**Gesture and Space for Teaching, Learning and Communicating Science Fiction**

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**Abstract:**

Use of the Microsoft Kinect sensor for teaching and student learning relate to the importance given to multimodalities in the Australian Curriculum. Trials of Kinect applications were focused on genre studies for secondary students at a government school in the Australian Capital Territory. Kinect-generated digital videos in a flipped classroom require further research to evaluate their impact on student learning outcomes and to meet new teaching standards. Following the TPACK model for subverting business systems for pedagogical ends, Kinect applications are recommended for secondary teaching and learning, with room for careful critiquing of the sensor itself and its purposes.

**Gesture and Space in the Australian Curriculum**

Trials using the Kinect sensor with secondary students studying English literature and particularly the genre of Science Fiction continued over two school years at Telopea Park School, a bilingual government school in Canberra. The Kinect was used either with an Xbox 360 console or through a few applications running under Windows 7. The explorations related directly to new, special emphases in the Australian Curriculum: English.

An evolving, online document, the Australian Curriculum: English referred over thirty times to multimodalities. In English, a multimodal text was defined as a, "combination of two or more communication modes (for example, print, image and spoken text, as in film or computer presentations)" (ACARA 2013) with five modes identified: linguistic, visual, audio, gestural and spatial (Anstey & Bull 2010). The authors of the Australian Curriculum link to documents noting the need to support students "to create multimodal texts with ICT" (Moyle 2006) and teachers to "demonstrate their understanding of the diverse modes in which texts can now take form and the cultural and linguistic demands made by multimodal texts" (ACTA 2010). Exploring teaching and learning with the added dimensions of spatial and gestural modes using the Kinect sensor was a natural response to calls from the Australian Curriculum and linked directly to trials of the Australian Curriculum: English in Years 7-10 schools in the Australian Capital Territory (ACT), a jurisdiction often found as an early and enthusiastic adopter of Federal curriculum documents.

And of course, the genre of Science Fiction (SF) studied through a series of short stories, a handful of films and some, few ancient novels that might be termed Literary SF was ideally suited to the hammerhead-shark, unblinking Cylon (Colla 1978) red eye and dead glass lenses of the Kinect. The sensor was used not for gaming with such excellent titles as *Kinect Star Wars* (LucasArts 2012), though this was played and analysed as part of another study in a non-academic, recreational Enrichment activity. Instead, the Kinect was used for interviews with and between students and primarily for the creation of digital video content episodes, roughly following a ‘flipped learning’ model.

Canberra schools were urged to adopt the 'flipped' classroom in senior secondary studies (Tucker 2012), summarised succinctly for this study meaning, “that while students are in school, they work on their homework. When they go home, they watch recorded lectures. This flipped model gives students who have struggled with the traditional lecture approach an opportunity to succeed, since it gives students more control over how they learn. By using recorded lectures, parents can learn with their kids and help guide them as they navigate the lesson” (Washington 2013). After the astonishing success of the Kinect sensor and while it was undergoing cracking open to run on many other platforms than just the Xbox 360 console, Microsoft released in mid-2011 a series of experimental applications under the broad category of *Kinect Fun Labs*, including *Avatar Kinect*. This application allowed for the creation of an avatar or built one from a close-up of the user’s face. This writer was displayed as a pudgy, middle-aged teacher wearing glasses that gave a series of brief talks recorded to the Xbox 360, downloaded to *KinectShare* <<http://kinectshare.com/>> and from there edited and sent up to *Vimeo* <[www.vimeo.com](http://www.vimeo.com)> in a dedicated channel with the video accessible through a link in the school’s intranet. *Avatar Kinect* allowed the teacher to speak for just a few minutes, whilst perched on an asteroid in a section of space visited by meteor showers and occasional flying saucer attacks.

Up to eight students could also come into the shared space of *Avatar* Kinect to discuss topics for the week, in one case looking at Mark Twain as a SF writer. The extraordinary advantage of this was the anonymity of the avatars on both *KinectShare* and then stored with *Vimeo* as no privacy guidelines were breached, unless a student could be identified by voice, which seemed unlikely given the often appalling sound quality of the early software. Students could give a presentation using the software and their presentation was accessible for moderation across the school system, published and polished with a commensurate boost to the student’s confidence.

In the same fashion as *Avatar Kinect, Yoostar 2* (Blitz Games Studios 2011) was tested for English presentations, running on the Xbox 360. At its base level, the program had hundreds of short video clips and the students could take part as one of two players and deliver the dialogue in Karaoke fashion with their forms superimposed over the filmic background. At a more useful level, there were also simple backgrounds, including a lunarscape over which the student could give a five minute presentation, running as with a green screen background but a much lower cost. This suited the timing of the Year 8 and 9 presentations and also made possible the use of gesture and architectural space required by the new multimodalities (Anstey & Bull 2010). Again, recordings could be saved and more worryingly, shared with users of the same program worldwide, though this was not allowed in school. The voluntary contributions of speeches with the real faces of students for the mutual regard of the Surveillance Society were positively discouraged, as is discussed later.

