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**Technology Mediated Memories in Networked Societies:  
ScanMemories, Himba Chronotopes and Wearable Absence**

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*PhD in Art and Computational Technology*

I declare that the work presented in the thesis is my own.

A handwritten signature in black ink, consisting of a large, stylized initial 'M' followed by the name 'iguel de Andrés Clavera' in a cursive script.

Signed. Miguel de Andrés *Clavera*

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It is a privilege to be part of the Goldsmiths University of London family.

Siguiendo un proceso vital por Zaragoza, Londres y Singapur.

## **Abstract**

Memories are the windows to the past, metaphysical relationships that are developed and associated within the mind, preserved, and shared with others, even sent into the future.

Individuals, communities, cultures, and even countries have memories that may be dramatically important to their very existence or simply the directions to the nearest coffee shop. As early as language and communication, the need to save and share memories has been important, whether to share concepts, lessons, or even simply for entertainment.

Contributions of this research are focused on the applications of technology regarding memory and memory storage. Using an action research design, the exploration of new technologies occurs through project designs and testing of memory technologies and how they will benefit society in the future, from ability to preserve memories more completely, regain them, historical value, and preservation of culture through memory sharing. Each project explores specific applications that present new ideas on how memories influence our lives and how the future of memories can influence new generations through technology.

This research includes the work presented in the appendix regarding the various projects and concepts of Scan Memories, HimbaChronotopes, and Wearable Absence, with an overview of the items covered in the chapters. Memory objects, memory spaces, digital and physical space, interactive memory making, collective and social memory are explored in relationship to potential real-world applications in daily living. Finally, the work concludes with how project interrelates with the exploration into research and application of the technology, the risks, the future, and implications.

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## Chapter 1: Introduction

Memories are important to people for many reasons, from practical to emotional, we strive to recall the details of our lives or the history of the world around us. In the past, memory occurred in histories, whether spoken, written, drawn, sung, or satire; histories evolved and were shared between peoples and persisted as best as their sources and materials could. In the present, technology increases the lifespan of memories with more permanent storage possibilities. The ability to store memories for longer period is another advantage of current technology. Additionally, current technology uses even create the ability to share memories, as mass communication, with anyone using the same types of communication networks. The Internet, as a means of mass communication and nearly endless storage source, has become a conduit for the endless desire of society to immortalize the past, present, and hopefully the future.

“Lost opportunities, lost possibilities, feelings we can never get back. That's part of what it means to be alive. But inside our heads - at least that's where I imagine it - there's a little room where we store those memories. A room like the stacks in this library. And to understand the workings of our own heart we have to keep on making new reference cards. We have to dust things off every once in awhile, let in fresh air; change the water in the flower vases. In other words, you'll live forever in your own private library.”

— Haruki Murakami, *Kafka on the Shore* (2002, p. 437).

Prior to the invention of digital resources and the Internet, people shared memories through written forms and images. A person might write every day into a journal that saves the key events of their history, a historian may collect images of a war or document commentaries

from people in attendance of the event; however, the data is always collected and stored after the event has occurred. This is true too of even earlier forms of memory saving – songs and art. Saving and storage of memory occurs after the memory has already formed. Photography created a conduit from only in the mind to in the moment real time saving of memories, and the ability to share at least that perception with others as evidence exact to the moment. However, technological advances are developing methods for in the moment, real time, saving of nearly every sense – sight, sound, and possibly soon smell and feel or even taste. At the fingertips of every individual, technology that mimics the dream of Memex – instant retrieval of every moment of life (Buckland, 1992).

Digital storytelling has become a common appearance of Internet-based history and focuses on involving both sound and visual support (Salpeter, 2005; Frohlich, 2007). Even in 2000, Frohlich and Murphy (2000) dreamed the Memory Box, designed to allow users to save memories of pieces of jewelry through a stored memory jewelry box. Creators of sites, along with the other uses of the sites, can instantly view the memories saved. Materials collected from past events and occurrences are able to provide opportunities to learn from history, when stored in digital resources where they can become long-term. Similar to previous forms of storytelling and history sharing, digital-based history suffers from a lack of “in the moment” history, often being represented by historical collection after the fact, except in the case of images or film, and in some cases recordings. New readers cannot ever explore the history in the same way as the creators of the memories; even more this is the case because new writers rewrite histories over time. Digital resources share a different fate, they can remain whole – in the case of film and

recordings and such is the case with movies and related media – or its access can be completely removed due to inaccuracies or inconsistencies. However, the question regarding the removal can support the claims that individuals unwilling to share the entire story with the audience, and not by the communities and the people living the history control history.

Bell and Gemmell (2007) expressed “the human memory is fallible” and with that, every future generation seeks new and more complete methods to overcome that human fault. We strive to save memories to increase the ability to locate keys or to recall the details of a past life event, and individuals and communities alike work towards creating new and improved methods of storing and sharing memories for future preservation. However, in the very act of preserving memory it could be that memories are changed, acted upon by the very recalling tools created to increase the likelihood that we will recall the memories. Memories, as being specifically those carried in the mind and memories are acted upon by even the act of recall itself, as suggested by Bell and Gemmell (2007). When neuroscientists explore memory in the mind, through tools such as MRI, there are many consistencies between the response of the brain when individuals recall events, but not always in the same way as another individual, even to the point that the recall of events can occur more in some areas simply based on age (Wilbers, Deuker, Fell, Axmacher, & Kilner, 2012). It is possible that memory changes with time, whether due to the meaning or the need of the memory.

Digital memories have many different advantages and disadvantages, including that unlike human memories, digital memories may be harder to misplace or dispose – making them appear to be immortal. Digital memories have a difficult disadvantage, they cannot demonstrate

emotions and they cannot guarantee a specific emotional response as was created in the individual at the time of the original memory. At this time in history, humans cannot truly experience the memory they see in any media form today, whether this is because of the missing senses alone or because of the inability to recreate the exact moment and emotion. However, to date digital memories cannot truly replace memories themselves, except as histories. In the future, digital memories may be able to act on more senses when activated. For example, wearable technologies projects are developed for individuals to wear, collecting memories to store. The environment activates these items, or access can be achieved through RFID devices, and digital archives of cultures.

Organizations use RFID technology for locating and tracking products, shipments, and other items. In some situations, RFID technology serves in hospitals as devices to aid in locating patients within the hospital, quickly update medical information, or to access more quickly a patient's medical history. Science fiction, through novels and movies, has used RFID devices to track individuals, monitor currency, and sometimes as part of a device, that controls individuals –whether by limiting movement or taking life, such as in a prison-type environment. The first project that guides the research uses RFID technology to access memories in cemeteries or objects. Individuals are able to code items, such as headstones, old clothing, memorials, books, or other items with RFID technology later accessed by a cell phone or similar device using the programming. The user of the information can instantly access the information around the object – the person who the object is for or previously owned the object. Saving memory is everywhere, and is used for a number of different purposes, but how the technology influences life is yet to be



determined.

### **Aims and Objectives**

Memory and technology raise many questions for researchers to examine. This research was designed to examine how memories are stored, accessed, or used by individuals. Three projects were used to meet the aims and objectives, which was to explore how memory can be influenced by technology, and the methods in which these technologies can improve upon access to the individual, groups of people, or regarding historical reference. These projects were conducted over the course of a few years, including a number of different research teams and volunteers. Aims of the projects were to determine both viability of the methods and potential uses by individuals. Objectives of these projects was to apply technology to the needs of people, in order to improve upon the memory storage and access by people. Additionally, in the case of HimbaChronotopes, the goal was to explore the ability to preserve culture. Each of the projects selected focused on developing areas that are important in memory collection, specifically that Scan Memories evaluates the ability to retrieve memories or history of ancestors through stored information at the site of burial or in a database accessed from anywhere in the world; biofeedback memory to enhance the memory retrieval of the individual; and website with artefacts to preserve the collective memories of a culture.

The role of memory in a person's life had to be understood before the projects could be developed. Many different sources, definitions, and technologies during each project, and re-examined in this work. All three projects represented a different area found to be significant in the storage and retrieval of memories. In the case of Scan Memories, the focus was on saving

memories of ourselves and our lost loved ones, throughout history, in a format that provided more details to ancestors and the future. The Wearable Absence fit the identified need of reliving a memory, more completely, specifically focusing on how we feel at the time that the memory is made. In this case, the memory experience could be relived in all the biological experiences of that first memory. Lastly, HimbaChronotopes represents the area of memory that is focused around preservation of entire cultures, people, and their history. Throughout time, methods of memory storage have focused on preserving history, including that of culture, but much is lost over time. HimbaChronotopes explored preservation with technology. These aims and objectives resulted in the following research questions to guide the thesis.

### **Research Questions**

Specific research questions designed to enable the project are regarding the role of memory in technology, and in the need of memory storage devices for the individual. The questions asked in the literature review included:

- Research Question 1: What is the definition, purpose, and history of memory?
- Research Question 2: How are memories stored and recollected?
- Research Question 3: How are memories externalized and mediated in the digital world?
- Research Question 4: What types of control, hindering, or security are there for memories in today's society?
- Research Question 5: How is memory saving used in society, to create networks or to socialize?

- Research Question 6: How might memories be stored, preserved, accessed, or externalized in the future?

Memory is an abstract concept, which also needed to be defined to accomplish the goals of this research. Throughout history, memory has been an important tool, and has resulted in the creation of arts and technology, aimed at immortalizing the activities of the present to create memories in the future. Understanding these areas required development of the various questions answered in the literature review. These questions were further defined in the overall development of this research:

- What are the roles of digital technology in preserving memory?
- How can technology improve upon memory retention and access?
- What role can technology have in the future for memory?

Research questions specifically addressed projects. Regarding the Scan Memories project, the hypothesis is that touching, or accessing, is a natural and robust way to indicate willingness to receive the information, and that restriction is not required other than as passive. For the Wearable Absence, the hypothesis was that technology could accurately store biofeedback in a way in which the information could be related to an activity and could allow a user to recall how they felt by reviewing the data. The hypothesis developed for the HimbaChronotypes project was that the memories of a combined people could be disseminated to a larger people, through technology, and would increase the retention of these memories through continued access to the materials.

## **Research Methodology**

An action research design was used for this project, as a result of the projects completed for the exploration of memories and memory storage in projects that explored these concepts, along with how technology directly influences changes in memory management. Action research was further supported by case studies in memory management, which are each of the projects identified in the following section. Case studies enable researchers to explore social and behavioural sciences using real-world applications of theories, processes, or other systems in place within the case being studied (Putney, 2010). Each of the cases identified in this research are experiments with memory and technology and as explorations are an action research design approach, and individually, they become cases in memory application that can be explored as bounded entities utilizing the ideas that are found in the literature review and enable the exploration of the research questions presented. The research methodology is further explored in Chapter 3 of the document.

## **Introducing the Projects**

This research engages the questions of memory and technology using three projects that engage users in the methods to save or store memories, from the type we see ourselves to the type that occur within us and are unknown. The first project is Scan Memories, which specifically identifies how people utilize objects of stored memories, through RFID, to engage in how people passively engage in memory or information gathering. Wearable Absence is the second project, and is a worn technology that collects biofeedback and stores this as digital

memories. The third project is HimbaChronotypes, which explores documentation of cultural memories of an African tribe, through Internet storage of their history.

### ***Scan Memories***

Scan Memories (sM) examines memory practices that act upon or alter memories and beliefs in and around death by information technologies. This includes the questions about how information can alter embodied relation with the materiality of memory objects and spaces, and how this can change the issues of identity and privacy of the dead. It explores the possibility of accessing the information of the deceased from specific objects and the space in which they were or their bodies are, making the information available only when people who want to retrieve it are next to the physical objects or within the spaces. This type of memory is both individual and cultural. How the memory associates these particular items to create an individual memory, or recall one, can demonstrate how important this application of the technology can be to the future. Individuals may forget the minor details, but the digital technology may never forget; however, there are tombstones in many older cemeteries, long forgotten, barely tended, and while they fade away to time, this would not be as true of information saved in digital resources, short of damage. The project combines the physical space in which our physical bodies move and feel the virtual space in which we store and retrieve information leaving our physical bodies outside and the process of memory reconstruction. It proposes a way of connecting all three networked technologies allowing the transmission of memory as experience.

Scan Memories, or sM, is distributed event-driven architecture for discovering location specific mobile web services in the physical space and objects, which system addresses as main

challenges the production of smart spaces, restricted retrieval of information and localized scalability. The principal trace of action when using sM is that when the user touches a RFID tag with an RFID reader, embedded in their mobile device, the system pushes to the user's preferred device information associated with the reader. This information, for example, can be a link to a web service relevant to the identity and memories of the deceased. My hypothesis is that touching, or accessing, is a natural and robust way to indicate willingness to receive the information, and that restriction is not required other than as passive. The individual does not access the information unless they choose to access the information. At the same time, we are able to obtain reliable information from the system, regarding the user's current location, or another location where the services are in the future.

From a functional point of view, sM enhances the computational capacity of the user's environment, thus addressing the pervasive computing characteristic smart space. RFID tags in the environment allow connecting to a specific online back-end system, which is aware of the touching events recorded by the readers. This particular use of the conception of the architecture is the opposite of examples that include building access systems, theft protection, commuting ticket systems, and goods. Monitoring as it is, the RFID reader remains static. The areas covered with RFID readers are not an active environment, but simply RFID tags that initiate service events. Like this, we create passive environments where the user or the user's device is responsible for collecting the information and initiating services, as mobile phones with RFID reader scan tags distributed into the environment. The back-end system consists of a relational MySQL database. More detailed information is provided in the Methodologies chapter and

supplemented by the Appendixes.

### ***Wearable Absence***

Wearable sensors are the focal point of the third project, *Wearable Absence*, guiding the investigation in complete memory retention through the gathering of biofeedback. *Wearable Absence* is wearable body architecture based on small wearable devices (such as used in medical fields), embedded in the garment are sensors that use biofeedback as a method to retrieve and deliver digitized and catalogued memories from a relational database. This particular method of wearable memory storage uses body responses, particularly those associated with emotion and the memory retrieval system is created to be different in that it does not return images and sounds to the individual but works towards being able to return the “feeling” of the event that includes the memory. Even the individual creating the memory cannot duplicate it, or achieve the exact same feelings and emotions when recalling the memory, because the exact same conditions are singular in nature.

The project is an interdisciplinary collaboration using textiles and wearables, biofeedback sensors, mobile devices and digital technologies to develop a technological mainframe that will convert specific pieces of clothing into the catalyst that will retrieve digital data from a relational multimedia database. The project investigates the cultural and emotional density of clothing that is able to monitor physical parameters of the user to query a database and retrieve digitized memories. Part of the project includes the creation of a relational database, which must include the video narratives to create memories of fictional characters to be retrieved during specific responses. The project develops nearly like an adaptive responsive system that may achieve the

similar reactions of the brain itself in comparing different reactions or events to prior events and finding matching memories to compare responses to in the current situation. Clarity on the project parameters and implementation are found in the Methodology section and related Appendixes.

### ***HimbaChronotopes***

The final project, HimbaChronotopes, guiding the research is the documenting of cultural memories of an African tribe particularly that of the creation of their crafts using an online platform designed as a digital archaeology project. HimbaChronotopes explores how situated, networked, and participatory narratives raise awareness of a tribe under threat in Northern Namibia by crossing material objects with immateriality of information. The Himba, a semi-nomadic tribe in Northern Namibia, are currently threatened due to land seizures and increasing involvement of outside cultures on the communities. This culture is at high risk of losing the traditional style of living and cultural memory. The project documents traditional Himba crafts in the form of annotated video narratives. As networked and mobile technologies provide a more flexible medium for storytelling, the Himba crafts become networked material objects that enable access to the documented creation processes. A participatory online-networked platform uses databases and interactive video techniques to allow the weaving of myriad paths through an otherwise linear presentation. In addition, the inclusion of sidebar materials is nonintrusive and allows the user more information without the interruption of the materials. The crafts are also tagged using identification techniques. These identification techniques provide access through technology such as cell phones, allowing the item to become a physical repository of virtual



information. The crafts become the gate to access the virtual information and users can access it via mobile technologies at the point of purchase for these items. Users can purchase these items from the Himba in traditional as well as online platforms. The research is identified and explained in the Methodologies chapter, along with accompanying Appendixes.

### **Participants in this Research**

It would have been impossible to complete this research without the assistance of the amazing teams that worked together to complete the case studies identified above. Each of the cases included a variety of researchers whose work included the design of the project, obtaining materials and resources, and conducting the study. Included in these participants are the volunteers and subjects, without which the projects could not have been successful. In addition to the impressive contributions of these members in the cases, there is special recognition to the Himba tribe, whose contributions were valuable and enlightening during the research. While this research was conducted as an Action Research, using projects to test out ideas, it did not include testing on a population, but rather on the viability of the projects. In this way, each project was able to be explored for the fundamental uses, an intervention for technologies and memory saving.

### **Contributions**

This study contributes to the field of memory storage by demonstrating the uses of technology for enhancing memories and creating opportunities for long-term memory storage. Memories serve as historical reference, including through the relationship memories have with individuals while they are living, for their descendants, and for cultures as a whole. Technology

growth in the area of memories can contribute to management of memories for the elderly or for preserving cultures long into the future. Evaluation of the cases selected was done considering the implication of these into the future of memory preservation at each of these levels. As demonstrated in the following chapters, memories serve many values to humans as a whole, which creates many opportunities for researchers and technology developers in the future.

### **Document Structure**

Chapter 1: Introduction provides the backgrounds to the projects selected, research questions, contributions, and introduction to the remaining chapters.

Chapter 2: Literature Review includes memory uses in history, currently, technology, and relationships with memories as people have seen it over time. In addition, this section explores how technology has grown as a result of people's interest in preservation of memories, including growing technologies that are designed to improve upon memory sharing that can occur in social media and other sharing methods. The literature review demonstrates the focus that individuals have in preserving and sharing their memories, both of themselves and their loved ones. Further, the idea of culture preservation through memory storage and sharing is introduced and explored.

Chapter 3: Methodology, the action research design is examined, as the focus of the research design of the paper. Additionally, the chapter explores the various methods in which the research was conducted, from examining how case studies are utilized in research to the application of action research designs into the case studies. This chapter also introduces the various participants in the studies, which enabled the projects to be successful and available to the researcher.

Chapter 4: Three Case Studies and Results is the case studies, and the results of those studies. Each project is fully explored regarding the methods used to develop the study, how the study was implemented, and the results of the studies overall. This chapter also introduces the specifics aspects of the studies, which are further explained and supported in the Appendix sections.

Chapter 5: Conclusions and the Future of Memory Storage is the discussion and conclusion chapter, aimed at introducing how this research indicates the directions and future of memories and their storage. Memories serve as an important part of the history of humans, including through shared memories and individual saving of memories. Using technology to aid in these practices improves upon the ability of everything to be saved, from culture through heritage, or even the feelings from the first time a person met their future spouse.

## **Chapter 2: Literature Review**

People use personal and community memories in all aspects of human life, including to develop self-image, explore historical relevance, understand people from the past, and even to attribute important aspects of life in ways that generations can appreciate the memories. Digital technologies enhance communication, and while communication promotes sharing of memories, digital communication promotes saving of those memories (Dijck, 2008; Gradinaru, 2015). Moving memories from the past, forward, through time, uses communication techniques that were not always able to preserve memories in their fullness, completeness, or even in a method that could be perceived as permanent, digital memory saving offers opportunities to overcome those complications. As memories are extremely important to human life, understanding memories assists in understanding what aspects of saving and sharing are important to use of technologies. In this research, the ability to define memories assists in understanding how digitalization of memories may assist in the future and how the future may look in terms of memory preservation and sharing.

Chapter 2 begins with the definition of memories, as understood from both a personal and scientific level. The definition provides a foundation in which to understand how memories are analysed in the research. Following this, the chapter examines the literature from the goals assigned by the research questions. These goals included

- Research Question 1: What is the definition, purpose, and history of memory?
- Research Question 2: How are memories stored and recollected?

- Research Question 3: How are memories externalized and mediated in the digital world?
- Research Question 4: What types of control, hindering, or security are there for memories in today's society?
- Research Question 5: How is memory saving used in society, to create networks or to socialize?
- Research Question 6: How might memories be stored, preserved, accessed, or externalized in the future?

Memories are part of every individual, both past and present, and management of the information obtained may directly influence any number of areas in technology in the future (Brown, 2015). This chapter begins in the beginning and ends with a look into the potential of the future.

### **Defining, History, and Types of Memories**

According to the Oxford English Dictionary, memory is actions or processes, which result in recollection of information, occurrences, remembering, or even commemorating. The definition focuses on that which is gone, things that can only exist as part of what remains in an individual's mind, or recalled due to senses. Over the past five years, memory has taken on many forms in research. Memory is studied to understand how consumers make price comparisons, in which evaluations occur for memory disruption, implicit memory, memory blocking, and more (Kyung & Thomas, 2016). Performance of memory is studied in older adults, to assess delayed recall, recognition of memories, and immediate memory (Nespolo, Reschetti Marcon, Pollo De

Lima, Lebre Dias, & Martínez Espinosa, 2017). Even collective memories are studied in a variety of different areas, from wars to rock stars and history (Ocasio, Mauskapf, & Steele, 2016). Projects that store memories, such as touch, are being explored by researchers to preserve the “ghost touch” of past loved ones and feelings that we gain when in contact with loved ones (Brown, 2015, p. 65). Memories evolve, over time, to reflect how we begin to understand them, but not alone, because they evolve over time even in our own mind, as a result of time.

Memory is not exclusively an emotional experience and memory is not strictly needed to access thoughts of past events, people, places, or things, but rather also for practical purposes (Berliner, et al., 2003; Fadda-Conrey, 2010; D'Argembeau & Van der Linden, 2008; Dijck, 2008; Burgess, et al., 2010). Technology developed today is being developed to be used with practical purposes (Inglis, et al., 2004; Bell & Gemmell, 2007; Nagpal., 2008; Burgess, et al., 2010; Clavera, 2011; Hodges, et al., 2011; Riebe, 2013; Gradinaru, 2015). For example, technology guiding wearable technologies such as wearable absence, and are used to assist individuals suffering from diseases or disorders that reduce memory ability (Clavera, 2011). In some ways, the technology is already able to seemingly cure these disorders by assisting in building new memory connections in ways that were not achieved from traditional methods such as journals and pictures alone (Inglis, et al., 2004; LoPresti, et al., 2004). People have many needs for memories, new and old, short-term and long-term. An individual's education is a guiding influence that promotes future growth and presents itself far into the future or sets the foundation for new learning in the future. People must remember the last place they set down their keys or remember important events such as birthdays and holidays (Van der Hart & Nijenhuis, 2001).

Tools for remembering have existed for many years, from writing and mapping through technology such as handheld devices and cell phones (Hanh Huu & Tho Manh, 2007). Alarm clocks help people remember to wake up at a specific time and reminders can send an email to remind a person of a doctor's appointment. Even when the goal of memory is not to share, the importance of memory cannot be ignored.

When memories have individual importance, mass communication and media may not be the primary needs for these types of memories. For example, Himba stores memories to the digital resources that can be maintained in the Internet, but the purpose of these memories is to preserve their culture, which is independently important to each individual (Salpeter, 2005). Setting reminders in emails or by using social networking devices may invite others to share in events or add their own items to calendars, but the primary objective is to provide memory enhancement to the individual. In many cases, individuals may even design different "profiles" for attending their online social activities that are different from the social activities that are done under their real name. Individually, memories are important to the ability to interact socially, build self-image, and conduct business in a work atmosphere (Bell & Gemmell, 2007; Ahn, 2011; Başaran ince, 2014). Individuals, as part of a community, need memories of their community and family for emotional reasons, and these include both autobiographical related memories and memories gathered from other people (Brown, 2015; D'Argembeau & Van der Linden, 2008). However, the memories of Memex is not yet complete, to date, the ability to store the very information we need, instantly (to prevent forgetting to save) is not available. Organizations are working to create wearable technologies that track every moment, from

glasses to clothing, items to track every movement and every moment are not yet complete, and where they are nearly complete they have limited range, limited battery life, and are often costly. Technology changes every day, as new technology evolves older technology becomes more affordable for all potential users. Organizations around the world strive to capitalize on the technology advancements, including by promoting the technology in countries where people cannot yet access or afford the technologies. The future may see all people, worldwide, able to use technologies to prevent forgetting and to allow more memory permanency and sharing.

### *What is Memory?*

Memory, in its simplest form, is defined as the ability to receive, encode, process, and then retrieve information (Lee, 2005). However, through every field of study there are different references to memory, different terms, and different relationships with the word. Collective memory is defined as the memory held or recalled by a group of individuals, how an entire society recalls an event rather than as an individual. Collective memory, as explained by Fine (2005), is a very controversial subject that encompasses many fields of study, social and historical. There are numerous studies in many different fields, developed to better understand memory whether physical or metaphysical, and these aspects that invoke severe disagreements amongst theorists. A study conducted by researchers Saha, Halder, and Das (2013) was dedicated to understanding if athletes demonstrated better short-term or long-term memory than students not engaged in participatory sports. Meanwhile, Hawley, Crowe, and Brooks (2012) researched the relationship between teacher perceptions, individual memory of events, and the ability to effectively teach events in current history. Wilbers, Deuker, Fell, Axmacher, and Kilner, (2012)



researched autobiographical memories to determine if they presented as “inherently social” in nature, and defined the social interaction relationship as essential to the autobiographical memory development and recall. These researchers are not alone in the many different studies of memory and memory recall, studies evaluate how to improve recall in amnesia, Alzheimer’s, and dementia and some studies evaluate how memory promotes the ability for a rat to recall short-term changes in a maze to reach the food (Porter, 2015; Ouyang, Li, & Tian, 2014). Medical, psychological, philosophical, and sociological studies all evaluate memory in reference to a variety conditions both in humans and in animals. This widely studied topic has theories ranging from educational through medical uses.

In studying memory, some definition must be developed to understand the context in which the memory discussion occurs. In this document, memory is strictly focused on autobiographical memory, which is recognized as associated with episodic memories and as sub-fields of declarative memories (St-Laurent, Abdi, Burianova, & Grady, 2011).

Sullivan (2009) defines autobiographical memory as:

“The memory for information related to the self. This is mostly considered part of the episodic memory but can be distinguished from mere episodic memories by several features. First, autobiographical memories are more complex than other types of memories. According to Martin Conway, autobiographical memories are organized in different levels of specificity, from lifetime periods (e.g., when I lived in Berlin) to general events (e.g., the times I went to the theater) to event-specific knowledge that contains sensory or affective information. Recently, the life story was added to this model

as a more comprehensive level.” (p. 36-37)

Autobiographical memory then and as, according to Sullivan (2009) has, specifically “unique features” that are life orientated, individually but defined by things such as transitions or clear detailed aspects that exist only in the memory of that individual. Memory in this context is defining in nature and individuals may undertake the task of building self-image or even social image using autobiographical memory. In addition, the ability to recall or relate information as autobiographical may vary with age and not as directly as episodic memory, where older people may demonstrate less ability to store or recall episodic memories, which do not influence ability to retrieve or relate autobiographical memories (St-Laurent, Abdi, Burianova, & Grady, 2011). As autobiographical memory is a part of episodic memory, it is essential to better understand what episodic memory is defined by Salkind (2008) as:

“Episodic memory refers to a division of declarative memory responsible for storing and retrieving information about one's own personal experiences. Episodic memory is the theoretical component of the memory system that allows one to revisit and relive events that occurred within one's personal history. Once experienced, events such as one's first day of school, graduation day, and one's first kiss can each be called into consciousness and relived at a later time because of episodic memory.” (p. 349-351)

Whilst some theorists study episodic and autobiographical as separate types of memories, Pathman et al (2011), found that some studied it as interchangeable in terms, including Gardiner (2001), Kopelman and Kapur (2001), and Tulving (1972). For this research it is essential to note that episodic memory that is individual in nature may directly influence the choices for how or

why memories are saved in the digital formats that are currently embraced around the world, in this way may directly influence the perceptions of creating self-image for others to view, self-identity, and self-creation (Vavoula & Sharples, 2009; Wreszcz, Koźlak, & Kitowski, 2017). While episodic memories are related, much of the focal point is on individual selection of memories to store, whether their significance is important in a biographical nature or if individuals simply save all episodes of life, related or unrelated in significance to the self or the storage device. Each type of memory is considered independently of each other and equally as significant in establishing memories, using technology to collect memories, automated memory saving devices, saving memories in the various digital resources, and sharing memories in the many different resources including social media.

Noreen and MacLeod (2013) are amongst many researchers who have studied autobiographical memory, and in their research, they aimed to understand how episodes in the past were recalled, or forgot. When information is stored in digital format, personal memory may not match specifically to the event itself, but as far as I can ascertain, no studies in traditional memory related fields truly define the relationship between true events and memories (where they can be remembered), how a world of a digital history can invoke changes in the self when every action can be reviewed and rewound until it is rewritten successfully in the individual memory. Digital memories are being saved throughout the Internet, and throughout computers all over the world (Bell & Gemmell, 2007). In these formats, can memory may change from a simple process of memory based on emotions and lessons to something else that is less defined by self-processing of information. Memory is not only defined by researchers and theorists

striving to better understand how these processes influence behaviour, learning, or even consumer purchasing behaviour; but it is also defined by self. When an individual thinks about their memories, even when they are not aware of their individual decision to consider those memories, they are defined (Pathman, et al., 2011). Individuals strive to understand and preserve memories in ways that best suit their needs, hopes, or even their intentions for those memories in the future.

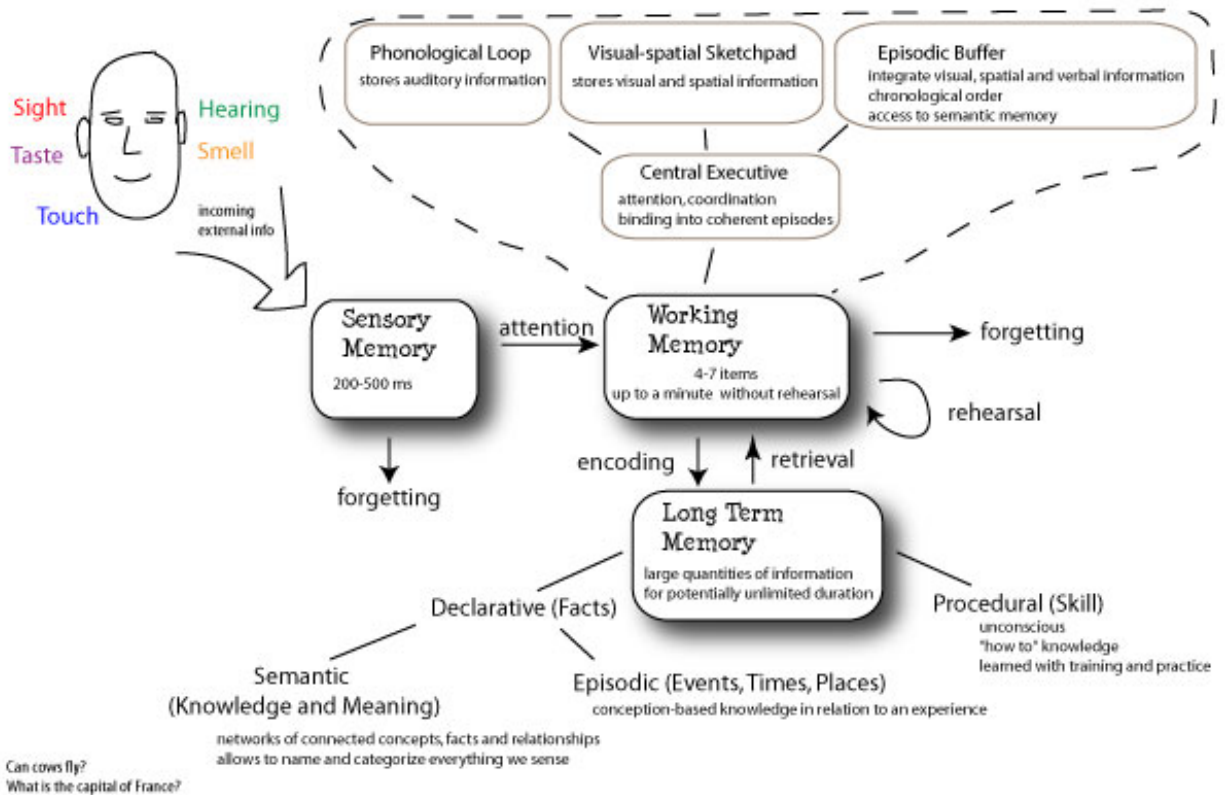
Memory is not distinctly about memory anymore, but sometimes it is about self, and self-image. Dijck (2008) notes that although images, particularly photographs, can be recognized as forms of communication and art, the relationship with memories cannot be considered a strong source of storage and the ability to manipulate images reduces its effectiveness as a memory storage tool. In this way, memories are not being created by the use of digital storage devices, the memories themselves may exist completely separate or independent of their digital counterparts (Säljö, 2010). However, in a way of identity or self-defining-imagery, it is reasonable to recognize that digital images, videos, blogging, or other communications are a form of autobiographical memory, designed to imprint that description on the world and possibly even self.

Memory can be accidental, unintentional, or even simply information (Jacobs, Lega, & Anderson, 2012). It is possible that communication, memory of communication, sharing in social media, and all the items that we describe as contributing to memory and self-development are actually simply a method of Causal Understanding (Jeong, & Lee, 2012). Causal Understanding can be simply defined as a cause and effect relationship; however, it is more strictly defined by

three different theory types and found to have a relationship that can be utilized in education and other related sciences (Joeng & Lee, 2012). As suggested by Hoerl (2007), some memory saving or episodic memories are not directly related to anything more substantial than the act of sharing information. For example, an individual posting their location as a restaurant in town may simply be stating a location and the following commentary or images of the food simply a sharing of information; however, there is no way to determine directly how any specific activities are directly influencing behaviour, self-development or any attempt to create self-image for others to view. This research will not specifically address any unattended or unrelated intent in message or memory sharing as different things may have different causal understanding with different individuals.

Finally, whilst definitions and storage devices come under debate by many different theorists and researchers in many different fields from education through psychiatry, it is reasonable to believe that memories are created in both the process and in the distribution of the digital materials (Başaran ince, 2014; Bell, & Gemmell, 2007; Czerwinski, et al., 2006). This is true culturally and individually, due to the mass communication effects that digital resources have on the world itself. In considering that memory is what we individually understand it to be, understanding the memories created and stored online may change how individuals view these resources as they create new memories. Historically, understanding how individuals and groups will store memories or even retrieve them in the future has been an instrument for research and for science fiction. Memories are not as easily accessed, and some medical conditions making access of memories even more difficult than simply the passage of time.

Figure 1: Senses and Memory Types



(<http://softwarecreation.org/2008/the-programmers-brains-at-work-understanding-the-software-system/>).

### ***Temporal and Spatial Position of Memory***

Memory is what we intimately know and experience (Coser, 1992; D'Argembeau, & Van der Linden, 2008 Gardiner, 2001). Memory is past experience left and re-enacted in the present. The continuous or sometimes disruptive links between past and present are intrinsically linked with the identity of a person. Memory is considered as something lying the past waiting to be

retrieved or remembered as it used to be. However, memory is performed when it is being recalled in the present. The act of memory – recalling, remembering – is not taking past things intact back to the present when it is recalled, memory goes through a kind of reconstruction in the present context. Andreas Huyssen (1995) notes “The temporal status of any act of memory is always the present and not, as some naïve epistemology might have it, the past itself, even though all memory in its ineradicable sense is dependent on some past event or experience. It is this tenuous fissure between past and present that constitutes memory, making it powerfully alive and distinct from the archive or any other mere system of storage and retrieval” (p. 3). In this way, memory cannot truly be captured by information retrieval and storage, the existence beyond the capacity of tools currently available. Memories are constantly renewed, changed, and redesigned through each and every interaction. Even the memory book from Cornell University, has memories that with each access could change. Students signed the book at one time, in 2006, what will they think of their responses today? (Sellen, 2006).

Memory implies multiple folds when it is represented and reenacted in the ‘tenuous fissure’ between a fact in the past and a narration about the past or emotions of the past and revival in the present experience. The fissure is a space of creation. Memory practice is not mere retrieval of the past event, it is rather a new play based on a scenario being written while it is performed. As Paul Antze and Michael Lambek (1996) note, “[T]hat enables us to creatively refashion ourselves, remembering one thing not another, changing the stories we tell ourselves (and others) about ourselves” (pp. xi – xxxviii). In the dual relations between self as narrator and self-narrated, we are “authors of our lives” at the same time objects of the authors: we are

simultaneously “subject and object of memory, the telling and the told” (pp. xi – xxxviii).

