas from Ingold (2007) who writes that lines are an output of a vast variety of human communication practices from sound, to walking and writing. In relation to this Ingold writes:

...as walking talking and gesticulating creatures, human beings generate lines wherever they go. (2007, p.1)

Thus the production of a series of line drawings placed one on top of the other also made it possible to explore further Ingold's ideas. By highlighting how the lines of the child's body moved within the confines of a physical space (depicted by the confines of the page on which I drew) I concurred that as with engagement in other spaces movement, and the lines that appear as a result, are an important parts of human meaning-making endeavors in VR too.

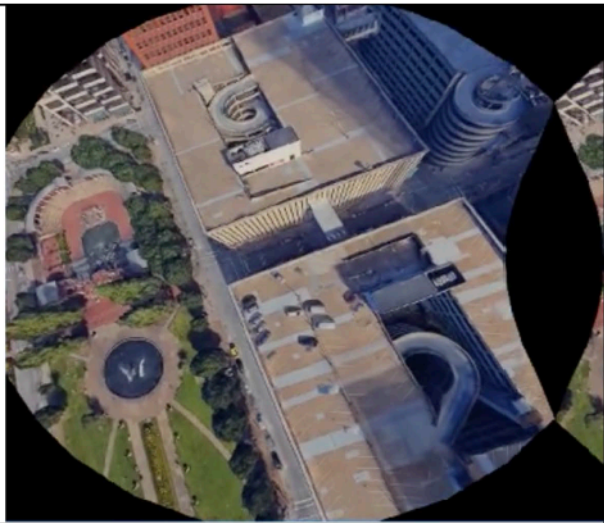
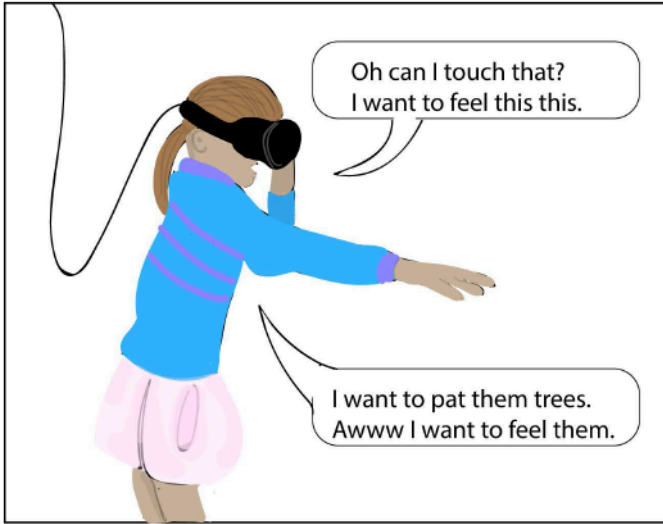
Additionally, I produced a comic strip style form of data transcription (Figure 3) that combined children's specific interactions with virtual elements in the VR content with either their hands or feet. To do so I used varied visual media that included line drawings of hand/ feet gestures, speech bubbles and screenshots of the VR content. This formed a type of multimodal transcript that drew to the fore the importance of sense to children's meaning-making practices in curated VR spaces. It could be argued that the full-bodied nature of this type of engagement necessitates a certain type of materiality of data analysis and that 'this and other graphica texts make something possible... [such as] the ways in which different mode of texts [bring about] different ways of thinking' (Jones & Woglom, 2016, p.3). For as Bennett (2010) writes:

...seeing, hearing, smelling, tasting, feeling a fuller range of the nonhuman powers circulating around and within human bodies. These material powers, which can aid or destroy, enrich or disable, enable or degrade us, in any case call for our attentiveness, or even "respect".

(Bennett, 2010 p.ix)

