Chapter 2
Ethics and Digital Heritage

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Introduction

This paper discusses ethical and sociopolitical questions raised for cultural heritage by digital technologies and presents two archaeological case studies from Australia. The paper was first drafted in May 2012 for a scholarly edited book produced in hard copy by the Springer publishing company with the usual processes of review and production. Had I published my work via a blog it would have become public immediately. Readers may have posted comments and started online communication. Our experiences, perceptions and roles as authors, consumers, producers or users of formats, genres and platforms and the actual and perceived qualities of the 'product' would be different. How would peer review apply? What about referencing? Who owns the intellectual property of discussion content? Would the blog be archived? Despite innovations in scholarly e-publication (Richards 2006; Kansa 2007; Shanks 2009:554-555; Kansa *et al*. 2010), most Australian universities only recognise peer-reviewed books and research papers (older media formats) as 'research outputs' to comply with government funding rules, making digital products of lower value. These are just some examples of the transformative nature of digital technologies.

Digital mapping and surveying technologies have long been used to study archaeological sites and cultural places (e.g. Coller 2009), and libraries were the first heritage institutions to engage significantly with digital technologies (e.g. networked information systems) in the 1980s (Evans 2006:549-555). There has since

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been development and wide use in heritage of online databases, search engines, imaging and multimedia applications, interactive communication technologies and social networking platforms. Current trends include data portals and cloud services for online research collaboration (e.g. Shanks 2007; AHAD 2012; Ross 2012). Archaeology has a long history of both using and discussing use of digital technologies (e.g. Hodder 1999; Lock 2003; Zubrow 2006; Evans and Daly 2006; Shanks 2007, 2009; Webmoor 2008; Ryzewski 2009), and since the 1990s the UK Archaeology Data Service (ADS) has promoted international standards of best practice for archaeological and heritage data management and online publication (Richards 2008). Libraries, archives, museums, art galleries and other memory institutions are also significant developers and users of digital technologies (Cameron and Kenderdine 2007; Parry 2007; Silberman 2010).

Digital technologies involve dematerialisation, compression, high-speed access, non-linear access, manipulability and qualitative changes in the production, form, reception and use of 'media' (Lister *et al*. 2009:9-48; Shanks 2009:550). Their history and significance is best understood through interdisciplinary perspectives from media and cultural studies, political economics, histories of technology and society and the history and philosophy of science, biology, psychology, cybernetics, computer science and anthropology (Lister *et al*. 2009; Harrison 2009:76; Harrison and Schofield 2009:197-198). Ideas about technologies and society discussed by Marx and extended by social theorists and philosophers of the Frankfurt School (e.g. Adorno, Horkheimer, Marcuse, Habermas) are relevant to understanding sociopolitical dimensions of digital technologies (Lister *et al*. 2009:395). In developing a post-phenomenological perspective on ethics of technology and technology design, Verbeek (2011) builds on work of Ihde (philosophy of technology), Foucault (power and ethics) and Latour (Actor Network Theory) and foregrounds the hybrid character of humans and technologies. Discussions of representation, virtual reality and hyperreality in digital cultural heritage and archaeology frequently draw on theories of, e.g. Benjamin, Baudrillard and Bourdieu (Cameron 2007; Harrison and Schofield 2009:197) and many other thinkers and artists (Cochrane and Russell 2007:3). Scholars of the history of technology and society discuss dystopic and utopic 'technological imaginaries' where fears and hopes for society and the future are projected onto or imagined through technologies and influence the way new technologies are produced, marketed, received and adopted (Brittain and Clack 2007:58; Lister *et al*. 2009:68-73; Morgan 2009:470). New technologies remediate (extend, remedy, refashion or reframe) older forms, processes and practices (e.g. McLuhan, Levinson, Bolter and Grussin cited in Russo and Watkins (2007:154)). Reviewing ethical questions (Who owns the past? What is authentic heritage? What defines professional archaeology?) through the 'lens' of digital technology provides new insight into existing and emerging heritage practices.

Cultural heritage is something valuable for past, present and future generations that people want to keep. It may be *tangible*, e.g. material artefacts, buildings and places or *intangible*, e.g. values and ideas associated with or symbolised by tangible cultural heritage and cultural practices, representations and skills with enduring cultural significance for future generations. The UNESCO (2003) *Charter on the*

Preservation of Digital Heritage defines digital heritage as 'unique resources of human knowledge and expression' that include 'cultural, educational, scientific and administrative resources' and 'technical, legal, medical and other kinds of information created digitally, or converted into digital form from existing analogue resources'. For 'born digital' resources there is 'no other format but the digital object'. Digital heritage includes texts, databases, still and moving images, audio, graphics, software and web pages and other formats. According to UNESCO these merit preservation so they remain 'accessible to the public' apart from sensitive and personal information. De Lusenet (2007) argues that UNESCO concepts of digital heritage as static objects are inadequate. Digital heritage includes items that are, or represent, dynamic processes and patterns of use which share more common features with intangible heritage. In discussing intellectual property, cultural rights and copyright legislation in Vanuatu, Geismar (2005:32) likens conceptualisations and practices of women's woven materials to those that apply to open-source software.