Memory is intrinsically connected with identity as constant self-affirmation. “Imagined self” is a construction of coherency of the self “single, centered, bounded, and located in a regular, directed, temporal trajectory” by generating “a sense of homogeneity, consistency, and order from unruly heterogeneous experience” (pp. xi – xxxviii). “[I]t may itself be the production of specific narrative conventions and systematic omissions” (pp. xi – xxxviii). Memory as a possession of a self already implies split selves by putting the narrated external subject in the position of ‘you’ by the self as the narrator.

The self of memory is intrinsically coordinated with the convention of socio-cultural collectiveness. Maurice Halbwachs argues, “[I]f we examine a little more closely how we recollect things, we will surely realize that the greatest number of memories come back to us when our parents, our friends, or other persons recall them to us” (Coser, 1992, p. 38). Memory is a locus surrounded by a permeable membrane through which the self of memory is infiltrated by collective memory of the socio-cultural influence within which the self resides. When conflicts break out, memory becomes a “locus of struggle over the boundary between the individual and the collective or between distinct interest groups in which power becomes the operative factor” (Antze & Lambek, 1996, p. xi – xxxviii). Memory is not just a subject matter of a person but also a field of social relations in which dominant discourses produce institutional knowledge of the past. The technical apparatus of discourses objectifies memory for analysis. “As memory emerges into consciousness, as it is externalized and increasingly objectified, it always depends on cultural vehicles for its expression... It becomes important to look at the symbols, codes,



artifacts, rites, and sites in which memory is embodied and objectified...” (Antze & Lambek, 1996, p. xvii).

### ***Collective and Social Memory***

Collective memories are identified by a group of people with the memories, sharing them and distributing them with other members of the collective/community to continue the memory through generations. Art forms, such as dance, have often been perceived as specifically collective memories and moved to each generation primarily through individual or group education. Development of art continues to build memories in more traditional manners, by viewing, learning, and doing. However, to make these practices more visible to larger public audiences, art has become more widely available in digital forms, creating larger impacts on collective memories by increasing the collective. Hudson (2012) notes, “[c]ultural memory is the amalgamation of artefacts and memories that constitute a community’s sense of group identification” and “[c]ollective memory allows us to shape cultural identities” (p. 290).

Public memory is defined as memories that a group of people have regarding subjects or ideas, such as world events. Public memory is changing, libraries and information resources continue to use online resources to restore their audience and increase the visibility of their institutions, and media enables the public memories to increase through Internet content. Digital storytelling is a method for sharing, particularly a method for saving and sharing community memories and collecting ‘public history’ (Burgess, Klæbe, & McWilliam, 2010). Public memory through digital media has recently become increasingly more popular because it allows ‘ordinary’ people to share their history with the world. Furthermore, it allows for an editable

history, changing as needed and being absorbed by others (Kallinikos, Aaltonen, & Marton, 2013). Social media and life logging are also methods for ordinary people to create public memories to be shared with their communities and as part of the collective knowledge online. However, not all public memories are strictly for individuals who create their own content, some content in digital sources is created to honour and share memories of loved ones who have passed, such as through online memorials. These also create collective and public memories of ordinary people.

Social memory is a changing field of study that previously had focused exclusively on the “unconscious and a supra-human memory” that could be perceived as potentially dangerous to individual identities (Küchler, 2011, p. 57). Küchler (2011) noted that the literature regarding social memory focused commonly on “the mediatory role assigned to objects, whose capacity to provoke shared associations and the mutual, inter-subjective anticipation of the actions was seen to bind words to concepts” (p. 57). Social memories can define understanding as created and influenced by individual culture and personal history, where individual self is replaced by possible group think approaches. When individuals contribute to social situations, either in virtual or physical activities, social memories can be changed based on the group rather than individual views of the activities creating memories and this can also directly influence the ability of the memories to be accessed in individual context. Social memories are created and developed in similar ways to community memories and can be influenced by collective and community memories as well.

Memory practices cannot be singled out just as ‘inner’ activities of individuals but they

are also closely connected with “externally materialized memory form;” (p. 33) as recognized by Hallam and Hockey (2001) referring to Pierre Nora’s notion of archived memory requiring massive recording and documentation to enable full preservation of the past beyond the reaches of the human mind. Any material form such as documents, speech or images become potentially significant as memory objects. The externalized memory objects serve as fixed sites to prevent forgetting and they operate as multiple significances open for an “endless recycling of their meanings” (Antze & Lambek, 1996, p. 134). The temporal quality of memory as a trace of the past becomes latent in material memory objects and opens the possibility of emotional and symbolic re-investment. Huyssen notes, “It does not require much theoretical sophistication to see that all representation – whether language, narrative, image, or recorded sound – is based on memory, *Re*-presentation always comes after, even though some media will try to provide us with the delusion of pure presence. Rather than leading us to some authentic origin or giving us verifiable access to the real, memory, even and especially in its belatedness, is itself based on representation. The past is not simply there in memory, but it must be articulated to become memory. The fissure that opens up between experiencing an event and remembering it in representation is unavoidable. Rather than lamenting or ignoring it, this split should be understood as a powerful stimulant for cultural and artistic creativity” (Huyssen, 1995, p. 2-3).

Not all individuals are capable of processing memories equally, or effectively, and benefit from memory assistance in creating learning possibilities from each experience. As individuals, our memories serve as more than pleasurable instances in our past, but also a strategic activity that provides ample learning opportunities. Assistive technology for cognition

(ATC) is designed to assist individuals suffering from impairments or developmental disorders by “address[ing] a range of functional activities requiring cognitive skills as diverse as complex attention, executive reasoning, prospective memory, self-monitoring for either the enhancement or inhibition of specific behaviours and sequential processing” (LoPresti, Mihailidis, & Kirsch, 2004). This type of memory is designed to replace missing memory functions in an individual; however, the possibilities of extended memory are also necessary in these circumstances. Where an individual cannot draw conclusions from past experiences due to missing memories, ATC provides a solution that helps eliminate harmful effects of memory loss. Although a practical realization of the use of technology is to enhance and contribute to memory, the artistic qualities of memory enhancement tools to preserve specific, intimate, memories are endless and provide the users with the ability to capture every moment of life for evaluation and analyzing at any time needed or wished.

Considering the intimacy of memory, the intrinsic values it holds cannot be captured in digitalized form, the ability of single memories to be captured and held for eternity seems nearly impossible, the fact that each memory must be created and embodied within the emotions and individual awareness of its existence devalues the very attempt to save each moment, even if in a frozen bubble of time. The act of uncovering a memory, viewing, whether through new eyes or other eyes, changes the very nature of the memory, and with each new view or viewer, it changes the meaning of the memory again. With this fact, the very act of memory saving – through digitized form or other – changes the memory itself and creates new understanding from each memory saved. The understanding of memories may be altered, will the importance of each

memory still be held within the single digitized memory or do the memories created new and unique perspectives for their viewers.

Presently, digital memories have garnered much attention as their ability to be accessed by nearly the entire world, their implications for the future, and the mass use of the technology to share every moment of a person's life. Social media, as part of the mass communication born of the Internet, has driven much of the technology that may become part of historical record keeping, and is already used as a source of memory enhancement. Projects such as Scan Memories (and other RFID technologies) Wearable Absence, HimbaChronotopes, and digital message storing have become key aspects contributing to the potential to the future. These projects are not alone, other studies include wearable glasses to record sites and update the user with reminders and social networking, scanning cameras that actively take pictures with the change of lighting or other programmable signals, and even computer enhanced homes to monitor all activity and create alerts as needed. The future holds many opportunities, which ones will be most influential in memory saving and sharing are yet to be determined. This research explores those elements, and the why of memory importance, including methodology, which follows and explores the projects developed in these investigations.

### ***History of Memory Storage***

This section addresses the research question of how people have stored memories in the past. Historically, people could only share memories with others based on recall, possibly photos, and on occasion recordings and film. In some historical instances, even in our own lifetimes, it has become evident that individual memories of an incident did not truly represent

the occurrences of the event (Gradinaru, 2015; Hoerl, 2007). Due to clear inconsistencies of the human memory, documenting has become important for historically relevant memory making events. Such as a family that uses video and sound to document the birth of a child, or a recording of a speech made by a religious leader. The act of preserving these events may simply be to watch the event again; however, it also assists in remembering the event in much detail by providing an anchor. In addition, the recording itself can be shared with others without accidentally missing important details or disseminating the information using emotional language. Saving memories in the way of digital material allows the person a clear view – from that viewpoint – of the memory itself.

There is a disadvantage to the technology, the use of the technology is not available to all people, the saved digital material can be completely deleted from history by accident or intent, and some question if the act of recording the memory itself does not change the memory in the individual or more importantly, is the memory actually saved by the documenting of the event. Gene Youngblood (1970) suggested that technology promotes the ability to change reality, to create history and manipulate the views of the people who receive the messages or contribute to the sharing. It is not the only concept regarding memories, as some researchers suggest that the current behaviour of individuals using social medias to interact may be using the resources to share specific memories as the development of both individual and public self-image. Many different fields of research study memories or the results of memories. Memories identified as autobiographical in nature in recall when they influence individual nature or self-image. These types of memories are influenced by recall and choice of memories saved. Individuals appear to

post every waking moment to their social networks, to share with their family and friends, but is it that they are actually building the image, creating it for themselves or for those watching.

Memories are saved in more than just images and sound, some people save the coat of a past loved one, recalling the smell of the individual when the object is near them (Kallinikos, et al., 2013; Seremetakis & Nadia, 1996; Hodges, et al., 2011). Some people report that memories of their grandmother come to them at the smell of baked items from a local bakery, or that the smell of a specific pipe tobacco reminds them of a visit with an uncle. Smell and touch is a difficult sense to digitize, but is often demonstrated as a strong element in memory recall. Specifically, individuals may not recognize the picture of a past relative; however, the smell of their perfume will send them to a place where the two once visited many years before. Senses captured by digitization do not resolve all problems, because digitization does not resolve the question of emotion, or emotional relationship. Memories come with emotions, and if they are always the same, it is not necessarily that the same emotion could be returned at each recall.

### ***The Importance of Keeping and Accessing Memories***

This section is designed to answer the question of why people keep or access memories, including what purpose they can serve, and leads into how memories are stored in the next section. In the human mind, memories can change with time, whether how the individual feels about that emotion or how the individual recalls the event. Digital recordings of events do not change; individual responses to viewing them may change. Groups of people already demonstrate the value of recall changes to memories. Individuals in communities and cultures may change how they recall an event based on how those event influences perceptions they or

others have of their culture due to that event. A city forgets a once loved child who becomes a mass murderer in his adult, a culture forgets their part in a war that resulted in hundreds or even thousands of dead. However, digital memories cannot be manipulated as part of disremembrance – the act of forgetting – but the way the event is reflected can still be manipulated. In the case of participatory cultures, the collective intelligence can influence how digital materials are interpreted. However, just as communities can forget their past, they can also censor it (Başaran ince, 2014; Fine, 2005; Hudson, 2012). Currently, digital materials are under the control of a few limited options, either the materials can be saved to individual servers apart from the rest of the world, or they can be added to the internationally active Internet. While the Internet does not currently reach all areas of the world, it is well on its way to that as part of the future. Currently, censorship and monitoring of the Internet is strongly guided by Western culture and laws, and supported by other countries in methods that are sometimes costly for the countries (Dardenne, 2011; Gumede, 2016), and countries wishing to have stronger censorship for their citizens may incur even more costs to overcome the reach of the Internet. The guidance and control of content in the Internet must meet the needs of the users, memories saved may vary, but the ability to determine what are considered culturally appropriate is not currently based on the culture with the memories and information.

While censorship and regulation could drastically inhibit the ability of individuals to share publicly their experiences wearing the Wearable Absence, or the ability for the Himba to share images of their cultural practices, even on an individual level the ability to maintain digital content is not truly infinite in nature. User generated content contributes to a large amount of



data found on the Internet, and the value of the information – memories or otherwise – can be considered questionable due to the content’s inability to necessarily reflect facts, truths, or even be consistent with other information widely accepted. Content control returns the discussion to censorship and disremembrance; however, information overload is a risk that applies to Internet users unable to sift through all of the information to reach the specific item searched (Feng, et al, 2015). Productive information dissemination is a process that must be overcome for projects such as the RFID implementations for memories to be successful. When considering the value of saved information, it becomes important to assign value to its loss. The future generations may need or want the information gathered today, and as technology advances, the ability to maintain that information could continue to decrease in cost and space. However, as information is removed from the Internet server bases, they can be lost forever, if not stored properly.

### ***Summary***

The purpose of this section was to explore research questions, which is “What is the definition, purpose, and history of memory?”. Memory is found to be a condition of saving information for other use, specifically in a way that it may be accessed later. Literature finds that memory is evaluated and understood based on conditions, such as temporal versus spatial, collective and social. Memories serve many functions, and are very important to humans, as demonstrated by the ways memories have been saved over time. Defining memories requires an understanding of how memories are stored and recollected at a later time.

## **Memory Storage and Memory Recollection**

This section addresses research question 2, which is “How are memories stored and recollected?” There are a number of things to consider, including personal versus community memory storage, technology, digital embodiment of memories, and even objects and spaces. During the research, it was evident that individuals store memories in a variety of ways, some of these ways are stored similarly by cultures and communities. However, storing memories is done in many ways, including as seen in digital versus physical spaces. How memories are perceived in that storage could be influenced by culture or nation, and recording or memory development has a variety of different options.

### ***Personal and Community Memory Using Technology***

With the introduction of language, as early as paintings on cave walls, began a long evolution of how personal, community memory could be shared and stored, from oral storytelling to blogging history has never given up its hold on passing forward the past. The evolution, technologically and culturally, has accelerated and flourished in the virtual and digitized world of the 21<sup>st</sup> century, taking no new specialties of the mind, but rather steady use of increasing technological advances (Ardilla, 2004). People have always sought to preserve memories through numerous methods including written entries in journals to images taken by cameras and saved in a photographic album. The earliest albums were produced in France in 1857/8 whilst amateur photographic albums date from the 1920s in Great Britain (Linkman, 1993). In the 21<sup>st</sup> century, digital technologies enable everyone to participate in preserving their memories, creating endless databases of life logging, instant news, and galleries of images, real and designed. Digital

databases of information that neither delete themselves nor become forgotten and in some ways are immortal in their form. Historically, memory was fleeting and changed with generations, now individuals can live on in their personal and community memories as stored in digital form every time someone accesses saved pages and images. Every memory is at the fingertips of the user, a dream of Memex – every experience, every emotion, all information within reach and assisting with the retrieval of memories (Buckland, 1992).

McShane (2015) wrote about mediated experiences, the ability of the virtual worlds in the internet to create more than just a place where gaming occurs, but also as a place where communities form, emotions result in and from, and a place where experiences, and memories, occur. Virtual Reality technology (VR) has been explored as a means to invoke emotions where they can be studied in neuroscience, examining the mirror neuron responses of individuals (Beeson, 2015). The connection between emotions and memories have been widely studied, including on how they enable people to reflect on their memories, such as meta-memory research conducted by Fairfield, Mammarella, Palumbo, and Di Domenico (2015). How memories are stored may be varied based on context; however, how memories are shared with others is also varied based on context.

In the past, memory has been articulated and understood through various metaphors due to the impossibility of direct access to the individual or original memories. This method of sharing was written, storytelling, paintings, and creative pieces worn or used – an ancient totem pole with a tribe sharing a tale. Historically, individuals shared the tale with props, and though written books seemed to take away that ability, current methods for sharing memories reclaims

the ability to add props, if just visual versions of the. “Digital storytelling is a new twist on the ancient art of the oral narrative. With the addition of photos, graphics, music, and sound, it becomes an inspiring personal exercise for your students to showcase their voices.” (Salpeter, 2005, p. 1). Today, digital storytelling is used in the classroom and stories from aboriginal communities through online websites (Ng & Howard, 2015; Wood, et al., 2015). Where the use of digital story telling allows for teaching, sharing, storing, and self-expression (Gradinaru, 2015; Frohlich, 2007). Additionally, digital storytelling has been developing a new phenomenon, introduced by Daniel Kahneman, which is the idea of “an anticipated memory” (Rojas, 2014, para. 1). The Instagram generation may be creating memories, but they also anticipate them based on the “tracks” and “scores” they are sharing in instant social media (Rojas, 2014, para. 3).

History is shared through storytelling, and communication evolves to methods that prevent storytelling from completely changing with each new telling – the digital saving of the storytelling allows each viewer to hear the story as it was told the very first time. In the past, a tale could evolve over time, the details change and possibly even the meaning; however, in today’s technological advances, the moment is frozen in time. Historians of the future need not piece together strands and try to apply meaning to them; every moment saved is exactly as it occurred from that viewpoint, the digital viewpoint that saved the memory. Memories of World War II are items saved in libraries, shared with people around the world as they move around (Jane, 2010). However, memories saved with technology are not restricted by time and space, they are where they are needed, and can be everywhere the technology can go (Speed & Macdonald, 2013). Researchers are working to understand how these memories hold meaning, as

compared to previous methods of memory retention (Speed & Macdonald, 2013).

To be carried forward, memories must be shared and imparted on others or they become lost with time. Without permanent methods for storing memories, many are lost or even changed, as the memory retold can be altered by mistake or different viewpoint. Metaphors and stories that developed as part of a community, or around an individual did not always represent the true story, but the understood story, or the important meanings derived from the events that could or would be saved. Over time, metaphors were created in print, and while they became less than stories remembered and chronological, they did not represent the factual occurrences as direct fact, unadulterated, and similar to movies that represented life, they were still focused on meaning and story. Stories change, written, spoken, or even filmed, stories and their meanings can be altered over time (Bell & Gemmell, 2007). The metaphors created from the altered tales have closely been related with the dominant cultural conception and it has been mediated by the technical medium of the communication available. Cultural perceptions guided the representations of history, of memory, and guided the representations that would live on in new generations, even in the individuals that are represented in the histories themselves. Metaphors and stories were cultural representations of memories, and demonstrated how memories were carried forward in generations. Memory may even be a disruption of fact (Kyung & Thomas, 2016). The act of saving a memory could result in a difference between what occurred, and the memory saved, even before time has acted on the memory (Kyung & Thomas, 2016). Regardless of how time changed, it could be kept closer to the truth when the memories are stored in print, rather than storytelling, or with images and print, and today with all of these digital storage

devices.

Metaphors and stories may not be the best way to store memories, “the human memory is fallible” (Bell & Gemmell, 2007, p. 58) and people strive to find more permanent ways to save their memories, for personal and historical review. Memories are even saved for self-reflection or self-invention. However, memories are acted upon by new information, on past circumstances of memory, and emotional relationships that cannot be duplicated in digital form and may inadvertently relate information that is not strictly part of the memory and the process that builds it (Kyung & Thomas, 2016; Bell & Gemmell, 2007). When digital archiving assists memory, it influences memory – possibly to enhance memory or to create new versions of the memory. These changes are not always strictly digital in nature but rather as a result of the digitization. With more methods to preserve memories, less will be lost; but the changing nature of the memories may be questionable.

Digital technology and information have changed the shape of memory, possibly it is meaning, by creating new and raw metaphors of memory, engaging the viewer in a new cultural perception, which may not specifically represent traditional cultural views. Photography, a growing hobby, as of the 20<sup>th</sup> century, and memory archival source can be described as “multiple, overlapping technologies: of memory; relationships; self-representation and self-expression, all of which is changing in the digital environment” (Van House, 2011, p. 125). Social media is a daily activity for many users, a form of life logging that tracks every move and interaction in these same identifiable motives. Memory changes and the relationship between methods for saving memories and the results on culture and personal and community memories

continue to evolve with the technology that has begun to shape it. Decades of research has examined the role that changes in technology and media play in creating and preserving memories on the individual, community, and worldwide levels.

Personal and community memories in a virtual world require examination, and the goal of this section is to explore and critically engage the issues and implications created by the massive exploitation of digital technologies for human communication and examine how online users form, archive, and de-code their memories. The systems used for production also influence the way users perceive and work with the memories. Cultural literatures, for example the regular use of technology in television shows, cell phone alerts, and movies in the designs of Memex, all concerning digital information and its impact on memory and identity construction provide viewers with important information that defines the shape of metaphor of memory and the effects expected on identity construction. Digital accessories and resources have become a significant part of today's world, essential in everything from alarm clocks to remind us to awake to text messages from friends advising us to visit their location. Memory itself cannot transcend the changes that occur with each new remembrance, but the first condition of the memory, the artefact that assists in its perseverance can be preserved at its nearly purest form.

*Figure 2: Cave Paintings*



(<http://www.alef.net/ALEFAncientPlaces/ALEFAncientPlaces.Asp?AncientPlace=France%20-%20Lascaux>).

### ***Digital Embodiment of Memories***

“In his now-iconic article “As We May Think” in July 1945, Vannevar Bush, director of the U.S. Office of Scientific R&D during World War II, popularized a vision of a personal storage system that included self-initiated recordings from a walnut-size head-mounted camera and voice recorder...” (Czerwinski, et al, 2006, p. 49). The proliferation of ubiquitous digital devices and networks enable the production, consumption, and storage of personally relevant information. Memories are recreated with each new access; however, memories in the human mind can be lost or irrevocably changed based on individual and personal association -or lack thereof. Saved memories may be useful in preventing memories from becoming lost or irrevocably changed.



Personal information storage has become a focus for individuals hoping to save their information, projects such as MyLifeBits (Microsoft Research), Haystack (MIT), e-Person (HP), and Lifestreams (Yale University) are working hard to provide information storage solutions that are both permanent and accessible (Bell & Gemmell, 2007). One of the most difficult aspects is retrieval; the ability to access memories in storage systems can be even more difficult than memories saved by the mind.

Semantic meaning of information is created by human interaction with the content and the creation, a focus of the project SemanticLIFE, which is developing a digital memory framework in an attempt to take a step closer to the Memex, envisioned by Vannevar Bush (Bell & Gemmell, 2007). The Memex would essentially save and create limitless archives of human interaction, thoughts, memories, and provide easy access to information and research. SemanticLIFE is a project for PIM, Personal Information Management, systems and is hoped to overcome the challenges of information retrieval by using many different plug-ins designed to fit into the application and provide flexibility and extensibility of the platform (Bell & Gemmell, 2007). This system engages the user, providing solutions and saving memories, data, photographs, digital data, deriving meaning is the domain of the user. Using this system would allow all users to have a limitless documentary of their life, their interactions, readily available and retrievable through many different methods that can be easily added to by increasing technology availability.

Once preserved, data can be digested and interpreted and evaluated for meaning, users are not strictly limited to what can be easily recalled, search engine aspects allow memories to be

found from even other individuals, creating awareness for the user. Different types of data may hold different understandings and different memory creations, for example "...personal photography as, in effect, multiple, overlapping technologies: of memory; relationships; self-representation; and self-expression, all of which are changing in the digital environment..." (Van House, 2011, p. 125). Different individuals can interpret information in the database differently, the process of saving the memories for posterity meets the needs of only preservation and not interpretation, and different users may assign different meaning to the data based on cultural and personal background.

Transaction and flow of digital data, across networked infrastructures, in the process of memory reconstruction plays a role in the creation of metaphors of memory. Kawamura, Fukuhara, Takeda, Kono, & Kidode (2007) "propose[d] an object-triggered human memory augmentation system named "Ubiquitous Memories" that enables a user to directly associate his/her experience data with physical objects by using a "touching" operation" (p. 287). The interaction with the item creates the ability for the user to develop their own associations, essentially enabling the metaphors of memory to be built, but also enabling the information to be stored without becoming lost. "A user conceptually encloses his/her experiences gathered through sense organs into physical objects by using a "touching" operation" (p. 87). The system used radio frequency identification (RFID) tags, where objects were attached to the tags and two experiments were designed to evaluate the "encoding specificity principle" succession to the Ubiquitous Memories system and the second experiment compared the system's characteristics to other external memory strategies currently available (Kawamura, et al, 2007). The Ubiquitous

Memories system demonstrated success in succession to the Ubiquitous Memories system and the “externalized memory in an object-memory-seeking behaviour directly corresponds to an object-searching behaviour where the object is associated with the memory in some scene” (p. 288).

Additionally, digital memory has grown in imagery and by design of moving pictures where home movies have grown to the insta-messages, insta-memories posted to Facebook, YouTube, and more social media. Fickers, Bosscher, and Wachelder proposed a study to evaluate the growing changes in saved memories by generation. If all thoughts and actions can be eternally saved for viewing later, it may have ramifications on how people remember their own histories, how memories serve them in the future, potentially, this form of enhanced memory retrieval could provide individuals with enhanced abilities to share or even learn from their own histories at better rates of success as true to the activities themselves. Individually, people can save videos and images throughout different digital spaces, but these are not alone in the historical memory saving activities of entire generations. Recently, people are participating in more and more television shows such as *Total Wipeout* or *Interceptor*, and in other reality based television episodes where people can become part of a memory for thousands of viewers. A generation whose memories and everything about them can be found in a very non-private format, online, or simply in digital forms that make a single moment ageless.

Throughout time, memory has been supported and enhanced by the technologies of the time, growing from the physical weight of a traditional photo album to be replaced by the bytes and regulated coded instructions of digital media. Traditional memory sharing has evolved and

consequently the ability to save memories for revisiting has changed. With continued growth of technology, users can analyze in the developments and usage, but also in the acceptance of the technology the contemporary consequences of disembodiment of data and information, from its referent status. Users may prefer systems that engage the user in the development and the saving of the information through an object, such as demonstrated in the RFID experiments for the Ubiquitous Memories system. While not all technological developments have successfully engaged the memory with items or successful memory retrieval, most new technologies strive to create systems for personal information that allow individuals to save memories forever.

### ***Memory Objects***

Seremetakis (1996) notes, “Memory cannot be confined to a purely mentalist or subjective sphere. It is a culturally mediated material practice that is activated by embodied acts and semantically dense objects.” Memory requires senses for activation; however, no one sense is forgotten in the act of recalling the memory. “This material approach to memory places the senses in time and speaks to memory as both meta-sensory capacity and as a sense organ in itself.” When individuals recall a memory, the memory begins in one single sense, such as smell, but evolves to include more, such as sound and sight. “Memory is internal to each sense, and the senses are as divisible and indivisible from each other as each memory is separable and intertwined with others.” One might recall the visit to a friend’s home just by the sight of a single green fabric, or be brought back in time to a conversation with a grandparent by the smell of a baking pie. “Memory is the horizon of sensory experiences, storing and restoring the experience of each sensory dimension in another, as well as dispersing and finding sensory records outside

the body in a surround of entangling objects and places” (p. 9). Memories can be sensory, but strictly speaking, events from the past may not always be remembered exactly as they occurred, sensory changes or understandings may change the event, and objects can trigger the event memories but may not always tell the true picture (Berliner, Hyman, Thomas, & Fitzgerald, 2003; Zhang & Xu, 2015). Memories, with each remembering, create and form new pathways, new methods for recall, new associations that build endless links and bridges in the mind for access and later new memories to be developed. Memories are the endless web that builds up and creates everything that interlinks and weaves through the past, present, and future.

“It might sound strange, but I can still smell the smoking of a cigarette,” remarks Stefano, wearing one of the jackets of his father who passed away several years ago. Stefano, who has developed an emotional and sensory attachment to clothing left by his dead father, is an interviewee protected by a fictitious name. Sniffing the jacket, he proceeded to recall the stories attached to the jacket including how much his father enjoyed smoking despite his critical health condition. While he was talking to me, his sensory memory of the smell of smoking seemed to trigger the memories and emotions about his father by taking him seemingly back to ‘see’ and ‘hear’. This is an example of memories of a single sense delivering messages to engage other memories, demonstrating the underlying links and associations.

Clothes, especially in case of a deceased person, are related to the absent. The cavity of the clothes has to be filled with a person to complete its functionality. Clothes alone become vivid confirmation of the absence since they might be considered as an extension of the bodily presence of the deceased. The items of clothing are not only an example of visual evidence of

their existence, but rather include tactile and even olfactory senses of the person they once belonged. When these items are saved, they specifically represent their previous owner, to others, using multiple senses. The multi-sensorial presence is partly shared, passed down to the others and revived by their sensory interactions. An act of wearing them is unfolding the presence of the deceased, but at the same time confirming the absence. Stefano explained when he wore the jacket in a family event, his mother was delighted to see a continuity of her husband's presence down to her son, but the delight was mixed with a sorrow due to the discontinuity of the familial role of her deceased husband in the event.

Juliet Ash, a cultural theorist, illustrates her personal experience with items of clothing – ties- left by her deceased husband. In addition, she explains her unstable relationships with her memory of her husband mediated by both the items and a photograph.

“The interconnections between clothes as objectively worn and the subjective sensation of wearing them and seeing them being worn indicate a possible variety of identities of people in the present and question not only how they reappear from the past into the present from their temporary absence into the present of the observer, but also how and in what ways the images recur and may vary in the future.-[...] My memory coincides with a photographed previous reality of the absence of both: the person and the tie: yet it is a photograph of a person who was. The representation is incomplete visually, since memory is never to be visualized or compared with the ‘reality’ of the photograph. In abundance, these ties retain memory for me, but with the absence of the wearer, they become a collage of memories, associations. They take on a different reality from the

contextualized reality of their being worn” (Ash, 1996, p. 220-223).

Her uncertain feelings reside between image of the past and her present sensory memory in relation to the ties. Observing the presence of both (her husband wearing a tie) in the photograph makes her feel more about the absence. Moreover, her instability of the memory is amplified by the presence of the ties but without the presence of the wearer.

Memories are reactive like the human mind that contains them, creating associations and developing intricate retrieval systems that identify any number of minor or major aspects of any given piece of information. Some associations can be retrieved by different methods, but each individual retrieval holds the potential for creating new associations. When memories are developed, much like hyperlinks in the Internet, more associations make the retrieval easier. As Stefano creates new memories in the jacket worn by his father, the memories of him will have greater association and greater retrieval success. While memories saved in digital formats can have numerous associations developed by mental or Internet association, the results cannot be a sensory experience such as remembering itself or by creating new emotional and metaphysical associations.

Sellen and Whittaker (2010) identified five R's that technology can assist for episodic memories, “recollecting, reminiscing, retrieving, reflecting, and remembering intentions” (para. 12). Each of the five R's are aspects of memory use, designed to enable us to learn or to relive the events of the past. Technology can be identified as an object that allows and promotes the five R's of episodic memory to be used by the person wishing for that memory. However, the idea of reflecting, storing, saving or remembering memories are not new, and have existed in

memory spaces before that of technology.

### ***Memory Spaces***

Memory and memory objects are important to the retrieval process, and in this way, memory spaces become important to the processes. Space, in geographical terms, is where physical objects are located, used, stored and displayed, while in social terms, it is a construction of social acts and cultural perception (Hung-Hsuan, et al., 2006; Foucault, 1998; Lefebvre, 1991). The meanings of space are of areas of conflict and negotiation between different cultural values by the members of a society and between different social acts. As the boundary of spaces between private and public is constructed by the issues of which social acts are performed or where objects (public objects or personal items) are located, the boundary of the space for the dead and the living provokes an issue about where memory objects are placed and displaced.

While memory objects can exist in any space, memory spaces may be cultural in nature, or used by the community as a whole, such as a church, park, or cemetery (Ash, 1996; Baudrillard, 1968; Kawamura, et al., 2007). Particularly in death, memory objects could range from a dead body, symbolic representation of the dead (e.g. a photograph), to insignificant domestic objects. The position of memory objects changes the nature of space. Considering dead bodies as memory objects, a cemetery is a space institutionally constructed where the space of the dead is alienated from the space of the living. In contrast to a cemetery, which is a socially fixed and designated space for the dead as a public space, an individual's practice of scattering ashes of the deceased in a public space changes the meaning of the space into a private memorial site. In contrast to the tombstone of a grave as a visible marker for the dead, the scattered ash is



only visible to the bereaved. These ways of changing the meaning of a space consequently lead to a change of social practices, which take place within them.

In a cemetery, the denotative markers for the dead, such as tombstone, flowers, and cards; also connote that the space is a social sphere of communication between the dead and the living. Through continuous memory practices done by private visits of collective memorial ceremonies in a group, a cemetery is a space where the bereaved construct a 'post-identity' of the dead by revealing only certain histories of the dead, which are socially accepted, especially in communal ceremonies. This is also a place where the bereaved share the new history of the family by talking or showing photographs of recent family events. This is the place where the deceased are socially alive as a member of a family. This also is the place imbued with socio-cultural conventions and certain metaphors culturally available. Elizabeth Hallam and Jenny Hockey show how metaphors have been used to describe death and memory and how they have changed the embodied experience of people. "Metaphor is at its simplest, a way of proceeding from the known to the unknown... For example, 'sleep' is the domain that many Westerners draw upon, metaphorically, to think about and manage death. In this context, material cultures of death include churchyards full of the stone 'beds'... The coherence of this system of metaphoric entailments is extended in the behaviour of living visitors who keep their voices down and take care not to step onto the graves' flowery coverlets" (p. 23).

*Figure 3: Cemetery Tombstones*



([http://s0.geograph.org.uk/photos/22/65/226536\\_8d4f85e8.jpg](http://s0.geograph.org.uk/photos/22/65/226536_8d4f85e8.jpg)).

In contrast to the cemeteries with publicly ‘visible’ markers in which socio-cultural norms are quite fixed and regulatory, in case of cremation, memory practices tend to be more informal and metaphorical. The ritual of remembering the dead can easily mingled with private practices of everyday activities such as walking in the park where the ash was scattered. Scan Memories, described further in the Introduction and in the Methodologies section, is valuable for understanding how this project benefits individuals, such as Jane. Jane has many photos of her mother. Some of them are displayed in her house and lots of others are in the family photo albums. She has a 7-year old son and 3-year old daughter: the boy was born when Jane’s mother

was critically ill and the girl was born after the death. Almost all the children know about their grandmother comes from the photographs and Jane's description about her. Jane still lives in the same house where her mother lived and often takes a walk-in a nearby park with her children. The park is where she had much time with her mother and where the ashes were scattered around a tree (Scan Memories, 2011).

In the case of Jane, carrying out an informal activity like playing with the children under the tree is a different embodied memorial practice from those taking place in a cemetery. For her children, the memory of their grandmother is transmitted by regular visits to the park and the shared activities with their mother. The tree became a visible marker of her mother's body and the seasonal changes of the tree, such as flower blossoms and falling leaves, can evoke the presence or absence of the dead. However, the mixture of the two kinds of different functionalities of the tree serves metaphorically as a tombstone (or grave), on the one hand or as a playground for children on the other.

### ***Digital and Physical Spaces***

Physical space is easily described as where our bodies and material items exist, interacting with each other in a clear and visual format that involves many senses described and understood by science. Virtual space is the less understood place of data and information, which can be defined as personal or public based on the domain in which it exists. Physical space and virtual space can both be assigned designations, which describe their locations; however, physical space is perceived as less changing than virtual space. Objects in physical space contribute to memory

functions of individuals, through memory relationships; however, virtual spaces can be developed to assist in memory retrieval as well. *Scan Memories* is a project developed to examine memory and virtual space.

*Scan Memories* examines how memory practices in and around death can be altered by information technologies. This includes the questions about how information can alter embodied relation with the materiality of memory objects and spaces, and how this can change the issues of identity and privacy about the dead. It explores the possibility of accessing the information of the deceased from specific objects and the space in which they were, or their bodies are, making the information available only when people who want to retrieve it are next the physical objects or within the spaces. Memories can be creating in digital methods or taken from physical sources by use of digital data, the *Scan Memories* project envisioned and shares this project and its motivations through its availability on Vimeo.com (2010 – 2011).

The project combines the physical space in which our physical bodies move and feel the virtual space in which we store and retrieve information leaving our physical bodies outside and the process of memory reconstruction. It proposes a way of connecting all three with networked technologies allowing the transmission of memory as experience. *Scan Memories* is a distributed event-driven architecture for discovering location specific mobile web services in the physical space and objects, which system addresses as main challenges the production of smart spaces, restricted retrieval of information and localized scalability. The principal trace of action when using *Scan Memories* is that when the user touches a fixed RFID tag with an RFID reader embedded in their mobile device, the system pushes to the user's preferred device information

associated with the reader. This information can, for example, be a link to a web service, which is relevant to the identity and memories of the deceased. For this action, touching is a natural and robust way to indicate willingness to access location specific services that is used to enable a restriction. At the same time, the system obtains reliable information of the user's current location, which can be utilized in other location-aware services in the future.

Memory spaces are limited, and personal image repositories are designed to provide extended, externalized memory spaces for personal memories (Huang, Sumi, & Nishida, 2006). Developing memory spaces externally has been difficult due to how human memory works through associations and development; however, many different projects have been created over the years to address memory spaces, and increase the space through usable databases. Some projects specifically aimed to create nodes in the information that assisted in memory retrieval, attempting to find a way that mimicked the way memory works. Memory spaces in online image galleries promote increased storage space when the information can easily be retrieved.