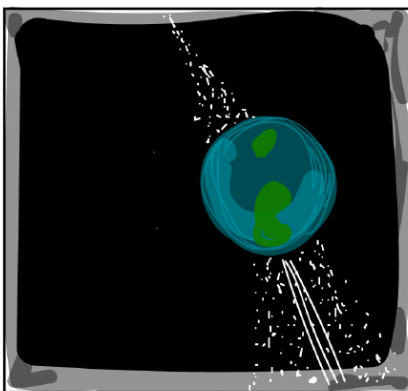
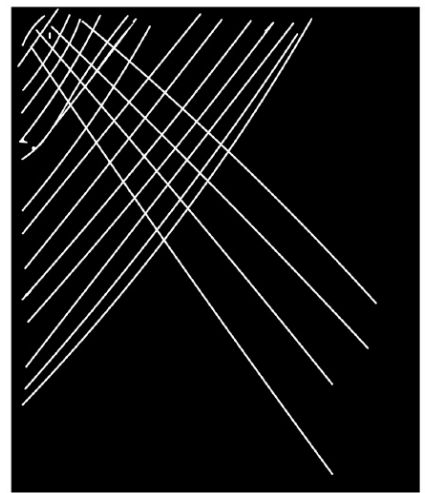
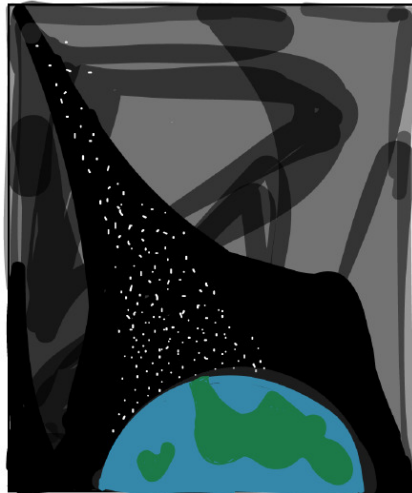
Graphica production are one way of giving attention to these aspects.

INSERT Figure 3 Google Earth interactions



During the observation sessions of children using *Google Earth VR* several children showed a desire to taste the virtual planet Earth. This caused children to walk around the physical environment (in which they were using the VR device) with their tongue out, something that was confusing for their parents watching on. Replaying the video-recorded observations and simultaneously conducting a literature review I began drawing graphic narratives related to this data to make better sense of theoretical ideas (e.g. Dewey, 1938; Longhurst et al, 2009; Tuan, 1977; Bennett, 2010) about the ways in which children experience new materials in order to explore why this was happening:

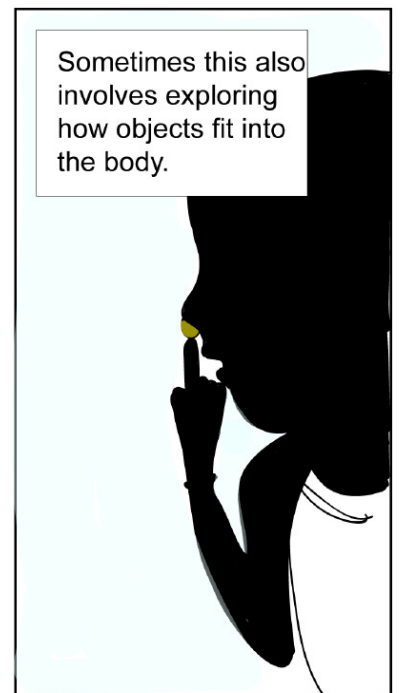
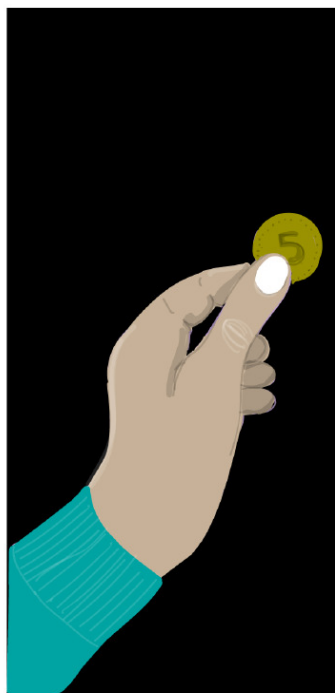
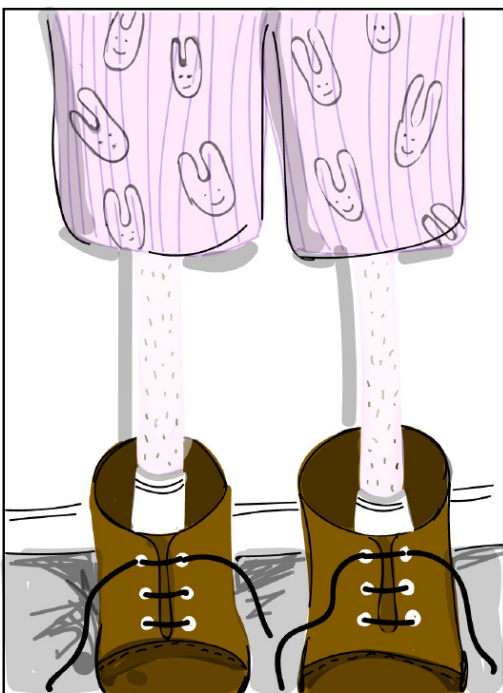
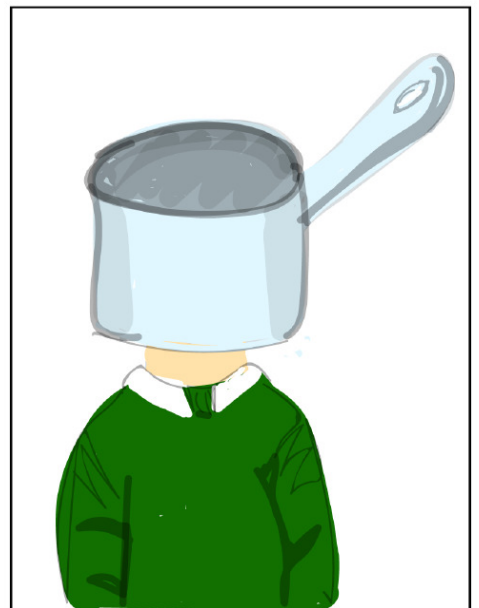
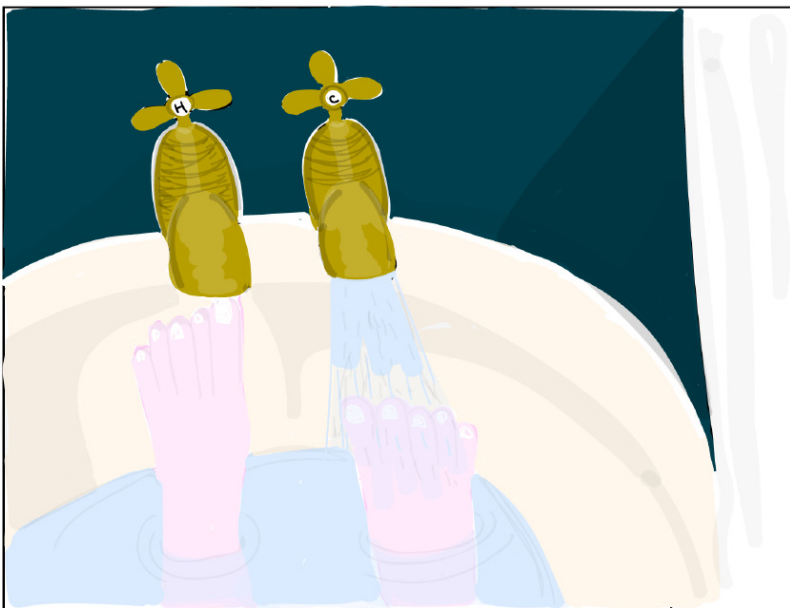
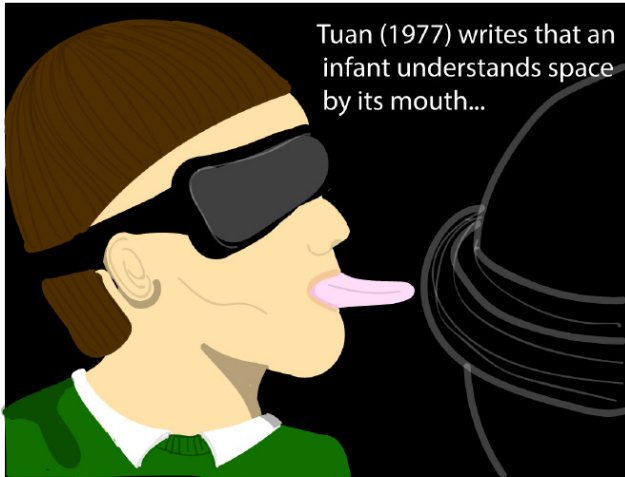
INSERT Figure 4 Graphic Narrative (3 pages)



'Materials come from the public world and so have qualities in common with the materials' of other experiences'
(Dewey 1938, p.208)

