

Chapter 17

Digital Heritage: What Happens When We Digitize Everything?

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Abstract Research that targets the re-presentation of culture and heritage using tools and techniques of digitization continues to develop worldwide. This chapter discusses digital heritage and what happens when we digitize everything. Society has acknowledged the urgency to capture heritage content in its various forms and the sites it is found in. At the same time, it begs the questions of what the impact of all this digitization will be and how useful or long-lived the results. A focus is placed on the audience, those who receive and experience the resulting digital output such as in a museum or gallery, website, interactive exhibit or any form of mediated digital heritage content. The concept of eternal themes is introduced along with human values related to digital heritage. The impact of digital heritage is discussed in relation to the mobilization of heritage content for diverse audiences. The vanishing virtual and considerations for the future of digital heritage are presented with some key points for conservation.

Keywords Digital heritage • Culture • Virtuality • Audience • Values • Information chain • Communication • Multimedia technology • Cyberception

17.1 Introduction

This chapter presents an overview of Digital Heritage (DH) from the side of the audience, receiver, viewer and the creators of the content. It brings together the various concerns of members of the heritage community; the archaeologists,

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technicians, historians, curators and media content specialists and it reflects on what it means and what are the implications for humanity and the cultural record when we digitize everything. The chapter begins with a framework for digital heritage, presents an outline of shifting cultures and the technologies affording digitization. Eternal themes are discussed from a humanities point of view leading into human values and digital heritage. Concerns about the vanishing virtual are presented ending up with smart heritage and cultural futures, concluding with implications and suggestions for conservation and archiving.

The following discussion is based on a very early paper (Thwaites 2001) wherein I outlined the impact that virtual heritage has on an audience or viewer, or user. It seemed fitting, after 12 years, that I revisit that work in light of the current focus on digital heritage around the world and an increasing focus on the digital heritage audience.

The title of this chapter derives from a talk given by Philip Rosedale (2006), the founder and creator of the Second Life on-line virtual world. In his presentation he posed the question “What do we learn IF we digitize everything?” I was fascinated by that concept when applied to digital heritage and thus came the inspiration for this chapter.

17.2 Thinking About the Past

The notion of time travel has always captured the human mind from the time of H.G. Wells’ original novel *Time Machine* written in 1895. In his 1999 novel *Timeline*, Michael Crichton describes a future where time travel to the past is possible and entertainment is the past.

At the end of the 20th Century, the artifice of entertainment, constant, ceaseless entertainment, has driven people to seek authenticity. Authenticity will become the buzzword of the 21st century. How do we define authentic? It is that which is not controlled by corporations, entertainment mega-conglomerates and media moguls. It that which is not devised and structured to make a profit. It is anything that exists for its own sake, and that assumes its own shape. What is the most authentic of all? The past.

In addition to looking into the past as a source of content, he poses some other excellent questions. “So what is it about history that is so appealing? History is the most powerful intellectual tool society possesses. History is not a dispassionate record of dead events, places and people. The purpose of history is to explain the present, to tell us why the world around us is the way it is. History tells us what is important in our world and how it came to be. It tells us why things we value are the things we should value and what is to be ignored or discarded.”

This is not the only notion of time travel that has fired the minds of digital heritage professionals in recent years. Ch’ng (2009), Silberman (2005), Lowenthal (2002), Mosaker (2001), Sanders (2001), Davis (1997), Britton (1996) and Woolley (1993), have all theorized as to the impact of digital heritage “time

travel” on the minds of an eager audience. Mosaker argues “virtual reality environments that present the past might be thought of a contemporary time machine”.

It therefore becomes important to clarify the difference between *heritage* and the *past* (Silberman 2008). *Heritage* comprises a constantly changing collection of objects and symbols, a complexity of images, cultural artefacts, monuments and a varying assortment of ethnic customs that are significant and meaningful to us. The *Past* can be viewed as the most virtual reality that we contend with. It is the ghost of a once lived reality surviving in fragments that can only be experienced in hindsight. The past can never be re-created as it was and thus our fascination and dedication to come as close as we can to re-presenting it to contemporary audiences via digital heritage applications.

Lowenthal (1994) identified a key point when he said that “the more realistic a reconstruction of the past seems, the more it is a part of the present.” This statement certainly highlights why digital heritage is both a timely endeavour and one fraught with so much challenge in our current digital-rich media environment.

17.3 Now and Why?

This book entitled, ‘Visual Heritage in the Digital Age’, seeks to address many key research areas such as social considerations and human behaviour, the technology and tools employed, the creation of information systems, visualization strategies, content interfaces and archaeological concerns focusing specifically on; Objects, Monuments, Landscapes, through case studies of applications and techniques and comparisons between technologies covering a global map of digital heritage sites or objects.