Individuals and communities design spaces for memories in an attempt to derive meaning from past events, share historical or pivotal moments in time, or create connections with new individuals. Online resources for memory development include sites designed to share the memories that might be found in memorials, such as War Memorials Online (<http://www.warmemorialsonline.org.uk/>) and honoring the deceased, such as Virtual Heaven (<http://virtualheaven.co.uk/>). Some are designed to remind of past atrocities such as the holocaust in Holocaust Memorial Day (<http://www.hmd.org.uk/>), or simply promoting the activities of a single tribe in a faraway land, such as Guyanese Online

[\(http://guyaneseonline.wordpress.com/2012/09/18/african-tribe-in-india-kenya-tv-4-videos/\)](http://guyaneseonline.wordpress.com/2012/09/18/african-tribe-in-india-kenya-tv-4-videos/).

Human memory is limited, sometimes the difficulty of retrieving memories can lead to memory losses of the most important memories; however, using additional memory spaces increases the ability to obtain or retrieve memories that may not have been available in previous times. In the past, people used written content, saved items such as baby clothes for children, created books of information regarding historical events, and even adapted new technologies for saving memories, such as photography and filmmaking. Memory space increases are a technological goal in many advances found today, such as creating servers able to hold more memory, applications for cell phones to hold extensive and detailed reminders, cars with memories able to change the position of the seat for different users, and many more innovations.

### ***Remembering Self – Interactive Memory Making***

Celia Lury argues that in the current post-industrial society, self-identity becomes “a possession of the individual” and consequently this leads to “experimental individualism” in what she calls “prosthetic culture” (p. 19). “The previously naturally or socially fixed or determined aspects of self-identity are increasingly brought within the remit of choice or, better, selection” (p. 19).

Through choice and selection assisted by technologies, a self is continuously being recreated and reassembled in each new view of the memory. She argues that in selecting and manipulating portrait photography in constructing a self-identity, (auto)biographical narratives enable a self to take simultaneously two different positions as subject and object of memory. In the process, a photograph plays a role of fixing a moment of life as a ‘thing’ and the self-image of the

photograph serves as an object to the person as subject watching the image. “The self-as- other” in the image provides the seer with a piece of evidence such that he possesses a moment of his happy life which serves rather as an image of himself than as an experience he has gone through. The selective process of choosing desirable images among photographs has become an important practice to control self-representation to the public.

The study of how self is created and individualism has existed all through history, though popularized through modern day fields of psychology and sociology. In BC, Aristotle suggested that individuals were the sum of their education and their past and encouraged education, though Aristotle did not delve into psychology as a field. Another BC history theorist, Confucius, is another good example of the building of self by using ethics, including personal ethics, which guides personality building in the present as well as in the past. Ethics being important to the develop of self, and defining self-image.

*Figure 4: Online Profiles*



<http://psivamp.deviantart.com/art/mirror-has-two-faces-146581799>

This process also includes an internalization of public value. Images and memories are directly influenced by and influencing the very public values and cultural nuances that create value in the images. Noted Van House (2011), photographs can be related to numerous elements, such as self-image, and are created by individuals seeking to remember the event or time. Self-defines memory in that no memory can completely be without individual context and that no memory serves a purpose if it has no individual context. In developing memories, materialistic objects are often designed by self-preferences towards specific senses.

Image making (not just photographic images but more general self-image) is a potent technique to create a self by choosing, selecting and manipulating in constant negotiation with social and cultural values which the self-wishes or is forced to internalize. Making an image of the self narrows the gap between the present state of the self and what I call a 'model-self' in the way that the self wants to be presented not just to public but also to the self. An image of the self can also be discarded at the expense of new images. The continuous reconstructing image of the self is also constructing contexts of the self. A piece of memory or a photograph cannot be illustrated without being placed in a context, in other words, it cannot be inserted into a new image of the self without changing the context constitutive of the old one. Remembering the self is closely linked with how to remember the other members of the group. This is also potentially interconnected with an anticipation of how to be remembered as a member of the group by the others. In the case of Jane, she displays a huge montage of her mother's photographs in her children's room and she displays a few photographs of her mother taken with her son in the living room. Displaying photographs is not just an attempt to keep her memory from degrading



but securing herself in the familial context. Her autobiographical strategy of collecting moments of her mother's life into one big picture is clearly interwoven with constructing the image of herself and presenting it to the others including her children since her domestic display is partially public memorial space for a limited audience who visit the place.

The Creators Project is dedicated to bringing technology and art to the world through interactive media, and has hosted numerous events around the world (Ashe Avenue & Area 17, 2013). Individual interactivity with the art has been the primary objective, creating art with technology that actively engages the audience – self can be a powerful tool in building strong memories. Similar to the interpretation presented by Berzowska (2006), “I emphasize the concept of memory (contrasting computer memory and personal, interpretive memory), and explore how responsive or interactive objects can create a new medium for annotating architectural space and objects, for leaving traces of presence, and for recording personal histories” (p. 446). Interaction with objects and creating emotional connections adds self into the memory process, increasing the ability to retrieve the memory, and technology can add to that strength by archiving the memory or providing additional resources for restoring the memory.

“Mihaly Csikszentmihalyi writes that physical artefacts help us objectify the self in three ways. They can be viewed as symbols of personal power, symbols of the continuity of the self through time (involvement in the present, mementos of the past, and signposts to the future), and symbols of the permanence of relationships that define the individual in a social framework (Csikszentmihalyi, 1993)” (cited in Berzowska, 2006, p. 449-450). Individuals build self in memories, explore self in memories, and create changes through building of memories. Art and

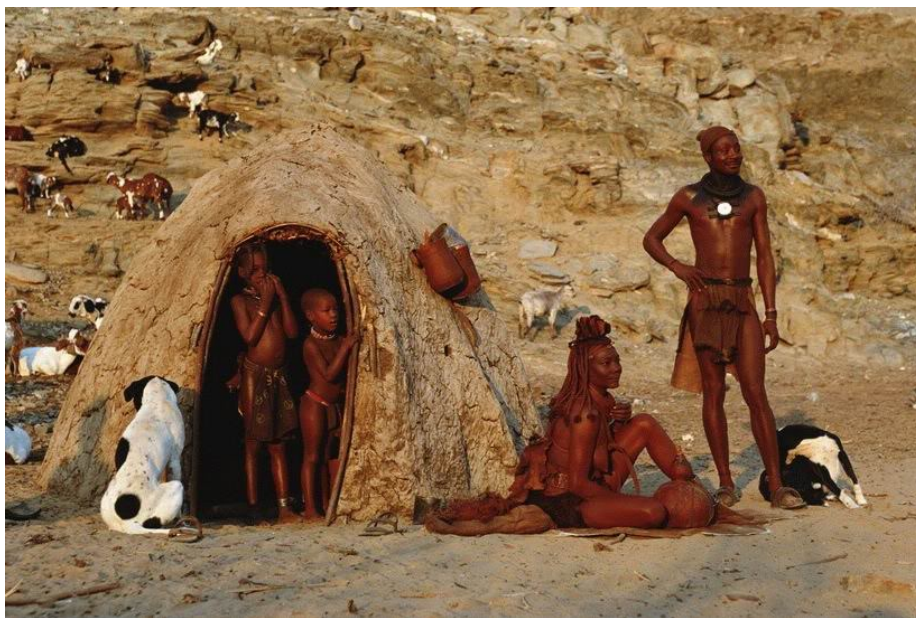
technology assist individuals in building memories, preserving memories, and sharing memories with their communities, in ways that traditional methods could not always duplicate. When memories are shared through spoken word it can change, written word can be lost or destroyed, old photographs can fade, but the potential for technology to create a method for memory saving to withstand the test of time, is growing. Technology provides people the ability to create and share these memories through imagery of digital photography, video making, written content, and even through social media.

### ***HimbaChronotopes***

*HimbaChronotopes* is an exploration of how situated, networked and participatory narratives raise awareness of a tribe under threat in Northern Namibia by crossing material object with the immateriality of information. Himba is a semi-nomadic tribe in northern Namibia whose living traditions are under threat of being devastated as government plans aimed to flood part of the land they currently inhabit. The project documents traditional Himba crafts in the form of annotated video narratives as they reflect their habits and ecosystem. As networked and mobile technologies provide a more flexible medium for storytelling, the Himba crafts become networked material objects that enable access to the documented making process. A participatory online-networked platform uses databases and interactive video techniques to allow the weaving of myriad paths through and otherwise linear presentation and inclusion of sidebar material without disrupting the story for those uninterested in its detail. At the same time, the crafts are tagged (identification techniques) to become a physical repository of virtual information that can be accessed by mobile technologies. Prior to the use of digital and Internet technologies, the

memories of this collective could only be shared by a few; however, now the tribe memories become global in nature. In addition, as the tribe becomes part of more nationalized practices from around their location, the information can be stored in a place where all people can locate it later. This could be considered a method for preserving indigenous cultures even after their homes and lands have become usurped by other nations, cultures, or even by the passage of time itself.

*Figure 5: Himba Culture*



<http://autopoiesis.crearforo.com/namibia-la-tribu-himba-35-fotos-tema817.html>

The Himba tribe people can be found in hundreds of videos and images online in sites such as MySpace, YouTube, Tumblr, Geolocation, Flickrriver, and is even part of a MIT Free Culture on YouTomb. The YouTomb project recognized HimbaChronotopes as a project that was forced to be taken down, particularly for takedown notices regarding copyright, but for other

reasons. HimbaChronotopes is “HimbaChronotopes is an interdisciplinary arts project with the Himba in Namibia that joins crafts with social networks and digital technologies. By Miguel Andrés Clavera” (<http://youtomb.mit.edu/youtube/pL3eiD5SlB8>).

Communities, both physical and virtual in nature, define community memories.

Communities are groups of people working together towards common goals, whether those goals are cause or culture in nature. The use of the Internet to increase communities and their causes has created any number of online resources for community members to share information and memories; however, information retrieval can be complicated. Successful community communications and memory sharing result in shared understandings of information.

“[C]ommunity memory may include discourse, collected materials, answers to frequently asked questions, evaluations of these materials (“This is an important article”) or sources (“This newsgroup has valuable information; this other one is a waste of time”), as well as marginalia and annotations, alternative organizations of materials, filters, and well-tuned queries” (Marshall, Shipman, III, McCall, 1995, p. 67). Resources for community memories can be stored in nearly limitless sources online; however, their ability to remain active may not be as immortal as the source implies. In the Methodology section, is a review regarding how technology was utilized to assist this culture, including how it was implemented.

Collective and social memories are increasing in availability due to increased media availability; however, not all proponents of mass media agree that the memories hold value or are truly permanent in the Internet and online data formats (Hudson, 2012). Technology is an ever-changing field with changes that could cause current sources to become obsolete, unlike a

tombstone that could literally stand as a moment for many hundreds of years. When databases are developed to store digital memories, many aspects would be necessary to understand how the information can be retrieved, saved, and valued by future communities and collectives for assimilation of those memories. Social media is perceived as a foundation and format for increasing collective and social memories, providing individuals with wider resources for their personal collective memories and enhancing their personal knowledge of their own cultures.

### ***Self and Nation – Memories Interacting Upon Each Other***

While nation could be defined as a bigger version of community, National memories are those of a nation. Similarly, to how community memories are saved, national memory is saved and defines how a nation views its culture, history, and the future of the nation. Memories of a nation often includes its leaders, heroes and ancestors. Projects currently developed by nations are aimed at sharing the rich history of a nation through online, digital, resources that can include anything from tourist attractions to history lessons. Nations around the world strive to provide viewers with opportunities to view their culture through the eyes of their citizens, though not all countries have developed websites, many who have work to increase the knowledge database where costs can be reduced. However, national databases would benefit from technology currently being explored, such as RFID devices storing information on tombstones for visitors. These types of databases can also guide the image of a nation. This type of memory sharing and saving does not take into account disremembrance or other intentional memory loss and hiding.

Kačerauskas (2008) suggested that national or community, memories are not truly independent of the individual or self-memory creation and storage, but rather one in the same. Kačerauskas (2008) theorized: “Individual’s life tying the existential time and space, unfolds the spiritual background of the nation, background, which is moved by every heroic story” (p. 13). Furthermore, suggesting that remembrance is not of the past, but rather of the future. Memory is of the future in that it is “coupled with the goals, strivings and hopes of a nation, i.e. with the remembered future” (p. 11). Nations are made up of people, individuals, in this way a nation’s hopes are created through the self and translated in to the community and nation. When the hopes of the people interact upon memories, they can change their message and redefine the information saved.

### ***Recording Memory as a Form of Digitized Information***

Identity construction is affected by recoding a life as a form of digitized information which is free to edit and easy to share through Internet networks. Bush (1945) envisioned a machine that would store all memories, communications, and necessary research for an individual, one that could quickly access information, instantly retrieved and returned to the memory forefront, a method for memory storage that was both instantaneous and immortal. Once only a dream, the Memex becomes a real possibility with the access provided by the Internet, the growing ability of computer memories, and the decreasing size of storage devices. The Memex is here, tablets access the Internet, store information, and even cell phones can access and save memories – communications and images, save all the information and resources individuals could need to access in supplementing their memory or knowledge.

Individuals, communities, and even schools have endless access to information through online resources. Additionally, there are endless methods for managing memory online, through scheduled meetings and parties on sources such as Facebook, Tweeting recent events on Twitter, and online calendars with endless methods for reminders and information retrieval. Everyone has access to blogging tools, communities' share illnesses through success stories in informal community boards with varying levels of privacy. There is no shortage of methods for image sharing, it being so commonplace that numerous projects have appeared to evaluate new methods for storage of digital images. Everyone can share their tale, find like-minded individuals in online communities, and read endless resources of information. How much of the information holds value and serves a true purpose is undetermined; however, numerous methods for gathering and storing information are being invented and explored every year.

*Figure 6: Wearable Memory Capture Technologies*



([http://api.ning.com/files/bZULmY8kjHwygto3s\\*qb4aq3Lrq7iFGqNUy90H1WDcRnBZn\\*2a6\\*vqir2AMw6zIciDyglkiVw4gCnVdVcWc2PvornEWIRXAM/JacketAntics2.jpg](http://api.ning.com/files/bZULmY8kjHwygto3s*qb4aq3Lrq7iFGqNUy90H1WDcRnBZn*2a6*vqir2AMw6zIciDyglkiVw4gCnVdVcWc2PvornEWIRXAM/JacketAntics2.jpg)).

### *Wearable Absence*

Wearable Absence (WAb) is a flexible, wearable, body architecture based on small wearable devices and sensors embedded within a garment that uses biofeedback as a filter to retrieve digitized information and catalogue memories from a relational database. The project is an interdisciplinary collaboration using textiles and wearables, biofeedback sensors, mobile devices



and digital technologies to develop a technological mainframe that will convert specific pieces of clothing into the catalyst that will retrieve digital data from a relational multimedia database.

Wearable Absence is a project to investigate the cultural and emotional density of clothing that are able to monitor physical parameters of the user to query a database and retrieve digitized memories. The use of memory storage devices could be limitless, and the ability of individuals to recall information that could be lost in the human mind is valuable.

Berzowska (2006) was involved in numerous developments that involved art and technology coming together to increase the ability of items to track and archive memory and intimacy through physical computing. A strong focus at XS Labs is the relationship between clothing and individual reasons for clothing, such as “second skins” that have “potential uses as disguise, vehicles of personal expression, and means of experimentation” (p. 447). Additionally, projects include recording of physical intimacy and time elapsed events, to imitate the way skin responds to touches.

Many different experiments regarding information retrieval and storage have considered whether or not information will have value at a later time, or if the information becomes cumbersome. Memories saved in individual minds may be random for retrieval, influenced by emotion, and lost unnecessarily; however, memories saved in digital sources can be purified other than the responses to the memories they invoke. Many different projects are being developed that allow all activities and senses to be tracked and saved; however, not all information may be necessary for information retrieval, or even relevant to memories saved in the human mind. Czerwinski, et al. (2006) note that information serves purpose in a number of

possible ways, including:

- “*Memory*: Finding things (such as keys and eyeglasses); replaying learning and teaching experiences; reviewing research and travel; remembering names of people and places; and reviewing discussions and meetings;”
- *Personal experiences shared (storytelling)*: “Reliving experiences with lost or distant loved ones; improving communication between grandparents and grandchildren; and sharing everyday events with people separated by distance;”
- *Learning and reflection*. “Understanding personal development; reviewing conflicts; finding situational patterns correlated to emotional states; and improving health via medical monitoring;”
- “*Time Management*. Improving productivity at and away from the workplace; improving coordination among family, friends, and co-workers; and identifying relevant or proximate information, given the current context (including but not limited to location); and”
- “*Security*. Using information for legal purposes (such as to resolve arguments and prove alibis); for security purposes (such as personal video recordings that might include evidence of, say, a possible terrorist in a public location)” (p. 46-47).

Successful memory storage includes successful memory retrieval, but all memory is most successful when it serves a purpose. Digital resources are designed to create better forms of storage and retrieval that is more successful; however, digital sources are not always designed to include solutions to unnecessary information. Personal, community, social, and public memory

may vary in definition and focus but the importance of information has been a guiding light in the development of information technologies. Mass media increases awareness, enlarges community memories, and increases the ability of memories to be retrieved by numerous individuals.

### ***Memory Development and Storage***

Memories serve as resources for creating references to individual past, collective histories, social relationships, and more. Individuals use memories as part of the process that builds individual character, personality, associations and relationships that make a person their individual self. Memories, as part of the human psyche, can be lost – either through misplacement in the mind or through the loss of the individual who carries the memories. Historically, memories have been shared as part of the relationship building process, and in many cases the memories shared, through storytelling, were shared in metaphor. Memories are more easily shared with individuals when those memories are shared associated with an object, an emotion, or a strong personal relationship with the memory itself. Over time, memories were shared in books that stored the memories, photographs that showed the memory, and eventually through videos and other digital resources that can store far more memories than any individual could hope to save or actively use in their lifetime. A memory aid could support memory recovery (Inglis, et al., 2004).

People have sought to immortalize themselves, their families, and their societies using memory aides that enable people to have access to all memories. Recently, technology has aided that endeavour by enabling creative individuals to develop methods for saving memories, storing them in ways that allow them to be completely accessed later, or shared with people of the

creator's choosing. Websites have been created to store data regarding lost loved ones, and memorials also in respect of great losses that directly impacted generations and entire cultures. Additionally, some sites have created ways to store historical family data that creates a passage from the current living family to the long past ancestors that make up the family line, through Ancestry.com. These methods create very social, very shared, methods for storing memories in a form that promote long-lived histories of peoples.

Individuals also embrace memory storage as an artistic form of expression, involving the viewer with the memory creation (Carney, 2016), such as through artistic works that use technology to allow the viewer to interact and be a part of the artistic creation. Art as a source of memory storage has existed for nearly as long as humans (Salpeter, 2005). Helping to levitate the round forms in a 3D display, being able to move the shadowed wings in a 2D image by moving their body before the wall, or creating methods where the art is about the person, as done by the creators of *The Creators Project* who holds events worldwide ([https://www.vice.com/en\\_us/topic/the-creators-project](https://www.vice.com/en_us/topic/the-creators-project)). People have the potential to hold memories, and access them easier, when there is a personal relationship with the memory and an object that can be used to assist in retrieving the memory at a later time (Hertzog, et al., 2010). Technology creates archiving and retrieval tools for many different types of memories.

While many reasons exist to store memories for eternity, some controversy exists over the true nature of stored memories in digital format. Memories are acted upon on each retrieval of the memory, and researchers have found that stored memories in the human mind may not always reflect the true nature of the event being remembered. A child may recall a traumatic

event in great details, though the details may be completely inaccurate, the event itself is not lost. However, a happy event may be remembered in complete detail, but fail to be easily retained or accessed at a later date. Facebook, Twitter, YouTube, and even television reality shows provide resources for every individual to share who they are with the world, a memorable saving of every activity for viewing and sharing. In many cases, adults remember childhood events differently than do their parents or even the digital memories created to assist in the memory retrieval. This and the interactions of memories with their emotion, cultural beliefs, social perception, and retrieval changes are building tools that assist in the memory, the meaning of the memory, and very value of the memory. Tangible uses of memory may not clearly utilize or value the intangible aspects of memory.

### ***Summary***

Literature exploration of memories, in the context of research question 2, found that memories are saved using a variety of different methods, and artefacts, which provide a means for individuals to recollect information. One person may use an artefact that is an object, and another may use a smell. Today, memories can be stored for recollection in a digital world, and is recognized as a continuation on written and photographic memories. Recollection of these memories requires that the individual access the stored artefact; however, the memories may appear differently than from memory. An example would be finding grandpa's old hat and discovering it had a brown band, when remembering it was a black band. In the case of digital memories, how we remember a birthday party may be differently from the video of that birthday

party. These differences bring about the next section, in which externalization and mediation is explored.

### **Externalization and Mediation of Memory in a Digital World**

Research question three asked “How are memories externalized and mediated in the digital world?”. Externalization of memories is often thought of as the way a person creates immortality, leaving behind evidence of their life and existence. Mediation of memories is the relationship memories have with other areas of life and society. Individual memories are seen based on the understanding of the world, self, and a place in society. These areas are explored in this section.

#### ***Importance of Memories: Self and Society***

Memories are important in many different areas of life, everything from historical relevance through learning and culture preservation; however, the ability to externalize memories has been an intricate part of memory throughout time. Partially this use of external memory forms is due to the need to share memories with others, or to preserve them for generations to come. Another reason for memory storage is to create art and literature – while in some ways these are designed for beauty and entertainment, they are also an intricate part of memory sharing and storing. Not all externalization and mediation of memory has occurred in methods for sharing, some are for journals when a person is young that may be saved into adulthood and some are images of family members doing things they might not want others to know about. Digital memories, whilst able to retain memories forever are also more easily and completely destroyed than other types of

history saved. When memories are erased from databases, later recoveries can be literally impossible, as the data cannot be restored in many situations (Bell & Gemmell, 2007).

Digital externalization has created opportunities for all of an individual's memories to be saved, where documented, regardless of its representation of the person or of its relevance to the audience that may view it. While this does benefit individuals by permitting them the ability to build self-image or create persistent historical documentations, it could also represent a change in how individuals recall memories as well. Historically, the memory could not be imposed upon by the facts other than those in recall, but with complete digitization, it would seem that emotional changes to the memory are unable to overcome the factual knowledge of the event. Such as a memory influenced by time, without evidence, may be told completely differently from another attendant to that same event. Another consideration is that increased opportunity to store memories externally may directly influence the ability of people to retain memories themselves. If memories can be retained, indefinitely, it is reasonable to believe that their influence can be nearly immortal, in the same as the ancient texts of Egyptian or Mayan languages intrigue archaeologists all over the world.

*Figure 7: Ancient Languages and Lost Memories*



<http://www.guardian.co.uk/science/2013/may/28/maya-script-glyph-language-decoding>

Saving memories using technology is not available or used by all people, but rather only people with access and interest in the technology and the Internet. While many countries have this access, not all people in all countries have access, in some ways this creates an unfair balance due to censorship or lack of Internet (Dardennem 2011; Gumede, 2016; Küchler, 2011). Having the ability to hone the skills of this technology requires access to specialized equipment, and while the types of equipment continue to grow, the access still requires one of these rapidly changing tools. In addition to specialized tools to access this digital saving process, much of the currently used environment for storing is found on the Internet, requiring individuals to have services that can be costly. This changes what is available in both saved memories and in historical relevance from the saved memories, reducing to what starts as a privileged few, but does not yet reach to all. Gene Youngblood (1970) stated, "...we have now reached the point at



which it is possible to manipulate reality itself to create new legends” (108), and in this way the forming of the new reality can only be completed by those able to obtain the tools to access these technologies.

It would seem that self-image is born, created, developed, and enhanced by the memories and associations delivered to others and defined as part of us. Self can be defined, as the culmination of all our learning, our experiences, genetics, and knowledge but our self-image may be a version identified as having two meanings - private or public. In private, a person might enjoy a variety of different music, but as part of a public image may deny any interest in more extreme variations of music. In some situations, these are two completely different images. Digital memories are used to help people remember current events, historical events, and even to create the individual self that can be displayed to the public or recalled in the private. Autobiographical memory is considered the memory that defines an individual, memories that pinnacle moments in the life. While not all individuals utilize the digital and social resources to create their own identities, the ability to do this could directly influence the memories themselves. The memories stored in digital resources are timeless resources, which are unable to be changed by the passing of time, but once removed, may be gone forever.

Today, many people find the past in a number of interesting ways, often at the time of a family member’s passing. While preparing for the funeral the family might find odd mementos in a jacket hidden in the back of the closet, a picture slipping from the front pocket of a man’s shirt, a shoebox hidden in a back corner; all happening as the family works to overcome their loss and manage what was left behind. This method for reuniting with the past could be directly

influenced by this change in how people store memories. In as early as 25-years from now, the process of moving-on a loved one might include, accessing social media, closing accounts from Internet sources, after the painful process of accessing and saving each image that reflects the person's life; it might be required. As technology continues to grow and be embraced by people, this additional method might become the primary method, it could result in no more hidden shoeboxes, but rather an old lost cell phone that your great grandchildren find in a back pocket, plugging it in to charge yields long lost images and phone numbers of a phone that was never dismantled.

Digital resources include websites for communities, such as city, town websites, or even museums online. However, with easy access to mass media and communication tools, cultures are no longer limited to memories, books, and movies to share their history. Participatory culture, the act of groups of people contributing to their collective intelligence and cultural behaviours, becomes a powerful tool in the world of mass media (Pedersen, 2008; Curry, 2010; Harris, 2008). This includes the use of the Internet where individuals have the ability to be in direct contact with members of their culture or of the communities they belong to and influence the behaviours of others. Digital memories are created regarding cultural behaviours; however, moreover they are propagated and shared in the mass media forms that are utilized to share communications and build sameness with advertising and social media.

Culture and digital memories are supported by shared information; however, data in digital form could be saved nearly eternally, making the ability to remove content or filter content more important with each year of growing data. Memories, stored by the mind are

naturally sorted and lost as necessary, though occasionally not by choice; however, digital memories are able to take up less space before they must be sorted and filtered. When individuals are able to create user-generated content and contribute to the growing sources of information it presents a number of difficulties for the future acquisition of important facts. Search engines and data filters may not provide enough support to prevent information overload and allow for productive information dissemination.

In the future, people may need to access information gained in the past few decades; however, uncovering the information could be a challenge – what is relevant and what is not. In the future, search engines could be far more complex in nature; however, currently the ability to find the proverbial needle in the haystack leaves researchers with complex hunting tasks when developing information. Two leading indicators for relative importance of information in the data resources available on the Internet are Word of mouth (WOM) and Social Networking Sites (SNS) (Shu-Chuan & Sejung Marina, 2011). Much of the identification of this particular phenomenon has been directly related to consumer activity rather than their use as message dissemination and shared cultural experiences or memories. As purchase power is not the only result of WOM and SNS, understanding its value in cultural exchanges can provide important insight into the future of communication influence of culture. These factors influence theories such as the Global Village theory (Khibany, 2003), which suggests that over time technology, will lead to a breakdown of barriers that separate cultures, promoting a globalized culture that directs change through the technology that guides it.

Communication inspires change, and eCulture is a sign of the changes that digital sources and the Internet bring to the culture and cultural memories that influence individuals ((Diocaretz, 2006). How eCulture might influence culture outside of the online experiences is not yet fully understood; however, individuals embrace technology as a source of communication that transcends the boundaries of geography and language. Global village theories suggest that over time technology will influence culture in such a way as to reduce the changes between cultures and spread ideologies throughout the world. In some ways, social media and social networking demonstrates the same theoretical potential as perceived by the global village theory.

### ***Defining Memory Mediation versus Memory Creation***

Memory is the human ability to recall events that have occurred in the past, whether only moments before or memories from many decades before; however, memories are recall, and memories are not exclusively the domain of the human mind. Memories are able to be stored in devices, images, pages, and even animals carry memories. Humans cannot recall memories stored by animals at this time, which is not to say that in the future there might not be a method for accessing memories saved by animals. When memories are stored in written form, we can “recall” those memories by reading the words, such as when we forget the list of items for purchase and check the list we wrote, or when we read history books, journals, and documents from events that occurred in the past. We can recall events by accessing the existing evidence of those events – such as images –pictures or even Facebook images. When we use tools to access memories, those memories are referred to as mediated. Even if it is by handling an item, to help recall its purpose or past, physical items, physical activities, and ones that fit into one of the

recognized senses mediate memories. The digital memory development relies heavily on visual senses, without the help of other senses.

*Figure 8: Preserving Memories from Birth Forward*



(<http://96.30.13.24/~digitalm/wp-content/themes/flexsitez/flexthemes/default/images/slideshow1/13.jpg>)

Items, images, and words can assist in recalling memories, which recognize their power in memory mediation, but not their power in memory creation. Sometimes items create the memories themselves. Turkle (2004) suggested that memories are created by digital activities, including relationships and friendships. In the description of MUDers, Multi-User Domains, it is understood that the memories being made are created in environments outside the once “normal” methods for created relationships, particularly in face-to-face atmospheres.

Memory creation uses objects to create memories, a blanket reminds us of safe childhood memories, but those memories were created with that blanket. In digital memory mediation, the Facebook post, the YouTube video, or the Flickr album are representations of the memories;

however, in the case of MUDers, memories are no longer just stored in the digital environments, they are created in these very places. Turkle recognized that individuals, particularly community-based individuals, built strong memories and strong relationships with other individuals rather than simply using these resources to mediate memories or to control self-image propagation. Memory creation and mediation are recognized as able to be part of a single memory, such as in the case where a short-movie is made for class and posted on YouTube; however, in the case of mediated memories for MUDers, they represent memory creations as foremost, and mediation as secondary processes.

Starting in the 20<sup>th</sup> century with the invention of the computer and Internet protocols, the introduction of technology has uncovered a mass-media approach to self-definition; one that is no longer mediated by the same sources as previous generations. In these ways, memories actively become part of archival processes that preserve the memories and mediate them using a technology that continues to evolve. The evolution of technology continues to suit the needs of individuals by providing resources; however, in some cases it appears that the technology itself is changing how individuals create memories, define self, and interact with other individuals. In the case of mediation, “reliving” an experience through the archives of the technology, activates memories. In the case of creation, memories are being made and shared every day in the mass media, which is being utilized by literally billions of people every single day.

Memory archiving and mediation is not necessarily the reason people utilize the Internet and participatory community websites. Participatory websites engage individuals in social environments where memory archiving occurs by result rather than by purpose. Even sites such

as Flickr, previously designed to store and archive images, have developed a participatory environment where individuals can communicate amongst themselves, form a community and develop relationships. This type of site encourages and embraces the creative side of individuals; those who share their work, whether of family and friends or have artistic creation. These memories are created and by their creation become archived. However, this particular method of memory archiving also returns the individual to personality building and self-image. As an individual selects their sources of participatory media and engages in communities, they make conscious or unconscious decisions regarding which sources best represent them as an individual. For example, in the USA, Yahoo users may associate strongly with Flickr versus YouTube due to the association recognized between Yahoo and Flickr and possibly Google users will be more inclined to post to Google sites versus other sites. In Asia, WeChat, KakaoTalk, and LINE have a direct influence on the social networking, assisting in building new relationships through alliances between organizations to influence buying power, but struggling to maintain balance between social network and organizational structure. Organizations, in an attempt to become an intricate partner in self-development, create community-based relationships with organizations, relationships that demonstrate what their users most want to see in their self-image and memory creation processes.

### ***Autobiographical Memory Mediation and Digitization***

Preservation of memories is a practice of image, public image rather than self-image. Each person develops historical memories of their own life; however, what represents the individual is sometimes related to the storage, or the artefacts that can be identified. Artefacts – tattoos, scars,

“proof” of defining moments in history for each individual, whether public or private, and these items will influence the identity of the individual. While personal memory may have different motivations, and may define the self in the creation of digital memories, each representation of those memories may be a direct result of self-preservation and self-image. Autobiographical memory is the memory of the self, specifically defined as individualized memories, memories that may be period specific, but at all times is self-image specific. When memories are autobiographical in nature, they may have different self-related meanings, and may be different in self- versus public acknowledgement.

D'Argembeau and Van der Linden (2008) evaluated memories related to self-images, particularly how memories were preserved when they reflected on the individual. Defining autobiographical memory as a “phenomenological experience associated with remembering,” which can be recognized as part of the process in which individuals define themselves, using the memories and the events that shaped them into the individual (p. 539). However, D'Argembeau and Van der Linden (2008) also recognized that in this way, by the use of memory as defining moments, we choose who we are by determining the specific events in our individual histories that shape who we become. The aspect of identity was particularly focused on memories for personal experiences, and how each individual recalled memories that may define them, particularly in self-evaluations. These studies demonstrated that autobiographical memory was influenced by motivations and maintaining self-image, positive self-image in individuals with positive self-images.



*Figure 9: Developing Self-Image Using Public Image*



<http://artintheblood.typepad.com/.a/6a0120a570a392970b017eead3401970d-320wi>

Not all people create autobiographical memories only with memories; some people preserve their autobiographical memories in art and communication forms – such as when a child draws a picture of their family or when a writer uses a recorder to store a written tale in progress, and including all technology forms -writing, photography, and even in digital form. Using these forms of memory retention is not only for the individual to save memory but to preserve the image and to create a living memory of the autobiographical information. Some people may not use all the same information the same way, or even at all. Bell, a computer scientist for Microsoft Research Labs, has been recording every single activity, both in voice and in image, saving his digital and his physical world in documented forms (Thompson, 2006). While the practice helps the 72-year-old to remember specific details he might otherwise forget, he stated that he believed that the access to the digital sources for his memories could be contributing to more memory loss by making it easier to look up information rather than retain the information itself (Thompson,

2006). Memory solutions make life easier, and help individuals share pinnacle moments in their history; however, if the solutions are encouraging reduced memory function it could become a problem for people.

Kihlstrom (2009) states “[i]ntrapersonally, autobiographical memory provides a basis for establishing and maintaining social relationships” (p. 1179). Overall, scientists recognize memories as a requirement for any creature that must learn from experience, because without memories, experiences cannot be retained and new actions to that incident or problem cannot be performed or deduced. Additionally, memories are not only about events, smells, images, tastes, sounds, or activities, they are specific to humans rather than digital because humans innately forget things that do not appear to represent importance, while digital sources must be actively maintained to remove unrelated content. As people use memories and information to make decisions, solve problems, and even to establish communications with others, autobiographical memories are created in situations where people meet or interact with other individuals. True in both digital and physical forms, individuals share who they want the other individual to see, how they wish to be represented. In addition, Kihlstrom (2009) suggests that autobiographical memory could be both conscious and unconscious in nature, suggesting that whether the memory is saved later for self-evaluation or public display, it may be edited at the conscious and the unconscious levels.

Digital self is the perception of the person as seen by others from digital data stored and digital self-image is the perception of self that an individual presents to the public upon saving the digital data. All of this information represents opportunities for individuals to filter

information to the public images displayed, controlling how others perceive them as individuals. However, not all individuals using digital resources recognize these sources as other than opportunities to socialize, which suggests that self-image building may be developed unconsciously, possibly by cause and effect image management. In Taseñte, Ciacu, and Sandu (2012) study of Facebook users in Romania, only 11.9% of respondents recognized Facebook as a self-image tool. Users of social media sites are able to communicate at a private and a public level using tools such as Facebook, blogs, and even applications that can keep others apprised of their location and whether or not they want to go there again. The largest target market for these digital innovations is the teenager, who represents the largest learner group for self-image development, particularly in the learning phases of how different perceptions are developed. Posting an image of marijuana may appear to be just a funny joke, but when their employer requests a drug test, or person is dismissed from their position due to friending the wrong people, evidence of poor self-image choices are clear (Hill, 2012).

It is expected that digital profiles and resources will continue to multiply and increase worldwide reach of the tools. Teens over 13 are the largest market for these tools and they utilize them in relationship building skills, communication, and even are able to overcome the challenges of socioeconomic status by gaining access to social media sources outside of what the status might have allowed in previous years (Ahn, 2011). As more people use digital sources to share their lives and to communicate, more social blunders become publicized, such as individuals fired for Facebook or Twitter comments about their employers or customers. Digital images enable people to share and communicate with literally hundreds of thousands of

individuals; however, many social media users are discovering that their self-image is a public image, even when they did not intend that to be the case. Memories may not have the same meaning to an individual after they are scrutinized by the public or by employers.