Archaeological Ethics

Archaeologists have debated ethics since at least the 1930s (Wildesen 1984:3). Ethics are about values and what is right and wrong. Professional standards govern quality, appropriate actions and behaviours. Professional archaeologists have ethical responsibilities to maintain standards. Numerous charters, codes and guidelines about ethics and professional standards are published and updated online by archaeological organisations, museums associations and heritage groups worldwide. Key international organisations for heritage include UNECSO, ICOM and ICOMOS. Archaeological associations include WAC, EAA (transnational); AAA, ACCAI, AIMA (Australia); and RPA (formerly SOPA), AIA, SAA, SHA (USA) and IfA (UK). Some codes are highly detailed and prescriptive while others state broad intent. They emphasise different aspects of practice and espouse values that may be openly stated or only implied through wording and emphasis.

Most codes state that professional archaeologists have special rights to, e.g. access, excavate, record, study and interpret material remains that are significant to 'the public' for scientific, historical, cultural or social reasons. Archaeology is promoted as a public benefit enterprise. Actions and attitudes of archaeologists are assumed to have real-world consequences for the profession, other people and society. Archaeologists must help conserve finite material remains of the past ('the conservation ethic') and keep materials and information produced by archaeology for current and future generations through 'stewardship'. Archaeologists have responsibilities towards others including the profession (colleagues, trainees, students), traditional owners and descendants with special cultural rights, legal owners, businesses and clients who pay for archaeology, 'the public' and governments. Archaeologists must act legally. Professional guidelines define minimum standards for archaeological work and discuss intellectual property, confidentiality, publication, sharing archaeological data, public outreach and education.

Archaeologists work within national legal and policy frameworks that, e.g. provide protection for archaeological sites and heritage places or mandate community consultation. They work with other professions (anthropologists, historians, scientists, journalists, teachers, museum professionals, archivists, librarians) who have their own professional standards. Whether archaeologists always act ethically is obscure and joining professional associations is rarely obligatory, but archaeology is also regulated by legislation, policy and 'public' opinion including social and cultural mores. Governments and heritage agencies may only grant access to field areas or issue excavation permits to people who meet certain criteria. Professional organisations can sanction members who transgress ethical codes by cancelling membership or public disassociation. There may be informal consequences of acting unethically. However, an archaeologist who 'does the wrong thing' cannot be deregistered. They can still call themselves an archaeologist. Many people without formal training or qualifications participate in archaeology and interpret material remains of the past. Boundaries between 'professional' and other types of archaeologists are permeable.

Encoding ethical principles in charters and formal statements does not resolve the reality of contested and conflicting heritage values (Smith et al 2010). Codes of ethics are frameworks to help professionals and other stakeholders make decisions and judgements. Ethics are always historically contingent, highly dependent on context and linked to politics of power (Meskell and Pels 2005; Hamilakis and Duke 2007). Archaeology and other heritage practices are influenced by sociopolitical factors and formations such as capitalism, colonialism, nationalism and identity politics. Who sets ethical agendas? Who benefits from ethical, and unethical, practice? Who can most and least afford to act ethically?

Political Economy and Digital Heritage

Digital technologies can be expensive. Once new technologies become standard, heritage practitioners and communities in wealthier countries can usually afford to use them. Even cheaper technologies may be less accessible, or not accessible, to people with low incomes or who live in places where some technologies are unavailable for economic or political reasons. Physical abilities, digital literacy levels, language and cultural attitudes effect technology use (Joyce and Tringham 2007; Mason 2007:232; Lister *et al*. 2009:185-187).

Developing innovative technologies usually requires large capital investment. Neo-liberal capitalism, governments and businesses have vested interests in promoting and marketing particular kinds of digital technologies to consumers. In 2000 the European Council of Ministers wanted the European Union to become 'the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion' (Evans 2006:553). Hemsley *et al*. (2005a) and Ioannides *et al*. (2010) showcase some of hundreds of national and transnational European Commission funded

projects that apply technologies to cultural heritage. The European heritage sector has often been a 'technology driver' for scientific and research and development organisations and businesses (Hemsley *et al*. 2005a, b). Funding programmes of the 1990s and early 2000s aimed to produce major global engagement between the cultural sector and digital technology industries. Hemsley *et al*. describe such projects as progressive and good for economic development but note 'false dawns and dashed hopes' (2005c:296-297), a lack of 'successful business models' and that digitisation of 'cultural assets' did not generate expected money for the cultural sector or businesses trying to capitalise on them. Take-up and application of technological developments potentially of interest to users was judged 'well below early expectations' due to organisational barriers, copyright and economics. Fragmented national European cultural technology industries could not compete with large US and Japanese companies while 'major pan-European commercial activities' proved unsuccessful due to, e.g. language barriers. Despite some interesting projects and success in enabling access to people with disabilities (papers by Weisen, Bowen, Bornemann-Jeske and Scherer in Hemsley *et al*. 2005a), Hemsley *et al.* (2005b) regard efforts by international professional cultural heritage organisations ICOM (International Council of Museums) and CIDOC (International Committee for Documentation) as being more effective in, e.g. setting digital information standards. Governments can spend significant public funds developing and applying technologies to cultural heritage that are unsuccessful. Whether the money should be spent on things of greater public benefit is a political question. Framing cultural assets, including digital ones, as marketable commodities concerns ethics.