To frame the discussion of digital heritage it is first important to reflect on the beginnings and various terms that encompass the field. Virtual Heritage was discussed and defined in 1999 by Stone as “the utilisation of technology for interpretation, conservation and preservation of Natural, Cultural and World Heritage”. It has since been written about extensively under a variety of other terms such as virtual culture, e-culture, e-heritage, new heritage, digital history and digital heritage (Smith 2006). An important additional defining component is “...to deliver the results openly to a global audience in such a way as to provide formative educational experiences through electronic manipulations of time and space”, once again referencing the notion of time travel described above.

UNESCO in their Charter for the Preservation of Digital Heritage (2003), has clearly defined digital heritage as the “cultural, educational, scientific and administrative resources, as well as technical, medical and other kinds of information created digitally, or converted into digital form from existing analogue resources” and includes “texts, databases, still and moving images, audio, graphics, software and web pages.” Due to the increasing complexity of heritage data, in addition to levels of interactivity, we can aptly describe this content in the

form of digital heritage ‘datacubes’ (Thwaites and Malik 1998), or as comprehensive datasets represented by a 3D cube (Foni et al. 2010).

In 2013 heritage researchers and media creators continue to be fascinated with exactly what Crichton described for us. What impact will our research and production of Digital Heritage (DH) and multimedia cultural representations have on our audiences? How will we use DH? We do not yet fully know, as it has in the past failed to live up to expectations (Addison 2001). This failure has partly been the result of the influence of digital special effects in the film industry creating a perceptual stereotype in the audience, who eagerly expect digital heritage to equal or exceed the “spectacles”, designed by Hollywood.

However, as we continue to research, design and present digital heritage content we provide the receiver or visitor/audience with a representation of reality that elicits a certain information impact. This “impact” is created somewhat in fact and historical record, mixed with a possible fictional interpretation, while stirring that fleeting notion of fantasy through time-travel. It is these qualities that make our efforts at digital heritage so intriguing, as outlined in a discussion to follow.

17.4 A Brief Summary of Early Digital Heritage

As readers of this book may be aware, digital heritage (in its myriad of iterations listed above) has been developing in tandem with technology from the 1990 s when computers became more accessible and cheap enough for widespread application to heritage projects across a variety of disciplines and fields (Mahoney 1996; Dave 1998).

An early exhibition of digital technology applied to a heritage recreation was staged at the Imagina Conference in Monte Carlo in February of 1993. It showcased a real-time guided tour of a digital reconstruction of the Cluny Abbey, a building that has not existed for centuries. Following from that event 1995 saw the first Virtual Heritage conference held at the Assembly Rooms in Bath, UK. It showcased such projects as Virtual Pompeii (Jacobson and Vadnal 2005), Virtual Lowry (Stone 1996a), the Caves of Lascaux (Britton 1996) Palace of Ashur-nasir-pal II, Nimrud, Assyria modelled in 1999 by Learning Sites (Sanders 2001) and the Fortress at Buhen, Egypt (Barcelo Juan et al. 2000). Many heritage applications continued to emerge built on the work done in Japan at the Virtual Systems Laboratory at Gifu University including the VSMM (1995) International Conferences that followed each year from the first in Gifu Japan in 1995 and onwards (Stone 1996b).

Indeed each passing year added an impressive list of sessions to a wide variety of international conferences and meetings including (but not limited to); Europe’s VAST (International Symposium on Virtual Reality, Archaeology and Cultural Heritage), IEEE VR, ACM Siggraph to the CAA, ISPRS, CIPA, ICOMOS, ForumUNESCO, Virtual Retrospect, Museums and the Web, ICHIM and many others (Addison 2006). Within all these early, and some still continuing meetings,

there has often been little coordination on timing and collaborative partnering. This led to the virtual reality (VR) or digital heritage community attending one set of meetings, the computer scientists another, and the archaeologists their own special sessions resulting in duplicated projects and less than optimal collaborations.

As has often happened with early digital heritage projects, many of the excellent and pioneering works have been lost to time and technology shifts, such as the web-based examples of Virtual Notre Dame Cathedral (VNRD) created by Vic DeLeon (1999, 2000), Fig. 17.1 and the seminal Lascaux Caves project by Britton (1996) shown in Fig. 17.2.

Most of these early digital heritage projects, among many others (Harada et al. 1998; Hamit 1998; Simo et al. 1999; Stone 1999) have all but disappeared from view. Now they may only exist in the minds of those who saw and interacted with them and wherever they are still stored on the hard drives of the researchers who built them. Or perhaps they are lost forever. This raises questions surrounding the archiving and curating of digital heritage work into the future as we move so rapidly between generations of hardware and software tools.