Self-image development through the creation of autobiographical content on websites and social media is not self-inflicting knowledge, but culture building in a participatory nature that enables many different people to share the memories of the individual. YouTube is a popular online location for young people, particularly for the sharing of videos. Videos range from news through inappropriate behaviour and the number of views is much like a popularity contest. Individuals can learn how to grow a garden, or skate like a professional, or watch short clips of anything from funny activities to comical cartoon shorts. However, in my view, the interactivity of these videos has the most influence on the self-image created and the relationship with the community, such as when some neighbour posts the video of her son's first bicycle ride with pride. The participation of individuals allows the community to develop a culture that invites more individuals to visit the site itself (Chau, 2010).

### ***Digital Memories to Propagate Cultural Behaviours***

Generations share intergenerational memories, and this leads to memories as evidence. The cultural understanding of such memories is derived by the relationship each individual has with the media itself. For example, stories of World War II are everywhere; however, when a grandparent sits down and tells tales from deceased relatives, the stories may become alive and carry forward an emotional relationship. Mass media creates a new type of cultural memory sharing, and particularly a new type of cultural sharing and behaviour. Participatory cultures are

defined as cultural behaviours where the members of the culture participate in the propagation of the culture itself. Jenkins, in the 90s and early 2000s suggested that participatory cultures were defined as process of consumption, and derived relationships between participatory culture and fandom; however, in Pedersen (2008), the definition could be refuted by others stating that alternative views suggested that participatory culture was better demonstrated in the ability and encouragement for individuals to make private life public. Social media and digital resources provide many opportunities for all members of a culture and community to contribute to the development of the culture itself.

Propagating culture requires shared domains by all members of the culture, equally, to create a consistent bond between the members of the culture and to create an evolution in the cultural behaviours. Some research suggests that not all members of cultures are equally accessing or able to access the mass media resources that are shaping the community around them (Harris, 2008). Politics, around the world, engage in active social media strategies to involve citizens in political decisions that will directly influence their future; whether through polls, active contributions, or through encouragement to have their voice heard. However, Harris (2008) notes that even with the wide availability of digital resources, young female participation in this particular participatory culture is notably lower than that of young men. When digital opportunities are unsuccessful in motivating all members of a community to become a part of the cultural behaviours, gaps could develop. Members contributing to the participatory cultural behaviours are assisting the community to build cultural memories, memories that may be lost on missing members.

Participatory cultures are not exclusive to interactive digital sources; however, the growth of this particular phenomenon is in part due to the access and availability of communications to reach many different individuals in the communication of ideas and media. Historical documentation of events are often viewable in community type resources, such as the Holocaust Memorial Center, Zekelman Family Campus (<http://www.holocaustcenter.org>), which requests oral histories from survivors and their families to help build an oral history archive. DeviantART (<http://www.deviantart.com/>) utilizes digital space to provide opportunities for artists of all ages and cultures to share artwork with a community of likeminded individuals. Individuals can add their own art, photography, animations, etc. Additionally, members of the community can also comment, vote, or even buy the different artwork found on the website. The community develops projects, design challenges, and even journals. Similarly, You Tube's participatory culture has a gradual trajectory, allowing members of the community to be involved as little or as much as they wish to be involved. Members upload videos that can be commented on, voted, on and discussions created around them. Participators who contribute videos can create and promote their content. These types of participatory cultures allow the members of the community to participate in the growth, direction, and success of the cultural nuances that guide the community itself (Chau, 2010). Each activity of the culture is documented for prosperity and new members of the culture are able to see what has come before, learning from the history and the developed culture itself.

Martin Pogačar states that culture transcends geography in the virtual collectives that continue to develop and evolve in online environments where collective memories are revolved

around connectivity (Maj & Riha, 2009). Digital environments include everything from social media such as Facebook to community specific resources such as LinkedIn or even the ability to be part of projects such as Avery has to promote and test products. Each individual site promotes a specific cultural atmosphere that visits perpetrate and become a part of as individuals. Even massively multiplayer role-playing games – MMORPGs - have intricate connections with individuals and promote a culture that is often very game specific in nature, but utilizes the social interaction and skills that build cultural memories (Curry, 2010).

While different cultures, Western and Eastern, embrace MMORPGs as entertainment, cultural differences can be seen in avatar designs and roles played, which represent the culture of the person (Chia, 2008). Not all individual cultural aspects are present when associating development of character with individual identity, and as MMORPGs are recognized as persistent virtual worlds where many different people can meet from around the world, to share a similar themed play area, it is reasonable to believe that cultural crossovers would occur. Additionally, individuals, particularly at younger ages, associate the avatars they created for the MMORPGs as an extension of themselves, representing them in that virtual world and one that is designed to fulfil either self-image or perceived self-image (Blinka, 2008). Theoretically, the Internet itself is recognized as an “artifact of pop culture” (Curry, 2010, p. 250), which is perceived to be a culture developing around the world, where MMORPGs are a genre of that culture (Bainbridge, 2010).

Cultures developing around digital resources, experience different culture specific aspects no longer reduced to location, language, or heritage. With each genre within the pop culture of

Internet are communities that may range in background but often develop similar interests that guide the growth and the success of the community itself. Many different online groups have grown from small roots to larger organizations, such as Facebook started as a simple university program and now houses members from around the world. Culture changes in the new formats of communication, building and growing outside traditional formats of territory and heritage. In the future, cultures may be solely based on interests, perceptions, and beliefs, rather than on heritage, language, and geography.

### ***A Future View of the Present – Historical Documentation***

Throughout the Internet, different sites archives are using current events, in their digital forms, to create historical archives, representations of today or to rebuild the past, and able to select which histories to represent even when that history is user-generated content. Many sources of information found on the Internet are user-generated content, a term “popularized in 2005, when websites began to offer users a chance to create material for publication online” (Poyntz, 2010). User-generated content is not exclusively blogging or commenting on different subjects, individuals create content in the way of recipes on sites such as Spark People, where individuals can track current research on food, diets, exercise, and even keep each other updated on current events in the lives of other contributors (<http://www.sparkpeople.com/>). While studying China and the uses of the Internet, Haiqing Yu (2007) of the University of Melbourne, found that life blogging, of everyday events, had a large influence over self and culture, and stated: “I have viewed blogging as representing the postmodern pattern of media consumption and production on the one hand, and a rebellious force against the mainstream culture on the other



hand. As a rebellious force, blogging does not, however, challenge the mainstream culture (be it political or business), but rather deconstructs it through playful (mis)use (and often juxtaposition) of the available resources.” (p. 429).

In creation of meaning itself, individuals contribute to defining relationships and meaning from terms to the very words and history itself. Wikipedia uses visitor contributions for much of the content provided, even in many different languages and different sources of information from gardening through research and encyclopaedia type information (<http://www.wikipedia.org/>). Online news sources also use user-generated content, Yahoo.com has a specific contributor network specifically to develop and sift-through the user-generated content provided (<https://contributor.yahoo.com>). While user-generated content serves many different purposes, both as entertainment and educational, it can be cumbersome, requiring patience and organizational skills to sort through all the information. Unlike memory, most of the information found online can continuously multiply without much loss.

Individuals, who interpret information, evidences, and resources to develop documentation, write historical documentation. In the same way as an individual can evaluate an item and identify it in a one specific way, while another individual can identify that same object and come to different conclusions, this is true of historical evidence, even when that evidence is current, and within the lifetime of the individuals studying it. This particular disadvantage of historical data saving creates poor representations when the information can be influenced by bias. Throughout history, history has been “written by the conquerors”; however, history is being written by all sides of historical relevance in the mass communication that makes up the Internet.

While conquerors may have had the power to control media in previous history development, it is important to note that, the current source of media is not representing an equal view of history. Populations responding to the noisiest members of the community, as seen in the Internet, heavily control mass communication. Just as individuals may consciously or unconsciously control the information that identifies them in mass media, groups contribute to this same development. Bias is developed when individuals in a group give a “louder” voice to the cause, whether due to need or simply due to controversy.

Mass media presents opportunities for information to be shared between sources and resources, even when those sources can be interpreted differently between individuals. In addition, mass media through the Internet storage capabilities allows information to be saved nearly indefinitely, as current technology permits. While technology changes have reduced items such as 8-tracks to obscurity, individuals have been able to transfer the information from those and Super 8 videos to more current versions, including by moving VHF to more contemporary mediums. These changes have permitted history to carry on; however, the present is being sourced in many different mediums and encompasses much more space, though digital, than any other time in recorded history. History is not able to be regulated by the privileged, rulers, or designated history-making individuals. Libraries have historically been able to control what was available or accessed based on local need. Schools used textbooks to control the sharing of information can limit the information available to students. The Internet permits individuals and groups to tell the larger stories as well as the smaller stories. Large groups of people have utilized the internet in events including the Arab Spring, using social media to create and

document history. These uses are history written by the people living it without control to the role the storyteller plays in the history making aspects. Everyone writes history, everyone can read any aspect of history, and while some information sharing is still controlled by governments and organizations, any and all opinions and actions are somewhere in the mass media formats, and are not being regulated based on relevance or even based on position and historical relationships. When this information is not purged, it becomes part of the endless resources to all individuals seeking information on a subject that may appear to be related.

Too much digital information overloads us and many people struggle to recognize sources that are accurate or informative for particular uses. Search engines were designed to provide solutions to information hunts; however, even a search might not result in the specific information being found unless the search engine is able to anticipate the need through user definitions. The future must uncover methods for disseminating information in a meaningful way that creates usable resources to all participants. Computers have different abilities to categorize information stored; however, in cases where complete memories are being stored the ability to obtain a single memory in seclusion can still be difficult without enough or the right information. “Web Usage Mining is defined as an application of data mining techniques on the navigational traces of the users to extract knowledge about their preferences and behaviour” (Ramesh, Rao, & Goverdhan, 2011, p. 194). These are traditional methods for finding information; however, the future data will continue to grow, particularly with the increase of autobiographical data and social media. The continued growth could negatively influence the ability of individuals to locate pertinent information or to remove unwelcome historical data.

### ***Communication – Digital Manifestations of Cultural Change***

Computers and Internet provide uncontrollable changes to generations, eliminating clear borders, changing perceptions, and even sharing new memories of historical events. Cultures are represented in data in mass communication; however, culture is influenced by the data that it receives, and this may not always represent the national culture. In addition, not every member of every culture may have equal access to methods of communication, or even methods of memory storage. Current technologies can be completely out-of-reach for members of the culture, which can directly influence the amount or type of communication shared from a specific culture. Analysing the types of communication used by a community or culture, can assist in defining the existing relationships between technology, communication, and culture, can assist in defining the existing relationships between technology, communication, and culture. Communication comes in various forms, and many of these forms directly influence the creation of individual and cultural memories.

Word of mouth (WOM) is recognized as a powerful tool in marketing, as an electronic method (eWOM) it can increase the speed of communication to influence a much larger consumer base and cause dramatic changes to expected sales (Shu-Chuan & Sejung Marina, 2011). Social networking sites (SNS) have enabled eWOM to be a guiding influence in many different purchasing behaviours around the world, at a global level, organizations must work to control how word of mouth influences larger populations (Shu-Chuan & Sejung Marina, 2011). People can contribute information to friends, their friends, third level friends, and even at a level of public access, creating a domino effect in shared knowledge (Shu-Chuan & Sejung Marina,

2011). These effects are not exclusive to purchasing behaviours, in MMORPGs different viewpoints are displayed in behaviours and activities, such as the creation of avatars and these different views are shared within the world and across cultural barriers. Historically, word of mouth, behavioural demonstrations, and cultural memories have been intricately linked and defining for a cultural. This relationship built on social relationships within the culture, relationships that can be replaced by relationships in Internet activities, with online groups and virtual worlds.

Some theorists suggest that culture is influenced by social relationships as a basis of building cultural memories and distributing essential cultural information. eCulture is a new term, designed to describe the culture sometimes reported as popular culture, or pop culture, and defines a group of individuals who can refer to at least a single Internet based community to which they belong, or who influences their behaviours and decision-making processes (Diocaretz, 2006). However, how or if the eCulture influences culture itself is another concern of many different globalists, who believe that the future of socialistic behaviours are near due to the sharing of communications and belief systems. “Globalization has become a buzzword, a vague term used by academics, policymakers, politicians, and journalists” (Khibany, 2003, p. 138). Global Village, introduced by McLuhan in the late 1900s, was used to “describe how media technologies were breaking down barriers between different nations; communication technologies, more than before, have occupied a central place in debates about cultures, communications, commerce, and possible unity among nations and cultures, and hopefully peace” (Khibany, 2003, p. 138). The belief that communication could influence culture is not

unfounded, cultural memories are shared through communication, a small child cannot experience World War II; however, a tale of a past ancestor, a visit to a historical location, and the relationship comes to life for the child. Communication is essential to sharing historical cultural information, and communication is the primary application of the Internet (Comu, Iorio, Taylor, & Dossick, 2013).

Khibany (2003) noted that while the realities of the digital divide directly influence the effectiveness of the Global Village theory, countries with little Internet infrastructures would be influenced less than countries with wide access. In addition, not all cultures may be significantly influenced by this type of “reality” due to differences in culture, such as stressed by Hofstede regarding how cultures influence behaviour and response to different stimuli, such as ratings of Individualism or Uncertainty Avoidance (Hofstede, n.d.). However, access was not alone in the problems that Khibany (2003) foresaw in the Global Village theory, interest and access in the specific information must occur as well. While SNS and MMORPG influences could potentially lend strength to the theory, individuals have to seek information actively to change the culture around them. While eCulture may influence behaviours in online communities, the relationships to cultural changes due to digital manifestations of culture are unclear. How eWOM, SNS, MMORPGs, and eCulture will continue to define global cultures is yet to be completely understood; however, cultural memories are already being stored in digital formats accessible to anyone with Internet access. Additionally, research is working to understand if ecultures are influenced by low or high context cultures in their personal life, such as community, family, and work cultures (Panina & Kroumova, 2015).

Turkle (2004) recognized the group of online cultures as MUDers (Multi-User Domain Users) to include all different groups, from forum friends to MMORPGs, which enable communities to be built and relationships to be utilized. Gaming companies recognize the value of these relationships and how solidifying it through face-to-face introductions can create even stronger bounds between individuals. Sony Online Entertainment has created a yearly event for their MMORPGers – MUDers – by hosting a FanFaire called SOE Live, much in the same way as Comic-con or Star Trek and Star Wars Fan Faire promotional events. These events happen yearly in many places around the world such as the US, Europe, and Russia, and are attended by literally thousands of individuals. Access to these communities in Internet places assists in building a bridge between individuals of culturally same but geographically different communities. Communities that suffer geographical differences benefit from the mass media that increases the ability of these individuals to communicate.

Culture versus technology is a discussion that is studied by a number of different theorists, including Roberts (2013), who found that the relationship between culture and technology has widely different interpretations in media theory. “Andrew Feenberg has characterized the two most dominant positions as, on the one hand, the social constructivist or ‘technology studies’ approach to technology, and, on the other, the ‘substantivist’ theory of technology” (p. 9). Roberts (2013) stated that the arguments suggest that technology evolves because of culture or that culture evolves from technology. Culture itself, being acted upon or acting upon. However, historically it is obvious that culture can evolve without technology, but the ability of technology to exist outside of culture is questionable, other than it currently takes on

new forms and increased energy as different cultures become involved, such as with computers or even cell phones, whose advancements have been developed through organizations supported by many different cultures worldwide.

A simplified definition of culture is the manifestation and collection of a group of ideas or ideals in a collective, particularly in a community of individuals who share like-minded concepts and histories (Kashima, 2010). In some cases, forces outside of their specific environment influence cultures; however, in the case of mass media and MUDs, cultures are subject to a great many influences that were not part of culture creations prior to the current technological advancements. During the history of culture development, individuals have influenced cultures from afar, but not the same ability as individuals can influence cultures today. In addition, subcultures were often quiet in their beliefs or careful with whom they shared their interests, with the current mass communication methods and MUDs, subcultures have larger voices and abilities to explore their interests, even in situations where these interests might be deemed negative or deviant by their local and individual culture. Cultures can develop in a variety of ways; currently the influences of mass media have a direct involvement in cultural evolutions.

### ***Ritualized Memory Practices in a Digital World***

Saving the past, memory creation may not always be predictable; however, memory saving practices has developed throughout the years. In history, prior to the development of multi-media approaches, memories were saved through items, art, literature, and music. Today, memories can be saved in digital forms of those, as well as through video and photography. Every moment of



an individual's life can be documented in digital forms, through recordings, videos, and eventually even sensory perceptions will be able to be recorded. Most recently, Google Glasses have been released to the public with the ability to record information of the user through the video recording of the glasses (Riebe, 2013). Traditionally, memory recall has been associated with the senses; however, conceivably that could change in the future through technological enhancements in the brain itself.

Recently, research has demonstrated that “electrical stimulation in temporal neocortex can cause neurosurgical patients to spontaneously experience memory retrieval” (Jacobs, Lega, Anderson, 2012, p. 1). Patients studied were adults who were able to recall high school memories very clearly during the study, with significantly different results than when not using the treatment. Jacobs, Lega, and Anderson surmised that the part of the brain being accessed was part of the autobiographical memories of the individuals. Electrical activity in the brain can be stimulated through a number of different ways; however, to date, there are no tools or procedures that can bring back all the memories a person has lost – either due to time or due to damage. If studies like this one continue to prove successful, and continue to identify key aspects of how the brain works; the future could see artificial means for recovering data from the brain. This could work much in the same way as the heart can receive help from a pacemaker or an insert in the ear can provide previously deaf patients with access to sound. The ability to recall or enhance memory recall could be the result of a new discovery or a change in a tool that currently is used for other purposes. However, this type of recall would not be strictly related to the emotional

response to an image, or even other sensory perceptions such as sound or smell. In the future, recalling your lost childhood could be simply pushing a button.

At birth, pictures are taken, items are saved, and a little book may be started to document every first that occurs. During events in life, parents and relatives take pictures, storing them in books that document the activities of our lives. Special activities, such as sports or performances are documented through video and stored for prosperity. While some of these activities were particular to a class of individuals with higher economic standings, currently the privileged are not alone in their ability and even frequency of historical documentation of memories and life itself. The practice of documenting life, creating monuments of memories, is a ritualized practice that continues to grow each year with the technologies that enable and promote these types of behaviours. Cameras and picture taking tools are an everyday part of life, but an expected part of birthdays, holidays, and functions involving families and success.

Figure 10: Google Glasses



(<http://www.mobishop.eu/blog/wp-content/uploads/2013/02/google-glasses-2.jpg>).

History has been a fascination, or even a curiosity, of humans throughout time; however, the ability to record history or even define it in a way that relates it to current relationships has been more complicated – other than in religious applications. Sharing of memories might previously have included stories passed down from one generation to the next, items such as a memory book, an old blanket, trinkets, and even buildings were able to bring a memory of the story of the history that the community or individual family shared with the past. However, mass media and digital resources enable all historical moments to be preserved for “all of time”, or as far into the future as we can envision with the constantly changing technology. While technology

had moved memory sharing from a verbal to a visual format, it is reasonable to believe that soon technology will even permit the sharing of memory to reach other senses – already hearing, possibly soon smell and touch.

Today, memory is part of a complicated social experience that includes “like” on favourite pages that represent movies, foods, objects, places, or anything that could be imagined or currently exists. Part of memory creation practices include documenting, both in mass media sources such as Twitter, and through picture collection of favourite events. Prior to the digitalization of memory archiving, memories of favourite events were shared through verbal or written communications. In some situations, art sources could be used to describe the event, or even a quilt developed to represent the defining moments in a child’s life. Documenting events and history were developed in a less than instant method, in a process that could cause loss of information. However, in today’s historical archiving, ritualization of memory saving occurs through documentation of events, documentation that can occur instantly and typically results in excessive amounts of memory archiving. A single event may result in dozens of pictures, Facebook posts, Twitter notices, and more. Some theorists have suggested that in the attempt to archive the event, the event itself is not explored to its fullest. This raises the question of how ritualized memory practices in mass media may negatively influence the memory making process.

### ***Memory Interaction in a Digital versus Physical Element***

Memory interaction with the physical world might include rubbing a scar, an old war wound, which does not physically still hurt, but with each remembering of the event still causes aches. It

could be a picture, held fondly while recalling a dear aunt who passed away. Physical interaction with memory items can bring the memory closer. Digital interaction is limited to a single sense; nothing to hold or touch that separates the information from other information sources. The computer, iPad, smartphone, or other device is part of the everyday experience and it does not hold a single memory, but many. While future memory devices might be able to embody other senses, current memory tools have none of these aspects and make them less viable as sources of connectivity to memories in the mind. However, designing insta-sharing memories via social media has increased over the years. With social media, every moment of an individual's life can be integrated in the social experience. Friends many time zones away are instantly transported to the lively underground party from their quiet university room. The experiences are limitless, and currently the tools are becoming the same.

Digital memory interaction involves viewing memories as they happened, from the limited senses storage methods such as recordings and videos. These types of memories can invoke memory retrieval, much like telling a story, smelling a specific scent, or the feel of a texture. The difference between digital memory resources and other physical elements is primarily the limit of sensory involvement, as currently digital memory saving is visual and auditory only. However, in the past this was also true of video, images, and recordings. Books and other items also reach out to a single sense in the retrieval. However, similar to physical memory retrieval, a “similar” experience can invoke memory retrieval – such as an image that reminds the person of a similar event in their own life, a perfume that smells similar to the perfume their mother wore when the individual was a child, or the taste “just like grandma’s”.

When viewing a video on YouTube, the incident can invoke memories of personal experiences, or reading a friend's Facebook page can remind of an adventure from younger years. Social media, as the most widely used digital resource for memories, can contribute to shared memories related to one another and invoking memories in more people.

While a digital memory cannot include all sensory perceptions, and cannot be necessarily carried with the individual always – such as a scar or tattoo – the ability for digital memories to imitate other memory resources is extremely high. This process is also widely accepted, and organizations have begun to make products and items to help promote the process of digitally saving memories to social media. The ability to instantly access memories and share them with family and friends is a growing phenomenon around the world. When people can share all their activities, they are able to always access their own histories, as well as the histories of people they care about or are interested in knowing. Digital and physical memories share commonalities, restrictions, and interest.

### ***Mediating Differences in Digital versus Metaphysical Memories***

Differences in mediation of memory are recognized by their meaning, their association, and even by their life-altering abilities; however, their format may suggest differences as well, such as the differences between digital and metaphysical memories. Metaphysical memories can change, and shared through traditional methods, nothing could completely take away the ability for those memories to change. With the growth of technology came a more permanent, unchangeable memory resource, images, but not specifically just picture taking and storing, the ability to film

and record the entire event for posterity. This ability came with a price, one that makes memory remaking during each revisit, more difficult.

Google Glasses was released to enable every single individual the ability to record hours of activities, and with its release many people now have the ability to share their every action with social media applications (Weissman, 2013). While some people are analysing the restrictions, rules and regulations, some of the focus is on how this type of technology changes individuals, memory storage, and even the ability for an individual to remain private in any nature. Individuals have the ability to create their world and share moments, many moments, of their life with literally everyone. Google Glasses is not alone in the endeavour to put every moment of life into social media, current competitors include “Telepathy One”, developed by a “Japanese entrepreneur Takahito Iguchi” and this upcoming competitor specifically speaks to the social networking crowd, instant access to sharing with social media (Weissman, 2013, 1). However, this product is still not available to the public, in 2016.

Digital recording of life may not be so much different from living life, as one of the lessons demonstrated in the 1998 movie *The Truman Show* (Weir, 1998). In the movie the lead character, Truman Burbank (played by Jim Carrey), spends his entire life in front of the camera, where all his activities, failures, successes, dreams and ambitions could be shared instantly with onlookers around the world, all without his knowledge. In the movie, characters work hard to keep the secret from Truman, while still managing to guide and control his life in a direction that can keep viewers, increase ratings, and ultimately prevent the loss of the television series. This particular movie demonstrates something important to today’s generation of social media

addicts, users, and developers. It raises the question: if you know that your life is being recorded, all of your life, would you change how you live your life. Drama was important to the success of the show, and in the movie, people worked hard to organize drama right up until the final moments before the deceit became evident and Truman found out the truth to his life, nothing but a television show.

When using social media to share memories as they occur, people can instantly get responses to how individual behaviour is accepted by their peers, and be encouraged in directions in an instant fashion than a retelling of an event. Drinking too much at a university party, wandering out onto a balcony, where a near attempt to climb over the railing turns into an embarrassing tale of vomiting on a potential heartthrob can become a funny story later in life. However, that same event, present live or as a YouTube video, may be an endless embarrassment that never quite seems to leave the mind or turn into a funny “when I was your age...” story. It is endless truth to the memory process, and unlike metaphysical processes, it cannot change. In this way, it is like a scar that not only never goes away, but also can actually tell its very own story of the events that lead to its existence. Digital memories are permanent memory resources, and can bring on a remembrance much like rubbing a scar or smelling the coat of a relative since passed; however, unlike those things, a digital memory tells exactly what it saw or heard, with no embellishment, no ability to reconceive the facts to its making.

Individuals make memories every single moment of their life, they file, sort, file, and rewrite as necessary in their stored memories in their minds; however, memories instantly recorded for playback later can have a direct influence on how a person behaves the next time



they are in the “spotlight”. In physical memories, the actions themselves can fade in detail or be rewritten to be a more welcome memory, in digital memories; the event is preserved as it occurred from the perceptions of the digital devices recording them. The digital device could miss key elements of the memory making process, such as smell, or something outside the view of the digital device. Each memory can also have a memory that is not tangible, but each viewing of the recorded memory could result in changes to the memory, restoring it closer to the truth, or possibly invading the memory to remove key individual memory of the event. Digital memories are more resistant to change than individual memories, and while a scar that represents a great story can be embellished over time, the video of the event cannot.

### ***Historical Self***

Memories define an individual, whether by demonstrating a definition to others or by retaining a memory in the self. All memories are stored for a purpose, when an individual stores those memories in their mind, and memories stored mentally are able to change and adapt to changes in the individual. Memories saved on devices vary on their ability to conform to the needs of individuals; however, as technology evolves, so do the methods for saving memories. Each form of memory saving has continued to be able to encompass more senses in the memory process. In the far past, memories were saved primarily by being repeated in stories and metaphors to each new generation. Then, with technology changes, books and artist renditions were able to depict the histories and share histories with others. Thereafter, pictures and recordings of sound became possible. Memories could be saved, but a replaying of those memories could still be shared with an individual touch, the memory could still conform to the individual or to the community.

However, today technology brings an instant and more convenient way to save memories; memories can be documented – instantly - and shared – instantly – with the world.

Memories are not just memories anymore, while saving the memories to the numerous resources of popular social media; they become a process of self-promotion, self-building, and even represent an “always on” view of life that is currently being utilized by literally millions of people around the world. With YouTube, Facebook, and Twitter, social media users are faced with the ability to document every aspect of their lives, even without a smartphone now that inventions such as *Google Glasses* and *Telepathy One* have been working towards production. While the world of *The Truman Show* seemed utterly beyond probable, today’s society has been working towards creating that world, willingly, around them. In the future, it is reasonable to believe that every moment, even from birth, would be easily accessed and viewed in online resources. Currently, there reality television shows, individuals with cams that stay live day and night, and even individuals that update their social media accounts every moment of nearly every day. While some of these sources may be obsessive in nature, obsessive individuals do not single out the ability to record every moment of time, organizations have tested products that literally save everything. From refrigerators that take notes to upcoming ability to film everything an individual sees, these products are advanced enough to create environments where nothing can be lost, and everything can be shared.

Throughout history people have worked to save their memories; however, memory sharing has often included embellishment, a process that cannot be completed with memories stored in digital resources. In addition, because these resources are often “always on” the

individual cannot truly control the perceptions of the viewer of these memories. In this way, either people must modify how they behave to meet the needs of social media memory sharing, or they will have to develop methods for determining which events will be noteworthy for documenting and which events demonstrate the personality they hope to present to the audience. In many ways, the current memory resource methods, where social media and shared activities occur, create a very predominant self-image awareness in the users, in which the users must develop an attitude of not caring what peers think, or they must modify their appearances to the audiences they are sharing with to fit in and have peers recognize the value of their sharing. Each individual can make the world about himself or herself, as they create memories, they share them, and individuals can judge them. Included is an examination how censorship, disrememberance, and privacy influence the ability to store and share memories in digital forms, or any form that provides for mass viewing and sharing through mass communication methods. This exploration will evaluate the direct relationship to technologies that enhance the memory saving methods, building self-image, but possibly being denied existence by controlling factors outside the normal methods that influence behaviour in geographically defined communications.

The ability to build self, or share in communications is always tempered by societal norms and censorship that is beyond the control of the individual, or even in some cases because of the individual. When forces outside of the individual are able to control or dictate the information stored and shared with the public, it could lead to changes in how memories are stored, including even lost histories. Over the centuries, much of history has been left for the future to guess at its existence; however, some of that lost history was not lost due to time, but

rather due to censorship that occurred in the historical past, a past that is not strictly only in the past and could influence the memories made and stored today. These are memories that directly influence the future of memory storage.

*Figure 11: Perceptions of Self*



([https://sphotos-b.xx.fbcdn.net/hphotos-ash4/p480x480/999265\\_612750015416486\\_1365222126\\_n.jpg](https://sphotos-b.xx.fbcdn.net/hphotos-ash4/p480x480/999265_612750015416486_1365222126_n.jpg))

It is expected that no two individuals can perceive the same event in the same way, either during the experience or after the experience during memory retrieval. These are key elements in

understanding how memories are externalized and mediated in the digital world. Memories are further influenced by a variety of interruptions, such as censorship, which can create conflict in the memory itself, or prevent the shared methods of memories. The following section examines censorship, disremembrance, and privacy of memory storage and sharing.

### **Censorship, Disremembrance, and Privacy**

Research Question four asked “What types of control, hindering, or security are there for memories in today's society?” It is expected that individuals will censor memories shared, if those memories create poor self-image or demonstrate a behaviour that individuals do not want to share, as demonstrated in autobiographical memory, previously. Purposeful forgetting of memories is referred to as disremembrance, which is influenced by a variety of external and internal factors. Some areas that influence censorship, disremembrance, and privacy, are cultural norms. As demonstrated in this section, everything from laws to society changing norms have the ability to change memories or prevent their distribution to others.

#### ***Censorship and Disremembrance Today***

Research into memories, thoughts, and saving or retrieving that type of information is surrounded by boundaries and societal rules and regulations. In every culture, the amount of personal information acceptable to be shared may be different, the amount to be easily accessed by others controlled, and the “correct” means to promoting memories or even history could change based on boundaries in a map. However, the norm of these types of boundaries change, and some of these changes could occur by studying and exploring projects that enable memories to be shared, regardless of differing privacy laws around the world, cemeteries may one day have

tombstones that invite all visitors to look into the past life of those who once lived.

Understanding the implications of censorship, disremembrance, and privacy is important to any research in projects designed to challenge these norms.

Digital memories have a variety of differences – such as memories shared, and memories saved. In some cases, an individual may save memories on disk, hard drives, or even USB devices and never intend to share those memories with even close family. A person can use their social networking profiles to create hidden corners where private moments can be kept completely apart or shared with a smaller group of people than just the public. Shared or unshared, memories are at risk of being disseminated across the World Wide Web, by choice or otherwise. Digital memories have the ability to be saved for eternity, shared with the entire “online” or “plugged in” world, and stay longer than even the user may have intended. Memories, as digital content, can be controlled or maintained by people other than anticipated. Memories are subject to a number of issues when saved in a digital format; however, society continues to engage in technology development that increases the use of social media and the ability to share every moment of an individual’s life.

Censorship, disremembrance, and privacy are issues that arise when individuals share their lives with others, whether through social networking or even in print and other media. Around the world, differing perceptions of decency and appropriateness guide or dictate the acceptableness of content shared or even saved in public domains. Censorship arises to resolve everything from social unrest to pornography and includes destruction of content as well as

reduced or eliminated access. The ability to remember is sometimes only effective when there are clues or cues that guide our memory towards remembrance; however, with digital resources

Censor as a verb defined, by the Oxford University Dictionary, as the act of controlling news or information disseminated to the public. This control is typically defined as taking place as part of the government forces, rules, and laws that govern a particular land; however, the Internet has come under some strict control issues regarding censorship. Around the world, countries have found cause or reason to completely control and dictate the content that their people can reach, even to the extent of attempting to remove all access to sites and even the Internet itself (Dardenne, 2011). Sites themselves dictate content control, in Terms of Use and Terms of Service documents stating that content must fit into specific guidelines.

“YouTube reserves the right to decide whether Content violates these Terms of Service for reasons other than copyrights infringement, such as, but not limited to, pornography, obscenity, or excessive length. YouTube may at any time, without prior notice and in its sole discretion, remove such Content and/or terminate a user's account for submitting such material in violation of these Terms of Service.” (<http://www.youtube.com/t/terms>; para. 7B).

Any condition can be applied to the terms defined, and the terms themselves are rarely defined in any terms of use provided to users. Censorship exists with and without definition, and regardless of the country of origin or viewing. Dardenne (2011) reported that social media was a pivotal power in the ability of communications to guide and assist in powerful movements around the world, and that when countries failed to censor content to their satisfaction the solution was to remove the Internet itself. This method worked only in so long as it took for

hackers and tech savvy citizens to overcome the boundaries and return their fellow citizens to their online statuses. In the future, censorship could completely dominate the use of the Internet, will countries around the world have the power to separate citizens from their information, stored online memories, and communication.

Censorship can be used to strictly control content; where it controls content, it can also control the ability of people to share or save memories. When communication is controlled, it prohibits the ability of an individual to share information with others, and this currently is the case for many types of information online, from the censorship of entire sites and even the Internet to the strict content control of websites such as Facebook and YouTube. Defining allowed content requires individuals to remain diligent in understanding current definitions, often defined by organizations other than the ones delivering content. For example, organizations able to take payments through online sources are subject to the rules of processing organizations regarding defining acceptable content. When a website fails to remain within acceptable content rules, payment-processing companies can refuse to work with the organization. In the same way, governments can prevent sites from working when they fail to comply to server country legislation and regulations, as is the case with copyright materials.

In addition to restriction on websites, cultural needs of viewers must be considered. An individual may wish to share a particular life-changing event with friends and family in a social network, but censorship may prevent such sharing even when that event or content is not censored by that culture. Varying degrees of allowed nudity is an example of differences in censorship in cultures, some cultures accept casual nudity and the nudity of children is common



place; while other countries consider may consider images of naked children to be child pornography and highly illegal. Some cultures enjoy a great deal of human contact in their images and their interactions; other cultures find public displays of affection to be crude and disrespectful. Meeting the needs of censorship in global communication sources, particularly the Internet, may be a great challenge for the future.

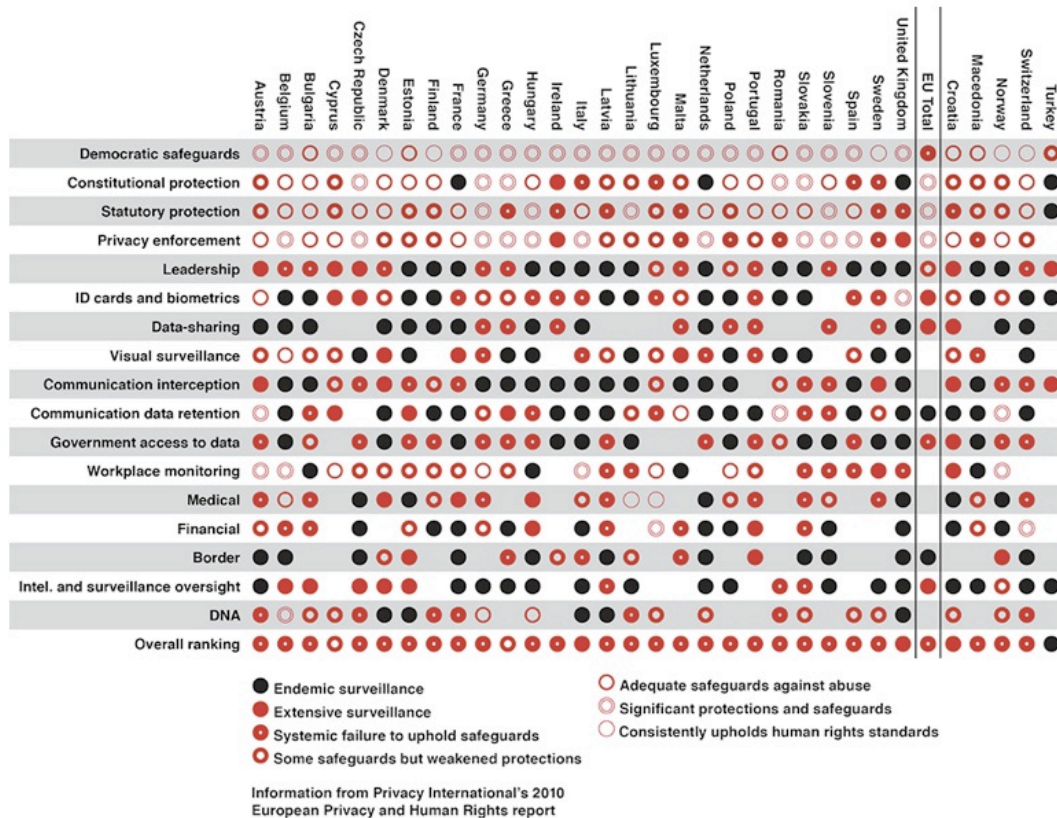
A new word, disremembrance, is attached to disremember, which is to forget or just failure in remembering and adding the suffix that provides the understanding that the word is a process; disremembrance is the process of failing to remember. In 1980, Aristides used the word to describe the memories that faded from his mind, seemingly from age. Disremembrance is purposeful forgetfulness, more so than simple forgetting, forgetting by design. Vinitzky-Seroussi and Teeger (2010) suggested that silence was a powerful tool of collectives, one designed to promote or discourage memories, suggesting that collective memories design to forget. In short, what a culture does not preserve may be as important to the cultural past as what is remembered and carried forward. Active forgetting is part of every culture, attempts to remove Hitler's history from his hometown are active forgetting (Hahn, 2012), nameless tombstones, cryptic journals, and more can be used to identify how a culture preserves the past with forgetting. Disremembrance is different from recovered memories in individuals or simply forgetting, it is a purposeful attempt to forget the history itself, the memory, such as when a young child tries to forget a painfully embarrassing moment in their history.