Along with the stress on multimodalities in the Australian Curriculum: English came the Australian Institute for Teaching and School Leadership (AITSL) standards and guidelines. For teachers to progress through stages of competence, though these were not linked to pay scales, the guidelines mandated a range of standards. Several standards relate to the use of digital resources and tools (Standards 2,1, 2.6, 3.4, 3.5, 4.1, 4.2, 4.4 and 4.5) including the safe use of the internet, but for this project the most interesting were those that intersected directly with the Technological, Pedagogical and Content Knowledge (TPACK) model (Mishra & Koehler 2006) that was part of every pre-service teacher’s learning at all Australian tertiary institutions in 2011. The use of TPACK in English is covered in detail in Hughes and Scharber's (2008) chapter in the TPACK Handbook and in more practical, Learning Activity Types on the best and original TPACK Wiki (Harris and Hofer 2011). Very recent research in teaching adolescent literature through the TPACK lens or framework is seen in George (2011) as well as Sheehy and Clemmons (2012). The approach taken at Telopea Park School sought to meet the demands of the need for multimodalities in English studies, as well as meeting the demands of the AITSL Standards, but its true essence was in choosing the right suite of technologies for particular classes with their particular studies in Science Fiction: aiming for the bulls-eye of the TPACK Venn diagram.

Following the flipped classroom model, a series of applications using the Kinect with a Windows 7 environment were tested with students in Years 8 to 10 and the best of these seemed to be *Personify* < <https://personifyinc.com/home>>. This program has stayed the application of choice for creating digital video content using an architectural space as it enabled gestures, in this case to move through a background of a PowerPoint slideshow, a film or any other digital stream. The gestures allowed the teacher, modelling the techniques to students who are required to present using the same multimodalities, to stop the show, zoom in on an area, run a video with a hand gesture, all whilst visible as a sort of miniature full figure with text points, diagrams or clips from a video running behind. Indeed, the distance measurement with the Kinect allowed the teacher to step through and dissolve back into images with a voice over edited using the software tools current for ACT teachers.

A series of Vimeos were made looking at elements of fiction within the study of Science Fiction. These changed from PowerPoint slides with a human presence, their jocund and grand-avuncular teacher slipping through slides, to a more architectural space, again following Anstey and Bull’s (2010) notes on the gestural mode comprising aspects such as movement, speed and stillness in facial expression and body language as well as the spatial mode, comprising aspects such as proximity, direction, position of layout and organisation of objects in space. A cheap, chipboard display case was stapled together and painted white, coloured lights used for the lighting in different rooms, and a variety of small models used to accompany the particular room and the point to be made in that room. This approach was based on Yeats' (1966) *The Art of Memory*. The use of colours, objects and a guided tour of different rooms with figures in each room was to remind the audience of a key point in the lecture, harkening back to Cicero’s demonstrations for his arguments (Yates, 1966).

For a point on narrative structure in the SF short story a rhinoceros standing in the depths of a white room bathed in blue light was used. The teacher pointed out the rhino’s horn structure to describe the first hook of a story, the introduction of characters, rising action and a climax and so on, through the superimposed image of blue-bathed plastic rhino horns. While students remembered the structure of the narrative through the rhino model and the short video over a year later, their reference to a narrative structure as a typical ‘rhino-horn’ mystified later teachers.

At this stage *Personify* was used to create the narration, using the Kinect to film the teacher in front of a running digital video that toured the architectural space of the white boxes with different figures and colours. From this point the way forward seemed to be what is called the *Minority Report* (Spielberg 2002) Effect, where total gestural control manipulates data and views of data as a seamless Man-Machine Interface. The digital video from *Personify* was taken from their share site, credits and music added and a layer, using *Adobe Premiere Elements* < <http://www.adobe.com/au/products/premiere.html>>, also part of the software suite available to ACT teachers. Now, a gesture upwards would see a graph appear, or a bright text box, as a floating element manipulated by the teacher and behind the teacher was an apparently three-dimension space that moved and changed.

As an educator attempting to meet new requirements for the Australian Curriculum: English, as well as AITSL Standards whilst employing the TPACK model for specific, differentiated students in specific classes this was a worthy experiment, it seemed. But readings, exhibitions and world events showed other aspects of this voluntary contribution of personal data. I was subverting (Kereluik, Mishra, & Koehler 2011) the use of *KinectShare* and several other video and gaming sharing sites for educational outcomes, becoming increasingly aware of the vast range of voluntary, identity contributionism amongst my students and other young people.