Ethics and Technology Design

Theorists discuss the affordance offered by technologies, i.e. their potential to function or be used in particular ways. Different technologies may support, encourage or determine ethical, or unethical, behaviours depending on their design (Verbeek 2011:50-58). Ethical technologies could be, for example, web pages that allow users to view but not download, copy, alter or redistribute digital assets or which restrict access to online information deemed culturally sensitive by Aboriginal people. In this case it is ethical to restrict access to information. In other cases providing open access to information is ethical. Unethical technologies could be those that support online sale of illegally acquired antiquities or force practitioners, through inflexible data entry interfaces on compulsory government websites, to record data in ways that create unnecessary work or support contentious research agendas. Many commentators regard community participation in heritage afforded by Web 2.0 platforms as 'democratic' and therefore a good thing (Webmoor 2008:190; Evans 2006; Broderick *et al*. 2009). Joyce and Tringham (2007) advocate using digital technologies for feminist communication and political action. Backhouse (2006) asks whether adoption of technology is good or bad for UK contract archaeology units faced with mountains of digital data and limited resources.

Designing and applying innovative digital technologies to cultural heritage can be complex. When professionals initiate projects, negotiating informed consent from stakeholders for actions that impact on cultural heritage is an ethical prerogative. This may be difficult when technologies change rapidly, or it is not obvious how best to use them. Community stakeholders and clients often lack technological knowledge to make informed decisions. Ethical codes state that heritage professionals should not undertake work for which they are not qualified, should update their skills through professional training and development and should seek to provide advice that supports the best interests of stakeholders and cultural heritage resources by seeking advice and working in an interdisciplinary way.

Shanks (2007) proposes that technologies for archaeology and heritage need conscious design and implementation to be ethical. He favours principles of agile design where technical and project managers work closely with clients, users and other stakeholders in an iterative manner so that consultation, testing and feedback are automatically incorporated into the design and development process. This mirrors some aspects of community-based archaeologies initially developed in response to objections raised by Australian and other indigenous communities about the ethics of archaeology driven by external research agendas of non-Aboriginal people that brought no obvious community benefits and in some cases transgressed cultural protocols (Colley 2002:102-105). Agile design methodologies and community-based archaeologies diverge in their aims and context but raise similar issues about governance, negotiation, participation and learning.

Cultural Information Standards

Cultural heritage professionals must abide by 'the conservation ethic' and work to ensure that cultural heritage does not get lost or destroyed. Vast quantities of digital information and heritage are currently at risk due to economics of technology production, organisational constraints, digital illiteracy, lack of political will and costs of compliance with digital archiving standards (Richards 2008; Billenness 2011). This challenges the basic tenet of most ethical codes of heritage practice.

Archives and libraries have led development of cultural information standards (policies, guidelines and methods) for collection, preservation and access to digital information about cultural heritage (Mason 2007). The UK ADS has developed information standards for archaeological and heritage data, software and complex digital objects and media (Richards 2008). Museums, art galleries and other memory institutions also deal with a broad range of digital information and items (Parry 2007). Digital data and objects need active curation (Richards 2008:174) and prior planning for collecting, preservation, access and publication (McCarthy 2007:255-256). Also essential is design and production of administrative, descriptive and technical metadata (data about data) that needs to be standardised at some level (Mason 2007:225; Kansa *et al*. 2010). For digital archives to remain understandable in future, metadata and content also needs to include information about the broader context of their production (McCarthy 2007:257; Witmore 2009:517; Sanders 2011).

Archaeologists are ethically obliged to make their research data publicly accessible, but the metadata standardisation needed to achieve this online can act to promote particular types of archaeological research design over others with implications for theory and practice (Hodder 1999; Cochrane and Russell 2007:14; Witmore 2009). Similar issues apply to museums (Cameron and Robinson 2007; Parry 2007). Mason (2007:228-230) observes that development of shared information standards for digital cultural heritage requires trust and cooperation between stakeholders and willingness to share both information and costs. Principles of federation work best and are more ethical as they embed negotiation and openly acknowledge sociopolitical realities such as digital divides, diversity of practice and cultural and other sensitivities.

Individuals and organisations can store material items and hard-copy documents in the reasonable expectation they will remain stable and accessible. Digital media and technologies are unstable and quickly become redundant or obsolete for commercial and organisational reasons (McCarthy 2007:246; Richards 2008). Preserving digital heritage requires active intervention, technical expertise, infrastructure and funding beyond the reach of most private individuals and organisations (BRTF 2008). Digital items are stored on networked servers which are shared places and raise questions of privacy, security, access, control and costs. Techniques for conserving digital heritage (Carroll 2008:247) include technology preservation (maintaining obsolete hardware and software), emulation (creating new programmes to replicate the look and functionality of older software) and migration (transferring data, information and content from older to newer media formats). Migration is the most widespread method favoured by libraries and archives and requires digital information be stored in formats that can be accessed by open source software and with metadata that conforms to international standards, e.g. Dublin Core (Mason 2007; Richards 2008). Digital preservation also requires institutions to maintain computer systems into the future and sign international agreements on sustainability (BRTF 2008).