Theorists such as Berensmeyer (2006) surmise that forgetting and remembering are important parts of creating cultural pasts and in this same way, they directly reflect the building

of self-memories and self-image. “In the dialectic of formation and deformation of the past, traditions are built as much on forgetting as on remembering” (Berensmeyer, 2006, p. 93). When individuals reflect on the past and purposefully lose memories, those memories are often recognized as temporarily lost and are typically associated with types of trauma. Van der Hart and Nijenhuis (2001) researched patients with lost episodic memory induced by traumatic events, and found that loss of episodic memories, due to trauma, typically caused “varying degrees of dissection of semantic and procedural memory”, which could influence behaviour and sense of self (p. 599). While the mind can disseminate memories of happiness and pride, trauma-based memories may have more difficulty. This type of disremembrance has already had many years of research, including many attempts, successful and unsuccessful to retrieve these purposefully forgotten memories.

During the 1980’s, in the USA, a phenomenon was discovered where therapists recovered “lost memories” and helped supposed victims of past traumas forgotten to overcome their recovered memories. However, some argument formed around the cases of recovered memories, even resulting in the term “false memory syndrome” and later an organization to combat these very incidents and future related circumstances (Sturken, 1998). The ability to find memories that did not exist seemed unreasonable; however, it was widespread and disruptive in nature. Disremembrance suffers from the factual losses to the creation of memories to fill in gaps that cannot otherwise be explained. If a history of a people lacks evidence of any particular event, which can lead to researchers uncovering possible disremembrance and seeking out history that may not truly exist.

Figure 12: Internet Security Chart



([http://cedriclaurant.files.wordpress.com/2011/01/110131-ephr\\_privacy\\_ranking\\_chart.jpg](http://cedriclaurant.files.wordpress.com/2011/01/110131-ephr_privacy_ranking_chart.jpg))

Privacy can be defined as the state or condition of being without public attention, alone, or free from the invasions of others. Throughout an individual's life circumstances, culture, and personal decisions dictate what aspects of life are kept private. A person may live in a culture with strong adherence to community values, extended families in the same home, or even open-door cultures where literally no doors are kept on the homes and rooms of a house. Privacy might have no meaning outside the thoughts locked in an individual's own mind; however, most countries and cultures practice some variety of privacy that extends beyond the ability of an individual to keep things to them. Private might be described as the financial circumstances,

where only a few limited people might know the “truth”. Privacy might be a few pictures hidden away in a box and shared with only the closest of family members, or found 50 years later by great grandchildren cleaning out the old house. Privacy occurs when an individual keeps things from public eyes, and may not always be as private as hoped. For example, many politicians and leaders throughout the world have kept secrets that later became public knowledge, and why they may have meant to keep those parts of their history private, it was released to everyone.

Storing history and memories restricts the ability of individuals to keep their information private. Journals and images can be kept locked away, but locks can be broken. Most documented memories are stored to be shared, whether in a controlled manner or just with anyone who would be interested to view the information. However, when memories are stored in digital resources on the Internet, the ability to keep them private can be outside the reach of the person who stored them. In addition, social media control over stored memories is nearly impractical, things spread virally, settings can be incorrect, and hackers can access even the most secure of sites during just the wrong times.

Memories are both private and public, and based on storage and sharing of the memories. The most secure of memories are those kept privately in an individual’s mind, and while others could potentially access those memories, it is more likely they are safe when a memory is saved only in the human mind. However, in the future, even our memories may be able to be accessed by computers through hardware designed to make software respond quicker to our commands. A brainwave-based authentication may be available soon, it will use “sensors to register electroencephalograms (EEGs), or brainwave measurements” to help the computer recognize a

user and the user's passwords (Thompson, 2013). While it currently provides a new level of security to users and their privacy, this type of technology could reasonably lead to the ability to access and share thoughts directly with the computer, data storage resources, and even social networks.

Censorship, disremembrance, and privacy are the disadvantages to memory storage, and technology being developed will be directly influenced by the ability of the technology to promote standards that may even be contradict the intended goals of the technology. Cultures have guided appropriateness of memories and histories shared; however, the global nature of digital sources, particularly in online resources, has changed the ability of single cultures and regulations to guide the sharing or storing of memories. These changes could negatively influence the ability of future to contain truths and full accounts of the past.

### ***History of Censorship, Disremembrance, and Privacy***

Any number of sources – from individual through government agencies, censor memories, self-censored, culturally censored, and globally regulated; censorship has taken strict control of communication. Throughout history, memories have been translated through communication, and censorship is not strictly book burnings or removal of art, it is self-censorship as well. Aspects of historical censorship can be seen in disremembrance and in destruction of historical evidence or documentation.

Throughout the history of all governments, propaganda has been inserted into communications and historical documentation of the government, country, and the peoples of those countries. Propaganda is controlled sharing of information, where that information is not

accurate, whether to be completely not accurate or where the story has been changed to demonstrate a different view and convince message receivers the goodness of the regime or source distributing the information. Many people around the world become frustrated with extreme cases of propaganda and media control; however, propaganda is not strictly a government or evil regime method of controlling other people's opinions.

Individuals use methods of propaganda every single day, whether in memory saving selection, or in distribution of memories. Around the world, people spend workdays and social networking hours submitting information to other people, whether true or not true, in a way to garner good will, or to create a response in message receivers. While this type of perception development is not propaganda, it serves the same purpose, controlling how the public views the individual. Even wearing a suit to a job interview can be seen as propaganda, it is an attempt for the wearing to demonstrate intent to be presentable at the workplace. However, individual propaganda censor's items that may particularly embarrass an individual, prevent them from having a successful life, or simply be part of a reduction of sharing every single memory. Social networking promotes the ability for people to share memories prior to considering their reactions; however, many social network resources allow individuals to remove those saved memories.

Propaganda censor's history, activities, and memories, but disrememberance is a community or individual's purposeful attempt to "forget" the memories that demonstrate a time in their history they may not wish to remember. Around the world, countries build monuments to events they wish to recall, whether because it was a great moment in history or because it was a

sad moment in history. Stonehenge is monument to a history long past, and today it is a huge tourist attraction, though people do not know what the place was built for, who used it, or why it was never torn down throughout all the changes that occurred. The Colosseum in Rome, Italy stands today, preserved to remind everyone of the lost Roman Empire. The Statue of Liberty, New York City, USA, stands to represent freedom and democracy. Examples still standing from the past are everywhere; however, monuments are built in society today as well. Memorials are built to honour loved ones lost during battles or historical events, monuments to iconic historical figures, and Museums to store, restore, and save pieces of history. Those are memories saved, memories that cultures wished to store for all of time; however, other memories are not preserved. The hometown of Hitler takes no great pride in admitting that he once lived there, and has worked hard to hide evidence of that fact. Countries where native people were once slaughtered may work hard to forget the bloody past and keep few records or trinkets. Some events, when negative, may even be refused to talk about when the event is too soon for the community. Throughout history, cultures have used memory storage – through items that tell the story or represent it – to save history, but the same can be true of missing artefacts as well. Cultures have spent their history “forgetting” past events that poorly represent their own personal histories.

Privacy has historically held varying meanings in every different culture; however, privacy in a world full of technology and media has gradually been driven to decline. During the past few decades, privacy has been even more difficult to maintain than ever before in human history. The use of mass communication makes the ability to keep anything private nearly

impossible if other people want to share the memory or event. Around the world, people with access to the Internet have the ability to share information about themselves, other people, the government, and any event they have access to or knowledge of, and unlike the past, where it could take literally weeks to years to spread a story, the information could reach thousands to millions of people in less than 24 hours. Even when the information or memory is shared willingly, the number of people who view the information cannot necessarily be controlled. It is difficult to keep anything from the mass media effect once it becomes available in an online source. In the past, privacy was easy while still saving memories in photographs and journals that may never become public view even after death. Today, storing memories online or sharing with intimate family could become a huge production viewed by literally millions. Some people enjoy trying to reach out to the masses, with personal blogs and tons of online images; however, privacy may be more important to other users.

### ***Self-Censorship and “Always On” Technologies***

Many of the technologies being developed today have the potential of being “Always On”. An individual can turn a webcam on their computer and every single action the person takes will be recording, and that production can take place for as long as the person might like. There are online resources that allow an individual to remain always on, such as a Skype, Facebook video chat, and more. Other technologies, such as wearable absence, can be in an “always on” manner; they record the reactions of an individual for so long as the item is worn. Products such as Google Glasses may have only short battery life at this time, but conceivably, they will have the ability to provide users with an “always on” status. Current technology, such as cell phones,



tablets, and even PCs provide users with the perception of seeming to be online at all times. While the ability to instantly post any activity to social media is there, current widespread technologies are not truly “Always On”.

There are a number of ways to save memories, and in some cases, there may be a number of ways to prevent the saving of memories. However, “always on” technologies can create an environment where the individual must learn to self-censor the memory saving, whether to stay within censored regulations, or simply to prevent moments of embarrassment from becoming public knowledge. The ability for an individual to save every moment of their life may provide extensive needs for storage, increasing capacity needs but also increasing the needs of servers managing social networks. A single individual could record literally terabytes of data in a single day. If individuals have the ability to save every single memory, free from censorship, the sheer amount of data could create online environments of mass disremembrance. Groups would have to forget the unrelated or unnecessary data simply to make room for data that was more relevant or important to the person. In addition, if self-censorship did not regulate the amount of data sent, it could make the ability for memory saving more complicated. When an individual dies their family or friends must sort through their memories to determine what to save. In the cases of individuals living for nearly a century or more, that project can take months of cleaning and sorting through items in a home or apartment. In the future, loved ones may have to spend even more time sorting through online memories to save the important ones from being lost. When individuals self-censor the memories sent it could prevent the complexity of saving the memories later.

### ***Social Networks and Mass Memory Auditing***

The ability for individuals to access the Internet has been growing over the past two decades, overall growth has been reported by the Internet World Stats website as 566.4% between 1000 and 2012. While the Internet became available in the 1990s, it was not widely used until after 2000. After 2000, the use of the Internet became popular for MMORPGers – Massive Multi-Online Role-Playing Gamers, MUDers, and later organizations followed by Social Networking. Many individuals have discovered the ability to keep in touch with long distance family members and some people even work in online workplaces. However, by far, one of the most popular activities online is social networking. According the Pew Research Center, social media accounts for 67% of Internet users as of December 2012. The primary reason for individuals to use social networking included keeping up social ties and building relationships.

Social networks promote the ability to store memories in an online resource; however, unlike a box of photos, social network stored memories are subject to deletion without the permission of the memory's owner. While memories stored in physical versions are also at risk of destruction, there is the ability to store them in more secure locations. When online memories are stored they may have backups, but they are subject to censorship, hackers, technology failure, and mass deletion by owners closing the resource. In addition, individuals themselves may use mass deletion to clear out older profiles or to rebuild a profile when circumstances in life change. Some people may delete old profiles when job seeking, getting married, changing schools, having children, or any other event in life that requires some changes in self-identification. However, this mass deletion can be the same as throwing out a box full of memories without

checking what memories might be important to save. When individuals change profiles in social media, memories that are not transferred could become lost. However, stored memories are not exclusive to the memory process.

Individuals save memories in different ways from technology, and even sometimes different from each other. Memories are often attached to specific events, smells, tastes, sounds or any of the senses. When memories are stored in physical forms they might be photographs, journals, movies, or other items such as monuments or memorials. Memories stored in online resources are able to be stored as images or as words. When destroying memories, an individual may not be able to completely “forget” memories, not exclusively by choice. When physical or online memories exist, they can be destroyed or outlast their meaning. Mass memory auditing comes into the ability of the individual to determine which of the memories require or dictate a need to be saved in a physical or digital manner. A memorial may exist in a physical location and may stand for literally hundreds of years as a memory of the people whose lives were taken or given. Online memorials may have the same potential; however, unlike the stones standing against time and nature, the online versions are more fragile in nature. The ability of people to control and audit memories promotes the success of social networks; however, it may potentially limit the success in memory storage.

### ***Cultural Censorship versus Individualism***

Digital memories are able to be stored in a location that is no longer subject to a single culture’s perception of right and wrong. This ability makes the censorship of stored memories more complicated and can interfere with the ability of people to be individuals in their storage of their

memories. Cultures develop ethics, ethics are used to guide the behaviours of the group, and when those ethics fail to control all the members of the culture, the communities make laws and regulations, which dictate punishments for failing to meet the ethical requirements of the culture. Cultures use their power over individuals by dictating the will of the majority versus the wishes of the individual. While not designed as a theoretical debate, the ability of cultures to control the memories saved to the Internet is present in a number of different websites throughout the Internet. Some of the sites include Facebook and YouTube, where decisions regarding what are allowed to be submitted are guarded by terms of use statements that are designed to change whenever local cultures or laws and regulations change.

Individuals are members of cultures, and prior to mass media, all members of a culture were expected to succumb to cultural censorship or risk punishments of various levels from shunning to death. Around the world, cultures with different ethical guidelines have begun to use the Internet as a source to share memories and created new memories; however, this sharing can also promote the ability for members of one culture to spend time with other cultures. In this way, values of memories can interact with any set of ethical guidelines at any given time. Cultural censorship can take place when an individual shares memories that are deemed unacceptable by that culture. While one culture may find it acceptable to share the birth of a child in an online video, another culture may be embarrassed or outraged at such a video being made publicly available. However, the ability for cultures to control the masses is challenging due to the number of different values influencing the Internet. Currently, the predominant website content control mechanisms are often the money processing centres, which can refuse to

take payments for organizations that do not conform to the regulations set forward to the website. These regulatory environments may not even be in the same country as the website using the processor; however, the individual needs of that website are dictated to by the processor's rules established in another country.

Cultures are able to censor most effectively when they create laws that impose the ethical rules on the individuals in the culture; however, Internet use has made that control more complicated. Many individuals believe that when a country is able to impose their cultural ethics on a digital resource, that they have created unfair practices for cultures outside of their belief systems. Individuals work to create Internet "places" where freedom of communication allows the individual the ability to share the memories they wish to share. Internet users have created communities of many varying interests; including interests that may be illegal in the individual's own culture. When the interests of the individual do not meet the interests of the culture, the ability to keep digital memories or to store them could be compromised. Individuals can store memories in their mind, but storage elsewhere could be difficult.

### ***The Question of Art, History, and Regulation***

Art appears throughout history as methods of communication, expression, identification, and even as memory storage. History is the past, which is stored, discovered, and saved for the present and the future. Throughout time, art has been identified with history, such as period art. The Renaissance period includes artistic expression, written content, and is identified as a significant time in history for the growth of social awareness and creative expression. However,

history and art are not uncensored memories transferred to each new generation, they are regulated memories shared under controlled circumstances. Everything from the creation of history, through its designed preservation is controlled and regulated by governments or ruling parties. A memory, regardless of its truth or falsehood, must pass through the regulation to reach future generations.

Digital memories are no more secure than any other memories intended for future generations. These memories must be secured, and even when this security is outside the control of servers and networks, they may not be outside the control of government regulations. For example, in some tribal communities, nudity is a fact and contains no overtly sexual purposes; however, storage of nude children from any of these tribes, potentially even from these tribes, could be regulated under international child protection laws. A parent must carefully monitor the digital memories that are stored, regardless of their source, to ensure that the entire selection of digital images is not removed from their possession. In the future, with “always on” technologies, either regulation will have to be revisited or people will be forced to express themselves with more self-moderations.

### ***Summary***

Research Question four asked “What types of control, hindering, or security are there for memories in today's society?” Control of memories occurs in a variety of ways, the first is the control the individual has over the memory. The second is the control that society has over the memory. The third is the control that the legal environment has over the memory. In some cases, security is missing, or unable to help individuals and society control memory sharing, which

results in a loss of privacy. In other cases, censorship prevents sharing of memories, as a result of social norms that dictate what is acceptable. Further, when an individual or group purposefully forgets a memory, this is referred to as disremembrance. Of these, censorship and privacy will continue to evolve along with the society norms; however, disremembrance will continue to be relevant to individuals as much as any of these other areas of influence. Another concern exists for all three, censorship, disremembrance, and privacy, that is the memory saving and networking integration.

### **Memory Saving and Networking Integration**

In the fifth research question, memory saving used in society, to create networks or to socialize, was explored in the literature. In the past, memories were stored through spoken stories, pictures, written works, and as part of other types of artefacts. Today, memories are found in artefacts that are networked across platforms and available on a global level. Social media and other networking methods have created platforms for sharing; however, the application and the networking of these social environments may create other memory needs or problems. As technology continues to grow, questions exist about how humans can store and retrieve memories is discussed in this section.

#### ***Memory Saving and Technology***

Memories saved can be used as part of the networking process, and are currently today. LinkedIn is recognized as a professional networking site, which can receive updates from Twitter, Facebook, or other social networking sites. When the memories saved are part of the networking process self-regulation must guide the process of memory submission. Different social networks

may have different rules and regulations regarding acceptable content; however, and possibly more importantly, individuals use different social networking for different purposes. Individuals may use Facebook as a social hangout, inviting friends and possibly even having a different Facebook, profile for friends and one for work related activities; however, if accounts are networked, such as through Twitter, an unhappy situation could occur when activities, thoughts, or images are shared with people outside of the expected group. Recently, employers have started using social networking as an opportunity to demonstrate a dedication to customers and consumers, by firing employees who blatantly insult, degrade, or embarrass companies in networking sites. While the obvious conclusions, such as not to post negativity on Facebook profiles open to the public may be the best solution; many people are still posting things that result in their loss of work and even inability to obtain a new position.

Where the future includes social networking potential, such as wearable absence where every movement, sense, and experience is recorded for posterity or Google Glasses, able to record the activities of anything and anyone viewed, it is likely that censorship might inhibit or work towards controlling content even more than currently. In a matter of mere seconds, an uncontrolled post could literally reach thousands of users on dozens of integrated networks. In some ways, content control could be the most valuable way of preventing accidental posting of horribly inappropriate content. The ability to save every memory, every experience, and create a digital version of history for every individual can be a hindrance and a risk to the ability of a person to be successful. If the wrong information becomes networked, the person could risk a memory not soon forgotten by anyone.



### ***Creating Persistent Memories under Supervision***

Memories are created every moment of our lives; however, not all memories are persistent.

Persistent memories are created when a particular memory cannot leave, and can be recalled easily. Some persistent memories are created when family members retell a story repeatedly, the person who created the memory may not recall the memory exactly how it happened, but the memory is persistent because family members or friends recall and repeat the memory constantly. As memories are part of individuals and of groups, some memories are created under supervision because they are pre-audited. For example, a visit to the state park might result in eating a bug that accidentally lands on food; however, the event itself is not documented and shared, the memory is independent of the persistent memory of the group, even if the memory is persistent to the individual. The group based on culture supervises memories, some groups might share the bug eaten, and some might protect it.

Supervision takes place on various levels. When digital media is used to share or store memories, that supervision includes regulation and individual family groups. Prior to the ability to share all memories created, individuals were restricted to memory saving methods that cost money per memory, were easily lost or destroyed, and required permission to create and store. Permanent storage would require approval by the people who would be required to continue storing the memories after the person has died. Digital storage may have the ability to overcome many of the previous barriers to memory storing, including the ability for next generations to delete the content, and potentially making permanent or persistent memories of every moment saved to digital sources online. When individuals have the ability to create these types of

memories, the ability to supervise the saving of memories can become important to the success of retrieving memories for historical relevance.

### ***Moderating the Moderators***

The ability to regulate or moderate the memories shared and stored in digital spaces requires the users of the spaces to acknowledge specific sets of rules and to approve of the monitoring that occurs in those places. When social networking and other social media sites regulate the content they have the ability to set forth restrictive rules or very open rules; however, who monitors if these rules are being followed by all participants or only by specific individuals. Currently, site monitoring, whether social media or simply websites, is regulated by entities based on the reports of individuals complaining to regulating sources. Some sources that can have a direct influence on a website include government agencies in the same country as the site or server owners and the processing companies used to collect money from users. In some cases, the sites are directly accountable to advertisers and consumers alike. However, the regulations are not developed clearly by the sites that will moderate the content; the directives come from the other sources. No one directly monitors those sources for regulations, and those sources can develop stricter content rules and directly influence the ability of sites to meet the needs of their users. When the moderators control content, the moderators should be directly accountable to the individuals they monitor, in the case of processors, they are not.

### ***Storage and the Future***

Memories are stored in various forms, and each of these different forms is subject to different degrees of privacy, regulation, and censorship. Some of these are direct results of individual

censorship and regulation, while other aspects of these same parameters are the direct result of cultures locally or worldwide. When memories are controlled or dictated they can become controlled and restricted, in this way, history can be monitored, and individuals can be forced to save only what others may feel are relevant to the history needing to be saved. However, when memories stored are not monitored they could potentially provide havens for people who wish to create memories of hate, abusive in nature, or other deviant purposes that could be harmful to others. When moderators control the content of digital memories shared and stored, they become directly responsible for which cultural ethics are required to control content. However, not all cultures have the same views on sex, nudity, or even appropriate content.

In the future, individuals will have the power to film nearly every moment of their life, wear clothing that can track their body's responses to others, and possibly even equipment to store or save memories directly from the mind. This future provides opportunities to explore and save memories; however, it provides for the need to self-censor, where it is appropriate. Individuals may have secrets, random thoughts, or even express thoughts that may not be applicable later. When a person expresses anger about the workplace on their Facebook account, they could lose their job. In the future, simply thinking annoyance with a job could result in the same course of action. Memories are private matters, and shared by choice or by circumstance, but currently they can be viewed or witnessed by literally thousands of people at a time. Without censorship and regulation, memories could embarrass, insult, or even cause legal action. Memories of the future may require self-regulation and censorship, possibly even more than legal regulations.

The future is not exclusively being acted upon by regulations and societal norms, but rather by the technology and steady growth of information throughout the world. Technology is changing how people, cultures and individuals, view the world, interact with the physical world, and even dream about the metaphysical world. In the past, people had big dreams, and as the future comes closer, people work to make all of those dreams come true. In the next section we explore the future of mediated memories and how that may influence the ability to store or even create memories.

### ***Summary***

Memory saving is used in society, to create networks and to socialize, through the use of social media and other internet capabilities that reach across the globe. Answering research question five, the ability for people to use online services provides a new way to immortalize the self, create self-image, cultural images, and to build new communities in which an individual can share and develop. Memories are a critical area, as demonstrated in the development of humans as both social and self. Currently, a variety of different ways exist to create persistent memories, which also allows for those memories to be stored. As the future approaches, there may be additional ways in which to store and share memories. Included in these concerns are areas such as the moderation of memories, or even the moderation of the moderators. Over time, expectations to how online interactions occur may change. These may be a result of changes in society norms, legal regulations, or even due to how technology operates.

## **The Future of Mediated Memories**

Research Question 6 asked “How might memories be stored, preserved, accessed, or externalized in the future?” The future is fast approaching, and many possibilities exist. Some ideas of what may be included in the future are found in what is being worked on today. Each year, the capacity of smartphones increases, similarly, Cloud applications are growing, and many opportunities and risks are identified. This section explores the technology and memory storage that may exist in the future.

### ***Mediation of Memories***

Memories serve many purposes, such as to remind a person where their keys have been placed, store information for animals on safe warm places to hibernate, create self-portfolios and self-identity, cultural memories, and more. Creatures and people alike store memories for later use, whether for life-saving behaviours or just to contribute to self-development. In the course of recorded human history, the attempt to share the recollections of one individual with another individual, have contributed to the growth of communication technologies, and benefited from these advancements. Paintings, songs, writing, print, photography, movies, and digital media have been a progressive evolution of communication and memory storage alike. Each advancement provides opportunities, and the advancements have not ceased over the years, they have multiplied.

Individuals use memory storage tools to keep track of birthdays, work schedules, appointments, and to save their history. These tools include cell phones, computers, iPads, and a continually evolving range of technological equipment. The equipment alone does not attribute

to the ability of individuals to store and save memories, digital resources are not exclusively limited to the small and limited memory resources of a single tool, and Internet access enables a device to load information in much larger quantities to sources outside of the device. This includes social media. Individuals can store images and information on sites from Facebook through Twitter, and including even individual preferences in search engines, email, and more. The ability to use these sources requires little more than creating an account and contributing to a network, most are free and take little time to acquire.

Many of the sources are designed specifically for social interaction, as a method to communicate with friends and family near and far. The social networks invite sharing of memories, information, and regular communication with live or instant responses from the other individuals. Many of these networks work on all the devices available for communication, from computer to cell phone, everyone can be in-touch at the touch of a button. While Facebook appears to be exclusively a source for social interaction, the ability to store family history in the pages provides resources for reminiscing about loved ones since past. In the future, the ability to organize our entire lives could be done through technology that guides us from one event to another, documenting each and every action. However, some memories are not exclusively related to activities, sounds, or images. In the future, memories might be triggered by stored smells, touches, or even possibly by feelings restored through changes to the body temperature and chemical responses.

These same types of growing technology could directly influence the ability of communities to share their memories with newer members of their communities. Children could

potentially sit in a room, suddenly surrounded by the world of sights, sounds, and even smells that engulfed their great grandfather as he walked through the neighbourhood during a leisurely evening stroll. Historical events could be re-enacted down to the cold damp mud seeping through the boots of a soldier or the smells from castle kitchens over a marsh. Technology could enable memories to be recovered from a simple neighbourhood party to the signing of major peace treaty. While some of these, very events can be experienced through tourism and re-enactments, the ability to gather or save nearly 100% accurate information has been beyond the reach of these activities. In the future, the past could be relived as if the viewer stepped into a time machine to explore the event. Many items used today, or already invented, could create this very type of atmosphere for future viewers. Items such as Google Glasses, and devices built in the fashion of Memex save moments in their most intimate of details, though through a limited perception in some cases.

People and communities are not alone in their needs to store and save information and memories. Communication has come a long way in the course of only a few hundred years, and this type of communication creates a need for more practical memory storage system, a way to remember everything, accurately, and with easy access as needed. Organizations need a way to visit memory, but more importantly, they need a way to remember everything and properly organize it. It is not so far in the future, that the ability to integrate information technology with personal technology could bring every person's memories to the tip of their fingers, providing an always-organized method for remembering.

Cultures have been lost in history, records found holding very little meaning, and assumptions are developed based on what we perceive to be likely truths. If archaeologists could step into a time machine, what is known about these long lost cultures may turn out to be completely inaccurate. In some historical studies, memories of dinosaurs have led to commonly held beliefs that have since been proven inaccurate with the uncovering of gene recognition. When the genetic coding become clear, the purpose of colour or height can become more clear to a scientist; however, these traits do not explain how the animals, or even past humans, lived. In the future, cultures could be 100% preserved to be viewed by others. Around the world, cultures are being integrated into the technologically advanced societies around them, giving up their cultural nuances to integrate and conform. These cultures, like many cultures before them, could become lost in history. Technology developed in the future could preserve the culture in a way to present it to anyone who wished to learn, a time capsule that stores all the data of the culture, even the aspects that might not be noticed – such as smell and feel.

Technology continues to address the needs of the people, defined by the creators of the technology, but more by the users themselves. In addition, the ability to do more with less continues to expand the ability to continue to grow the technology. Once a computer took up the space of an entire room, today handheld devices have more processing power than even those bulky machines. As technology becomes smaller and more powerful, it also becomes easier for use, and with each change the prices of the previous technologies is reduced – making the ability to obtain those technologies easier. Over the past few decades, the increase in mass communication has fostered a powerful determination to share technology around the world,



cultures sharing with each other in an attempt to further causes or to simply empower other nations. Twitter on cell phones, along with other media technologies, have had a direct role in the activities of activists around the world, including by contributing to the mass uprisings in some countries. As technology continues to infiltrate the lives of individuals, its ability to preserve history becomes inevitable as it stores and preserves its own activities.

People use technology, and to use technology better the technology needs to better suit the needs of the user. In this way, technology is being designed to be more interactive and responsive every single day. These advancements are designed in everything from search engines through software recognition programs that know when you cease looking at the object or follow eye movement around the room. When technology can be designed to anticipate the needs of individuals and interactive in its behaviour, it can be created to recognize when to save memories and when to dispose of them. Eventually, individuals could be able to use robotic assistants to manage everyday items such as schedules, projects, shopping lists, and more. Assistants with robotic processing speeds could sort through memories and digital information at much faster and more precise speeds than humans. This ability could potentially help to organize information; however, the ability of technology to completely anticipate human needs is unknown.

While the technology could be designed to enable individuals to save memories and store information for sorting and dissemination, there is already technology monitoring and storing digital information regarding the entire world. Around the world organizations, governments, and researchers are tracking everything from weather patterns to individual activities. People are

watching people, animals, ocean life, and the stars. Everywhere imagining occurs, at the ATM, in the library, at the airport, and more. With and without permission, individuals have their entire activities documented, stored, and reviewed. Monitoring software continues to advance, and while individuals may not truly be the reasons for the capturing of this digital information, they are the outcome. When a robbery occurs, the digital documentation provides evidence of the events. However, in the future of monitoring how far is too far in evaluating and using the information being captured worldwide when it can be used to invade privacy or to store information that would otherwise be considered proprietary.

It is not enough that humans can use technologies to monitor the world around them, but some humans would be willing to consider that technology as part of their own bodies, integrated into their human skin and even into their mind itself. Humans already use technology to assist in hearing, with implants, cybernetics for walking, and even machines to help make the heart pump regularly. When machines can be used to preserve information, restore memories, and assist in processes, people may be willing to adjust their individual perfection to seek a greater perfection. In some cases, items such as memory storage and second skins could seem like a solution to storage of information, and higher performance.

While either technology is developing the ability to enhance the individual, contributing to needed elements that correct impairments or simply to enhance the aspects that could work better, the creative world introduces the world to the dramatic possibilities that could directly influence the use of these potential items in the future. Referred to as dystopian science fiction tales, the stories are “hypothetical forebodings of what might be in store for us” (Schuster in Maj

and Riha, 2009, p. 14). Predictive stories are a not uncommon, apocalyptic themes exist in everything from religious texts to modern movie-making and they are not exclusive to dystopian imagination, but rather range from cataclysmic geographical events to manufactured catastrophes. Stories of predictive futures in dystopian science fiction strive to inform of the current ethical and potential physical dangers of the actions current trends or technologies could have in the future. Technology has had many different types of movies to explain the upcoming possible changes in the world, everything from tales of robotic apocalypse to overweight and lethargic people controlled by computers. While these movies warn about the potential dangers in the future, they encourage the questions that guide in policy-making and ethical development in the types of technologies that are created and their uses.

### ***Individual Memory Needs & Technology***

People use memory to manage events, store information, communicate with communities and share life. Memories may be triggered or represented by words, print, images, objects, smells, and many other ways, even a colour could potentially represent a memory. Currently, individuals can store memories in the form of written words, sounds, or images on digital devices. However, in the future, technology could be used to store smells and possibly even feelings such as soft or fluffy. Smells are related to many different memory associations, and in some cases, are believed to directly influence relationships from mate through enemy.

Throughout history, the ability to store different scents and smells has evolved into a science of perfumes and fragrances; however, the ability to store a specific odour requires the ability to combine these different fragrances with pheromones, hormones, and even each other to

create the unique smells that may enable an individual to recall a specific memory. The ability to store these types of memories are potentially part of the future technology of memory storage, meeting a need to recall any fragrance, regardless of the unique combinations they are built using. Gingerbread cookies may remind us of our grandmother, but the ability to store those specific scents could bring a new dimension to memory recall and individual memory storage capabilities.

Every single day people touch literally hundreds of things, and due to this habit to touch everything a complete science has evolved around cleanliness to ensure that the constant touching is germ-free. In addition, clothing manufacturers test products based on how they feel to an individual and textures are not strictly a pattern of colours on the fabric. Organizations are able to preserve some of the touching activity through images, the appearance of a texture can invoke the memory of its touch; however, the ability to store a touch, like the ability to save a small patch of a favourite old blanket, is limited to the life of the object itself or the ability to reproduce that exact object. No digital form of memory exists to save a touch, unlike sound and sight, touch cannot always be repeated. If it were possible to feel the waves pull out from under feet, in a digital form, the memory would have to take place either in the feet themselves or in the mind re-enacting that activity. Technology advancements are working to make technology interactive, such as with the Wii, where the user interacts with the digital activities, allowing the user to experience the weight or tension from the movement through vibrations in the controllers. Gaming itself has been a driving force behind technologies, people play games and games need to be interactive, responsive, and entertaining. Every year, around the world, more and more

people are engaging in gaming related activities; and whether they are using consoles, computers, or cell phones, they spend money acquiring the technology, the programs, virtual currencies, and more. Money often drives innovation, and in the gaming industry that is no less true.

“Driven by explosive growth in computer processing, affordable sensors, and new haptic sensation technology, neurogame designers have entirely new toolkits to craft an immersive experience, which simulates our waking life. Lucid journeys into the dreamscapes depicted in films like Inception may soon become possible.

Recently developed platforms like Xbox Kinect and Nintendo Wii don't require the motor skill to use complex gamepads, so it's common to see three-year olds and even seventy-three-year olds showing those teenagers a thing or two about Nintendo Wii tennis. The next step for game designers is to introduce psycho-emotional inputs measuring anything from heart rate, facial analysis, voice measurement, skin conductance, eye tracking, pupil dilation, brain activity, and your ever-changing emotional profile. These games will know the user at a subconscious level and deliver an experience that could forever blur the line between virtual and reality.” (Frank, 2013, para. 3).

*Figure 13: Handheld Devices of the Future*



[\(http://singularityhub.com/2013/05/12/the-future-of-gaming-it-may-all-be-in-your-head/\)](http://singularityhub.com/2013/05/12/the-future-of-gaming-it-may-all-be-in-your-head/)

Throughout history, technologies designed have been repurposed to suit other needs. The Slinky was designed from malfunctioning springs, Play-Doh as wallpaper cleaner, and penicillin was an accident. Photography and art have multiple purposes, from historical relevance to creativity and meet individual needs successfully. Current digital photography, storage, and sound serve the ability to document events, organize data, and provide personal entertainment. In the future, gaming innovations will increase the ability of individuals to document and store memories for sharing or simply for future review.

### ***Community Memory Needs & Technology***

Community memory, whether the community is simple an apartment complex or a small town, consists of people who share common locations; however, communities have begun to change over the years due to the access to mass communication. The Internet provides the ability for communities to evolve outside the restrictions of location and geographic relationships.

Presently, technology is evolving how people relate to one another by providing them different means of reaching one another. When individuals are not restricted to conforming to their small-localized communities, culture evolves and creates bigger communities.

Communities use memory to create a past, build culture, and adopt rules of behaviour. When members do not conform to the rules of the community, either the community remove the member from the community or the community evolves to accept the new types of behaviour. In the past, members of a community would be required to adopt the rules of the community or risk punishment. Today community rules are still required, but the ability of individuals to have a community of like-minded individuals to spend time with and share ideas. In the future, communities could continue to expand; however, the ability for different cultures to evolve, separate of geographic location, represents the future of society and potentially the future of how laws and ethics are evaluated and instituted.

