

Engaging Collections and Communities: Technology and Interactivity in Museums

Paul Longley Arthur¹

¹ Edith Cowan University, WA 6050, Australia

paul.arthur@ecu.edu.au

Abstract. Museum computing is a field with a long history that has made a substantial impact on humanities computing, now called ‘digital humanities,’ that dates from at least the 1950s. Community access, public engagement, and participation are central to the charter of most museums and interactive displays are one strategy used help to fulfil that goal. Over the past two decades interactive elements have been developed to offer more immersive, realistic and engaging possibilities through incorporating motion-sensing spaces, speech recognition, networked installations, eye tracking and multitouch tables and surfaces. As museums began to experiment with digital technologies there was an accompanying change of emphasis and policy. Museums aimed to more consciously connect themselves with popular culture by experimenting with the presentation of their collections in ways that would result in increased public appreciation and accessibility. In this paper these shifts are investigated in relation to interactive exhibits, virtual museums, the profound influence of the database, and in terms of a wider breaking down of institutional barriers and hierarchies, resulting in trends towards increasing collaboration.

Keywords: virtual museums, interactivity, cultural heritage, community engagement

1 Digital Technology in Museums

Man [sic] has seen the agricultural revolution, the Renaissance, the Industrial Revolution and is now on the threshold of an information revolution which is likely to shape his mind in the next century. Massive assimilation of information, systematic storage, quick retrieval and unobtrusive dissemination of knowledge may lead man to a new understanding of life and values that may mark the beginning of a new era in human civilization in AD 2000.

– Saroj Ghose, in *Museums 2000* (1992)¹

The 1989 conference marking the centenary of the establishment of the international Museums Association led to the production of an edited volume, *Museums 2000*:

Politics, People, Professionals and Profit (1992).² In a published keynote address, Suroj Ghose (then Director General of India's National Council of Science Museums) recognised that computing systems were about to bring far-reaching changes to information management and access that would revolutionise society and even 'shape' minds. In a quotation from the speech above, he boldly predicted that the combination of large-scale information assimilation and corresponding advances in storage, retrieval and dissemination facilities could herald a 'new era in human civilization.' Digital technology had already impacted on museums, in particular science museums, which had led the way for more than half a century in the development of interactive installations and displays for engaging visitors with museum collections. Ghose summarised their evolution in these terms:

Side by side with the artefacts came up a new brand of exhibits to explain the basic function of artefacts and to demonstrate scientific principles. Animations were devised to simulate a particular situation which cannot be created in a museum setting. Push-button demonstrations were introduced to bring the concept of experimentation out of laboratories into museums. Audio-visual techniques were presented to create a particular atmosphere. Scaled down and sometimes scaled up models, sectioned artefacts or models, life-size dioramas, meticulously created period rooms and many other different modes of presentation were introduced into science museums to compact more information into a given space and to attract and induce people to retrieve information as quickly as possible. With new inventions and innovations in laser, video, microprocessor and computer technology, science museums went through a radical change. All this came in an evolutionary process spanning over half a century and reflecting a shift in basic objectives and functions of a science museum.³

Community access, public engagement, and participation are central to the charter of most museums and interactive displays are one strategy used help to fulfil that goal. In the museum context the purpose is clear: the museum seeks to deeply involve visitors in the process of learning, striking a balance between looking, doing, and learning. Over the past two decades interactive elements have been developed to offer more immersive, realistic and engaging possibilities for representing the past including through incorporating motion-sensing spaces, speech recognition, networked installations, eye tracking and multitouch tables and surfaces.

A landmark exhibition at the National Museum of Australia, 'Yiwarra Kuju: The Canning Stock Route,' recently showcased large canvasses of Aboriginal desert painting alongside touchscreen tables. With the paintings effectively 'untouchable,' the touchscreens were a tactile outlet not only for children (a traditional target demographic) but for adults too. The interactive tables were not designed only to offer information for learning; rather, they were creative installation works in their own right, allowing visitors to draw patterns in the sand of a vast virtual desert and pan around the map. Adjacent tables plotted a large continuous landscape, evoking the land from which the paintings in the exhibition had originated.⁴

This is may be just the beginning of the era of sensory experience in museums, foreshadowing future innovations that are barely imaginable now. Paradoxically, this kind of experience does not rely on the presence of original artefacts, only on their simulation. It seems that people are increasingly attracted to and satisfied with the *illusion* of direct contact with the real, via a virtual path, especially if it can engage their senses as well as their minds. In *Infinite Reality* (2011) two scientists who were pioneers of virtual reality technology use a ‘revolutionary’ rhetoric, recalling Ghose, when they imagine the future museum three hundred years from now in terms of ‘a quantum leap of sorts, a turning point in our history distinctly marking what came before and after it,’ with ‘virtual worlds encompassing all of the senses.’⁵ Ghose was only predicting the developments of the next decade; these scientists look ahead 300 years.