Digital heritage preservation services are offered through some government libraries, archives and museums and for archaeology by, e.g. the UK-based ADS http://archaeologydataservice.ac.uk, the USA-based Digital Archaeological Record (tDAR) http://www.tdar.org and some European institutions aligned to the ARENA project (Richards 2008:176). Despite these efforts, much digital heritage remains at risk because only some practitioners have access to necessary services. Even in the UK where digital preservation of archaeological information is mandated by government and which has better resources than many other countries, some digital heritage still remains at risk.

Commonly used software and file formats are commercial products developed by businesses that restrict public access to their coding to protect intellectual property. Whether such proprietary software and file formats remain usable into the future depends on market forces. Heritage conservation ethics are predicated on principles of public ownership, open access to information and the 'public right to know' tempered only by consideration of privacy, confidentiality of commercial information and cultural rights of traditional owners and descendants (McCarthy 2007:253). Sustainable digital archiving and preservation assumes open-access file formats and protocols (Kansa *et al*. 2010). It could be regarded as unethical for heritage practitioners to use proprietary software to make unique and irreproducible records of important

heritage information unless future public access can be assured. This is clearly impractical and undesirable given the enthusiasm with which professionals and communities embrace commercially produced digital technologies and apply them to cultural heritage. Using such technologies delivers significant public benefit which must be balanced against the constraints of conservation. A pragmatic approach is for heritage practitioners to develop greater awareness and understanding of ethical and other consequences of using these technologies in different ways (i.e. digital literacy). Some technologies are used as tools to record and help conserve tangible and intangible heritage. Others are research tools, are communication devices or have research and heritage value in their own right (Evans 2006:569). Technologies may combine several functions simultaneously and defy easy categorisation.

A recent European Commission funded initiative recognised digital preservation as an urgent and serious matter demanding action from government and businesses at international level with the growing rate of digital data creation 'rapidly outstripping the rate of growth in data storage technologies' (Billenness 2011:3). With insufficient market demand for private industry to develop digital preservation products, governments were urged to provide funding incentives for industry and introduce regulation, including modifying copyright laws and ensuring digital preservation featured on university computer science curricula. Ideal and ethical future technology design (e.g. self-preserving objects) should make digital preservation seamless, simple and automatic (Billenness 2011:4; Evans 2006:564; Witmore 2009). Yet it could also be unethical for technologies to automatically keep information for posterity without also making users aware and offering choices. Collecting and storing digital information raises questions about security, ownership and privacy which are currently regulated by legislation and, e.g. university research ethics protocols. Digital Rights Management becomes more complicated when information is made accessible online and is commonly described as 'a problem' in the heritage literature. What kind of problem depends on context and whose rights are being protected or advanced by withholding, restricting or making information freely and openly accessible or by imposing copyright charges, royalty fees and restricted terms of use. There are particular concerns about online access to culturally sensitive information and digital heritage belonging to indigenous people (Hollowell and Nicholas 2008; Bowrey and Anderson 2009; Brown 2007). Ethical codes governing ownership, permissions and appropriate use of indigenous cultural heritage have been developed and are updated through ongoing discussion between representatives of indigenous communities, museums, archaeologists and other heritage professionals in Australia, New Zealand, North America and elsewhere (e.g. WAC, AIATSIS). Guidelines for ethical and culturally appropriate practice embedded into government heritage policy and research ethics protocols in Australia extend to digital heritage (e.g. recognising cultural rights of Aboriginal and Torres Strait Islander peoples, negotiating informed consent from appropriate traditional owners prior to fieldwork and publication, access to and ownership of cultural materials and information). Guidelines and policies that seek to empower traditional owners in decisions about cultural heritage do not erase colonial history and legacies of inequality. This concerns politics rather than being specifically about digital rights management.

Professional archaeologists have responsibilities to publish findings and share data with colleagues and the public (Fagan 1995; Kansa 2007; Beaudry 2009). Codes allow professionals to retain exclusive access to their own research data, provided they own the rights, until they finish analysis and publish their work. Publication also establishes their intellectual property rights in their research products. Digital technologies offer new and exciting options for publication that can be interactive and afford deep access to heritage data and information in ways impossible in hard copy. However, current government research funding policies that undervalue innovative publication formats are blocking progress. New business models, including pay walls and sponsorship, are also needed to cover the costs involved in scholarly digital publication (Richards 2006, 2008).