**Rafael Lozano-Hemmer’s *Recorders* and Learning to Love Big Brother**

Lozano-Hemmer’s *Recorders* (2011) exhibition at the Museum of Contemporary Art (MCA) used a plethora of sensor devices, including the Kinect sensor to create artworks based on personal interaction in a space. Without the observer, there was no artwork. Viewers and participants were recorded to computer banks and displayed on vast white walls, superimposed over one another, fading through and out but always recorded for the next exhibition so that a data bank of images could be tens of thousands of viewers contributing their faces, movements and gestures to the artworks. One room collected fingerprints and displayed these in reducing size until a wall could show ten thousand prints. Viewers placed passports, open wallets, credit cards and their IDs on conveyor belts that digitised them and showed them back interactively as a collage with a thousand other personal identities.

Like Kinect sharing, Lozano-Hemmer's recorder artworks can "hear, see or feel the public and record and replay memories entirely obtained during the show" (Laurent, 2010). Also like the Kinect sensor in tens of millions of households, there is the "seduction of participation, preservation and inclusion, and the violence of Orwellian and ubiquitous computerized detection" (Laurent, 2010). While Lozano-Hemmer admits that the exhibition space is not neutral and that "materializing surveillance just normalizes it", nevertheless the technology is a language that is not optional and "what we can do is pervert technology, to misuse it to create connective, critical or poetic experiences, to make evident its presence and the way it limits, expands or constructs our identities" (Laurent, 2010).

In his lecture 'Surveillance as (Life) & [Art Form]: A sociological reflection on Recorders', Gavin Smith (2012) noted that participants were fascinated with themselves, "very curious to see their fingerprint in this system, down the screen… smaller and smaller and into the boxes," pursuing" a natural curiosity and pleasure and fun in experimenting with bio-physical shapes." The narcissism is not simply limited to participants, it is multi-dimensional. "We are all surveilling each other through our mobile phone cameras, etcetera, and uploading these images. Particles are flying around everywhere and we are all part of the capture and surveillance" (Smith, 2012).

In *Loving Big Brother* (2004) John McGrath argues convincingly from Freud's understanding of narcissism as a stage in sexual development between ‘auto-eroticism’ and ‘object love’ that is intimately linked to the "fetishes of sight" through "scopophilia (love of watching) and exhibitionism (love of showing) as a ‘narcissistic formation’ in which ‘the subject’s own body is the object of the scopophilia" (McGrath 2004). It is the object of scopophilia that is appropriated, the body image as digital data.

McGrath notes that our data bodies surround us in surveillance space and these are not simple representations of ourselves, nor falsifications, but what are called ‘hybrid versions’ (Gurses & Berendt 2010). The multiplicity of selves will be "distorted and exploited by the consumer-corporate system" but the real danger lies in disengaging with the surveillance space. More important are new understandings of surveillance, particularly spatial understandings that will "help us live creatively and productively in post-private society" (Gurses & Berendt 2010). It is the duty of the citizen to challenge and deconstruct the ideologies of surveillance, perhaps through counter-surveillance. While we disseminate information on the social web and our ecology of devices, participating in "horizontal and vertical information broadcasts and surveillances" (Gurses & Berendt 2010) we build vast collaborations serving to propagate collective will and consciousness rather than the narrow views of a media elite. Surveillance is to be recognised and embraced - we watch each other and draw attention to the dimensions of power in every space, critiquing who is advantaged and why, living consciously and deliberately in a digital democracy.

**Always On and Recommendations for Schools in the Surveillance Society**

The Xbox One Kinect has lost its Cylon hammerhead sleekness with compound eyes. Instead the Kinect sensor is a Cyclops but a brand logo balances the lens, making the new sensor a black, Death-Ninja *Wall-e* (Stanton 2008) ocellus.

As reported by *Der Spiegel*, the Federal Republic of Germany’s data protection commissioner, Peter Schaar, was ‘unsettled’ by the recording of all sorts of personal information by the Xbox One as it was said to be always running, rather than coming to life when powered-up. The ‘always on’ Kinect in McGrath’s (2004) surveillance space is apposite, with some writers calling the Kinect “an all-seeing Xbox eye” that beams “info back to some Microsoft cloud center which, as we now know, is tapped by the government” (Miles 2013), then processed on a server and possibly passed on to third parties, spying on the living room to make a “twisted nightmare” (Gallagher 2013).

‘Mother’, the limited sentience of the Nostromo spacecraft in Alien (Scott 1979) was also always on and connected, always ready, always recording, always sending information back to its creators.

Cognisant of the arguments regarding privacy, voluntary participation and the mutual surveillance society and following the TPACK model for subverting business systems for pedagogical ends, Kinect for Windows and select Xbox Kinect applications are recommended for secondary teaching and learning, especially useful for moderating students’ presentations as avatars, ironically enough given the emphasis on the appropriation of personal identities by technologies like the Kinect sensor. Its use for the creation of personalised lectures to communicate important content for later discussion and debate also seems clear. Still to come with the Xbox One advanced sensor may well be analytics of student behaviours in a classroom, perhaps providing valuable data on student performance and engagement through their movement and interaction as anonymous heat signatures.

The best is yet to come. Keep watching/being watched.

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