Although the *Museums 2000* book was prophetic in some of its insights, it contains, surprisingly, only a few mentions of the word ‘computer,’ just one reference to ‘database’ (a term in use since the 1960s) and eleven instances of ‘media’ (all in the sense of ‘the media’ rather than in relation to digital media as medium), within 200 pages of text, contributed by multiple authors. And yet, museum computing is a field with a very long history that has made a substantial impact on humanities computing, increasingly now called ‘digital humanities,’ that dates from at least the 1950s.

There were practical reasons for the introduction of computers in museums, as there were in other sectors, relating to efficiencies in information management. There was also a sense that the digital was the ‘language’ of the information society. Interactivity and computerisation seemed to reach out in a particularly effective way to children, and to families, a target demographic for museums.⁶ However, prior to the development of hypertext systems and the World Wide Web, the concept of interactivity remained restricted, referring mainly to installations intended to facilitate educational engagement.

As museums began to experiment with digital technologies there was an accompanying change of emphasis and policy. Museums aimed to more consciously connect themselves with popular culture by experimenting with the presentation of their collections in ways that would result in increased public appreciation and accessibility.⁷ There was a general shift from privileging the display of objects in collections to a new expectation that museums would also provide contextual information about museum objects. In this way museum practice started to be linked closely with the goals of practitioners in the broader digital humanities field even though this connection was rarely articulated at the time.⁸

Some aspects of the new digital approaches were so clearly positive that ‘museum policy and marketing rhetoric in many parts of the globe began to trade heavily on the arrival of new media as a sign of museum democratisation, accessibility and excitement.’⁹ Nevertheless, many continued to feel a sense of loss of control as a result – that technology is exerting too heavy a hand on museum policy and practice. Certainly it is true that the new duality – of museums being physical as well as virtual environments – has posed challenges as well as presenting new opportunities. The physical and virtual were once thought of as very separate spaces, with different and even opposite concerns. The traditional view is that museums should primarily be physical places to display material culture, fostering a direct engagement between visitors and history.

In this paper these shifts are investigated in relation to interactive exhibits, virtual museums, the profound influence of the database, and in terms of a wider breaking down of institutional barriers and hierarchies, resulting in trends towards increasing collaboration.

2 Virtual Interactions

Some of the earliest virtual museums that date from around 1994 remain active. Consisting of a limited set of static web pages, these pioneering ventures now appear very simplistic. Clunky operating system interfaces, limited computer processor power and storage, and rudimentary multimedia capabilities resulted in an online user experience that was very slow indeed, and the engagement – so central to the museum visitor experience – typically resulted in frustration at the missing content and dead links that were common characteristics of the early World Wide Web era.

Demonstrating exponential advances in web technology, virtual museums have taken multiple forms over the past decade. The term is commonly applied to exhibitions of born-digital or digitised material that may be drawn from one or more museums or collections. Some are highly interactive, such as the Virtual Digital Olympic Museum, an experimental virtual museum offering an immersive view of the 2008 Beijing Olympic Games, ‘dissolving the barriers between the museum visitor, the building’s architecture and the information contained therein,’ and providing an introduction to the architectural concepts and forms that are shaping 21st-century museums. The project involved a team of architects, working with information technology and communications experts at Darmstadt University, Germany, to ensure that the virtual architecture did not simply create spaces to accommodate digital interactivity but embodied aspects of today’s digital culture in its design. Other virtual museums are effectively portals to or views on multiple museum collections, such as the Virtual Museum of Canada, facilitated by the Canadian Heritage Information Network (CHIN), which features nearly one million images drawn from hundreds of individual collections and institutions.