Collecting and preserving digital heritage but not making it public (e.g. creating 'dark' archives) is ethical when restricting access to sensitive information. Harvesting and data mining from the Internet potentially allows archivists and others to collect everything publicly accessible online and store it automatically. For digital cultural heritage de Lusenet (2007:173) asks 'Are we going to keep everything because it is possible? What has happened to the idea that heritage has some value attached to it?' She queries the legality and ethics of archivists capturing and keeping conversations on social networking sites without permission, yet this is the basis for successful Google and Facebook business models. Interoperability of technologies supports access, information sharing and digital preservation. McCarthy (2007:248) regards silos of unconnected knowledge banks as undesirable for cultural heritage. Facebook, now commonly used in heritage practice, is a 'walled garden' designed so Google and other sites cannot index most of its content (Arthur 2012). Objects created inside the Second Life (SL) virtual world cannot generally be exported, so archaeologists and heritage practitioners using SL for research face data loss unless they continue to pay SL use fees (Morgan 2009:483). Digital preservation, whether provided by a private company or public organisation, does cost money. However it could be considered unethical for private companies earning money from donated public data not to also provide means for users to export their own content should they wish. When the Yahoo! product GeoCities closed down in 2009, the Archive Team worked to export, store and make content publicly accessible before it was lost (The Wayback Machine 2012). What are the ethics of this?

Case Study: New South Wales Archaeology Online

New South Wales Archaeology Online (NSW AOL) http://nswaol.library.usyd.edu.au is a website with full text search and display functionality and a sustainable digital archive of previously unpublished and hard to access heritage consultancy reports about the historical archaeology and colonial history of the state of NSW in south-eastern Australia (Gibbs and Colley 2012). Stages 1 and 2 are part grant funded by the NSW agency responsible for managing post AD 1788 archaeology and by significant in-kind support from content donors, academic staff and research affiliates

at the University of Sydney, local consulting archaeology companies and the University of Sydney Library. This is the first project of its kind in Australia. Neither the federal nor any state or territory government mandates or routinely helps fund preservation of digital information about Australian historical archaeology. There is limited and extremely patchy provision for similar services for Aboriginal and maritime archaeology. There is also no mandated NSW repository for physical collections of artefacts recovered by archaeological excavation of historical sites. Hard-copy reports of fieldwork, some with digital content on CD-ROM, are lodged with relevant agencies for planning consent. Many documents can only be read by visiting physical storage locations in different parts of Sydney and elsewhere in NSW (which has a land area of over 800,000 km^2) or by requesting loan of private copies. Some digital content is now being made accessible online by private websites of consultancy businesses but not in any consistent or sustainable way. The reports and archives are important for research about Sydney and NSW archaeology (e.g. Clarke et al 2012) for which no other resources are available. Many items are missing from public collections, including work produced by academics, students and consultants between the 1970s and 1990s in hard-copy formats which helped establish the subdiscipline of historical archaeology in NSW and Australia. NSW AOL has borrowed 'at risk' hard-copy reports from private donors for professional scanning and digital preservation through the library.

For Stage 2 (May 2011 to May 2013) we started auditing born-digital (images, databases, GIS files, websites, etc.) and hard-copy items (reports, recording sheets, drawing and maps, photographs, slides, film, etc.) produced since the mid-1990s and held by private consultancy companies and numerous government agencies involved in NSW heritage. There is so much material that even a complete audit is beyond the scope of our current grant. This material only describes terrestrial historical archaeology in NSW. Maritime and Aboriginal heritage and archaeology are managed under separate legislation and are not yet part of NSW AOL. Other Australian states and territories manage their own Aboriginal, historical and maritime archaeology and heritage independently and under different legislation. Codes of ethics for Australian archaeology include statements about professional responsibilities to conserve heritage, archive information and make data publicly accessible. In practice this is neither working nor workable.

We started NSW AOL to support our research and university teaching with technical support from experts in sustainable digital archiving at the University of Sydney Library. The library will curate Stages 1 and 2 content as a university research collection. We were awarded grant funding from a NSW government heritage infrastructure scheme that specifically excludes 'research' and expires mid-2013. A small group of mainly Sydney-based consultancy companies and research affiliates donated time and content out of interest and from their professional responsibility to conserve information and make data publicly available. NSW AOL is also useful for consultants' own work and promotes their businesses which operate in a competitive market. The NSW AOL website resides on university servers and must comply with the University of Sydney branding guidelines and website policies.

There are limits to goodwill contributions. The global financial crisis has reduced funding for universities and government services. Currently the library cannot undertake additional technical development work until further notice for organisational reasons. NSW AOL has been well received and successful, but we have only recently been able to start work on publishing hard-copy peer-reviewed publications about the project due to significant funding-related time constraints in university workplaces. Developing NSW AOL is time consuming even with grant funding. The university cannot credit our digital product as a research output even when we add proposed new research and scholarly content. Academic staff are not paid as service providers for the heritage industry or the public. We recently met with a university lawyer to tighten our permissions policy following a complaint about plagiarism in a report previously made publicly accessible by NSW AOL. Paid to act in the university's best interests by offering advice designed to minimise costs and risks, the lawyer asked us why university resources were being used to make information freely available to people outside the university at all. Such policy decisions are not yet made by university lawyers, although we do comply with legislation and university regulations.