Rahaman and Tan (2011) present a review survey of online digital heritage examples wherein they discuss the technology used and levels of interaction (exploration, manipulation or contribution) available to the user. They argue that early projects tended to focus on the “faithful” representation of realism, making

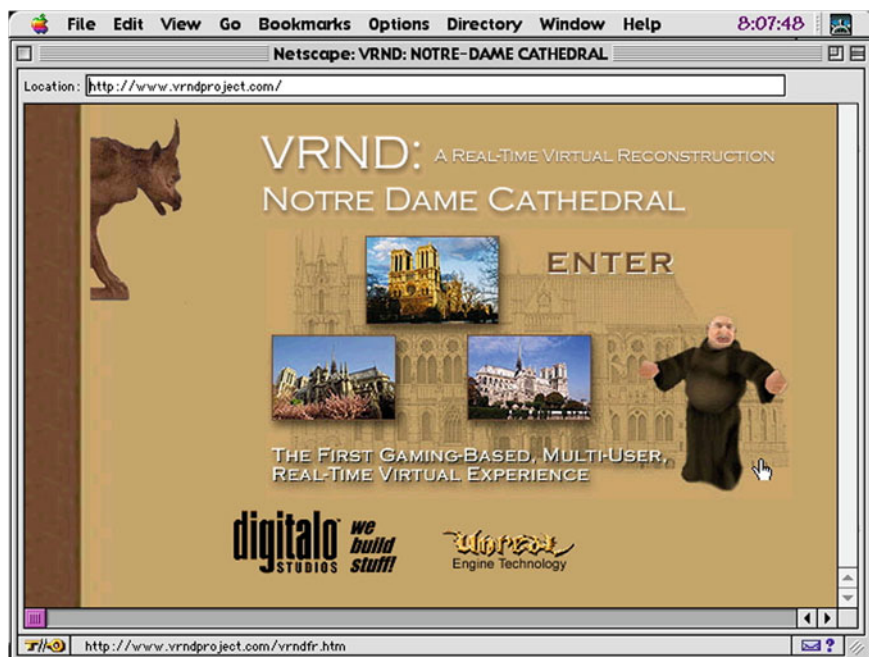


Fig. 17.1 Virtual Notre Dame Cathedral project (reproduced from DeLeon 1999)



Fig. 17.2 Virtual Lascaux Caves (reproduced from Britton 1996)

them inherently quite static with little audience involvement. That early nascent quality of DH work has since become much more evolved both in terms of content and the technology used to present it.

17.5 The Information Impact of Digital Heritage

I would now like to describe an area that for most readers may seem to be out of place in a book that deals mainly with more scientific discussions of various research projects in digital heritage. However, given the scope and scale of applications being developed the world over, I feel that it is important to incorporate this discussion here. Much of digital heritage has focused either on the ‘process’ of creating work or the resulting ‘product’ but rarely does it consider the ‘receivers’, the audience (end-users) and their perception of the project content (Rahaman and Tan 2011; Russo and Watkins 2007).

This section argues that in order to build a complete and complex cultural representation via digital heritage technologies we must also understand how the users interact with the system or interface that is primarily ‘information’ based and thus through human interaction, elicits an ‘information impact’.

Within the fields of cybernetics and biocybernetics the concept of ‘information’ is understood in the systemic form of an information complex. Biocybernetics is formed by the application of basic cybernetic laws in biological systems. Heritage and cultural artefacts, in various iterations comprising the content of digital heritage, can be viewed as information complexes. They are the source of the

information, the environment in which this source is situated, or transmitted and most importantly the audience or receivers, who are experiencing the information, processing it, responding to it and storing it in their memory. They are called “information complexes” because the information in them is complex, often very different in form, or can be perceived by different senses and in different time frames. This overall process is called an *information chain* as shown in Fig. 17.3 (Malik and Thwaites 1990).

The fundamental principle of an information chain is its connectivity (the reason for the name *information chain*). Each component of a digital heritage project (the content itself, the space and conditions by which it is perceived and the person(s) perceiving it) may contain pieces of the final message. If any part of the information chain is altered, the information itself is changed. It must also be understood that each part of the information chain could exist independently and that the connectivity is multi-layered (one information source could be connected to thousands of receivers, networks) or transmission conditions could vary across time and space or the receivers could change (a different audience in different cities for the same source) or the same receivers could change their viewpoint or thoughts about a particular piece of digital heritage work over time.

On a daily basis twenty-first century media “consumers” perceive great amounts of information detected by our senses, processed and often stored in our brains. This myriad of details is not perceived in isolation, one by one. Certain groups of information are perceived as entities, others as patterns, and others as mosaics. Some groups of information have their own complexities of space, time, structure and reflections in our sensory and mental processing system. They are carriers of many different messages or contents, all depending on our past experiences, cultural or personal backgrounds, particular habits and stereotypes.