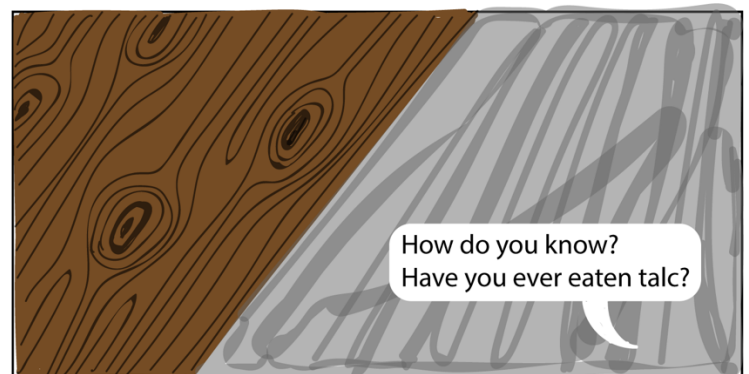
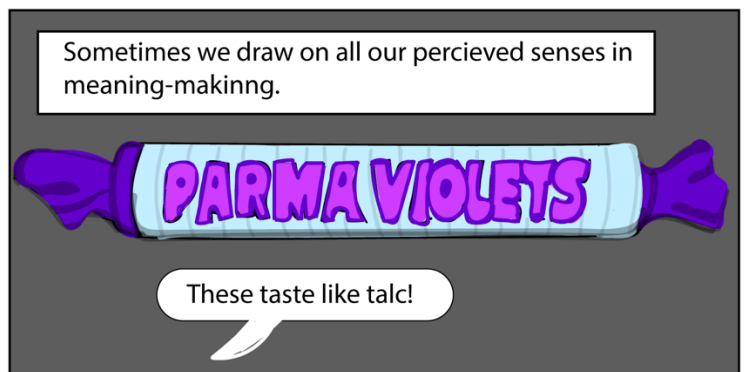
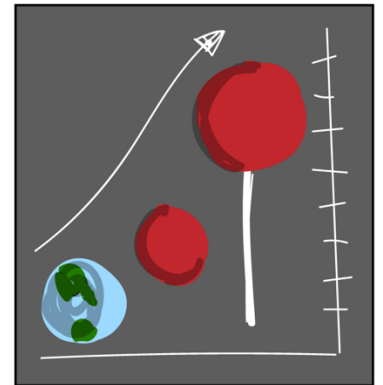
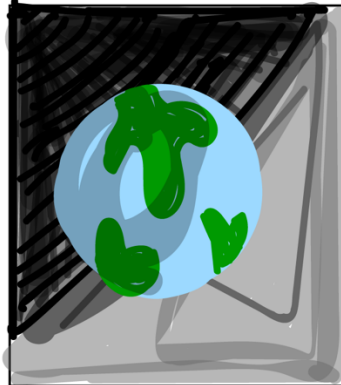
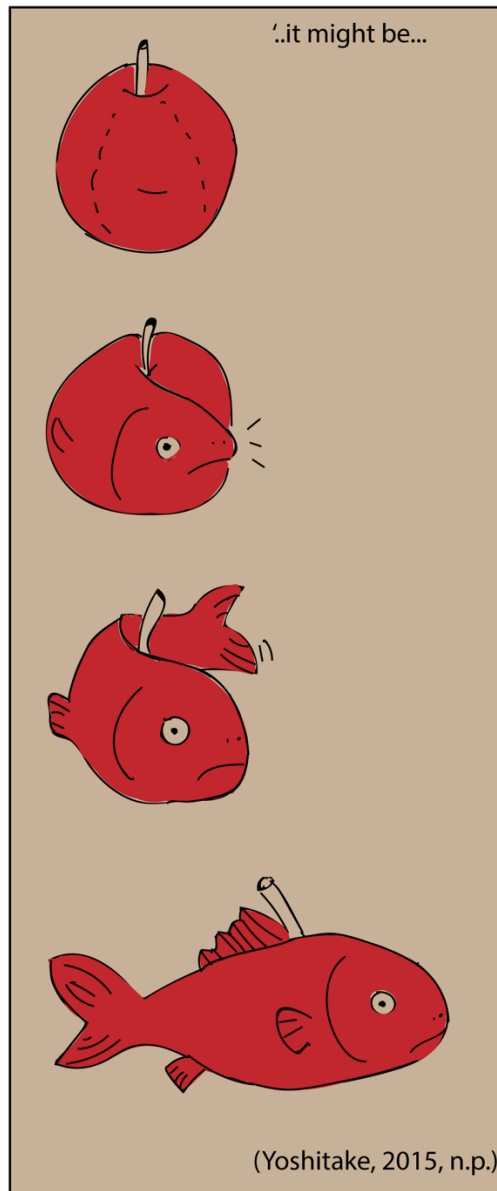
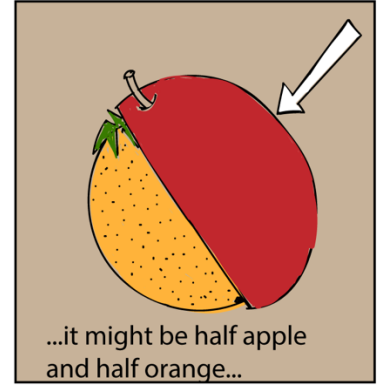
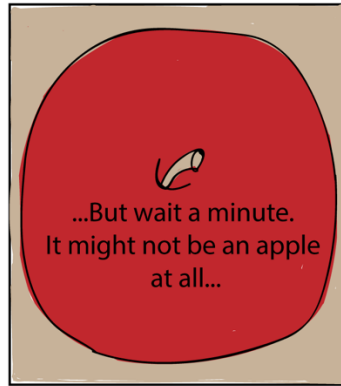


'Smells and tastes help us remember place and draw associations between our past, current and future place experiences'
(Longhurst et al., 2009 in Bartos, 2013, p. 92)



'This habit of parsing the world into dull matter (it, things) and vibrant life (us, beings)...
the quarantines of matter and life, encourage lively powers of material formations...'