Deciding 'What happens next?' has driven frequent changes in project scope and methodology and meetings with stakeholders, potential collaborators and technical experts offering advice or soliciting paid work. The challenge is to manage relationships between people, organisations, regional archaeological practice, technology and economics. Some people who are willing to share their older information online will not release more recent or current information due to business competition. Others may not wish to draw public attention to 'substandard' work produced under the commercial pressures of development-driven archaeology. Fear of 'airing dirty linen in public' inhibits information sharing in archaeology elsewhere and in other disciplines (Ford 2010; Pisani 2011). Most of us want to showcase our better work. A donor was disappointed that online PDF versions of their documents were inaccurate copies of the originals. Poor image reproduction in the PDF versions misrepresented the real quality of mapping and photography they created for clients and reflected badly on their consultancy business. This is understandable, but current Internet bandwidths only support making compressed and smaller PDF versions of reports available online.

Some archaeologists offered scanned PDF copies of reports, including about Aboriginal and maritime archaeology, planning to discard the hard copies to save space. Currently we are unable to accept such content. Metadata entry is relatively expensive. We pay project staff to complete this to a high standard, and our grant is already committed. Enabling donors to enter their own metadata is not an option on the current website. University policy forbids external users uploading publicly accessible content. Even if permission was granted which seems unlikely, digital rights compliance costs are prohibitive, especially for any Aboriginal information. The University of Sydney Library cannot currently accept files in PDF format for digital preservation as part of NSW AOL because PDF does not match their digital preservation criteria. The NSW AOL website delivers PDF versions of sustainably archived TIFF files that remain invisible to users. The XTF-based full-text search

and display functionality of the website helps users find information and access document content. NSW AOL is currently configured both as a research tool and a sustainable digital archive. Future plans include uploading selected 'at risk' images, adding commentary to better contextualise collections and producing online publications linked to the archive reporting scholarly research on regional archaeology.

Visualisation and Virtual Realities

Visualisation and interactive and immersive multimedia technologies have been widely and enthusiastically adopted in cultural heritage practice. Their significance both *to* and *as* research and practice is theorised as remediation of illustration, mapping, photography and cinematography and by discussing representation, simulation and virtual reality (Earl 2005, 2006; Gillings 2005; Cochrane and Russell 2007; Barceló 2007; Perry 2009). Such technologies raise questions about essential qualities of 'real' and 'virtual' material objects and places (e.g. Pujol and Champion 2012) and discuss notions of authenticity and truth. Trust, truthfulness and transparency are professional and ethical values. An opinion survey showed that local people trusted North American museums to be accurate and authentic (Hazan 2007:135). Ethical codes for archaeology, museums and archival practice stress professional obligations to retain and value authenticity and uphold intellectual integrity by separating factual evidence from interpretation and unfounded opinion. The problematic concept of authenticity is central to heritage theory (Smith *et al*. 2010). Truth, 'actuality' (c.f. Harrison 2009:85) transparency and realism are slightly different concepts. Anxieties have been provoked for museums by the reproducibility and 'immaterial' nature of digital objects based on fears that real (material) objects and artworks are threatened by mechanical reproduction and simulation (Cameron and Kenderdine 2007:4; Parry 2007:61-66). Trade in faked antiquities is a potential concern given developments in 3D printing technologies that could in future materialise 'untruthful' digital objects in realistic looking ways.

How realistic or truthful must a digital visualisation be to be useful, less useful, ethical or unethical? This depends, as always, on context. Realistic visualisation was not that important to Morgan's research on the functional design of prehistoric features at a reconstruction of the Çatalhöyük archaeological site in the Second Life (SL) virtual world (2009:478), but she notes that archaeologists working with other SL virtual reconstructions of Çatalhöyük found them 'too real' or 'too sterile' (2009:481-2). Convincing 3D audiovisual simulations that look or seem 'real' due to advances in computer imaging technologies, but blend fact and fiction, are regarded as unethical and unprofessional by some researchers and heritage practitioners unless production is contextualised and made transparent by including paradata documenting interpretative processes that make the degree of reliability of the visualisation clear (Sanders 2011; Bentkowska-Kafel *et al*. 2012). The *London Charter for the Computer-Based Visualisation of Cultural Heritage* (2009) sets out principles for rigorous, scholarly digital visualisation based on intellectual integrity and reliability, documentation, sustainability and access. It is aimed at computer

visualisation in research and professional practice and 'those aspects of the entertainment industry involving reconstruction or evocation of cultural heritage' but not for visualisation in 'contemporary art, fashion or design'. Given challenges of separating facts from interpretation, this would be difficult to implement for archaeology except when discerning the facts is possible or socially important (e.g. in some kinds of archaeological science or for legal and forensic cases concerning rights claims or criminality).