Institutions registered domain names for the World Wide Web at a time when it was not yet possible to know what an address in cyberspace may offer. There were practical fears. Would online presence result in fewer visitors actually coming through the doors of the museum? There were more deep-seated anxieties too. These centred on the status of the ‘virtual’ relative to the ‘real,’ and the ‘authentic’ as distinct from the ‘copy,’ leading theorists into debates that questioned the very function of museums in society. Surveying the evolution of museums in *Recoding the Museum* (2007), Ross Parry asks, rhetorically, ‘If through their long histories museums have been principally about material things (physical visits to physical objects) what possible role could there be for a machine that can only display information, surrogates and simulacra?’¹⁰ Baudrillard, as far back as 1983, wrote of ‘a world completely catalogued and analysed and then artificially revived as though real, in a world of simulation.’¹¹ The philosophy of use of media in museums was a particularly controversial and sometimes divisive topic in the 1990s. For some the concept of virtual museum was a contradiction in terms. The ethereal impermanence of cyberspace (existing at once somewhere but

nowhere) seemed at odds with the familiar solidity and physicality of the museum building (home of the collection, place of protection and preservation, a controlled environment that also provides interpretative context). Against the ‘cultures of the micro-cosmic, the singular space and the physical visit that had been built over centuries,’ the intervention of the digital and virtual in the form of the Internet, questioned the very notion of the visit itself.¹² Without the need to be there, and without the ‘threshold distinguishing its liminal space from the outside world,’ roles appeared to be reversed. Visitors would not come to the museum; rather, the museum went to the visitors, thus becoming ‘a broadcaster and publisher distributing packages of content to myriad localised and varied contexts.’¹³ These anxieties paralleled those of movie theatres as they faced the sudden rise of the home video culture, and, as in that case, the new did not displace the old, but it did make it essential to adapt and change.

Most museums now have an online presence of some kind and online outreach is a key priority for public engagement. Museums have become quasi-publishers in the process, needing to satisfy the demand for a stream of high-quality, audience-specific, tailored digital content. There is no doubt that virtual museums, digital extensions and online outreach of museums have shifted some of the focus away from the physical space of museums. The conventions around engagement and interaction in that space have had to adapt – mirroring trends in society more broadly. More than two decades after the beginnings of widespread public access to the Internet, the physical museum environment certainly shows no signs of being left behind in favour of the online presence. The fears of dwindling visitor numbers, and the virtual usurping the real, have proved unfounded. Far from discouraging through-the-door visitation, research conducted around the time of the first smart phones when computing became truly mobile showed that online visitation actually increased interest in physical collections. In the most successful cases the online presence builds a cyclical relationship, with visitors going online before and after the physical visit and so extending their contact and engagement.¹⁴ The time has come when virtual visitors can no longer be thought of as secondary to visitors through the door.

3 Engaging the Public

Today we expect digital technology to be able to stimulate and provide richly informative experiences for public engagement. Yet some museums have been criticised for relying upon new technologies simply because they are available. This is the ‘technology trap’ – that is, technological possibilities directing museum practice and so tending to supplant core priorities and policies. There is no doubt that while interactivity can encourage engagement and learning, it can also become an end in itself, where the activity eclipses the goal of using the technology. Those accessing information in the online environment want the very same things that people have always expected of museums: imaginative presentation and creatively contextualised materials that inspire and invite interpretation and learning.

Others would argue that museums need to recast the concept of ‘engagement’ that has been at the core of the mission of museums worldwide over the past century,

suggesting that the notion of interactivity should be freed from its very literal association with the use of ‘interactives’ in exhibitions, described by Witcomb as the ‘interactives fetish.’¹⁵ They advocate a broader concept of engagement with museum collections, one that embraces and exploits new interactive technologies in strategically targeted ways. Geo-locating and live streaming on personal mobile devices are again re-defining, in a positive way, the concept of the museum ‘visit.’ Others may claim that the ‘virtual’ and ‘real,’ as they were once described, are at last merging more naturally and successfully and are no longer perceived to be in conflict. With the prevalence of smart mobile devices and social media, today the digital and the physical not only sit side by side but are in a dialogue that is dynamic and increasingly user driven.