Digital heritage (DH) environments in particular, are prime examples of information complexes. Since they must be communicable to diverse audiences spanning continents, cultural groups, time zones and different semantic and aesthetic experiences, a common ground is needed for data assembly, evaluation,

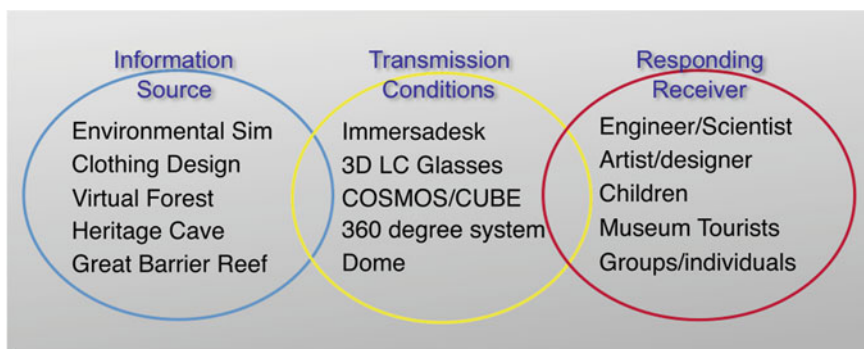


Fig. 17.3 Information Chain Scheme (reproduced from Malik and Thwaites 1990)

creation, transmission and storage (Thwaites 1999). This common ground is based on three key assumptions: teamwork with cooperative and non-competitive attitudes; a common language that is well understood by all members of the team and lastly the ultimate dependence on each team member's contribution to the overall production and creation process of any DH environment.

17.6 Eternal Themes

In 1973, Clynes described roughly three distinctive groups of human activities, from which an information impact could arise: (1) Egotropic group, where basic personal human needs are expressed; (2) Egosentic group, where the most basic emotional states of mind are expressed, and (3) Egospacial group, where most environmental and social needs are central. Each culture may have a different classification or priority within the "eternal themes", but most researchers more or less agree with these three major groups and find in each group several examples of values that are agreeable to them.

The presentation of thematic aspects of a media piece to the audience does not progress in distinctive steps, but in more of an uninterrupted flow even if the receiver of the information is not actively reading or viewing and only daydreams about the thematic stimuli (Churchland 1988). The process of segmentation of artistic information has increased in the twenty-first century, facilitated by the rapid speed of images, sounds and media works, perceived by enthusiastic "information grazers" (McLuhan and Bruce 1989).

From the opposite viewpoint, if a digital heritage work does not contain strong semantic content, the viewer may turn their attention to the more formal, stylistic details and actively engage with them. In this situation, the theme may replace the form and form may replace the content for the audience. It is often the case that what we may consider 'important' in a project becomes quite the opposite for the audience. Mosaker (2001) found a paradox arising from her work whereby "the part of the virtual environment that was based on less information was the one that the visitors liked the best and the one in which they felt the most presence".

Finally, the classification of themes has another more elusive sense. As the receiver of the information sorts the various heritage experiences according to themes or contents, the recall or "remembering" segment of the information chain (the receiver and their response) may work to merge several experiences together creating more of a feeling, inclination or attitude toward a certain theme (Thwaites and Malik 1991). This state of mind can easily enable new information input that can amplify an idea or a theme. This process is the primary cause for much of what we call the "the taste or preference of any given audience".

Today the audience of digital heritage presentations can be seen to follow in the footsteps of their forefathers, but with very different shifts of time and space that are warped by the digital electronic environment and a hierarchy of values heavily dependent on the technology and speed of information processing such as in the

work of Sarah Kenderdine and Tim Hart (2011) comprising vast omni-spatial heterogeneous datasets.

Researchers and DH media creators now have access to unprecedented technological tools and a wide range of affordable hardware and software (Hemsley 2005). There has been a renewed and increased interest in digital world heritage, mostly due to the UNESCO initiative establishing the World Heritage list of sites. Additionally a more global sense of community and the decreasing access to heritage venues due to deterioration caused by “over-visiting” has raised an alarm to protect them by the implementation of pervasive computing applications at heritage sites and museums (Ch’ng 2011).

17.7 Shifting Cultures

The situation that results when we create digital representations of cultural heritage sites and artefacts is that we move towards virtuality and interactivity, both of which originate in abstraction. There has been a complete shift to the digital realm. Previously where analogue sought to transcribe, digital seeks to convert. The analogue media of the past stored cultural information in the material of physical objects. Digital media store it as formal relationships in abstract structures of zeros and ones. You cannot ‘see’ digital content in the same way we can see an image on a strip of 35 mm film or a photo negative, both of which are quickly becoming dead media. Our current ability to digitally model a heritage environment makes abstract coordinate space become object space while the computed information becomes the image space (Hayward and Wollen 1993). Ascott (2003) coined the term ‘cyberception’ that aptly describes this altered state we now embrace. Cyberception includes all the interfaces we use to connect to cyberspace. These digital tools afforded by the computer are cognitive extensions that underline the independence and further the creative abilities of the user.

Our interaction with reality itself is increasingly mediated by interfaces to computation (Holtzman 1997; Ioannides 2010). Digital media continue a tradition of a surrogate reality inaugurated with the development of the camera. Exploring digital heritage simulations can teach us a great deal about what reality is or was, while dramatically changing the reality in which we live (Kalay et al. 2008). Digital heritage relates back to an issue pointed to by John Searle in 1992, when he argued “simulating something is not always enough to make it the real thing”. In addition I might add another question to consider, how complete does a simulation have to be before it is real, or to put it another way, how much information is enough?