Visualisation technologies have been embraced by some archaeologists to actively challenge boundaries between science and arts, truth and fiction, and because such technologies can enhance engaged, experiential and creative practices as part of archaeology (Cochrane and Russell 2007; Joyce and Tringham 2007; Webmoor 2008; Ryzewski 2009; Shanks 2009; Witmore 2009). Where 'contemporary art, fashion or design' or 'entertainment' stop and professional archaeology and heritage management start is not clear as discussed by Holtorf (2007, 2009, 2010) for archaeology, popular culture and 'the experience society'. Holtorf accepts and celebrates fictionalised popular representations of archaeology while Pyburn (2008) regards this as professionally dishonest.

Indigenous critiques of digital technologies and cultural heritage by Brown (2007) and Bowrey and Anderson (2009) employ visualisations by indigenous artists using digital and other media to communicate ideas about cultural appropriation. Brown (2007) urges indigenous people to apply digital technologies to their own cultures before others do so on their behalf. Spiritual and cultural qualities customarily transferred into reproductions and representations of material Maori *taonga* (treasures) extend to digital simulation. Digital technologies can be valuable for cultural repatriation provided their use is governed by communities in culturally appropriate ways (Brown 2007:85).

Context, genres, modes of delivery and audience understandings and expectations are crucial to such debates. Digital media representations of archaeology and cultural heritage are viewed, consumed, experienced, appreciated, ignore or disliked in actual places using differently formatted, sized, shaped and placed screens and audio equipment in public or private social contexts (Shanks 2009:551-552; Graves-Brown 2009:210). Without denying the power of professional media advertising (Holtorf 2009), presumably most mature and media literate audiences appreciate differences between 'reality' and fictional reconstruction in heritage visualisation. The 'wow' factor of the technology (Lister *et al*. 2009:141-5) may be part of the appeal, even for heritage and archaeology, although as computer-generated visualisation becomes increasingly common in heritage interpretation it can become mundane, boring or annoying to some (Silberman 2010).

Questions of the 'real' are pivotal to archaeology's ambiguous relationship with professional print and broadcast media and film producers (Brittain and Clack 2007:46). Archaeologists criticise 'the' media for inaccurate reporting, misrepresenting archaeology as trivial entertainment and undermining professional authority (Taylor 2007:190-194). 'New' digital media technologies (e.g. blogs and online platforms like Flickr, YouTube and Facebook) and cheaper audiovisual equipment and software allow audiences to produce and distribute their own media content online using different formats. Archaeologists and others can represent themselves and tell

their own 'media' stories to potentially wide public audiences. This has significantly transformed established business models and practices of traditional media who now also produce 'new' media themselves (Lister *et al*. 2009:262). This throws interesting light on archaeologists' existing concerns with media 'professionals' about unethical practice. If archaeologists become media producers themselves, they can tell their own stories in their own ways, and they need to act professionally and reflect on media ethics. As Brittain and Clack (2007:41) discuss for professional media, visual and audio multimedia present 'more complicated' issues than print media when representing people involved in archaeological and heritage projects, especially in cross-cultural contexts. When professional archaeologists perform 'engaged' fieldwork and heritage practice (as discussed by, e.g. Ryzewski 2009) using technologies to closely document people's behaviours, reactions and opinions, and not just archaeological information, they have professional obligations to seek informed participant consent and to think about privacy and surveillance, particularly if content will be made public online. This depends on circumstances and who is involved. Some people like being on camera and performing to public audiences. Others may not want to share their opinions and attitudes with a wider audience or have their actions and appearance documented for public broadcast. Technology may impact on outcomes, for example, when being recorded for public podcast changes how people act or what they say. Who controls the editing and the story? Can people easily opt out with no social or other costs? Is there a 'take-down' policy if participants object to web content? Coercion is possible when participants are students, employees or in less powerful positions. University research ethics codes now govern such practices.

The ethics of archaeologists using traditional media coverage for self-promotion or to foster public support for particular types of archaeology are discussed by Brittain and Clack (2007:36). Even posting information on a basic website immediately and unavoidably raises questions of representation, branding and online identity. Are ethics and professional issues raised by the self-representation, branding and advertising implied by 'broadcasting yourself' on YouTube, for example, any different to traditional media?

Given highly flexible design options (Morgan 2009:479-481; Harrison 2009:83), what should or could the avatar of a professional archaeologist look like in a virtual world when they are there conducting research? Should they be 'obviously' identifiable as a professional archaeologist (whatever that implies) when interacting with other residents? Should they remain anonymous? To what extent are other residents in virtual worlds 'community stakeholders' as discussed in archaeological codes of ethics governing actual worlds?