Technology bands together large groups of people, where shared memories promote the shared needs of the individual with related people. Technology could one day provide individuals with the ability to share their thoughts with others, possibly in a way that persuades a larger amount of sameness in laws or regulations that organize the world. When individuals

share why laws are in effect, others could be influenced to feel the same way. The ability to share memories provides a power to causes and guides legal and regulatory behaviour around the world. If a community has never had a problem with a specific situation, no laws may regulate that behaviour until the problem arises, but in the future, there may be few communities not aware of every potential problem. Additionally, in the future, individuals will not be restricted to decisions on ethics based strictly on their local ethical exposures.

### ***Organizational Memory Needs & Technology***

Organizations need memory, and already use technology to help manage the needs of remembering, scheduling, organizing, and managing. Around the world, organizations strive to rise above other organizations by having the best management, the best products, and the strongest organizational structures. These goals require a strict adherence to information processing and people management. When organizations work to achieve these goals, their ability to improve the memories, shared memories, of the people who work for the organization are dependent on the strengths of the people working in the organization. If individuals could share memories and ideas in faster forms of communication, an organization could successfully overcome some of the more difficult aspects of management.

Organizations are not strictly for-profit conglomerates striving for market domination; some organizations are non-profit projects working to accomplish a goal for the better of the people the organization serves. If memory were saved and stored more effectively for sharing with other individuals, the ability to cure diseases such as cancer could benefit from the awareness of the disease or disorder through the ability to predict leading determiners for the



conditions. Today, organizations such as the American Cancer Society promote their non-profits through the Internet, even so far as to utilize the communities online, such as Second Life. Relay for Life, a competitive fund raising section of the American Cancer Society (ACS), utilizes the role of community to increase awareness of the disease and raise money for the ACS projects. The organization benefits from the ability of individuals to share their memories and knowledge of cancer, to bring like-minded individuals into a single organization where their combined knowledge and own communities can contribute to the ACS and provide it with funds.

In the past, organizations could only expand as quickly as technology and experience could carry information and give consumers time to try the services or products. Today, individuals can provide information of their use of a product in online forums and in the form of video or testimonials. People can share their memories of the organization, the products, or the services. Organizations also use technology to communicate information in the organization, storing and retrieving individual experiences in databases. Additionally, organizations can gather the resources stored by individuals and machines in a way that allows all information to be transformed into reports that allow the organization to evaluate processes and work towards correcting any errors or in streamlining approaches.

In the future, organizations may have technology that stores the memories for the organization and uses those memories to streamline processes artificially, without the continuous input from humans. The future could include anything from increased use of machines in the workforce to increased success in information processing. When technology becomes the primary source of memory storing and sharing, the ability to have endless supplies of memories

only requires the processing speeds to maintain and organize the information. Organizations are a leading contributor to the increase in technology, particularly in the increase of information management. Information management is the process base of all memory storage systems currently in use.

### ***Cultural Memory Needs & Technology***

Cultures change over time, and these changes can result in core concepts of a culture changing or even becoming lost. Archaeologists and anthropologists strive to understand cultures long gone or to create better connections with cultures whose changes have morphed beyond their original form to become something else. As different cultures are exposed to each other, the cultures change. When environments change, cultures can change. Many different things beyond and within the control of people can make changes to cultures, and those changes can be lost in history due to active attempts to forget or simply failure to remember. Cultures or collectivises, to survive time and overcome the challenges of growth, must be able to communicate and share ideas with other members of the community; particularly, cultures need language and modes of communication (Pogacar as cited in Maj & Riha, 2009, p. 24). Current technology promotes the extended version of communication coupled with the ability to nearly permanently save that communication for literally generations. However, researchers suggest that it is either a new form of collective memory, such as through a memory boom or potentially sources of digital amnesia (Başaran ince, 2014).

Cultural memories are valued by all people around the world and when histories are lost they weigh heavily on researchers who strive to restore those memories to the overall collective

of memories. Scientists, around the world, have spent hundreds of years researching the past and attempting to explain everything from where people come from to what they did in their daily lives. Even in a time before humans covered the better part of the planet, humans were preserving information about their own cultures through images on cave walls and songs designed to share their way of life with the younger generations. History is the most historical notion of cultural existence. The past could not be saved in the same ways as today, much of the past has been lost. In the greater picture of history, we know less than we might otherwise realize. That does not always have to be the case.

Over the past couple of decades, the ability to store the past in online sources has gradually increased. “Online representations of the past (ORP)” have the ability to include “four basic discursive elements, text, sound, image and video”, and successfully redefines the concepts of time and space by providing every available content that is nearly free of traditional forms of degradation (Pogacar as cited in Maj & Riha, 2009, p. 26). History is no longer confined to the limited memories of a few people, as now it can be stored by literally all attendants if they choice or have access to any of the range of tools. In addition, the sources of history telling are no longer restricted to the rich or educated, because tools of various costs have become available and require much less education than publishable prose.

In the future, technology could store the data of everything ever thought of regarding a culture. From the way, they lived to the way they thought and much of everything in between. Technology advances could provide the ability for individuals far in the future to look back at the cultures of today and understand very thoroughly their existence, the way they lived, and how

the world around them influenced their way of thinking. Even more, the ability to completely preserve the present, especially as technology continues to advance and save more of the present, could accomplish something our ancestors were unable to accomplish – the complete influence over the generations to come. If history is completely preserved, the people learning the history are able to retain the lessons and grow on those lessons themselves. Instead of generations passing and history repeating, generations are able to take the lessons of their ancestors and apply them as needed. Individuals preserving lost cultures due to access to those cultures. Around the world, people study different cultures and become fascinated with how the people may have lived during those times, including re-enacting the lives of those people in their culture. Medieval festivals through US restoration of Native American tribes, demonstrate the fascination with history and cultures.

### ***Smaller versus Bigger***

The first computers could not have fit onto a small desk, and the monitors that followed often required two individuals to move. Today, this same technology is a handheld device with the ability to do even more than first users might have dreamed possible. With the steady decline in size comes the increased ability to have many different devices and many more storage sources in a single space. Where one computer could store a limited set of data in a single room, many different USB drives can now store literally hundreds of times that information in a tenth of the space.

The smaller the storage device and the smaller the tools provide another strong advantage to the future, these devices could easily fit into the human body. People seek out methods for

organization and for storage of their personal memories. In the past, people may have saved a few mementoes from their great grandparents or other ancestors, just enough to fill a shoebox or a small trunk. Today, the number of images an individual could save from the past could be hundreds in a source smaller than the size of a fingernail. Memories can encompass nearly an entire life in less space than the previous artefacts of generations past. These resources, as small as they have become, promote the ability for information to be stored in an individual.

With the current size of technology, the ability to insert technology directly to the human body is well underway. Artificial limbs restore movement and hearing aids restore sound to the deaf; however, technology of the future may go further. Technology could eventually be able to hook right into the mind of an individual. It could transfer information directly into the brain, or retrieve it from the mind through a connection externally or internally. It is suspected that technology advancements could provide this type of mental support in the very near future. Specifically, projects like this are working towards restoring memories for the elderly, people suffering from amnesia, and even in projects designed to restore proper nerve function in children. The future could provide resources for those who need, and for those who want to restore memories or save them for future generations. Smaller technologies decrease the space needed to store memories, memorabilia could be saved for longer and utilize less resources; however, it does not determine how much of the saved information would ever again be accessed after stored.

Nanotechnologies are expected to revolutionize the way technology is used and the way it interacts with humans.

“Human/machine hybrids: Technology has already radically enhanced human capacities, so we are stronger, faster, and more agile than any other living system. But the capacities were provided by external means: rockets, cars, cell-phones, and computers. However, slowly, these technologies are getting smarter, and the human machine interface is getting more seamless. Now we are at the cusp of the next stage: where the technology gets directly incorporated, whether by implanted chips, neural interfaces, or simply by remote sensing capacities. With this shift, the very character of the human changes. We move from the natural organism, Humanity 1.0, to the natural/artificial hybrid, Humanity 2.0.” (Khushf, n.d., para. 3).

Technology continues to evolve with the needs of the users in a way that promotes the objectives of the users. Photography was a practice worked on for two centuries before it was able to create images that could be stored for long periods and created relatively instantaneously. When technology reaches the ability to instantly save thoughts, the ability to use this could eventually become worldwide and open to all individuals. However, if all individuals could save history and memories, future generations may struggle to understand which messages are important to their individual success and the histories could be forgotten based on popular demand. When large quantities of information exist on single topics, it becomes necessary to sort information prior to dissemination of the information.

*Figure 14: The Future Today*



(<http://graphics8.nytimes.com/images/2006/07/12/science/13brain190.1.jpg>)

### ***Interactive Tech (Robotic Assistants)***

Science fiction has dreamed of the future, and that future includes the use of robotic assistants. These assistants will keep notes, answer phones, clean homes, but some of that is already here. Call centres use messaging systems, automatic call routing, and even database programming to assist callers before they can speak with a representative from the company. Today, organizations such as iRobot create smart tools that sweep and mop floors or clean out pools without or with little supervision. The future could present the ability to accomplish a large number of tasks, including domestic.

While machines are currently being designed to make life easier for individuals and organizations, they serve as another process, they ability to remember every action. The human body develops memories in more than just the mind, muscles tend to remember common movements, and make those movements easy. In this same way, machines remember activities and movements, storing them into their memories and unlike humans, no activity can be forgotten, though it can be deleted should the need arise. While memories can always be forgotten, such as lost when an individual dies or deleted from a program, machines will less easily forget some memory types. These types of memories include things such as patterns and movements. This type of memory saving would contribute to the memories of the object, which also promotes the memory saving and storing for future activities and for individuals to review later.

Computers already make a name for themselves in other ways, such as Watson: “IBM’s Watson computing platform made a name for itself on Jeopardy, but its incremental roll-out into the real world has been no less impressive. It has worked in finance at Citi helping to assess risk and at Memorial Sloan-Kettering Cancer Center sifting through medical cases and data to help oncologists make the right diagnoses. Now the supercomputer is [rolling out to the masses](#) as a computerized customer service agent designed specifically to help customers connect with the information they want at a variety of firms in a variety of businesses, including Australian finance house ANZ, at media ratings maker Nielsen, and at Royal Bank of Canada.” (Dillow, 2013, para. 1).



In the future, machines could be more interactive in many different ways, including by responding to specific behaviours or needs of people. Cell phones currently use a responsive software that recognizes the movements of an individual's eyes, telling the software to freeze the movie on the screen until the eyes return to the screen. Other technology responding to human movements include game systems like the Wii and certain technologies used in televisions. While this type of growing technology is not readily available to all individuals, its continued adaptation and evolution could potentially put it in the reach of more individuals in only a few short years.

When machines are able to track the movements of individuals, they are also able to save that information as part of their programming, their specific activities, or part of the history of the machine. People can utilize these types of memory storage as part of the memory preservation practices or part of their ability to review what previous owners of the machines used the machine for or saved into the machine. The ability to restore the memories of machines, unlike the lost memories of a past loved one, are likely as many different types of information can be restored even from equipment previously believed to be unrecoverable. However, in the future, the ability to completely destroy information from a machine may be more improved to assist in privacy.

Robots may eventually be a part of everyday life, and scientists around the world strive to make the activities of robots more useful to everyone regardless of the intended purpose. Today, an individual can purchase a machine that vacuums or washes a floor with little assistance from its owner. Other machines are being taught to walk along pathways, to carry objects long

distances, and even to explore far away worlds. Machines are being taught to create memories of their own, but these memories are amongst the many things the machine saves for future use. Machines currently on Mars transmit all of their experiences back to scientists on Earth, but the machines also store information such as location and direction in the mechanisms that are running the machine. Robotic assistance could go far beyond laboratories and surgical applications.

### ***Passive Tech (Monitoring Software)***

Around the world, passive technologies have been implemented to reduce crime, decrease traffic issues, and even just to better understand how the world works. Organizations such as the World Bank monitor economic and developmental factors in numerous countries, also teaching those countries to monitor these same factors, along with others (The World Bank Group, 2007). Greenpeace monitors environmental issues and strives to protect Earth-based histories in the preservation of historical areas, peoples, and land. RFID is also a passive technology that has continued to grow in uses.

“Automated identification technologies (AITs) include a variety of technologies such as RFID and barcodes that are used to identify objects. The benefits of using AITs are that they have the ability to increase efficiency and reduce data entry errors. Currently, AITs have commonly been used in access control and security applications in several industries. Such industries include those that must track products through the supply chain or manufacturing process or those requiring the identification of products at the point of sale or point of service [1]. With the success that AITs have seen in other industries, it is only natural to apply these technologies to

the healthcare industry to improve operational processes and patient safety.” (Jones, Garza, Anatakrishnan, and Kandari, n.d., para. 1).

*Figure 15: RFID Technology in Use*



([http://wearechangetv.us/wp-content/uploads/2011/08/RFID\\_tags.jpg](http://wearechangetv.us/wp-content/uploads/2011/08/RFID_tags.jpg)).

Passive technologies can guide or control the direction of any number of fields and advancements; however, it can also directly influence the ability of individuals to record their every living moment. For example, passive technologies imbedded in clothing can monitor heart rate, oxygen levels in the blood, or even blood pressure; however, these same types of technologies could grow to encompass movements, body heat, all bodily functions, and even predict emotional responses based in changes to the functions of the body. These types of technologies, with future advancements, could reasonably reach the potential to track and record every single moment of life including the “inside” responses of emotion and reaction.

SenseCam is a “wearable camera that stimulates and rehabilitates autobiographical memory” (Hodges, Berry, & Wood, 2011, p. 685). This is a small box shaped item that can be worn, scheduled to take pictures at specific intervals, and assists in saving memories from the day or an adventure. This camera has the ability to use electronic sensors to change when images are taken based on lighting in the environment, time, or even to allow the wearer to take images. While the initial design in 2003 was to create a “human black box recorder” (Wood, Fleck, & Williams, 2004: cited by Hodges, Berry, & Wood, 2011, p. 686), the use of it was able to assist in building memories with individuals suffering from impairments to saving autobiographical memories. The product is currently available for sale and some users have already worn it for numerous years. Particularly, the device was able to improve memory functions where other solutions, such as written journals, were unable to be of positive use. This type of passive technology provides the ability for individuals to monitor their life and use the information later.

In addition, passive technologies already enable people to monitor their blood pressure or heart rate during periods of exercise or in daily activities. These technologies are currently marketed outside of traditional medical fields, such as Nike technologies – Wearlink and Livestron. These technologies have a variety of uses and are even able to talk to applications used on smartphones. While the technology continues to add increased abilities, such as temperature monitoring, the technology has not yet included devices able to record related memories or activities to emotional response systems. Medical applications are similar, such as diabetes, enable users to accurately take medications or to respond to adverse conditions influencing the body.

Passive technologies can be used in a variety of different ways, even today with the technological uses of it in RFID devices. RFID devices could be installed in cemeteries, added to the headstones of each individual. This type of technology could be used to store the memories of individuals, provide historical relevance to every individual. Loved ones could prepare the documentation, or people – prior to their death, could prepare the information much in the same way as setting up their estate. Future generations could learn many things about their own heritage, the history of a community, or even worldwide events from individual perspective. The ability to review history using RFID devices becomes an example of the use of smaller technology to evaluate everything from personal through cultural history and has implications for learning and even medical purposes. When the technology can fit into the smallest forms, the technology can be implemented in much wider uses, uses that will continue to evolve over time based on human needs or wants.

“The Department of Science and Technology of the Council of Zaragoza is collaborating with Scan Memories to produce a public installation in the municipal cemetery of such city using wireless and RFID technologies. The project will allow the public to use our system to interact with memories and intersect at the point of the body of the physical/social characteristics of such an emotional and meaningful place.” (STCI, 2008).

*Figure 16: RFID Devices on Tombstones*



(<http://www.rfidjournal.com/lib/x/a/assets/2010/03/7439-5.jpg>)

In the future, passive technology might not simply monitor the environment for chemicals or watch a street corner for crime; it could eventually be technology that every individual wears. Technology that records the health of the body but documents all of it in single chips that could either transmit the data or store the data are becoming part of normal use. This type of technology could preserve the individual's life in a form that would leave nothing to the imagination of later generations.

### ***Cyber Humans & Second Skins***

Writers have dreamt of a day when humans are not just working alongside robots, but when their components are integrated parts in humans. This technology is not so far away. Passive

technology would simply monitor the every activity of the human body, cyber technology works directly with the human body. For example, cyber physical devices are being explored for a number of different conditions, and designed to return motor function to users. Cyber technologies utilize the changes to technologies, such as the steadily decreasing size of technology, to increase the use of the products to individuals; however, many different groups of people have become concerned that technology could become a serious problem in the future, including the belief that people will begin to exchange perfectly healthy human parts for advanced cyber parts, rather than only using them when needed or in replacement of failing human parts. Science fiction has focused on this potential role in many different types of story lines, including stories in television shows where great villains are humans who have lived long past their ability of their own human body to regenerate, such as Dr. Who (*Dr. Who*, 2006) and are completely manufactured of computer and robotic parts.

In some storylines, the human being cast into the part of the villain has suffered some premature death, and their life restored strictly from their mind being added to a computer. However, all of the storylines have one thing in common, the lack of the physical body did not simply restore the ability to access memories and thoughts, but it deprived the individual of their soul, their potential to “feel” for other humans and creatures. In current technological advancements, there is no way to know if any of these changes to the human body could remove the relationship capability or emotional aspects of humans. Not all stories of cyber related futures have unhappy endings of cruel villains without compassion, and some writer predictions, such as *I, Robot* (Asimov, 2004) of robots demonstrate a striving to find humanity in their existence. To

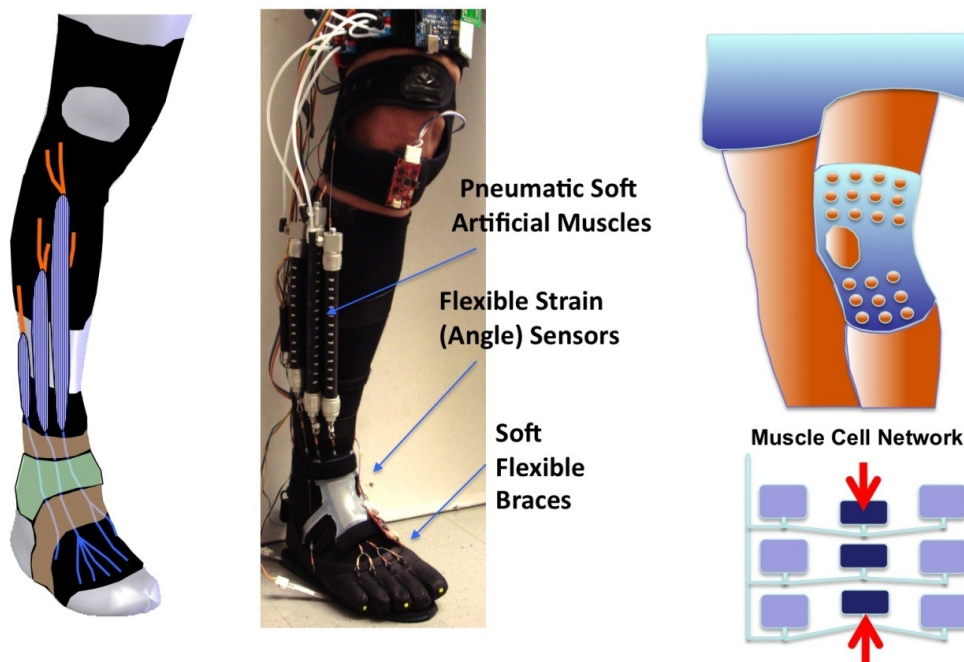
date, humans attribute human emotion and response to machines, but no evidence of any such connection exists in science itself. In this same way, no scientific reports of the use of machines or non-human parts have ever had relationship to a decrease in human-like behaviour in a human. These aspects are things that could only be studied in a future where such technologies exist.

“We present a novel, wearable, bio-inspired cyber-physical assistive device for rehabilitation of injured nervous systems, called the “Second Skin.” The device is characterized by (a) a soft, responsive interface with the body, (b) sensors and actuators that emulate the function of biological components, and (c) a control system based upon distributed networks with modular components. Unlike current exoskeletons [1], [2] that are heavy and structurally similar to motorized braces, our cyber-physical device is made from soft and elastic materials.” (Park, Young, Chen, Wood, Nagpal, & Goldfield, 2013, p. 1).



Figure 17: Active Uses of CyberSkin

## Active Soft Orthotics & Programmable Second-Skin



(<http://www.eecs.harvard.edu/ssr/projects/mod/overview-asoss.jpg>).

However, even researchers and scientists predicted the use of microcomputers, and in 1999, Maquire, Jr. and McGee suggested the technology was nearly available or might even be possible in the present rather than the future. Citing wearables including “WearCam” and bodynets as intermediate computer technologies that could easily be forerunners to microchips ready to implement and enhance the human memory and processing capabilities. Currently, mechanical and computer assistance has strived to assist patients missing something considered to be part of the human condition, whether eye sight, hearing, or limbs. Theorists and writers such as Maquire, Jr. and McGee (1999) suggest that the ethical questions of enhancing memory

or processing, for the sake of increased or even in the case to equalize the power of every mind, have yet to be addressed.

### ***The Future of Technology and Humans***

The future consists of many unknown factors; however, science continues to evolve the way we think and the way we live. Memory is important to individuals, communities, organizations, and cultures. Memories promote history and provide foundations for the future, but most importantly, memories enable individuals and groups to live on through time even when they can no longer share those memories themselves. As technology expands, science fiction becomes possible, even so far as to suggest that one-day computers may have the ability to store every single thought, event, and activity of an individual; however, in that potential future it could be used to prevent crimes by arresting individuals before they can commit the crime. Every action could be monitored by technology for preservation, but also for invasion of privacy. While technology promotes the strongest of organizational structures for individuals to gain a much greater control of their life and history, it also provides easier access to people who may use that information for purposes other than their intentions.

Technology continues to advance, bringing about new ways to help individuals overcome disabilities and ways to monitor everything from sound through touch. Google glasses demonstrate a future ability to record sound and images from every moment of life. Equipment designed to monitor diabetes and blood pressure continues to decrease in size, and with every new evolution of technology comes more applications. The applications provide potential for individuals to monitor their life, store their every memory, except thought. However, with the

ability to record heart rates and blood pressure, the ability to record emotional responses is nearly in the technology already. When individuals can record their every moment, storing it on much smaller devices than any other method of recording memories before, the ability for those memories to exist far into the future continues to grow.

In the future, recording history may occur in any number of advancements that could serve other purposes. Technologies being designed to monitor health needs, such as blood pressure or heart rate could be used to record the emotional responses to different events or circumstances, and health-monitoring software could track the every movement of the individual wearing it. When people increase this type of advancement to wearing every single day, it could involve the ability of individuals to use new technologies, such as nanotechnologies, to provide the body itself with the ability to permanently record every moment of the person's life. These types of memory storage could be permanent documents for future generations to use in understanding the past, but it could contribute to a massive increase in information overload. When everyone has the ability to record his or her entire history, the question of who decides which history is saved must be considered. Families would have to select which of their histories to save and which to dispose of, and this might not be far different from histories lost in the past.

### ***Summary***

The question answered in this section was research question 6: "How might memories be stored, preserved, accessed, or externalized in the future?" Today a variety of different storage methods are available, from photographs to social media. In the future, interactive technology will continue to grow, and enable individuals and communities to continue to store information

on different types of devices, including through interaction with artificial intelligences or even as a second skin. These findings created a need to explore some technologies that could occur in the future, leading to the methodology selected for the study. In the following section, the information gained for the research questions is reviewed.

### **Conclusions of the Literature Review**

The literature explored many concepts in memory, from why memories are formed to how they are stored and what the future may hold. Guiding the literature review was six questions, which resulted in the six sections of the literature review. Findings indicated that defining memory was a large undertaking, concepts in memories include everything from types of memories to accessing and understanding memories saved. Storage devices and artefacts can be anywhere, or even everywhere. From photo albums to a small USB drive of digital images. Today, people even save memories in social media, filled with a variety of self-defining information and designed to increase the way in which people immortalize themselves, find communities of like-mindedness, communicate, and define who they are. In the future, more personalized methods of memory storage may become popular, including second skins or interactive robotic technologies. Understanding memories and who people may use them in the future resulted in the studies that were used in the action research design of this study. In the following section, the methodology is defined.

### **Chapter 3: Methodology**

Projects were selected for the study of memories and the technology used to store and access memories. An action research design methodology supports the use of projects, and was used to explore memories and their potential importance through projects to test out ideas and understand implications of technology with memories. In the future regarding the storage and saving of memories as part of historical record, whether for individuals or for communities and entire cultures. Each of these three case studies represent an opportunity to explore the use and preservation of memories, using unique applications of technology, and focusing on meeting the needs of memories on a variety of different levels. These studies were conducted only within the teams designing the projects, and remained in a tested concept stage, which included other related projects that allowed the researcher to explore the ideas of memory storage. The following describes the concepts behind the development of this research.

The research included projects developed to evaluate how these technologies can assist or work with humans to preserve memories or create instant access to memories. These projects included Scan Memories (sM), Wearable Absence, and HimbaChronotopes. The idea is to better understand how people interact with technologies to store memories, and how those storage methods can continue to be important to the success of memory storage and retrieval in the future. Memories, as demonstrated in the literature review, occur as a result of numerous conditions when stored in the human mind. These include the senses, as explored in Wearable Absence, which indicates that a specific bodily reaction to stimuli can result in a memory, or increase the ability to retrieve the memory under other circumstances in the future. What if we

could remember the exact feeling we felt when we were introduced to our future spouse?

Retrieve the same physical responses to a funny story?

Scan Memories (sM), a technology that explores the ability to store long term the memories, images, and stories of those who have left this world, allows the researchers to identify the application of RFID in memory storage and retrieval. Today, social media can be accessed long after a person has ceased to be active, whether loss of life or computer. This technology exists until someone deletes it or the information is lost. Loved ones can visit the sites, remember, cry, and rejoice at stories that involved that individual. RFID can be used to allow instant access to these memories, and this project explores that application.

HimbaChronotopes is a project designed to explore the ability of a fading culture to impart itself onto others. Around the world cultures are changing, and some are fading away in the face of technology and increasing industrialization. Preserving these memories occurs by sharing them before they are gone, including by giving a 'reminder', and artefact of the people whose stories are being shared. Museums around the world gather artefacts of lost cultures and civilizations to preserve the past; today, we can preserve the past through internet and artefacts that people buy to help preserve those memories. Wearable Absence was a project designed to explore the concepts of storing memories that occur as a result of observable body responses, such as temperature and heart rate.

### **Action Research Design**

An action research design methodology focuses on understanding through projects and exploration, to explore knowledge by becoming part of the knowledge itself and implementing

change. Utilizing this methodology allows the use of projects with basic guidelines to adapt and explore memories during the course of the research. Over the past few decades, the use of action research as a methodology in studies has grown, particularly in the fields of education and health services or studies (Eden & Huxham, 2006). In addition to these fields, action research is used in studying organizations as a method for testing new ideas for more solutions to problems through training programs, interventions, or other organizational structures (Eden & Huxham, 2006). A number of disadvantages to the use of action research are in the inability for the study to be recreated exactly, the need for continued research, and previous applications that require that the testing of a theory or intervention as the methodology (Eden & Huxham, 2006).

This research was engaging throughout the process, where the teams worked to create a means of exploring populations through memory opportunities, such as the technology presented in the case studies. As an action research methodology, these projects served to create a situation where specific individuals were able to explore how a concept would work in practice. For example, people were able to wear the products developed in the Wearable Absence project. Similarly, HimbaChronotopes was designed to be implemented by the culture. Prior to each of these projects, literature was reviewed to determine if there was a need, similarly to how an intervention might be developed.

While these ideas and concepts could become products in the future, the purpose of these studies was to understand if these projects would serve a purpose in the area of memory.

## **Projects Used in the Research**

Three case studies were developed. The first project, Scan Memories (sM), was designed to explore how individuals wish to preserve the memories of loved ones. The second project, Wearable Absence, explored the ability of people to save memories complete with bodily responses that were directly associated with the action that created the memory. The final project was that of HimbaChronotopes, exploration of the preservation of a culture through the sharing of memories outside of the culture. All three case studies involved small teams, over the course of many months, who explored the ideas in a forum and development method. The teams examined ideas, checked feasibility, and explored the concepts as they related to their individual perceptions of memory storage and sharing. Collectively, these case studies represent the exploration of memory, implications of technology as memory aides, and the ability of individuals to interact or retrieve these memories at a later date.

Case studies are versatile by creating opportunities for exploration that are not limited to a single source of data, but are still guided by research questions and hypotheses (Putney, 2010). The guidelines applied to these case studies are in their individual designs, which demonstrate a protocol into the use of the technology and application or reach to a population. Further, the case studies are managed through qualitative research, which is supported by the success of the different experiments in achieving memory goals during the research. Each of these areas are further explained in the following sections, where the project details are provided. These cases were developed with research teams, rather than tested with target markets or in the population.



## Scan Memories

Scan Memories was a project using distributed event-driven architecture through networks, to discover and access information situated virtually in objects and specific geographical locations. The technology involved RFID as well as access materials – particularly smartphones or other RFID reading devices. As this project utilized databases accessible through the internet as user-driven website content, it could be envisioned as a usable resource for literally unlimited numbers of potential users. It is also envisioned as a platform for people to create, store, and accumulate digital memories as a type of digital epitaph that can be later accessed by descendants once the user has passed away.

A project team was developed that consisted of both users of the technology and creators of the different areas of the technology, as participants and creators of the item, the project was able to build on the information by exploring different technologies and ideas regarding memories. The members of the team did not include participants, and all activities were conducted using fictitious names and information. Each area was further explored using previous studies in the same areas of the research. A project was developed to explore how Scan Memories would be effective over time.

The project examines how memory practices in and around death can be altered by information technologies, particularly those related to memories. The ability to control memory recovery of an individual, as the *self*, could be the future of storage technologies. In addition, this particular project focused on relationships between memories and locations, providing users access to memories through RFID or GPS location identifiers. The project was installed as a

closed demo in the city of Zaragoza, Spain, and strived to provide a public service in the cemetery and the urban area. Additionally, trailers can be located at both <http://docu.scanmemories.org> and <http://vimeo.com/4835377> .

Scan Memories documentary provides an emotional and evocative approach to memory, death, and space in networked societies, by weaving together the memories of Neli, TJ, Lorena, and Tim. It demonstrated how RFID, mobile technologies, databases, and wireless networks alter memory practices based around and about death. In addition, the project resulted in distributed forms of media systems and information networks that transmit memory as experiences. This particular project included a project developed around interviews regarding memories of deceased family members and the design of a small website that enabled users to create profiles for deceased loved ones. Scan Memories was featured as a presentation – Scan Memories Documentary Visual Essay - in the following conferences:

1. International EXPO Zaragoza 2009, Spain (September 2008) –
2. ZEMOS '09, Sevilla, Spain (November 2008)
3. Performing Presence: from the live to the simulated Conference - University of Exeter, UK (March 2008).
4. Futuresonic Social Technology Summit, UK (May 2008).

### ***Project – Virtual Cemetery***

Jane has many photos of her mother, some of which are displayed in her house and many others are in the family photo albums. She has a 7 years old son and a 3 years old daughter. Her son was born when Jane's mother was critically ill, and her daughter was born after her death.

Almost everything the children know or remember about their grandmother is the result of photographs and stories that Jane has shared with her children. They have no interpersonal experiences of their grandmother, and no memories of her life.

Jane still lives in the same house where she was born and often takes walk in a nearby park with her children. The park is where she spent much time with her mother and her mother's ashes were scattered there according to her wishes. The children have shared experiences in that they are able to be in the same physical places their grandmother once occupied, places where Jane already has memories that she shares with the children.

When I had a chance to go to the park with them, it was a beautiful sunny day with a gentle breeze filled with the smell of flowers blooming. It took approximately 15 minutes to walk the distance, and we arrived with just a bit of sweat in my shirt. We visited the tree around which the ashes were scattered, and there the family played there while I took photographs of their interactions. Their visit to the park, itself, made memories of their interactions with each other, in a place where memories already interacted around ancestors. Many other similar experiences had already occurred between Jane and her mother.

*'In loving memory of John, who loved this park, 1930 – 2000'* was an engraving we saw on the tag attached to a bench in the park. I assumed somebody named John might have visited this park often, even possibly with his family, interacting similarly to how Jane now interacted with her children, or how Jane's mother interacted with her in the past. John might have spent time sitting or resting on that very bench. Even possibly, he notices and gave attention to another person's tag, which might have been *'In loving memory of Susan, who loved this park, 1920 –*

1970'. For a moment, my curiosity heightened: Who was John, was he a father, a grandfather, a schoolteacher, was he tall, or short, happy or friendly? All the information I had from the tag is his name, how long he lived, and a guess that someone remembered and loved him enough to buy a tag for the bench. When I pointed this out to Jane, she told me she is on the waiting list for tagging a bench herself, for her mother, and was informed by the park authorities that she must pay 1,000 pounds to keep it for a few short decades.

An online memorial or virtual cemetery can become a way of storing and sharing information about the deceased. One where anyone with the correct access permissions is entitled to gain access to the database, and from there they can see the history of the dead and create tributes or comments. Memorials did not have to be limited to a single few per decade, and could even be developed to embody many smaller amounts that provide visitors with tales that they can use to remember cultural history versus only family history.

Access can be under any physical (environmental) or a temporal circumstance, as accessible through RFID or GPS location, so long as the individual has a computer or device capable of an Internet connection. The disembodied nature of cyberspaces is well described in a virtual cemetery company's website.

*BENEFITS OF A VIRTUAL CEMETERY:*

1. Cemetery access day or night, 24 hours a day
2. Sharing your loved one's memory with relatives and friends
3. Provide an affordable memorial tribute for a loved one's unmarked gravesite
4. No long distances to travel

5. Never having to depend on the weather

- From [www.wildrosecemeteries.com](http://www.wildrosecemeteries.com)

The Scan Memories project was initiated by the imagination, *What if we can get the information of previous users and possibly the history of the deceased from a specific object that was used or space that was occupied.* Furthermore, what if the retrieval of the information is allowed only when people are with the physical objects or within the spaces, or enhanced by the ability for curiosity location viewing of memories or tributes for that location. Does it have to be physical, or can it be simply words in a site. The project examined three main categories of spaces: first is the physical space in which our physical bodies move and feel, second is the cyber space in which we store and retrieve information leaving our physical bodies outside and the other is the inner space of ours, which we can call memory. Considering the different conditions of the three spaces, it proposed a way of connecting all three with networking technologies onto our new surface or space, on or in which our experience could newly be defined, and this is referred to as the interface.

Information technologies have been changing the way of storing, processing and transferring information in relation with our experience of the world. This specifically becomes an essential way of constructing and controlling memories of individuals and groups in present “technological form of life” (Critique of Information). Information becomes a mundane word we use every day. We get tons of information from the newspaper, TV and the Internet and make information writing emails, maintaining blog sites and other social media. We usually say ‘I’ve Googled and found lots information about ‘Hamlet’ in the Internet’ but are not likely to say ‘my

recent reading of Hamlet gave me much to consider”. We could say ‘I came to know a lot about how the political power that guided that time”. We might be using information partly apart from the notion of meaning: Googling ‘Hamlet’ can give me the information about the writer, period of writing, critic’s opinions and more; but reading it does not just give information, rather something more complicated and generative, which we can call *meaning*. Though information and meaning are intermingled together, which is not easy separating one from each other, the notion of information seems to be more detached from the specific situation of a reader while meaning is more intertwined with a reader’s context.

If information can be separable from context, it can be stored and transferred via any types of media. Meanwhile meaning is very dependent on a whole set of situations in a specific context, which may not be inclusive of the information gathered. Whole situations, in a specific context, possibly can be segmented into sets of information: socio-cultural level, psychological level, physiological level and other not as identifiable levels. These sets of information could describe the situations only in codified manner: this is the idea of behaviourism that one or multiple sets of information can be abstracted from a situation and can be reapplied to the same situation and then the same behaviour can be expected.

The online company’s ad of the benefit of virtual cemetery shows how the perception of memory has been changed: Memory can equally be triggered by the information stored in the disembodied space. In the book of ‘critique of Information’, Scott Lash clearly summarizes, “The primary qualities of information are flow, disembeddedness, spatial compression, temporal compression, real-time relations” (Critique of Information (p2). The information stored in cyber

space can be retrieved whenever, wherever people are, and in virtually no time restraints, through a network. Lash argues, “Technological culture is constitutively culture at a distance. Forms of life become forms of life at-a-distance. Because my forms of social life are so normally and chronically at-a distance, I cannot navigate these distances, I cannot achieve sociality apart from my machine interface. I cannot achieve sociality in the absence of technological systems, apart from my interface with communication and transportation machines” (Critique of Information, p. 15). Disembeddedness in physical or psychological context is what makes the life at-a-distance possible by storing information in external database, even “what was previously thought internal to one’s mental life is also stored in a distant information database” (Critique of Information, p. 16).