As we create our digital heritage *datacubes*, we will force a dramatic challenge to our media-based culture as we try to comprehend the paradoxes of interacting with computed digital heritage representations. Marc Pesce, early in 1995 identified this process in what he called “electrification of imagination”. It is now apparent that we have come full circle, back into an era where we seek to

communicate the imagination. That is one of the things that cyberspace and certainly digital heritage is about, capturing our imagination with the past and bringing it back into the present. In order to make computers clear to our minds, we have to teach them to speak to our hearts.

Digital heritage can be considered to comprise facts and information (architectural plans, 3D scans of heritage artefacts or sites, photos of locations, etc.), fiction, interpretations or “best guess” (re-creations of landscapes, people, building adornments etc.) and fantasy (highly engaging for the audience) in varying forms and degrees with interpretive narratives of the past. The notion of fantasy is perhaps the strongest to appeal to the imagination of the viewer/visitor on certain levels. It may ultimately be the key to the widespread appeal of digital heritage as a public experience and help the goals of many projects succeed. That does not mean that a “fantasy” element is a bad or negative quality. It can be much more of a dynamic catalyst that sparks audience engagement with the digital heritage representation (Kwiatk and Woolner 2010).

Current work in digital heritage is also very much in keeping with what Janet Murray outlines in her recent book ‘Inventing the Medium’ (2012) that we are “shaping new digital artefacts and the systems of behaviour in which they are embedded” as a cultural practice. Sarah Kenderdine has spoken widely about “inhabiting the cultural imaginary” wherein the audience becomes an integral part of, and immersed into, the digital heritage experience. Her evaluation study of PLACE-Hampi revealed a wide cross-cultural appreciation of the project and that people are very forthcoming to report and discuss their experiences of digital heritage. Sadly, many digital heritage projects are never experimented or monitored with people, and instead just die in labs (Kenderdine et al. 2009). However, with many new projects the audience has thankfully become an increasingly important part of the overall research scheme whereby the receiver’s feedback is incorporated back into the evolution or new versions of the work when presented again.

17.8 Multilayered Delivery

A common way DH media creators convey a certain story, idea, or content is to imitate or describe a certain situation in life or society, heroes and heroines, events, advantages or disadvantages, which happen(ed) in either real-time or were restricted or prolonged over time. All these *stories*, in a basic sense, are the subjects of what is referred to as the *mimesis* of life. What distinguishes them from real life is not their closeness or remoteness to the cultural or intellectual level of the audience or receiver, but the relative freedom with which the receiver can play, daydream or think of them in endless variations. This is quite contrary to real life, whereby events pass around us with a certain one-way direction, which cannot, or is usually not, interchangeable.

After a real-life event has occurred, it cannot be undone or changed according to our wishes. Within a digital heritage media project quite often the opposite is possible or even desirable. The event can be turned around not only in the media piece, but it can be endlessly replayed in the viewer's mind: forwards, backwards, sideways and in any real, daydreamed or night dreamed state of mind. Bachelard (1998, 1994) wrote extensively of 'poetic imagination' and 'reveries' as powerful states of dreaming.

The result of such a freedom of thinking is a centuries old craving for artistic mimesis of life as can be found in literature, theatre, movies or television and now within digital heritage multimedia presentations. The power of the artistic mimesis of life comes from a multilayer information delivery. Distinct cultures and nations may have different subjective values or preferences for content. Once an artist has created the mimetic information skeleton (outline), they can start to describe the people, events, situations and environment in a human perspective or "through human eyes". The audience then begins their own similar decoding patterns within his own memory thus imparting a great impact on a digital heritage mediated work (Malik and Thwaites 1994).

Any multilayer information delivery process initiates a very important effect: it can bridge a number of "missing connections" in the basic information design. Since the receiver follows the "path of life experiences", they can fill in any gap in the mediated reality using their imagination with ease and efficiency. They can fantasize. In a brief time the viewer can cross centuries, distances, social groups, peek into the private lives of many other characters and "survive" or experience imaginary wars, crashes, battles, and scandals, etc. (Malik et al. 1991). Digital heritage can easily incorporate many of these qualities by the very nature of the content and the technologies currently available and employed.

The human brain has a remarkable ability for multilayer information delivery (Alkon 1994). It can process incoming information in two basic modes: (1) A sequential mode: respecting the time and flow of events, characters, such as in books, and films and in (2) A Spatial mode: reflecting the incoming information back on their own experiential mindscape. Although each mode evokes activity in a specific brain hemisphere; (sequential processing in the left brain hemisphere and spatial processing in the right brain hemisphere) the whole brain is processing information in a parallel fashion (Small and Vorgan 2009) giving the viewer an amazing opportunity to move forward in the information flow or to adjust it according to their own cultural and intellectual experiences. This is why the addition of interactivity to digital heritage is so compelling to the user as evidenced in recent projects (Cameron and Kenderdine 2007; Champion 2008; Kenderdine 2010; Ch'ng 2011).