(Bennett, 2010.p. vii)



Taken out of context the page of the graphic narrative with the Dip Dab sweet seems strange, surreal even. This is exactly how parents reacted when they saw their child's interaction with Earth in the VR environment. As children crawled, stomped and walked around the room with their tongue out trying to lick the virtual planet their parents said things like "They don't normally act like this", "I am so sorry, I don't know what has happened to them", and "Make them stop doing that". The newness of the technology and the perceived separation of the user's sensory experience to the parent sat outside the immersive virtual environment seemed to exemplify that the way in which adults and children interact with spaces and materials are fundamentally different from one another.

Drawing the Dip Dab sweet narrative made it possible to think more deeply about the importance of memory to sense and meaning making:

What is more important is that this structure being created in the brain uses as its building materials not only the external input supplied by the sensory organs but also memories that are invoked by this input...memories not only lead the recipient to voluntarily ruminate on the past but called upon in succession as the brain receives outside stimuli also act to hash out an image for understanding new information.

(Hara, 2007, p.157)

Thus the process of producing a graphic narrative allowed me to realise how the medium can be an important way of exploring the connection between data and theory. Like Sousanis (2018), I found that comics are a suitable medium for understanding and displaying complex ideas and stories.

The final section explores visual means that were used to understand the importance of social interaction to children's meaning-making practices in VR.

Social Meaning-Making

Drawing on Falk and Dierking (1992), Dicks (2013) writes that:

...there is now a consensus in visitor research that visitors experience museum environments in highly social ways, in which personal, social and physical context overlap.

(Dicks, 2013, p. 312)

Likewise, contrary to what might be perceived as an isolated experience, the children in this study engaged with virtual environments in very social ways. Once again comics were used as a medium for understanding the nature of these social interactions. For as, Sousanis (2018) writes the aesthetics of comics can be used for research analysis because 'the visual form is never a secondary pursuit- from the start, form and meaning are united and equally inform one another' (p.193).

Figure 5 shows how the form of the comic below made it possible to gain insight into two children's social interaction while one played on the VR game *Job Simulator*. Firstly, by colour coding the speech bubbles so that white represented the child wearing the VR headset and black for their friend watching their play on a computer monitor while joining in the role-play from outside the virtual environment. Additionally, the decision to include screenshots of the VR content made it possible to comprehend how social interaction was encouraged by the aesthetic style of the game. Thus in combination with the interview data from the child-participants I was able to draw conclusions that the low-modality (unrealistic) images contained in *Job*

Simulator encouraged more role-play than in higher modality content with more realistic imagery.

INSERT image 5 Job Simulator



Such examples show the extent to which children's use of virtual environments are very social and that this was particularly the case with open-ended VR content that used less realistic images. This ties with theoretical ideas of comic artist and scholar McCloud (1993) that has shown how more simplistic imagery allows viewers to transpose their own narratives onto that of the artist's.

Conclusion

This visual essay has shown how, as with studies into children's meaning-making in physical spaces such as museums, but also, educational settings, green spaces and play areas (Hackett et al 2015), young people's interactions with virtual spaces, objects and texts within them are also experienced through sensory and social means. The findings were represented to allow the reader to contemplate the similarities and differences between how children embody and engage with the 'nonmaterial' of virtual curated spaces as opposed to physical museums and their material objects, and also how this manifests in physical interactions and experiences. Finally, the article sought to show how the combination of 'drawing and writing facilitated understandings that couldn't be attained otherwise' (Sousanis, 2018, p. 190) and as such there remains a need to continue to push for new methods to make sense of data about children's geographies.

Dedication

I dedicate this visual essay to my good friend and creative ally Lisa Procter. Lisa gave me feedback on an initial draft but took her life before it was accepted. At a pertinent time when there is widespread concern about the abuse of early career actors in Hollywood and the proceeding #metoo campaign, I would like to pay testament to the way that Lisa spoke out about the psychological and physical harm that exists in universities. Thus I call to arms senior academics to help protect those more junior from all forms of academic abuse of power.

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