Key to current notions of engagement is the concept of a longer term relationship with the museum, an extended visit of sorts, one that starts before the decision to go there and continues during and extends beyond the original visit. With content designed for pre- and post- visit purposes, the online component starts and finishes a cycle and leads to other cycles and points of interest. I marvelled at the beauty and presence of the objects displayed so poignantly in the National Museum of Australia’s *Exploration and Encounter* exhibition that celebrated 350 years of the Royal Society in the South Seas, which I reviewed in 2011.¹⁶ As I noted in the review, however, there was far more information available on the website than on the interpretative signage in the exhibition space. The displayed items were richly contextualised and made more meaningful by the wealth of online background material. Nevertheless, there was still something indisputably magical about being there, in the presence of the artefacts, within touching range. The power of this intangible dimension of presence in the museum experience points to a future where museums embrace the vast opportunities offered by the virtual world, but retain, albeit in new ways, their traditional custodianship of physical artefacts and material culture. This can ultimately lead to a much richer contextualisation and *situation* of museum materials both within and without the museum’s traditional boundaries. Again, the notion of outreach and publication can merge with the concept of display and exhibition.

In the fast evolving Web 2.0 environment – by way of which social media applications allow for dynamic user participation, information exchange and other sorts of user-generated content and collaborative authorship – arguably the most important factor in designing a successful online strategy and presence is to respond directly to the needs and wants of target communities.¹⁷ For museum practice, social media is enabling new communities to be formed around and also contribute to, museum identity and collections. Museums are trialling various strategies, ranging from colonising existing social networking applications through to designing applications for dedicated online communities around museum content through their websites. Users are now commenting on museum holdings, including through tagging, and this is starting to influence the way museums think about their own cataloguing systems. People’s patterns of searching online are offering museums new insights into what visitors perceive as most important and interesting and it can also show that visitors see connections existing between material that are not recognised in the more rigid formal classification schemes.¹⁸

4 The Museum as Database

Museums, like computers or any other information tool, teach man to look back at his past heritage, to assimilate information in a systematic mode, to analyse gathered experience in the context of present understanding, and ideally to predict the future based on such assimilated information. Like any other information tool, museums store massive amounts of information contained in its [sic] collection and disseminates such information through its presentation. Richness of museum collections symbolizes richness of data storage in an information system, and it is the speed of retrieval system that distinguishes one museum from another. How quickly a visitor can get access to or retrieve the stored information from an artefact depends on how interactive is the object or its presentation in a museum. – Saroj Ghose, in *Museums 2000* (1992)

In this observation, made well before Web 2.0 made digital interactivity a part of everyday life, Ghose draws a parallel between the museum and the computer. Both can be thought of as communications devices for systematising, storing and disseminating information, allowing us to view the past and look to the future. Using a deterministic language that is remote from the fluid notions of engagement that would be embraced in the new museology, he links the speed of retrieval of ‘stored information from an artefact’ with the degree of interactivity in its presentation. While the comparison may look basic in retrospect, it predicted the importance of speed of access and foreshadowed the centrality of the database for museum collections.

The manual index card systems of the twentieth century had signalled the coming of standardisation in the digital era, and their locked cabinets proclaimed their increasing value to museums. ‘Rather than objects (and material culture), it was information and records that were being contained and ordered.’¹⁹ The overlapping concerns of libraries, museums, and other publications and collections that situate themselves in today’s expanding online environment are clearly representative of a deeper shift towards a world increasingly seen through and in terms of database forms. Ghose identified the database as a structuring agent integral to the notion of interactivity, claiming:

Interactive exhibits are those which throw a challenge to the visitors...and adjust into different situations like a chess player. The objects behave like a chess player, and visitors must derive information through a discovery process by a systematic analysis of the database, which is again imbued [sic] in the exhibit.²⁰

Writing two decades later, Parry argues that the database should no longer be thought of simply in utilitarian terms, but that its very form reflects the underlying ethos and ethics our technology-driven, globalised society:

The database itself has become profoundly iconic for [the museum]. It has done so in a way similar to how other ‘new technologies’, in history,

have become iconic to other institutions and ages. This is the concept of a particular technology coming to exemplify (through its form and its impact) both the operations and values of a particular historical or cultural locality.

He also warns that there are dangers that result from the database acting as both the mechanism through which information is collected and organised and the main mode of access and presentation to collections, arguing that at no time has there been such a high status placed on a museum's catalogue. Parry describes this as a 'fetishising of the museum database'; the database has become 'the metonym of the museum.' Whereas once the digital expression or extension of a museum formed a kind of duplicate or surrogate, now the very structures that allow for the online organisation of information are informing the public presentation of objects as well as the management of documentation related to those objects:

At present, the museum's notion of 'collection' is not only structured to accommodate the tools of automation, but is imagined (and frequently presented to its publics) as a database. The logic of the database is now embedded within museums' management of their collections.