Case Study: Archaeological Communication and Digital Technologies

Similar questions apply when archaeologists use other social networking platforms and interactive communication technologies for their work. A 2011 interview survey of professional archaeologists and heritage practitioners based in Australia aims to

investigate relationships between professional communication in archaeology, heritage practice and impacts of digital technologies (Colley 2014). Thirty participants provided information about the organisational context of their work, their work-related communication and use of digital technologies. Preliminary analysis shows that respondents used a wide range of hardware and software for work and they were generally more positive than negative about them. Technologies saved time, made work quicker and easier, were effective and allowed people to store, access and share more information. People liked the instant communication, quick online publication and being able to communicate better with colleagues and the public. Others liked using technologies for improved visual presentations, data analysis and visualising spatial information. Problems included limited bandwidth, 'crashing', outdated hardware and software and inadequate technical support. People disliked software that was hard to use, or remember how to use, and technologies that were not interoperable. Expense was an issue for self-employed consultants and in workplaces where employers did not cover technology costs. Some people disliked steep and continual learning curves, having to constantly reskill or having to work with others with different levels of digital literacy. One person complained of 'dazzling' technology that was not needed or useful. Technologies could be misleading, distracting and create unreasonable expectations of instant replies (e.g. student emails to university-teaching staff). Technologies were considered barriers to some kinds of work-related communication. Some people preferred tangible and hard copy to digital media and were worried about digital preservation, costs of metadata compliance and imposed data standardisation.

Attitudes to social media and interactive communication platforms (e.g. Facebook, Twitter, LinkedIn, blogs, wikis, etc.) were polarised. Some heritage professionals in Australia cannot access social media and similar web technologies from work as they are blocked by government employers. Stated benefits of using such media included being able to share research more easily and reach interdisciplinary research communities, making professional contacts with a very wide range of people, work-related advertising and connecting with students, younger people and the wider public. Some university-teaching staff thought social networking sites engaged students better than mandated university online learning platforms like WebCT and Blackboard Learn. One university researcher liked the freedom of being able to 'fly under the university media and marketing people's radars and circumvent university branding guidelines'.

Others expressed concern about privacy and misuse of personal data by private companies or thought that using social media presented an unprofessional image, was pointless or was 'ephemeral'. It is ethical for university-teaching staff to maintain professional distance from students. Inappropriate personal content and communication on, e.g. Facebook presents the danger of transgressing such boundaries. Some professional archaeologists said they disliked social media or considered themselves too old to use them. Others were not interested or did not have phones that supported access. Other online tools failed to match expectations when, e.g. few people contributed and sites attracted limited visitors. Online communication tools (emails lists, forums, blogs, wikis) presented challenges of dealing with negative and derogatory comments, e.g. 'people feel they can hide behind anonymity and say things they would not dare say to your face'.

Digital technologies present convergent issues for heritage practice regardless of institutional or disciplinary context. These also apply to others who produce and manage digital content and wish to archive or make it publicly accessible online, including media professionals, journalists, creative practitioners, businesses and communities and private individuals. The 'public sphere' online raises questions about public and private spaces (c.f. Graves-Brown 2009) the nature of 'online communities' and appropriate professional and private behaviours in digital spaces. Themes of 'digital citizenship' about access, commerce, communication, literacy, etiquette, law, rights and responsibilities, health and well-being, security and self-protection (Ribble 2012) are not specifically about heritage, but digital communication technologies blur boundaries between public and private and workplace and home and impact on heritage practitioners as private citizens and consumers.

What Happens Next?

Making provision for digital preservation to prevent loss of archaeological and heritage information is the major ethical and professional challenge facing our profession. Principles enshrined in existing ethical and professional codes are extensible to digital technologies in most cases, even though only some codes discuss technology. Research for this paper suggests it is useful, necessary and ethical for archaeologists and other heritage practitioners to extend their digital literacy to help them make better decisions about the use and application of technologies in their work.

New technologies in general have acted to fragmented professional media production and audiences and participants increasingly prefer to engage with familiar content that expresses values they already hold (Lister et al. 2009:202-4). To some extent this mirrors fragmentation in current archaeological theory and practice. In discussing archaeological theory, with admittedly less focus on practice, Johnson (2010:183-184, Figs. 12.1 and 12.2) presents two cartoons illustrating changing interactions and communication between archetypes of archaeologists of different theoretical persuasions, e.g. processualists, post-processualists of different kinds, feminists and, in my opinion, a highly 'unrealistic' Classical Archaeologist. In Fig. 12.1 (by Simon James) illustrating 1988, the public is an 'irritating distraction', the Classical Archaeologist prefers to read books on his own, while the others argue passionately with each other about who is right or wrong. In Fig. 12.2 (by Matthew Johnson) showing 1998, the public have wandered off to do something else, the Classical Archaeologist still reads his books on his own, and the other groups have long stopped talking to each other and only engage with people who share their perspectives. If we updated the image to 2012, presumably even the Classical Archaeologist would be downloading e-journals from the web, and archaeologists in all groups would be checking e-mails or using their mobiles to text people not even in the picture. A digital cloud would be gathering overhead beckoning everyone to start standardising at least some of their metadata for online collaboration and to aid digital preservation. Some archaeologists would be observing the scene,

taking pictures on their hand-held mobile devices and producing video blogs. The 'the public' and everyone would be online somewhere if not actually in the same physical location at the same time. I have visualised this picture in words rather than copying and extending the original images, as this is quicker and cheaper, if probably less effective, than obtaining necessary reproduction rights. It is legal and ethical to describe other people's work if I include a bibliographic reference. Digital technologies raise many practical, ethical and sociopolitical challenges, and they are a transformative and interesting part of archaeology and heritage practice.

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