17.9 Digital Heritage and Human Values

Over time each society has developed a hierarchy of values resulting from its geographic location, interior and exterior social relationships with other human groups, and specific to its social structure. The distance or closeness of content to a particular set of human values may label the work as “national”, “tribal”, “personal” and as such, it facilitates establishing the information consumer’s attitude toward any mediated work (Malik et al. 1991).

Historically artistic works were most often destined for a specific audience (one’s own tribe, own community, or own nation). The codification of content in writing narrowed this function to only those who understood the specific language. From medieval times onward the concept of cross-cultural understanding and cross-cultural communication rapidly extended the information impact of artistic works globally. Marshall McLuhan’s vision of the “global village” (1989) signals a strong cultural importance in this sense. As we closed the twentieth century artistic works of all kinds, were increasingly shared by people of diverse countries, ethnic and cultural backgrounds, rising dramatically in the twenty-first century.

Basic human values are usually united into hierarchies and the expression of them in human behaviour is generally perceived as “value stereotypes” and “value archetypes”. Whenever a thought or idea is repeatedly processed along the same established, repeated pattern the result is a person thinking in his own “stereotype”. In addition, there are a number of human values that traditionally cut across cultural and national boundaries. Certain religious, political and humanistic values are of this nature. Those that are closest to *sentic* (Clynes 1973) human values will transfer across geographical, national or political boundaries easily (survival, home making, love, motherhood, jealousy, hate) and those, which are geographically or nationally specific, are usually perceived as “exotic”, or “strange” (Malik et al. 1991). Thus, human values are a key component of digital heritage content that can elicit a significant impact when digital heritage works are transmitted via cross-cultural applications and globally mobilized through expanded technology such as described here in this chapter.

17.10 Considering Style, Form and Content

A digital heritage information complex undergoes a transformation while being perceived within the domain of the human brain. Not only are the original shape, form and content subtly or substantially changed, but also the receiver’s own experiences, combinations and dreams begin to enrich the original content. The significant element here is not just the original stimuli (the content), but a whole mindscape of thoughts, recalls, memories, or fantastic dreams brought to bear on the content by the audience (Malik and Thwaites 1994).

At the end of twentieth century the time and space axes of information began to deform the content and form of an artistic work in the mindscape of information consumers (see Fig. 17.4). As a result, the designer of a digital heritage piece no longer has the complete ability to engage their audience. The person who perceives the work is freed from the conventions of traditional audio-visual form. They can start to move freely within his/her imagination due to the awesome capacity of human brain to combine the carefully designed elements of subjects, image and sound content, and interactive forms into a most fantastic, invisible pattern of thoughts, dreams, and personal imagination (Thwaites 2005).

Heritage, culture, our understanding and definition of it, is a vast and complicated human quality evolved through the centuries and manifested in language, art, architecture, writing, drama, etc. Digital representations of reality, either past or present, that by their nature embody culture, are currently tied to a myriad of technology schemes that can vary greatly in the presentation form and style of digital heritage information (Foni et al. 2010; Champion 2008).

The re-presentation of digital heritage via Internet websites, a popular content conduit, can provide only certain kinds of information and in certain ways subject to established protocols. The longstanding format of QuickTimeVR or other forms of 360° panorama interactions, combined with texts, images, databases and avatars are common. DVD delivery by nature of its high-density can take content further in scale and scope but are limited in interactivity. Stand-alone, immersive delivery platforms such as CAVES, Cubes, 360 Panorama Theatres, and touch-tables, to name a few, can further provide a more “true virtual” and interactive or immersive experience (Hemsley et al. 2005; Ioannides 2010).

Our quest for the optimum technology is the seeming “holy grail” of digital heritage, however it is often costly and limited to specific venues. No two applications are alike nor do they present content in the same style or form. The resulting information impact on the audience is, or can be, altered in each case. Such an outcome must be considered carefully in the overall content design whether it will be specific to a delivery system or across a variety of transmission conditions. A current iteration of this is manifested in the developing field of transmedia, comprising content of various media formats and technologies across new modes of delivery, often requiring redesign or reshaping before use.

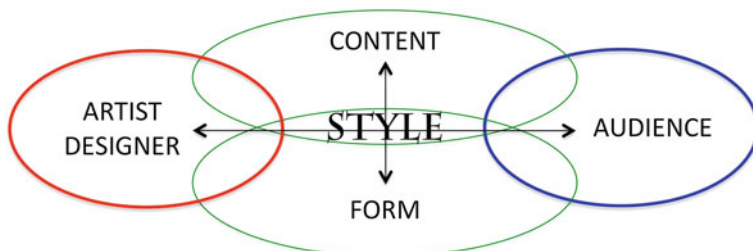


Fig. 17.4 Interactions of style, form and content (adapted from Dondis 1973)

17.11 The Vanishing Virtual or the “Disappearing Digital”

Many researchers have highlighted an urgent situation around the world, that digital heritage is vanishing or disappearing faster than actual physical heritage of all kinds (see Fig. 17.5) (Koller et al. 2009; Stodl et al. 2009; Addison 2008, 2006; Cohen and Rosenzweig 2006; Kuny 1997). How can this be and why is it happening at such an alarming rate? Mostly it is happening due to inappropriate standards, a lack of understanding and in some cases just a rush to capture, and digitize, in order to “save” it before it is gone, often resulting in the opposite result.