Elizabeth Hallam and Jenny Hockey’s extensive research in ‘Death, Memory & Material Culture’ shows how metaphors have been used to describe death and memory and they have changed the embodied experience of people. Their work states that “Metaphor is, at its simplest, a way of proceeding from the known to the unknown’ (Nisbet 1969, quoted in Turner 1974: 25)” (Death, Memory & Material Culture, p. 23) “For example, ‘sleep’ is the domain that many Westerners draw upon, metaphorically, to think about and manage death. In this context, material cultures of death include churchyards full of the stone ‘beds’...The coherence of this system of metaphoric entailments is extended in the behaviour of living visitors who keep their voices down and take care not to step onto the graves’ flowery coverlets.” They also show how metaphors of memory have been developed in relation with the ‘supporting technologies of that time’.

During the medieval period, the space of memory was regarded as 'waxed tablet', 'storehouse', or 'inventory'. The metaphor of storehouse “conveys notions about the contents and internal structure of memory and highlights collecting, sorting, ordering and containing impressions, which are thus made available for recall.” (Death, Memory & Material Culture, p. 30). In our present time, we become familiar with an analogy of a computer with our memory storage and our alternative social space, easily monitored in many places and during many times. We keep a memory of the events of our lives the form of digital photographs, video, sound and text in many computer servers and share them with others on the Internet. *Is this our way of thinking that the servers keep our memory and so my identity, which survives my physical bodily death?* As McLuhan notes, “the storage and retrieval of information are functions played by all media, not just the computer” (Critique of Information, p.185). However, digital technology does not store or produce a material but instead bytes. This information cannot be translated into memories without assistance, both technical and personal assistance to understand the information in the format available.

The price list, from another cyber-cemetery service site, shows how the human memory seems to become something measurable when translated into computer memory.

|                              |                             |
|------------------------------|-----------------------------|
| Photo album                  | FREE, UP TO 1GB, 300 PHOTOS |
| Slideshow of selected photos | FREE, UNLIMITED             |
| Playing audio clips          | FREE, UP TO 300MB, 15 CLIPS |
| Screening video clips        | FREE, UP TO 300MB, 15 CLIPS |



|   |                 |
|---|-----------------|
| A mailing list to all your loved one's family and friends | FREE, UNLIMITED |
|---|-----------------|

- [www.memory-of.com/Public/Pricing.aspx](http://www.memory-of.com/Public/Pricing.aspx)

The physical weight of a traditional photo album is replaced by the size of bytes. When materiality of the photo album changes into weightless bytes, the bodily practice also changes the way of handling a heavy album changes into moving computer mouse to scroll the monitor. Changing 'bodily practice' also changes the memory construction. Photographs, video, audio and text is a cultural means of storing information, which is what Paul Connerton calls 'inscribing' practice while 'incorporation practice' is mediated by bodily practice, which including bodily action, gestures of movement. He argues incorporating practice is mediated what he calls 'bodily habit'. This is a way of transferring memory from generation to generation. "In habitual memory the past is, as it were, sedimented in the body" (How societies remember, p.72). The specific modes of bodily gesture and movement have been built by long-term practice of ritual. If the space of ritual changes, the bodily practice changes in corresponding ways. When we visit the graves of our relatives, the physical existence of the cemetery constrains our bodies into socially accepted mannerisms: not running around, stepping quietly, and showing remorse. The practice of setting objects such like tombstones and flowers follows certain cultural rules. Many cyber spaces of the dead also adopt the metaphors of the real cemetery by setting images of flowers and tombstones. However, our actual physical bodies are not in the space; they could be anywhere including a sitting room, an office or an Internet café. Our bodily practices do not need to follow the cultural constraints: we can write a condolence letter while making a joke with somebody else on the phone, or leaning back the chair precariously.

What follows digitalization is not just losing context but also losing information attached to the objects: weight, smell, texture, etc. A “photograph is more than an image – it is a tactile possession that engages not just vision, but also touch, and, as Edwards argues, other bodily senses such as smell. For example, the handling of old, heavy family albums intensifies the experience of looking back” (Death, Memory & Material Culture, p. 144). C. N. Sermetakis’s research about memory construction and embodiment in the material object in relation with social context is also described in Death, Memory & Material Culture. Memory is not just a part of inner mental space, but it is also “a culturally mediated material practice that is activated by embodied acts and semantically dense objects”. Interaction of senses with material objects in embodied performance builds up over time and is retained as an accumulated ‘emotional and historical sedimentation’ within objects (1994: 7). This sedimentation is capable of triggering further embodied actions, which, in turn, transforms the significance of material objects as the process unfolds” (Death, Memory & Material Culture (pp. 11-12). The Scan Memories project’s experiment evaluates the question of how the very different nature of two experiences (cyber, embodied) can coexist and interact with each other and if or how it could change the nature of memory construction of individuals and groups.

Implanted RFID (Radio Frequency Identification) tags in objects and spaces opens a gate to cyber spaces, only through them can information be obtained. In comparison of the virtual cemeteries (wherever, whenever you are) the RFID tag is a constraint (only when you are in proximity of a few centimetres with the tags) and while it conforms to the limitation of the materiality (you cannot physically inscribe all the information on the steel tag of the bench). It

adds another space to the physical spaces or objects, which is an extension of the physical spaces or objects: compression of two spaces into a single sphere of experience or existence.

Imagine the process that Jane might take when she uses the project system. The Scan Memories Company provides a portal site for her to upload her mother's photos, video, voice, or some combination of all this information as it is available. She can make groups, such as family, friends and public: only the members of a certain group will be allowed to access certain information only open for the group and have a right to upload their tributes to her mother through the PDA provided from the park authority. This raises questions regarding what will be saved and what will be shared: What kind of information will Jane put in the database? How will she select data to put into the website? Whom she will give rights to access the information? Where will she put the tags that will be able to tell people her mother once was present in that location? Which objects or places in the space? Will or how will she control the messages from the others? How would she feel if the tag was broken or stolen? These questions were explored during the study.

Consider another case person, we will call him Tom, who has a son and a daughter, and uses the service prior to his death. He does not want to be remembered as an old man so he put only images taken while he was young. He is especially fond of his daughter and makes a group in which only the daughter can access to the information. He then implants a RFID tag in a mobile phone she wanted to have. In addition, he put some messages to the public, which includes contents criticizing his son for past mistakes. Finally, he dies without designating the service company as surrogates to maintain and keep his site safe. No family members have

access to his information and no members of the family can change what he did. He is buried in a cemetery and a tag is implanted in the tombstone. The family is both embarrassed by the mistakes and ashamed, but cannot agree who has legal rights to make changes.

The first case seems to be simple because Jane is socially accepted as the heir of her mother's possessions, including photographs and other personal belongings. We can easily imagine she would follow typical behaviours when she uploads information into the portal site. For example, they might be only good memories of her mother, or represent times that were pleasant. The message she delivers, which can be accessed from the park, about her mother is clear to the members of the family because they know the park is special. When people unaware of the life of Jane's mother visit the park, they can learn that they were not alone in visiting, and can learn more about previous visitors to that location. Some information could include that Jane's mother's ashes were spread there to enable her to always be in one of her favourite places.

In the second case, it is questionable how well the situation can be mitigated to control the problems that were created by the untimely passing of Tom. Publicizing memory about Tom, so constructing post-identity, is not anymore under the control of the bereaved. We can imagine many legal issues could arise, including who owns the right to management of memories for the dead. The traditional context of a cemetery might also change when people can access the information they did not expect to get in that somewhat culturally fixed mode of space. If Tom's daughter wants to exchange the mobile phone for a new one, she would be at risk of losing the tag her father gave her. She would have a useless device with no means to control the information it contains.

We might imagine the following situations could occur:

- A new type of power relations will develop, one that concerns control of the database. The social and cultural identity, the relationships between the individuals, and even ownership of the information, it would still be both unethical and illegal to have copyright material in the information regarding loved ones.
- Second, the context of spaces and object would be transformed from their conventionally defined nature into another form, resulting in a change to psychological and bodily interaction with information.
- Third, the interaction would imply certain potential likelihoods, beyond the possibilities we can expect or prepare for in the course of the project.

Intermixing of two different natures of spaces can cause a kind of noise, particularly an accumulation of undesirable information, which might interrupt the both sides in different modes: the dynamics of information between existing code and the power of code breaking.

Claude E. Shannon in the book, 'Mathematical Theory of Communication', proposed that information is not meaning but a probability function. As the co-author of the book, Warren Weaver interprets Shannon's mathematical expression of communication, "The word information, in this theory, is used in a special sense that must not be confused with ordinary usage. In particular, information must not be confused with meaning. ...It is this, undoubtedly, that Shannon means when he says, "the semantic aspects of communication are irrelevant to the engineering aspect.'" (Mathematical Theory of Communication). The purpose of Shannon was

to make information measurable in mathematical expression in order for it to be transferred without the loss of quality. “The information source selects a desired message out of a set of possible messages ... The transmitter changes this message into the signal which is actually sent over the communication channel from the transmitter to the receiver... The receiver is a set of inverse transmitter, changing the transmitted signal back into a message, and handing this message on to the destination” (Mathematical Theory of Communication). It is the mechanism of communication he describes: successful communication can be achieved when encoded messages from the sender are accurately reproduced in the destination with minimum distortion. The communication channel has to be clear of any noise between sender and receiver. “The two extremities of the channel ‘are on the same side, tied together by a mutual interest: they battle together against noise’” (Network Culture (p15): quoted from ‘Hermes: Literature, Science, Philosophy’ (p.67) by Michel Serres).

In the sphere of human communication, noise is not just a something, which has to be eliminated but also plays essential role in generating meaning. Meaning is not just pre-coded message, which just has to be decoded on the side of receiver but is also being constantly coded on the side of receiver. Donald McKay as a contemporary with Shannon argues for a different definition of information, which includes the receiver’s mindset. Information “remains meaningless in the absence of a (human) framer and that framing cannot be reduced to a generic observational function, but encompasses everything including the biological and cultural specificity of this or that singular receiver” (New Philosophy for New Media). He tries to connect information with meaning. Meaning in this sense is not pre-coded on the sender and

transmitted to the receiver; generating meaning is dependent on the context in which the receiver and sender are. The same message, “it’s raining” can have different effects on people depending on their “conditional readiness for behaviour, which betokens the meaning (to you) of the message you heard” (Information, Mechanism and Meaning, p.22). In human communication, same message does not generate same behaviour. As N. Katherine Hayles describes Shannon’s notion of information is about ‘what information is’ while McKay’s is ‘what information does’. In semiotic term, ‘it’s raining’ is a different sign in each situation: it might signify to the person indoors a reminder of romantic time with his girlfriend in a restaurant watching raining through the window while to the person outside a sign of urgency to find a shelter. The situation of being indoors and outdoors is what he calls structural information. “Structural information indicates how selective information is to be understood; it is a message about how to interpret a message” (How We Become Posthuman, p. 55). This structural information is not static but always changes according to geographical, biological and all the other social, cultural factors. “MacKay’s theory had as its generative distinction the difference in the state of the receiver’s mind before and after the message arrived. In his model, information was not opposed to change; it was change” (How We Become Posthuman,).

For Shannon’s notion of information, the generative nature of meaning could be considered as noise source because the message a receiver gets has different message from what a sender has sent. That is why Shannon did not include human’s psychological factor in his notion of information. However, his notion of information not as a content of message but “one’s freedom of choice when one selects a message” paradoxically gave a potential to the status of

noise (How We Become Posthuman,). For him information is not a message, which a sender sends, but “one’s freedom of choice when one selects a message.” “The greater this freedom of choice, and hence the greater the information, the greater is the uncertainty that the message actually selected is some particular one. This greater freedom of choice, greater uncertainty, and greater information goes hand in hand (p. 18). If noise interferes, uncertainty increased on the side of receiver. The noise, Weaver says, is an “undesirable uncertainty” (p. 19) caused by errors in the communication channel in comparison with desirable uncertainty as a freedom of choice on the part of the source. Receiver can have greater information, which is ambiguous message, than what sender sent. “Some of this information is spurious and undesirable and has been introduced via the noise. To get the useful information in the received signal we must subtract out this spurious portion” (Mathematical Theory of Communication, p.18). Shannon’s notion of information is based on the static value of message, which could be predictable and reduced uncertainty.

If I write a birthday card to my friend filling the bracket between ‘( ) birthday to you’, most probable words could be happy, but ‘bad’ or ‘miserable’ or other adjectives cannot be excluded; they simply have a lower probability. ‘Happy birthday to you’ has culturally been codified in some sense; a verb such as ‘go’ cannot make sense, so we might say ‘go’ has zero probability in the English language code. Code reduces the probability, regardless of if it is cultural or syntactical. Code is a system, which makes communication possible under the condition of conventional agreement among members of a society.



The project concerns not only with the dimension of successful transmission of information, which means selected memory handed-down without distortion, but rather with the undesirable information as noise potentially able to transform the conventional codes. In McKay's notion of information, cemetery is a structural information in which, we can imagine, the information about the dead in it would be more meaningful than in an Internet café, so more meaningful reaction of the receiver. However, the information could also be noisy, which breaks the conventional mode of space: Tom's message, open for the public in the cemetery, is noise generated by friction between the physical space and the information. The friction between a code established over the long period in a society and the unexpected information and the reverential silence can transmute into anger, or even a giggle. The qualitative changes:

“In as much as information concerns the problem of form it also poses the question of the organization of perception and the production of bodily habits which it foregrounds with relation to the emergence of social meanings. . . . Information is not about brainwashing as a form of media effect, but it does also involve a level of distracted perception; it thus informs habits and percepts and regulates the speed of a body by plugging it into a field of action” (Network Culture, p. 19).

The friction is mediated by interface, through which information flows and is blocked: it is space where power relations resides. A RFID tag, a PDA and a portal site are interfaces linking between two spaces, through which controls of whom will be included or excluded, which information will flow or become blocked and this possibility is constantly at war with

itself. In this sense, an interface is not just surface relaying information between man and machine but also a space where a new form of sociality can act.

### ***RFID Connection***

RFID Connection was designed to review the use of RFID labels and GPS Coordinates for memory storage projects. The main goal of this project was to provide individuals the ability to store media content, memories, and link it to a specific location in physical space using RFID labels and specific GPS coordinates. Registered users of this system were able to create media containers by using a website, which they filled with the memory contents and then bound to a specific geographical location. The memories could be accessed and viewed using a desktop application on a laptop, PDA, smartphone, or any other device capable of reading the RFID code. The RFID pen reader and GPS navigator were used for application in this project and it retrieved information from a server that stored the memories per the user's submissions and uploads.

#### *Functionalities for Users:*

- Registered users can create and edit profiles, memories, and related information using the website. Memories can be setup as viewable to the public or set as private. Private settings can be modified to consist of only individuals or sets of individuals. Users can invite others to access the memories. All users have the ability to change these permissions and access levels at any time.

- Unregistered users to the site can navigate the site, search, view profiles, and access any public memories created and submitted by registered users.  
Unregistered users cannot create profiles, access private information, store memories or other data, and cannot invite users to join.
- Registered and unregistered users can download the PDA/mobile application that allows them to see the memories when they are standing in a specific geographical position. Each memory can be linked to particular GPS coordinates or RFID labels located in positions of physical space. Users of the application can receive the list of memories that are linked to the current coordinates or to a specific RFID label. A RFID pen reader can read the RFID label if no application can be obtained with the user's device. Public memories from the list, acquired through the location or RFID label, can be viewed by everyone, while private memories can only be accessed if the user is logged into their individual user account (after registering) and invited to view those specific memories.
- Each profile has an unlimited number of submissions permissions for memories. Each memory can contain any number of media files: video, audio, images, or texts. Memories could be connected to particular RFID labels or specific GPS coordinates. Each RFID label or GPS coordinate could potentially have unlimited memories from numerous different profiles.

- Users were permitted to create new profiles using the website only. Memories were created from both the website and the device applications (following website profile creation). Other users were able to create Tributes to profiles and submit text comments regarding Memories. Tributes had the same functionality as Memories, but could only be created by users who were not the profile owner of that specific memory. Profile owners could not create Tributes on their own pages. The function of Tributes was to create opportunities for other individuals to share their memories regarding that specific profile.
- Website content included a “Map” section that allowed users to see the locations of memories accessible to that specific user.
- All profiles included a “Timeline” which visually demonstrated the memories in chronological order, to allow navigation through years. Each memory included a “Memory Presentation (timeline), which put media content in the chronological order, and allowed the user to designate where the memories belong on the timeline.
- Website technology was selected as java-based back-end and flash-based front-end to provide end-user rich experience and functionality. PDA/mobile solutions were based on two applications: c-based applications that perform low-level access to Bluetooth devices and GPS navigator with flash applications that were designed for the front-end.

Definitions and terms used are located in Appendix A, along with other utility information. The project, having been created for researcher consumption rather than individual function, was designed to be successful in achieving the end-user goals by driving the hardware and software functions that made this time of memory management possible. Additionally, the results of these dynamic processes were not tested by outside contributors, only by research teams and compared to previous similar research.

### ***Profiles and Memory Timelines***

Registered users were permitted to create multiple profiles, which could be linked to the same account within the website. The design permits users to see their personally created profiles as part of their “Owned Profiles” and select permissions and memories separately for each individual profile within the created profiles. Profiles specifically contained basic information regarding the creator, including memories kept, name, birth and death dates, featured image of the individual, and any other memory materials as created or provided by the user. A single user could theoretically complete profiles for all family members within their profile, including what memories belonged to each individual, their birth, their life, and even information pertaining to their death as applicable. The profiles share a common primary account, or parent account, but individually have each permission and memory stored and shared as an individual account. No other individual can make changes to the profiles, unless the user shares their individual account information with that person.

During the time of the project, no specific regulations were developed to address potential abuse, such as creating profiles for other people who are still living or deceased,

without the permissions of the individual or their families. If the project were developed and opened to the public for use, a specific clause and course of action would be required to protect individuals from identity theft or misappropriation of their identities. Additionally, while the site was developed to be secure, additional measures would be required to protect proprietary information and individual private information prior to the ability of the project to be used on a larger scale available to the public.

## **Wearable Absence**

Wearable Absence was designed to make it easy to save every single memory throughout the day. Nothing can be lost, misplaced, because each moment and activity of the day is instantly stored for future, searchable, retrieval. The project, Wearable Absence, involves dynamic garments that incorporate wireless technologies and bio-sensing devices to activate a rich database of image and sound. Communications and multimedia devices embedded in garments are able to retrieve and present information from a large database containing traces of an “absent” person’s life. The invocation of visual and aural memory files are triggered by a passive process in which the user will not consciously participate but using unobtrusive sensing devices that detect the physical state of the wearer.

This project was developed sections, including a studio in Canada was responsible for the creation of the garment and the sensors in the garment, from my original idea. Following this, I designed the system and the fictional characters to populate the multimedia database of memories. The project was completed in 2007, prior to newer technologies developed to obtain information regarding individual heart rates or other medical applications. In addition, this was completed and recorded by other groups exploring these types of technologies.

The technology used to develop this project included a jacket, designed for the individual to wear. People can use technologies in clothing, which enables information to be stored in the article or to be transferred to another device. This specific design was intended for wear by the project participants and utilized wired technologies, as identified in the following images and text:



The jacket-like garment is embedded with the software and hardware required to capture heart rate, galvanic skin response, respiration rate, and temperature.

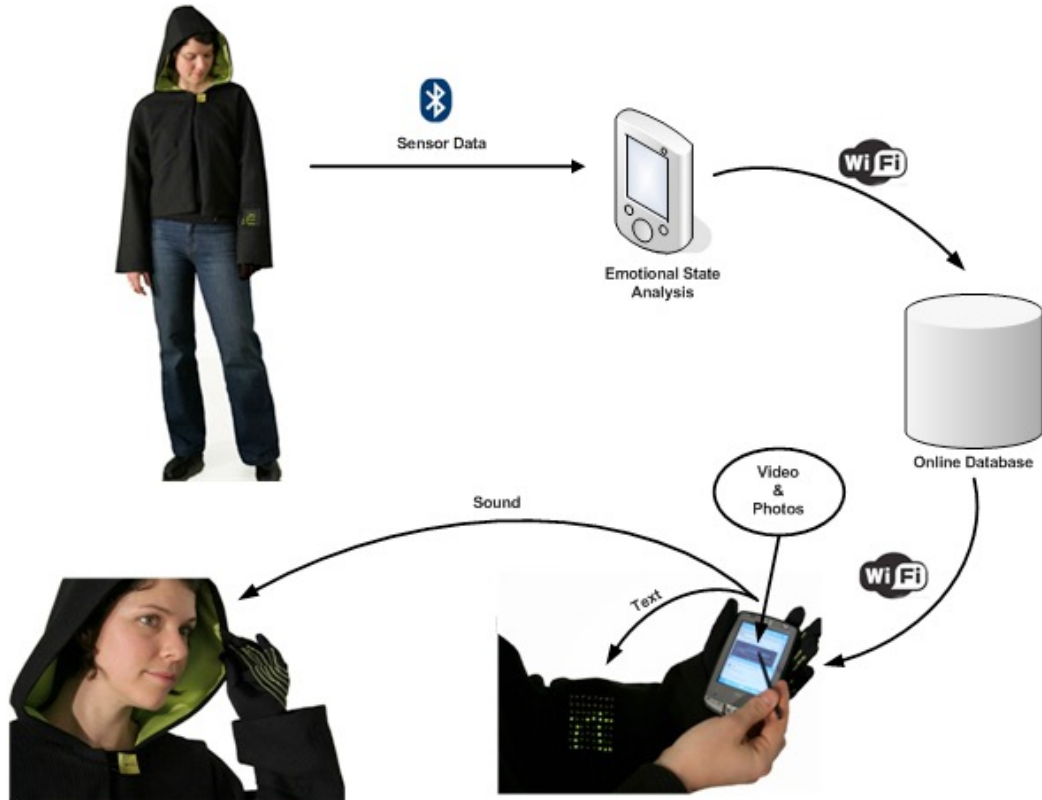




**Technology:**

- HP-PDA running Explorer on XP
- Two 3.7v cellphone batteries reduced to 5v
- Bluetooth wireless system
- Basec stamp microcontrollers
- Sony wireless headphones sewn into hood
- Handwoven LED array on sleeve
- Four sensing devices (heart rate, galvanic skin response, respiration rate, and temperature).

Wearable Absence transferred data from the jacket, to an emotional state analysis device, to an online database, back to the PDA or mobile device – resulting in sound or text, or both.



The project was designed to embrace elements that are perceived to be directly influencing personality and memories, particularly in areas of artistic practices and cultural issues; specifically, unintentional responses to stimuli. Mediated through technology, these very emotional responses provide an eclectic, creative and social vision of how the use of textiles, database, affective data-stream and mobile technologies can participate in the socio-cultural processes in our daily life, aiming to transform them. More details on the project and schematics are found in Appendix sections.

### ***Wearable Absence- Description***

The project, *Wearable Absence*, has created several prototype dynamic garments that incorporate wireless technologies and bio-sensing devices to activate a rich database of image and sound. An integrated system, in which clothing becomes the catalyst and the filter in a technologically mediated process of memory construction, is in the garment. Communications and multimedia devices embedded in garments have been devised to retrieve and present information from a large database containing traces of an “absent” person’s life. Notions of aesthetics and well-being have both been explored in the Embedded Wearable System for the development of this module, based on the notion of a non-obtrusive, minimally invasive and non-destructing technology. We have tried to measure involuntary and voluntary data as the criteria to create the queries that will discriminate the information to retrieve. The type of sensing devices that have been tested for the module include: galvanic skin responses to measure skin conductivity, pulse oximetry sensors, stretch sensors for monitoring respiration and temperature sensors.

The garments are wired inside the garment, and then wirelessly connected to a rich online database. The data culled from the biometric devices trigger various media files based on predetermined criteria. These videos, stills, and auditory files are automatically downloaded into the various displays and speakers that are subtly embedded in the garments. This playback can provide an unexpected aesthetic experience, or perhaps give you “what you need” in response to your immediate physical state. This application has possibilities for medical and sports sectors as well as proposes a personalised management system for well-being and emotional therapy. The project engages with software, engineering and material challenges. The nature of cross disciplinary and cross Atlantic collaboration will also be addressed and how an integration of weaving, electronic circuitry and programming to facilitate communication has been achieved during the 2-year project.

In *Science News*, (March 31<sup>st</sup>, 2008) it was announced, “Garments that can measure a wearer's body temperature or trace their heart activity are just entering the market, but the European project BIOTEX weaves new functions into smart textiles. Miniaturised biosensors in a textile patch can now analyse body fluids, even a tiny drop of sweat, and provide a much better assessment of someone's health”. At the same time, Philips Research produced a range of promotional jackets featuring its innovative Lumalive technology. Lumalive textiles make it possible to create fabrics that carry dynamic advertisements, graphics and constantly changing colour surfaces. Indeed, Smart fabrics promise to revolutionise clothing by incorporating sensors into cloth for health, lifestyle and business applications. In the long term, they could consist of

circuits and sensors that provide all of the typical electronics we carry around today, like mobile phones and PDAs.

Drawing on Marshall McLuhan's observation (1964) that the garment is an interface to the exterior mediated through digital technology, Sabine Seymour writes in *Fashionable Technology* (2008) that,

“... the electric age ushers us into a world in which we live and breathe and listen through the entire epidermis”.

Some 40 years on, cultural/cyber theorists, neuroscientists, cognitive psychologists amongst others, are still engaged with the how we live in a world mediated by flickering screens, multimedia/multi-modal integration, interactive programming, and one in which, following Seymour, contemporary fashion mobilizes the garment as a mediator of information and communication, a medium that incorporates technological elements that transform it into interactive interfaces. For example, as neurochip technology becomes more widely available tiny devices will take advantage of the discovery that nerve cells and silicon chips can happily co-exist, allowing an interface between the electronic world and the human body.

What if both devices were connected to a wireless network, would we have arrived at the point which science fiction writers have been getting excited about for years? If McLuhan thought the 'Medium was the Message', then the body is that medium with an emphasis on an ecosystem of accessories, from I pod white wires to integrated ear bud clothing, in short a way of interacting with gadgets that appear and appeal as more 'natural' and that go beyond single areas of evolutionary improvement. In other words, spreading the functions over a number of co-

operating parts providing more value as a co-coordinated whole, supported by high bandwidth, short-range wireless technologies. Such device parts, it is argued, will be worn on and in the body, earrings as speakers, necklaces as microphones and cameras, sleeves as screens.

The distinctive aspect of *Wearable Absence* is that a mainframe is presented in unique garments, which become the catalyst and filter within technologically mediated process of memory reconstruction, which people input. The project has also created several prototype dynamic garments that incorporate wireless technologies and bio-sensing devices to activate a rich database of image and sound. I focused on technological implementation and the use of mobile technologies that broadcast and retrieve everyday life. This include information about oneself, the use of narrative allows the form of storing memory being immaterialized as a digital form. Through narrative, we construct, reconstruct, in some way reinvent yesterday and tomorrow. Memory and imagination fuse in the process. Even when we create the possible worlds of fiction, we do not desert the familiar but subjunctive it into what might have been and what might be.

The human mind however cultivated its memory or refined its recording systems, can never fully and faithfully recapture the past, but neither can it escape from it. Memory and imagination supply and consume each other's wares."



Dynamic garments have been created that incorporate wireless technologies and bio-sensing devices to activate a rich database of image and sound. Communications and

multimedia devices so embedded will be able to retrieve and present information from a large database containing traces of an “absent” person’s life through other characters and stories. So, *Wearable Absence* is an interactive piece where users can access their own memories previously stored in a database. The interchange of those will be a choreographed interaction between the user and the devices that will monitor the bodily information. More than this, playback can provide an unexpected aesthetic experience, or perhaps give you “what you need” in response to your immediate physical state.

In the first instance, three characters were created that drew on the idea of science fiction but who also reinvented their past through fictional fusion. The research, carried out by Janis Jefferies, evolved through watching films and soaps as cited in the text, Paul *Auster’s Travels In The Scriptorium, The Invention of Solitude* and *The Music of Chance*, Georges Perec’s *Life: A User’s Manual* and *W, or, the Memory of Childhood* and through conversations another PhD student, Eleanor Dare and the great new, intelligent media theorist Sarah Kember, whose *Cyber feminism and Artificial Life* proved invaluable as did reading her first novel, in draft, about the optical effects of lightning. However, defining the life of a fictional, “absent” character and the production of multimedia files (text, sound and video files) to portray aspects of that life, seemed more challenging and appropriate to the creativity of the original garments designed in the SubTela Lab.

One of the characters, Paul, is an elderly and disenchanted microbiologist who firmly believes that he has evidence of a Martian microbe with characteristics similar to that of green sulphur bacteria. However, in the process of giving a lecture goes mad performing to the Beatles

song ‘Lucy in the Sky with Diamonds’ and turns into the green slime of the ‘Incredible Hulk’.

The stories generated through the fictional characters are about life changing events but it is also the case that the stories in themselves are somehow life changing. However, if you use the system you are asked to populate a database with personal multimedia content (videos, photos, sounds, text...). You can either accessing a web portal or a local computer. Each multimedia clip will be described by inputting keywords, which you provide. This categorisation is then be used to generate different criteria to retrieve content from different users. Once the database has been populated, you will be able to enter into a space, which will act as a stage for choreographing a “monitored experience”.

The bodily reaction of the user wearing the censored garment will enable the navigation through the database content. According to the data coming from different sensors embedded in the garment, the system will select the memories that belong to each of the users that have shared a piece of their garments. Depending on the quality of the experience of each user, the sensors will register and generate one-search criteria. The system will select from the database the objects ad-hoc according to their keywords description matching the criteria. Once the system has selected all the content, the information will be displayed for each of the users on different parts of the space by using data projectors and speakers.

### ***WAb Interactive Mobile Platform***

Emotion-oriented ways of metadata to annotate media needs tractable ways of describing the states that matter to it. Some schemes describe them as full-blown emotion rather than pervasive emotion-related phenomena like friendliness, trust, distress and mixed or time-varying



emotions. The work done in this area as part of the strategy to use metadata when producing the digital content is clarifying the states most likely to matter to emotion-oriented computing, and adapting ideas from psychology such as dimensional representation and appraisal theory to provide a threshold to represent memories in more tractable ways than a list of irreducible categories.

The increasing production and sharing of digital content throughout life, combined with global networking, requires creating an environment of interaction within living spaces to cater for emotional needs of individuals in relation to networks and digital information. One of WAb's objectives is to look at ways of preserving the emotions associated with that information mediated by sensory textiles and networks.

Emotions are physical expressions, often involuntary, related to feelings, perceptions or beliefs about elements, objects or relations between them, in reality or in the imagination. The bio-sensing devices embedded in the electronic textile defines the networked query, which serves as memory triggers and allow emotions and memories to be conjured up by bio-feedback as metadata. New forms of crafting emotions through networks such as WAb's biofeedback and networked search and retrieval of metadata are to shape our relation to space, narrative and memory through networks.

### ***Categorization of Emotions***

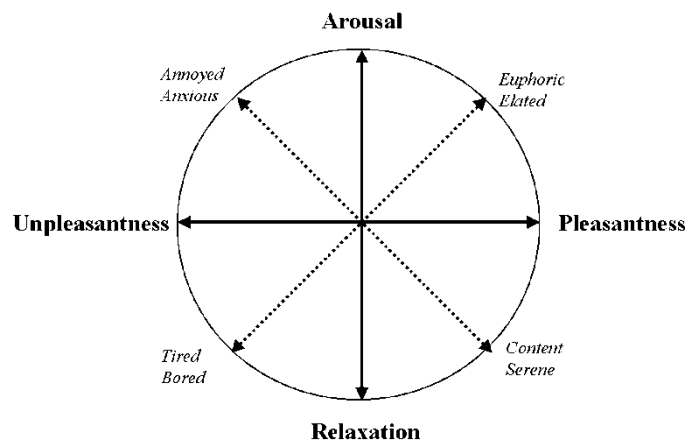
Emotions are categorized by the physiological data monitored by the sensors embedded in the WAb garment.

In the initial stages of the development, these are the sensors used:

- GSR (Galvanic skin response) and HBR (Heart beat rate) as main source for the categorization.
- GSR is used to determine how much a person is excited (Aroused or Relaxed).
- HBR is used to determine whether the person's emotion is positive or negative (unpleasant or pleasant).

The main emotions are categorized into Angry (Annoyed, Anxious), Joyful (Euphoric, Elated), Sad (Tired, Bored), and Content (Serene, happy)

GSR and HBR also determine the degree of emotions (very, middle)



The initial sensors used in the first architecture were:

- Galvanic sensor
- Heart beat sensor
- Temperature sensor
- Respiration sensor

Using the values from each sensor, we have to decide among sixteen types of emotional states.

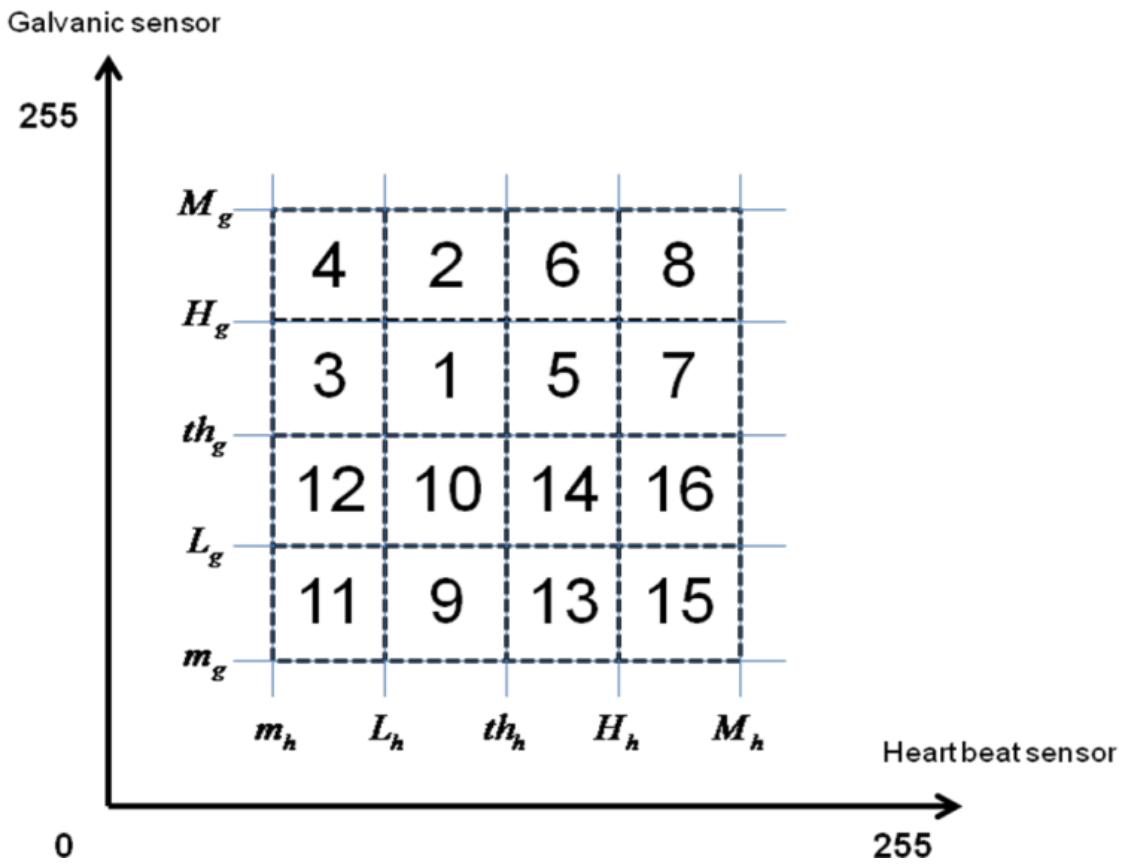
The types of emotional states are listed in Table 1.

| ID | Emotional state                  |
|----|----------------------------------|
| 1  | A little anxious + calmness      |
| 2  | A little anxious + excitement    |
| 3  | Very Anxious + calmness          |
| 4  | Very Anxious + excitement        |
| 5  | A little joyful + calmness       |
| 6  | A little joyful + excitement     |
| 7  | Very joyful + calmness           |
| 8  | Very joyful + excitement         |
| 9  | A little sad + calmness          |
| 10 | A little sad + excitement        |
| 11 | Very sad + calmness              |
| 12 | Very sad + excitement            |
| 13 | A little meditative + calmness   |
| 14 | A little meditative + excitement |
| 15 | Very meditative + calmness       |
| 16 | Very meditative + excitement     |

### Table 1. Types of emotion states

Primarily the values from galvanic sensor and heart beat sensor are used to decide emotion states. Temperature sensor and respiration sensor is partially used to support or verify the matching results based on former two sensors. Many previous works was based on galvanic and heart beat sensors. There is no rigorous algorithm to recognize human emotional states.