He explains this in a broader context by drawing upon Lev Manovich's observations on the transformational social impacts of the database form and aesthetic in the digital age:

...in its digital granularity, its de-privileging of narrative, its unending editability and lack of completeness, the database stands as the 'symbolic form' of the post-industrial age. The database, in other words, has become a rationalising system for the modern world – more than just a tool, but a system of thought.

Digital humanities projects, in very different settings and disciplines, are increasingly being conceived of in terms of exhibitions rather than as publications and as I have argued elsewhere that shift in emphasis towards spatial design derives from museology. Parry makes a related argument when he claims that evidence suggests that there is a direct reciprocal influence between the museum and database:

...we are reminded not just of how the museum is increasingly being conceived through the language and structure of the database, but how the database itself (as a framed collection of digital objects, through which users can build their own narratives) is being endowed with the qualities traditionally associated with the museum.

Museums can also be thought of as a form of communication media in their own right.²¹ And yet, the concept of museum as a form of media sits awkwardly with theories of 'broadcast media' that have tended to foreground the space between the transmitter and receiver.²² Henning de-emphasizes the communicative relationship between visitor and

museum object, artefact or collection, suggesting that ‘new media is best thought of as a means to organize and structure knowledge and visitor attention *in* the museum, not as a means of communication or set of devices (emphasis added).’²³ Such assumptions have needed to be revised in the past decade, with the massive impact of the Web 2.0 social media environment. The dynamic nature of today’s communication communities means that records of potential historical value are being created each second; the challenge is how to prioritise and also preserve them, as public records worthy of presentation and display within and beyond museums.

5 Conclusion

...the idea of accumulating everything, of establishing a sort of general archive, and the will to enclose in one place all times, all epochs, all forms, all tastes, the idea of constituting a place of all times that is itself out of time and inaccessible to its ravages, the project of organising in this a sort of perpetual and indefinite accumulation of time in an immobile place, this whole idea belongs to our modernity.

– Michel Foucault, ‘Of Other Spaces’

In the opening pages of his book *The Birth of the Museum* (1995), Tony Bennett quotes the passage above from Foucault, noting that the modern notion of museums and libraries emerged from similar historical ingredients, linked closely with nineteenth-century Western cultural influences. The process of ‘indefinite accumulation’ was not random, however. It involved an ordering, a ‘developmental sequence’ underpinning classification and display that was foreign to the eighteenth-century, with its focus on ‘permanence.’²⁴ Step forward to our time and it is very clear that information management practices in museums have changed dramatically. Parry identifies ‘The act of reducing collections to hierarchies, of imposing data control or standardising data entry, of containing documentation to specific codes and terms,’ as ‘a peculiarly late twentieth-century solution to the production of knowledge.’²⁵ The uptake of Web 2.0 services at the start of this century has brought new freedoms in terms of museums’ relationship with the public. Historically, museums, like so many institutions, have understood their role as containing, controlling and regulating public interaction with a protected and guarded resource. Authority has been generated through this controlled interaction. The very notion of mediated access rests on the intermediary role of curators and institutions. However, social media now facilitates far greater dialogue between experts and the public, levelling the traditional hierarchies and moving from the one-way information flow to a two-way relationship. Today online communities of interest give new value to the electronic dimension of institutions, sustaining the interest base and attracting visitors through the door.

The changing nature of museums, bringing with them shifting notions of curatorship, has prompted radical changes in museum practices. Museums are not only guardians but are entrepreneurs – linking, facilitating and marketing collections. These

fundamental changes in the roles of museums and their curators, driven by the digital revolution, have also cast light on a wider issue: all major institutional frameworks and hierarchies are being rethought and dismantled. Cultural institutions are lowering the walls that have guarded reputations, collections, and whole fields of inquiry, facilitating new kinds of engagement. The circulation of information outside of the walls of the museum – or university, or library or art gallery – is now just as important as the specialist knowledge held within, and this in turn is blending familiar notions of outreach with publication and dissemination of online content. The benefits for the public and for the institutions themselves of this spectacular and sudden democratisation of knowledge through social media and the Internet more generally, are obvious. Museums were quick to take up the opportunities presented by digital technology and were pioneers and innovators in developing interactive installations to engage visitors. Museums continue to be innovators, embracing new modes of digital delivery and display (both in the physical settings of museums and online). Yet as museum practice evolves and formats for digital display of history in museum settings change, the core responsibility for ensuring accuracy, relevance, clarity and quality remains.