Addison has identified some of the broad areas where there needs to be consistency in characterizing information related to heritage. They are the following; capturing and digitizing, the use of metadata, the selection of technology, data quantity verses quality, and archival protocols. He has proposed a minimum 14 point basic template of metadata required to be added into each heritage asset such as photos, 3D scanning data, measurements, documents, sound and video recordings (Addison 2006). If all our digital heritage data were tagged accordingly it would move us towards a more comprehensive archiving of what we seek to preserve thus extending and expanding usability over time.

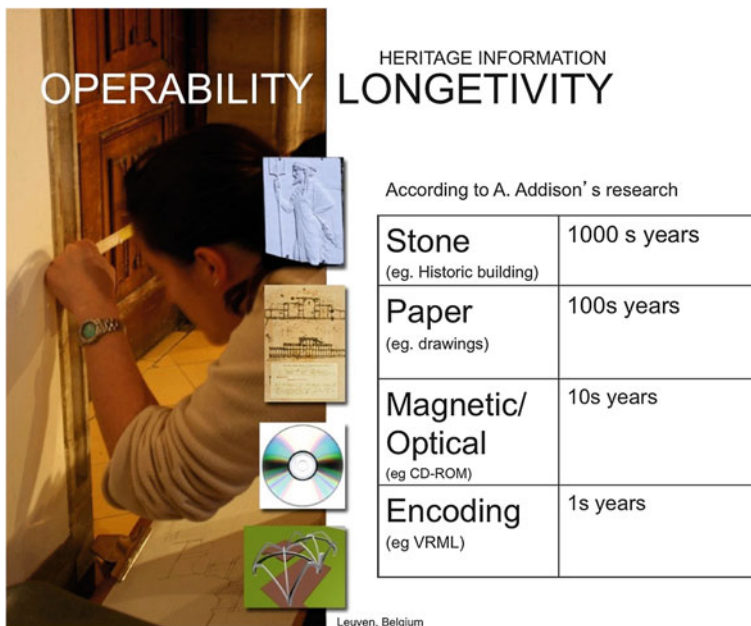


Fig. 17.5 Longevity of storage formats in years (reproduced from Santana-Quintero 2008)

17.12 Smart Heritage and Cultural Futures

The concept of smart heritage and cultural futures is comprised of applications that combine imagery and sound captured at locations of high cultural significance with animation, narratives and immersive sound and vision technologies to create hybrid virtual-real worlds rich in detail, interpretation, and aesthetic impact exemplified by the work of Kenderdine et al. (2009). This field of research is extremely promising because it seeks not only to create new experiences in digital heritage but also to have them live through into a “cultural future”. Sarah Kenderdine’s (2013) ground breaking work with the immersive panorama format displaying the heritage site of the Mogao Caves at Dunhuang has been seen by thousands of people in various locations (see Fig. 17.6). It is an example of what I would call ‘mobilized’ digital heritage since it was designed to be experienced across cultures in different environments and by diverse audiences.

Much of the future of digital heritage re-presentations lies in what Balsamo (2011) describes as “public interactives”, “a category of exhibits that use interactive technologies to present content to a wide range of public audiences”. These experiences can push the boundaries of digital creation to new styles, forms and content in venues such as galleries, museums, heritage sites, exhibitions and other public spaces. They immerse and involve audiences by maximising the components of the information chain; the source, transmission conditions and the response of the audience, capturing their imaginations in ways that were until now only dreamed of with early digital heritage presentations. Work continues to evolve in this exciting field each year with new installations appearing around the world.



Fig. 17.6 The Mogao Caves at Dunhuang 360° immersive panorama installation (reproduced from Kenderdine 2013)

17.13 Born Digital Content

Digital heritage content is created in many different formats as described and discussed above. What is now of increasing importance are the totally 'born digital' projects, those that are completely computer generated and presented with no analogue equivalent such as the work of Kwiatek on creating heritage stories (2010), Ch'ng and Stone on ancient landscapes (2006, 2005), Pletinckx et al. (2000) on archaeological visualization among many others.

UNESCO's charter for the preservation of digital heritage has indicated that such 'born digital' content should be given priority. Why, one may ask? Presumably it is simply that totally digital content stands an even greater chance of 'vanishing' than content that has been created from a digitization process of an existing reality.

Born digital content comprises the following formal aspects; it is original content that is entirely digitally generated and presented, and has no analog equivalent; it is easily replicated, altered, and destroyed, has networked or distributed storage, can be internet-based, and it is subject to instability (lost information is lost forever). In addition, and of critical note, it is subject to technical obsolescence and physical decay, thus not having a 'cultural future'. Lastly it is content having a lasting value and significance, being dependent on computers and related tools, with hardware and software always changing and thus by nature is dependent on storage media and format upgrades (Jianhai and McDonough 2009). All of these features need to be addressed from the outset by those creating born digital heritage content if we are to see it as 'Smart Heritage' that is carried forward into our 'Cultural Future'. Therefore, it must be curated, re-versioned, and updated to move forward in time.

17.14 What Do We Learn When It is all Digitized?

The year 2013 is a significant time and place in history, a time of the merging of technology and human will/needs in order to preserve world cultural heritage in its many forms. It is also intensified by the interest and encouragement of UNESCO to digitize endangered heritage sites (Smith 1998). In the process, what impact will these digital interventions have on our perception and understanding of heritage into the future? What follows below are some of the possible implications of this process that may shift in importance and scope over time and as technology and our research in digital heritage creation develops further.

As a result of digital heritage there has been increased interest in cultural heritage the world over. It can provide access to remote or closed heritage sites that are on the rise and open a wide variety of rich information sources. Digital heritage projects create an increased awareness of global humanity, encourage virtual tourism over mass tourism, and provide a means of recording, preserving, interpreting

and educating thus fostering widespread cross-cultural and inter-cultural communication. Lastly it comes full circle to the beginning of this discussion by coming closer to satisfying our “fantasy” of time-travel into the past.

From the above discussion, it is apparent that digital heritage can be technologically intense and expensive to develop and present, often existing in an exclusive environment not easily shared across time or space. It can provide only a limited perception of the overall “cultural value” of a site, leaving certain ellipses in cultural information. It has raised public awareness of heritage sites often resulting in increased tourism to sites, putting them in danger of over visiting. There has been a huge diversity in the amount and accuracy of the information available around the world posing a risk of commercialism and low quality applications. The digital heritage audience has had an exposure to formative experiences creating pre-defined expectations of what digital heritage experiences ‘should be’. Lastly of course, the content requires custodial care and maintenance as digital heritage technology evolves with increasing speed each year (Tan and Rahaman 2009).

In addition to the foregoing discourse on digital heritage, Lavoie and Dempsey (2004) have identified key issues to the understanding of digital archiving that readily apply to the overall digital heritage processes and could be seen as a minimum starting point. They describe it as an on going activity aligned to set of agreed outcomes, with a shared and understood responsibility. Preserving our digital heritage entails a selection process in order for it to become an economically sustainable activity. It must be built upon a cooperative effort that is often seen as an innocuous activity, or perhaps an aggregated or disaggregated service, while also being a complement to other services. Digital heritage has become an understood process, but it is just one of many options for heritage preservation. Most significantly it can overall be seen to be as a public good and a global initiative for humanity.

For additional guidelines that support digital heritage projects see the work of Letellier (2007) in the publication “Recording, Documentation, and Information Management for the Conservation of Heritage Places” as some clear indicators of what we need to consider as we move further forward in the process towards ‘digitizing everything’.

17.15 Conclusion

From the foregoing discussion it is safe to say that Digital Heritage is still a relatively young but rapidly evolving field. This chapter has presented a broad summary and overview of issues, approaches and digital heritage projects across time and space. Many researchers and media artists around the world are working to find better ways to “digitize” our global cultural heritage sites and artefacts before they disappear forever. Millions of people comprise the twenty-first century media consumers who anxiously await the results of our efforts (Mudge et al.

2006). Technology advances faster than we can sometimes keep up with it. This double-edged sword provides us with the tools to create ever more engaging representations, while at the same time it creates challenges for the exhibition, access and preservation of digital heritage works.

So what now? How do we proceed forward so that the best of Digital Heritage can make its way into the public space given the constraints and considerations outlined in this chapter? The engineers, historians, archaeologists, digital media designers and artists must find new and useful ways to expand their work, share approaches and learn from each other (Cameron and Kenderdine 2007). In my opinion, very few projects should, or can now, be carried out in isolation, one specialized team working without the help or input from other disciplines. Digital heritage is indeed a transdisciplinary team endeavour that can only succeed through the meeting of minds and the sharing of ideas and research from around the world and across cultures. We are seeing many more examples with each passing year.

In the very near future some critical issues will need to be addressed; increased accessibility to (and sharing of) heritage data, consistent interface design for widespread public use and re-presentations of work, the formalization of a digital heritage database, establishment of a global infrastructure, institutionalized archival standards for digital heritage and most importantly the on-going curation of work forward in time as the technology evolves so that our current digital heritage projects will not be lost to future generations. We cannot afford to have our digital heritage disappearing faster than the real heritage or the sites it seeks to 'preserve' otherwise all of our technological advances, creative interpretations, visualizations and efforts will have been in vain. The solutions lie with the digital heritage community and with the readers of this book.

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