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Notes

- ¹ Saroj Ghose, "People and Museums 2," in *Museums 2000: Politics, People, Professionals and Profit*, ed. Patrick Boylan, 1st ed. (London: Routledge/Museums Association, 1992), 84.
- ² Patrick Boylan, ed., *Museums 2000: Politics, People, Professionals and Profit*, 1st ed. (London: Routledge/Museums Association, 1992).
- ³ Ghose, "Museums 2000," 85.
- ⁴ When the exhibition moved to Perth, Western Australia, these touchscreen tables were so popular that visitors had to crowd around and queue to use them.
- ⁵ Jim Blascovich and Jeremy Bailenson, *Infinite Reality: Avatars, Eternal Life, New Worlds, and the Dawn of the Virtual Revolution* (New York: William Morrow/HarperCollins, 2011), 36.
- ⁶ Hughes, P., "Making Science 'Family Fun': The Fetish of the Interactive Exhibit," *Museum Management and Curatorship* 19, no. 2 (2001): 175–85.
- ⁷ Andrea Witcomb, *Re-imagining the Museum: Beyond the Mausoleum* (London: Routledge, 2003).
- ⁸ Ian McShane, "Museums, Multimedia and History Education," *Southern Review: Communications, Politics and Culture* 38, no. 1 (2005): 18.
- ⁹ *Ibid.*
- ¹⁰ Ross Parry, *Recoding the Museum: Digital Heritage and the Technologies of Change* (London: Routledge, 2007), 57.
- ¹¹ Baudrillard, "Procession of Simulacra," 12.
- ¹² Parry, *Recoding the Museum*, 94.
- ¹³ *Ibid.*
- ¹⁴ Paul F. Marty, "Museum Websites and Museum Visitors: Before and After the Museum Visit," *Museum Management and Curatorship* 22, no. 4 (2007): 337–60.
- ¹⁵ Andrea Witcomb, "Interactivity: Thinking Beyond," in *A Companion to Museum Studies*, ed. Sharon Macdonald, 1st ed. (Oxford: Blackwell, 2006), 353–61.
- ¹⁶ Paul Longley Arthur, "Review of Museum Exhibition 'Exploration & Endeavour: The Royal Society of London and the South Seas,' Curated by Michelle Hetherington, National Museum of Australia, Canberra, 15 Sept 2010 – 6 Feb 2011," *ReCollections: The Journal of the National Museum of Australia* 6, no. 1 (2011), http://reCollections.nma.gov.au/issues/vol_6_no_1/exhibition_reviews/exploration_and_endeavour/. Exhibition website http://www.nma.gov.au/exhibitions/exploration_and_endeavour/.

¹⁷ Caroline Payson, “Building and Maintaining an Online Community” (presented at the Social Media and Cultural Communication conference, Museum of Sydney / Australian Museum, February 29, 2008).

¹⁸ This has been the experience, for example, of Sydney's Powerhouse Museum (reported on by Sebastian Chan at 'The World of Social Media' session, during the Social Media and Cultural Communication conference).

¹⁹ Parry, *Recoding the Museum*, 80.

²⁰ Ghose, “Museums 2000,” 85.

²¹ Michelle Henning, “New Media,” in *A Companion to Museum Studies*, ed. Sharon Macdonald, 1st ed. (Oxford: Blackwell, 2006), 303.

²² *Ibid.*, 305. For broadcast media, the impact of the digital revolution has been less favourable. An article from the *Wall Street Journal*, written in early 2011, goes so far as to say, ‘An onslaught of digital technologies has laid waste to traditional media in the US and this year will bring a clearer picture of what will emerge from the rubble.’ ‘Media Learns to Swim in the Digital Tide’, reproduced in *The Weekend Australian*, January 8-9, 2011, *Inquirer* section, 3.

²³ *Ibid.*, 303. Borrowing from sociologist Erving Goffman, she speaks of a range of positive influences of technology on the ‘front and back regions’ of the museum.

²⁴ *Ibid.*

²⁵ Parry, *Recoding the Museum*, 30.