Original values from four sensors have different dynamic range respectively. However, all the values are normalized and converted to one-byte values between 0 and 255. On the application running on the PDA, the user interactively changes minimum and maximum values of all sensors. Moreover, threshold values for each sensor can be adjusted by users. Figure 1 shows the emotional map based on values from galvanic and heart beat sensors. Symbols used in Figure 1 are described in Table 2.



Emotional state map by two sensors(galvanic, heart beat)

| Symbol | Meaning  | Decision/Calculation |
|--------|--|----------------------|
| $m_g$  | Minimum value of galvanic sensor                                   | User intervention    |
| $M_g$  | Maximum value of galvanic sensor                                   | User intervention    |
| $th_g$ | Threshold value of galvanic sensor to choose between 'anxious' and | User intervention    |

|        |  |                          |
|--------|--|--------------------------|
|        | ‘meditative’   |                          |
| $H_g$  | Threshold value of galvanic sensor to choose between ‘very anxious’ and ‘a little anxious’       | $H_g = (M_g + th_g) / 2$ |
| $L_g$  | Threshold value of galvanic sensor to choose between ‘very meditative’ and ‘a little meditative’ | $L_g = (m_g + th_g) / 2$ |
| $m_h$  | Minimum value of heart beat sensor   | User intervention        |
| $M_h$  | Maximum value of heart beat sensor   | User intervention        |
| $th_h$ | Threshold value of heart beat sensor to choose between ‘joyful’ and ‘sad’                        | User intervention        |
| $H_h$  | Threshold value of heart beat sensor to choose between ‘very joyful’ and ‘a little joyful’       | $H_h = (M_h + th_h) / 2$ |
| $L_h$  | Threshold value of heart beat sensor to choose between ‘very sad’ and ‘a little sad’             | $L_h = (m_h + th_h) / 2$ |

Table 2. Parameter list for emotional state map

Input sensor values are located one region among sixteen regions generated by ten parameters expressed in Table 2. The ID numbers in each region correspond to emotional states listed on the Table 1. Two values from galvanic and heart beat sensor is enough to choose one

between sixteen emotional states. Temperature sensor values are used to modify the degree of emotion. Users also can specify minimum value ( $m_T$ ), maximum value ( $M_T$ ), and threshold value ( $th_T$ ) by typing values on the PDA application. If the input value from sensors are greater than  $th_T$ , 'a little' emotional states is modified by 'very' emotional states.

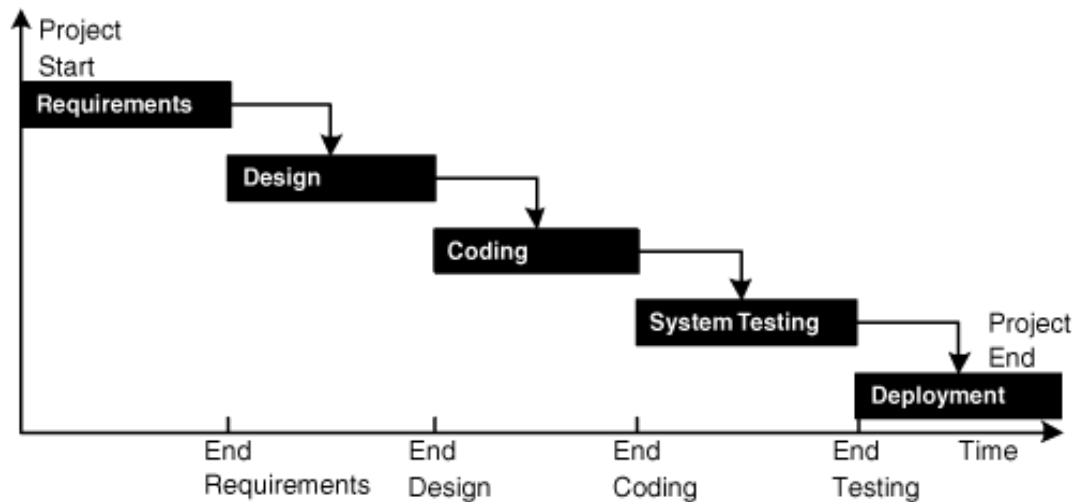
Respiration sensor values are used to modify the degree of overlapping with other emotion. Similarly, user can specify minimum value ( $m_R$ ), maximum value ( $M_R$ ), and threshold value ( $th_R$ ) about respiration sensors interactively. If the input values from the respiration sensor is greater than the threshold value,  $th_R$ , 'overlapped with calmness' is modified by 'overlapped with excitement'. The biofeedback mobile prototype first implementation is found in Appendix sections.

## ***Development Phases***

Listed below are the phases that were followed for the analysis design and implementation of the project:

- Requirements Phase— Gathering requirements
- Multimedia content production
- Design Phase— Designing the application
- Coding Phase— Coding and integrating the components
- System Test Phase— Integration and system testing
- Deployment Phase— Deploying and releasing the application

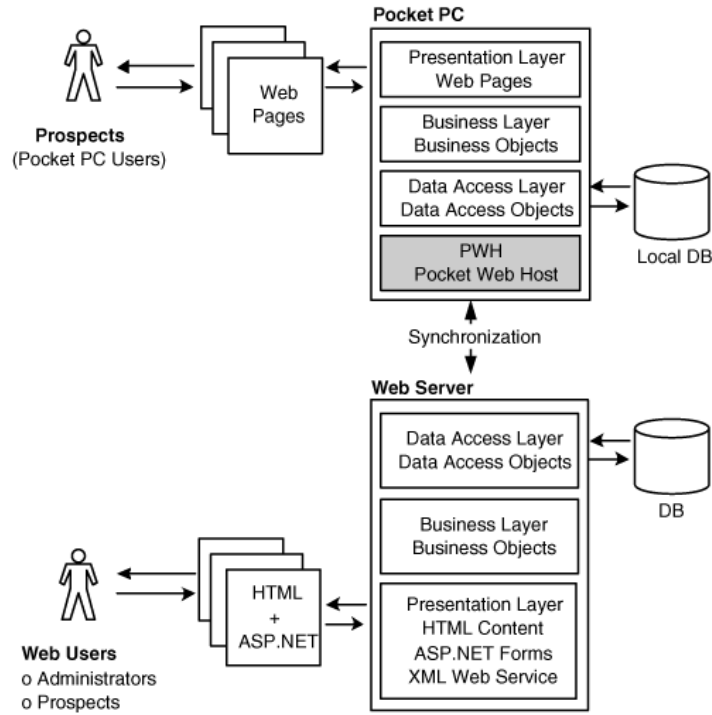
It was decided not to overlap phases through the process ensuring that each part of the process was ready and tested since we specified clearly the functionalities of the project in the first project description document. The following graphic shows the method followed over time.



Development Phases



### 3.2 Information flow



#### ***Database configuration***

Content Type: video (.wmv, mpeg), audio (.mp3), image (.jpeg)

Categories (to be determined by the user when populating the database):

- Context based: Active, Neutral, and Passive
- Emotional state: Happy, Sad, Angry, and Stressed

System description of the Wearable Absence web and mobile platform has been implemented. It consists of the following modules:

- Online Pocket PC/PDA Rich Media Flash Application and Interface
- PHP/XML Server Side Data Communication/Database
- Online Admin Tool

The Wearable Absence web and mobile platform has been developed using the following technologies:

- Pocket PC/PDA Windows Mobile 5
- Flash CS3 / Flash Player 7
- XML driven data
- PHP/MySql
- FLV Sorensen

### **Pocket PC/PDA Windows Mobile 2003 Platform/ Flash Player 7**

The Pocket PC platform is a popular PDA that shares content with Windows-based desktop computers and supports a wide range of multimedia features.

Flash Player for Pocket PC enables to deploy Flash content and rich internet applications for Windows Mobile 5 and Pocket PC 2003 devices. The main reason why this option makes the experience of producing rich media mobile applications in

- Web browsing compatibility
- Flash Player 7 support
- Action Script 2 support
- XML socket support



- Web services and SOAP API
- Video/audio compatibility
- External data serialization

### **Online Mobile Application**

The application has been developed using Flash CS3, PHP, XML and Flash Encoder.

To view the online application in the pocket PC/PDA device, it is necessary to install the flash player 7 for Pocket PC. The steps for this process are located in Appendix G. Once the player has been installed, the user will be able to use the application. The user interaction is extremely clear and the steps needed to access the information are simple. Flash allows an easy and intuitive way of retrieving and accessing rich media content. The trace of a user interaction consists of three simple steps before the user can actually display the content. The steps are found in Appendix G, and here is the ID and associated emotional states:

***a. Application is loaded receiving the category value as a dynamic variable.***

| ID | Emotional state               |
|----|-------------------------------|
| 1  | A little anxious + calmness   |
| 2  | A little anxious + excitement |
| 3  | Very Anxious + calmness       |
| 4  | Very Anxious + excitement     |
| 5  | A little joyful + calmness    |
| 6  | A little joyful + excitement  |
| 7  | Very joyful + calmness        |

|    |                               |
|----|-------------------------------|
| 8  | Very joyful + excitement      |
| 9  | A little sad + calmness       |
| 10 | A little sad + excitement     |
| 11 | Very sad + calmness           |
| 12 | Very sad + excitement         |
| 13 | A little content + calmness   |
| 14 | A little content + excitement |
| 15 | Very content + calmness       |
| 16 | Very content + excitement     |

### ***Dataset and Data Communication***

The data communication between the resident pda application that receives the information from the sensors and the online rich media application has been made using query string php data transfer. The associated code is found in Appendix G. The way the information about the characters is created and stored is dynamic and using XML. The data can be migrated to a MySQL database when a backup is needed depending on the host server. The XML document consists of storage units called entities, which contain either parsed or unparsed data. Parsed data consists of characters, some of which form [character data](#), and some of which form markup. Markup encodes a description of the document's storage layout and logical structure. XML provides a mechanism to impose constraints on the storage layout and logical structure. The data structured generated every time the administrator creates a new memory for a character, and can be found in Appendix F.

#### **3.6 Rich Media Content, Metadata and Memory Objects**

Every time a new memory is created for a character, there are four main elements that can be produced and uploaded to be retrieved: Video, photos, audio and text.

At the same time, there are certain parameters or metadata that will indicate the application what type of information is, this is also found in Appendix section.

##### ***a. Creating .flv videos***

Adobe Flash Video Encoder is a stand-alone video encoding application that encodes video in Adobe Flash Video (FLV) format. The FLV format lets you easily incorporate video into a web page or Flash document in a format that almost anyone can view using Adobe Flash Player. The

ubiquity of Flash Player ensures that both the mobile app and the online admin tool website can view Flash Video without downloading additional plug-ins.

On2 VP6 codec is the default video codec to use when encoding FLV content for use with Flash Player 8 or later. Using the On2 VP6 codec provides the following advantages when compared to the Sorenson Spark codec:

- Encodes higher quality video at the same data rate
- Supports the use of an alpha channel to create composite video

To support better quality video at the same data rate, the On2 VP6 codec is noticeably slower to encode and requires more processor power on the client computer to decode and play back the video data. For this reason, when compressing the video for the mobile application, I have used a previous codec, Sorenson, which optimizes the video stream with Flash Player 7, the best option for our mobile app.

*a. A character's memory object*



**6. Online Admin Tool**

The application is controlled and updated using a Content Management System application that enables the user to upload content to the server. It stores the information in the database and has the following functionalities:

- Login/Password
- Create a character
- Delete a character
- Create memory
- Delete existing memory

The application uses action script, xml, php to create the data, and this is displayed in Appendix G. One of the main achievements of the project has been the development of a prototype dynamic garment that incorporates wireless technologies and bio-sensing devices to activate a rich database of image and sound.

### **HimbaChronotopes**

Culture has worked towards persistent memories throughout history – from storytelling to video recordings, history is created of cultural necessities to preserve the truths, the memories of the culture. Today, identity can be defined by various cultural aspects or even how we define ourselves through our digital identities, our social networks. However, cultures like the Himba culture, are at great risk of these very advances changing their way of life, creating difficult paths that may reduce their ability to preserve their heritage and their cultural memories. This project was designed to surpass the boundaries between traditional and non-digital culture and memory,

by finding a way for the same methods of sharing to evolve directly to social media. This product embraces the technologies of RFID, web, mobile, and multimedia technologies to document the Himba and Namibia living traditions through objects, creating access to the world.

This project used fieldwork, which focused on the memories that emerge from the crafting process and everyday use of the cultural objects. The objects embody the quality of the physical space as functional utensils and carry the virtual materiality of the ecosystem (e.g. wooden carved headrest). The project documents how the objects are made, and how the Himba interact with the object on a personal, social and environmental level, specifically focusing on how they perceive their process, which will be achieved through interviews. Based on process in narrative theory (Labov, 1982; Mortola, 1999), the interviews will encompass questions concerning:

- 1) the ‘orientation’ aspects of the narrative, describing some equilibrium of the interaction with the physical and social environment,
- 2) ‘complicating actions’ describing the disequilibrium or trouble at the heart of making an object ready for use and interacting with raw materials,
- 3) narrative elements of the resolution of the process of generating and using the object to come to some degree of ‘closure’ and make sense of the creative and productive experience.

The video material, based on a categorized set of objects and narratives developed (see table 1), was used to populate an online multimedia database and is associated to each object by using RFID or an ID number placed in the objects and initiating a HimbaChronotopes. Each narrative of the HimbaChronotopes contains annotated cue points and meta-data that will allow



future users that buy or receive one of the HimbaChronotopes throughout the world to add and link more narratives to particular fragments.

The HimbaChronotopes website was assisted by Himba culture members; however, the site was not maintained for public use by the researchers. The ability to apply the technology was tested, but did not result in future projects. No personally identifiable information was gathered, and the study results were developed with the permission of all participants in the research. The goal of this research was to identify how memory saving of disappearing cultures could be completed using technology.

HimbaChronotopes will liaise with a local crafts Cooperative, such as the Namibia Craft Centre in downtown Windhoek, to place ID numbers or RFID tags in the crafts they make and that match the categories. This will immediately feed into the Craft centre's policy of promoting environmentally sustainable design, development and production. The management at the Craft Centre works directly with non-governmental organisations in Namibia to make sure that rural people have an outlet for their products and receive an income for their crafts. With training, mentoring and capacity building a priority, the Crafts Centre supports 2,000 Namibians directly and 10,000 people indirectly. HimbaChronotopes provides a new possibility for the objects sold to find owners all over the world. Additionally, their 'new' owners while carrying additional personal meaning conveyed by the Himba tradition, and users will be able to access the memories attached to objects from the online site created. This process is not available to individuals purchasing only from the market. The relational nature of the extra dimension given to the objects encompasses personal, social, and environmental information. Each item could be

a direct link to the Himba, their situation and perhaps a near-present history that will change as the functionality of objects changes after migration.

Storytelling is one of the oldest art forms and communication processes of human beings; initiated in the oral tradition, its form has evolved with the available media and with changes in society. Traditionally, how the story was told, depended on the way the storyteller chose the words and presented the tale to the listeners building the collective moment, having normally substantial alterations and variations as the story was told several times. Sung into existence by the ancestors, these stories actually function as maps of their terrain that can be augmented by travellers to recount. Interactive in the beginning with the advent of the written medium, storytelling, however, evolved into a non-interactive narrative style.

Media and web technologies provided a more flexible medium for storytelling. Networked objects and databases allow the weaving of myriad paths through an otherwise linear presentation and inclusion of sidebar material without disrupting the story for those uninterested in its detail. Stories or articles can be authored statically ahead of the reading or be dynamically generated "on-the-fly." This provides a medium that can capture more of the richness of the interactive storytelling present in the original oral tradition than previously available. In a mobile context within a cultural heritage landscape, technology can provide rich scenes upon which to set a tale or narrative, allowing the viewer to visualize details that could previously only be imagined. By the use of locative media systems, wireless devices allow a story to be presented in its natural setting, layering the narrative on top of real scenes, artefacts, or people, providing remote access to contextual heritage information.

Similarly, physical artefacts produced by the Himba are tagged and have produced a personalized HimbaChronotopes that users have access to viewing. The accessible information is a collection of non-linear stories, as the individual is able to participate. With a multitude of voices telling different stories in any given space, but being part of the same Chronotope, an ecosystem of different narratives in different places extends the initial conditions where the Himba produced the artefact, and that no longer exists. Users will effectively produce Chronotope blogging as they associate their posts with a given location, thereby, virtually inscribing a location with a multitude of different points of view.

HimbaChronotopes explores how situated narratives and the crossing of the materiality of new media with the immateriality of information can constitute and preserve the identity of a tribe under threat by heightening the awareness of the relationship between artistry and functionality so characteristic of the Himba tradition.

A field trip to Namibia was planned for the end of August, and will extend time in the field to approximately a month. The plan involves travel, lodging, car-rental (4x4 to drive in sand dunes) budgeting and the actual field-time involves plan of travel with a local translator, already known from previous work, and preparation of camping material.

Further planning of the work is in progress and involves standardization of interview questions, video equipment preparation, and further exploration of Himba objects that would be suitable for tagging, further exploration of cooperatives, getting in touch with those where possible, and development of the HimbaChronotopes website.

To carry out the HimbaChronotopes project a similar stay in the field is planned; staying with the Himba, camping just outside their camps, and traveling to various locations where the Himba live (as they are spread out and live in various different areas). The Himba will be approached by us through the translator, who has close ties to the Himba and speaks their language. A gift exchange takes place and the head chief of the area and the chief of the village need to agree to us staying, and the work that needs to be carried out. This process of negotiation is extremely important and secures our collaborative relations in the work. Next, a camping site is chosen, and collaborative research can commence. Various instructions will be shared with the translator a priori to make sure that the translator and the Himba are on the same page about the project. Once a week, the team will retreat back in Opuwo, the capital of Kaokoland and once the most Northern city of Namibia, for one night for a rest (and a shower) and re-charging of equipment etc.

As part of the plan, once the work has been carried out, we will be liaising with cooperatives to make the work functional as described in section 1. We will also present our work at an interdisciplinary symposium held at the Roger Williams University (Rhode Island, US) entitled 'New Media And The Global Diaspora' organized by professor R. Leuchak and assistant professor R. O'Connell. Some of the symposium's objectives are achievable through our project and we have therefore been accepted to present our work in October 2007. Below are some details about the conference.

The Global Communication Program and the Center for Global and International Studies at Roger Williams University in Bristol, Rhode Island, are sponsoring a symposium addressing

the relationship of New Media to the Global Diaspora. The symposium focuses primarily on the migrations of the past 100 years and how the “living traditions” transmitted by these communities are continually subject to loss, gain and interpretation. Media developed during this same period play a role, both direct and indirect, in this process as these traditions become transplanted into their “new home.”

The symposium has the following objectives:

- To encourage academic discourse focused on transnational migratory populations and the role new media plays in transmitting and sustaining their living traditions.
- To create a forum for researchers in the liberal arts and other disciplines studying the nature, significance and consequence of global migration
- To provide a concert performance of traditional music and dance illustrating the vitality of these living traditions.

We envision this symposium as a celebration of global communication, the liberal arts, and Roger Williams University's mission to “bridge the world” and are honoured to have been invited to present HimbaChronotopes.

## Chapter 4: Results of the Research

In 2000, Frohlich and Murphy published *The Memory Box*, a study of how a jewellery box of memories could be used to store information through the voice of the message from the person that either owned the jewellery or the box itself. This was the inspiration of the three projects selected for this research, based on the idea that users can make the memories that will remain with them throughout time. Like a voice recorded card, history remains in the memories stored in the box, with the jewellery. Research conducted in this study was designed to provide ideas in which to speculate of the future or memory and memory storage and to examine how well the projects worked in practice.

Six questions guided the research, providing aims and objectives,

- Research Question 1: What is the definition, purpose, and history of memory?
- Research Question 2: How are memories stored and recollected?
- Research Question 3: How are memories externalized and mediated in the digital world?
- Research Question 4: What types of control, hindering, or security are there for memories in today's society?
- Research Question 5: How is memory saving used in society, to create networks or to socialize?
- Research Question 6: How might memories be stored, preserved, accessed, or externalized in the future?

The aims and objectives of the research projects were developed from these questions.

Aims and objectives for the action research projects were:

Design projects that utilize the ideas of storing and accessing memories.

- What type of technology can be used in the same way as both physical and virtual memory storage to attain a sense of immortality?
- Can virtual and digital storage be used in the role of mediating memory?
- How can technology overcome the boundaries or lack of exactness in memory shaping and memory access?

The three projects are ScanMemories, for saving memories of past loved ones, HimbaChronotopes, and Wearable Absence. In this order, they are reviewed for meeting these aims and objectives. The following are the results, as compared to the literature.

### ***Summary of Findings in the Literature***

Digital technology is everywhere and continues to grow and contribute to society as a whole, but as an opportunity to mediate historical memory, it may be something different. This research aimed to speculate what that might mean, such as in the projects of Scan Memories, Wearable Absence, and HimbaChronotopes. If memories do not have to fade, if they can be as real tomorrow as they were the next day, would people want to explore these memories or prevent them from being lost? Today, family and friends keep lost loved ones close by preserving their Facebook pages, occasionally going back through them and reading the pages and comments again and again. The stay alive, through those pages, people can visit them. Is it possible that Facebook could replace the visit to the cemetery? Scan Memories considers that these are distinct possibilities. Individuals could access the information from a tombstone, even

100 years in the future, to remember the person who died, but they could also do this from the website where data is stored for any given period of time. While ghosts hover within reach off the busy and bustling highway of information on Facebook, could these same ghosts be just as easily within reach from a phone scan as a passerby wonders curiously about the tombstone they have past?

We cannot recall the first tremor of the first bite of an ice cream cake, the first kiss, the first time the ocean wind blew up our spine in the same exact way as we could in that very first time it happened. These memories remain, teasing our minds to reach for them; however, reliving those exact feelings is nearly impossible. Wearable Absence considers that we could step back into that moment, know the truth to how we responded, maybe even one day relive that exact moment as part of a virtual experience that includes the body responses that happened the first time. Wearable Absence records the body responses, changes in temperature, heartrate, and more. The one way in which digital technology has the ability to mediate and restore historical memory.

Today, anthropology seeks truth and preservation of disappearing tribes and cultures touched by the growing globalization and technological era; however, the preservation of these cultures, people, and their ways is slowing being degraded and dissolved with time. This could be an opportunity, what if tribes did not have to join the world to survive the changes? What if they could actually join the world and survive? HimbaChronotopes explores this very idea – in a digital technological world, is there a role for mediating historical memory? Tribes of people can share their story in websites, sell artefacts from their tribe, and contribute to the income of the



people through the sale of products. While these advances will still change the culture, the tribe, it can create opportunities, build pride of culture, and preserve the existence of the people.

The role of digital technology is speculating as serving the ability to preserve, relive, and remember the time before, or times we cannot simply regain, relive, or re-explore. We cannot revisit the times with a grandmother, but with recordings and images, we can relive. It may not be possible to have the exact response a second time, but what if that response was recorded, stored, accessed for use in the future? Anthropologists and environmentalists are working to save cultures and the world, and these are amazing areas of pursuit, but digital memories can preserve them, aid in creating interest in the tribe or culture, and provide the conditions in which people can remain within their tribe and still work to support the family and community.

### ***Physical and Virtual Space***

Scan Memories explored the potential for a virtual cemetery to include information and feelings from a variety of family and friends, to create a more complete immortal memory of the individual. Physical space and virtual space share commonalities as a result of how people use the spaces, such as journals and blogging, or picture albums and Facebook albums. People utilize the spaces available to store or share their ideas, voices, and memories. Today, people can access information about nearly everything, through Google and other search engines provided to users. In addition, YouTube, Facebook, Instagram, and other social media can be used to share events in a person's life instantaneously or saved for viewing later. Many social media or blogging sites allow users to store numerous years of information, carrying forward into time and continuing on as long as the account is saved and not deleted. However, some spaces are less permanent, such

as when user sets a time when the message, image, or video will expire. These types of virtual space usages are similar to physical spaces by the ability to throw the memory away.

Both physical and virtual spaces are similar in their ability to be stored or shared; however, virtual spaces have a larger reach. A photo album may only be shared to a few people, within a single geographical location, but a virtual photo album can cross oceans and reach lands far away from their origin. In as many ways that physical and virtual spaces are common, they are also different. Physical spaces are limited in access, while virtual spaces have fewer limitations. Similarly, physical spaces may be more or less able to withstand time, such as in a time capsule or through proper storage, versus virtual spaces that may disappear due to lack of use or removed due to content restrictions and space. However, physical and virtual spaces may be limited based on the ability to maintain the information. Houses may be filled with memory items and only be removed after a person has died; however, virtual spaces may be dependent on the ability of the organization to remain in business, servers to remain compatible with the information, or other conditions that could apply in different virtual spaces. In comparison, physical and virtual spaces are very similar, with different requirements and conditions that have similar influences but different roles they may have in the way in which memories and information are stored and shared.

### ***Role of Mediating Memory***

Cultures are lost, all through history, and memories of those cultures are eventually limited or lost to what archaeologists can guess from findings. HimbaChronotopes was designed to store the memories of a culture, and consider how the mediation occurs in the access of these

memories by a larger population. The role of mediating memory is more complicated than in any previous time in history. Today, mediating occurs as a result of how, why, and who is able to influence the memory. For example, a walk to the park wearing Google Glass could be the same as any other walk, until a friend or relative notices something that person making the memory does not, such as a piece of jewellery on the ground or an overheard argument that the individual missed. The memory itself may not have those areas to consider, until another viewer notices these items, and the memory could change. Any areas in which others can interact, during the act of making the memory or in response to the memory, could change how a memory is mediated.

Another example to be considered is the way in which memories are stored and retrieved as compared to pictures. A child may not remember their 5<sup>th</sup> birthday party at age 20, but with pictures, some memories may return. With a video of the party, the memory can be made new again. If the memory is mediated as a result of numerous input, videos, pictures, social media, and the shared memories of others present during the event, the individual understanding and recall of the memory could be changed completely.

Today, memories have numerous methods of being mediated and in the future this may be further expanded to things like Wearable Absence, which can store the memories of how the person felt, their physical responses to the memory. While they may recall a situation to have not been stressful, Wearable Absence may have another story to tell, a new way in which the memories are mediated and recall can be made. In the future, it is likely that individuals can share more than the images of their world, video, or sound, but how they feel and respond to a situation as well. This research speculates that virtual spaces may eventually use technologies

such as Wearable Absence to improve upon experiences. These methods change memory mediation and create new conditions for memory storage and retrieval.

Technology has a large influence over the world, including increasing globalization and providing new ways in which people can learn, love, and live. Google Glass may capture nothing of great significance to the average viewer; however, to this individual, the day may be something meaningful or purposeful in which the memory takes on a new shape through the use of the technology in creating the memory. This question asks if riding a bike is memorable without the sharing through social media and technology, or if the bike ride becomes more meaningful because of the addition of technology.

Globalization, technology, and social media applications have created an audience for anything that can be considered, thought of, or spoken. Audiences exist from the most remote of things to more common things. Some people view cat videos for long hours in a day, while others may not use technology more than just storing appointments and schedules. Technology provides a memory assistance, through the ability to provide people with information on what appointments they have or where a specific address is through the use of maps and navigation available on cell phones as well. The ability for it to meaningful shape memory is a concept more challenging.

### ***Shaping Memories and Memory Access***

Wearable Absence was designed to increase the ability of an individual to save memories as responses that occur in the body, which allows a type of re-enactment of the memory. Shaping memories occurs through the act of creating, remembering, and sharing or re-remembering.

Meaningful shaping of memory could be considered the ‘truth’ of the memory when viewing it on the video, image, or reading a post. A person may remember an event occurring one way, while the evidence demonstrates something different. This might suggest that technology keeps memory honest, refusing the mind the ability to “rewrite” history when things did not go as wanted or expected. An embarrassing moment becomes more so when it can be relived again and again through technology. Shaping memory also occurs when a story is repeated, such as by other people present; however, memories of events are different based on who the event occurred to or the relationship of the events. A single individual may remember one way, another may see things a little differently, but a video cannot change or alter its point of view.

When memories are stored, they may appear differently after time has passed. Wearable Absence explores the effect of reliving, and considers that this can in some ways possibly prevent the reshaping of memories. However, the ability to relive a memory may have other influences on how it is viewed. The first time a movie is watched is often completely different from the second time. Similarly, as people grow, different influences can create different ideas of how a memory is accurate, or relevant to the self. Wearable Absence could result in a variety of different memory storing, possibly even memory sharing, methods that reduce the loss of body reactions, but may not influence the perceptions of the memory later.

## **Chapter 5: Conclusions and Future of Memory Storage**

The Internet, as a means of mass communication and nearly endless storage source, has become a conduit for the endless desire of society to immortalize the past, present, and hopefully the future. A dream of Memex was a single individual looking into the future to see the evolution of technology to what may become fact – the ability to monitor every event of life, access memories of literally millions or even billions of other people, and use all of this information in the making of a single second decision (Buckland, 1992). Memories are important, and regardless of what aspects guide their creation, they become embedded in their storage devices – mind and machine – until lost or removed. The human machine can forget the memories, but can rarely remove them. The digital machines cannot forget memories, but someone can remove them. Either by accident or by intent, memories become integrated parts of the systems in which they exist. In the case of humans, memories become engaged in the active parts of the mind that can be tracked by neurologists and integral parts of many different fields of study – from education through sociology. The future may provide people the ability to never forget, and this research was designed to better understand the implications of a future they are predecessors of as the technology continues to evolve.

Memories serve many different purposes and roles in life, everything from safety through emotion and self-image; however, human memory is fallible. When people forget, regardless of what they forget, the information as it was first formed could be gone forever, and to overcome this challenge we do things to help us remember. We remember lost family members through images and documents, reminders help us remember birthdays and appointments, and pictures or

recordings help us to remember events. In the future, our fallible memories have many opportunities for improvement. Individuals could have improved memory function through wearable devices, such as cameras, body sensors, recording equipment, and more. Eventually, wearable technologies could essentially record every moment of a person's life, saving it in some digital form to be experience again by either the same person or a new person. If these memories are exactly as the memory occurs, it could be argued that they cannot create the exact same memory again in the same individual. However, the act of saving the memory could create hundreds more memories in the future.

### ***Research Questions Conclusions***

Six research questions were identified for the research, which included the following:

- Research Question 1: What is the definition, purpose, and history of memory?
- Research Question 2: How are memories stored and recollected?
- Research Question 3: How are memories externalized and mediated in the digital world?
- Research Question 4: What types of control, hindering, or security are there for memories in today's society?
- Research Question 5: How is memory saving used in society, to create networks or to socialize?
- Research Question 6: How might memories be stored, preserved, accessed, or externalized in the future?

These addressed the aims and objectives of the research, focusing on creating a background and understanding how literature perceives relationships between memory and other areas of life, including that of censorship or evolution of technology for memory. In the case of the definition, purpose and history of memory, it was found that a single most important area is that memory is different for everyone, but represents our ability to recall the past. Memory consists of many parts, from short-term to long-term and is both self or collective. What one person remembers one way does not necessarily occur the same for another person. However, it could occur in the same way, such as through Wearable Absence, which recreates or copies the biological responses to stimuli. If a person shared the technology that can recreate the feeling, then it may be possible for two people to have a similarly shared response. However, as indicated in the literature review, many things influence how current or past events are understood by the individual.

In question 2, memory storage and collection was explored. This area is the most difficult to fully encompass, because there are many different ways in which memories are stored or collected. This area was important to Scan Memories and HimbaChronotopes. Storage of memories has many purposes, but how they are stored is more fragile. If an individual recalls something, it may not be accurate. If a group recalls an event, it may be influenced by culture. If the historian finds the information for the culture, it may be interpreted differently than it occurred. Similarly, a coat that holds the memories of a past loved one cannot be retained, or retain its value, over time. Scan Memories provides details that are stored in a device that, while it can be destroyed, shares the same information over and over again without deviation. In the



project HimbaChronotopes, once the cultural information is saved, it is preserved until the larger databases are destroyed or the data is forgotten in information overload.

The next question examined was externalization and mediation of memories in the digital world, which includes how we create, store, and share memories. Internet and social media resources are widely available; however, there are other considerations. In the case of Scan Memories, a loved one may not share the things that were bad or negative about their lost loved one. Similarly, self-reflection or self-shaping of identity can control how the memories are shared with people in social or public medias. The digital world has the power to share with many people, very quickly, even if the sharing was an accident. This could reduce the type of information shared, including for cultures. Though it is not possible, in the future, Wearable Absence may be able to be shared using social media, this could also change how people view the types of sharing that occur.

Security is an issue that was not explored directly in the projects developed; however, they are essential to the question of memory sharing and storage. In question 4, the exploration was of types of control, hindering, or security for memories in today's society. A variety of answers were found, much of the answers created both negative and positive environments for individuals. Concerns were raised, specifically when considering the projects. Security today does protect people from bank theft and other types of theft; however, security is constantly needing more work. In the project Wearable Absence, an incidence of sharing that was not approved could result in negative consequences to the person who saved the memory. The response may be embarrassing, or result in other types of harm. Similarly, if the

HimbaChronotopes site was to have security issues, customers may be at risk of their information being stolen. However, security is not the only risk, because censorship occurs in digital storage as well, particularly in the Internet. Some countries are still censoring access to citizens and restricting what is shared.

Question five considered the importance of memory saving as part of the act of being social, people use memory saving tools to create networks and to socialize. These occur in sites such as Facebook. Scan Memories and HimbaChronotopes are examples of creating a social method of sharing information, though these are both also designed as preservation, they provide a sense of belonging. Networks are groups of people sharing common interest, which occurs in Internet-based groups as well as others. Creating networks improves upon sharing, but it may also increase hiding. Wearable Absence may have a group of people that share that they use the product, but it is not likely they will all be willing to share the memories stored. In the future, being social and creating networks may overreach the ideas of privacy and security. If this occurs, people may share even more than they do today.

All three projects sought to answer research question six, which was “How might memories be stored, preserved, accessed, or externalized in the future?” In the literature review, this question was also explored. Some considerations were the changes in capacity of technologies, which now may permit even larger amounts of data to be stored. Other considerations were about how people could store and share information. New technologies, such as Google Glass, and potentially Wearable Absence, have the ability to change the way

people store, share, access, and preserve memories over time. Some of these changes are happening even today.

### ***The Projects, the Past, and the Future***

These projects and related study demonstrated that technology serves many purposes; however, it also creates new purposes for the existence of the technology and new technologies. Many different people use technology to build self, create images, and store memories. Additionally, organizations are constantly looking for more applications for technology, and this information demonstrates the importance of memories as an application to technology. Many fields have the ability to benefit from this research, but successful application will be in related memory fields. Similar projects could be developed to better understand how larger groups can implement the technologies for medical purposes or for remembrance of lost loved ones. These projects occurred over the past decade and demonstrate the fast-pace that technology is taking, including in the case of memories. Memories may serve many roles, each having a place in the grow applications designed by research such as the projects indicated in this work.

Czerwinski, et al, (2006) identified five roles that memory serve: (1) memory for finding things or learning experiences, (2) personal experiences shared such as in storytelling, (3) learning or reflection, (4) time management, and (5) security such as for legal purposes or to lock a door. Memories serve roles in life; however, they can also be initiated through objects, images, sounds, feelings, or even smells. Many people collect objects significant of their past to help them remember the past, and while digital images and recordings can also be part of these collections; memorabilia cannot be wholly replaced by objects. "...They [objects] can be viewed

as symbols of personal power, symbols of the continuity of the self through time (involvement in the present, mementos of the past, and signposts to the future), and symbols of the permanence of relationships that define the individual in a social framework (Csikszentmihalyi, 1993)” (cited in Berzowska, 2006, p. 449-450). This explains many of the reasons that people save items from their past, from the past of relatives, or even collect things from significant places where history has occurred that they wish to add to their collection. The act of making memories, saving memories, and collecting mementos of memories is assisting in the creation of self. Self-image can be both public and private, but require memories and evidence to support the perceptions.

The goals of saving memories are important to individuals, but they are also important to communities and cultures. Over the years, methods for saving and storing the past have been of both sentimental and of significant importance, such as boundaries of land versus a family heirloom quilt. Memory saving processes is perceived as inevitable in consideration of the social needs and habits of humans. To interact socially, a person must recall details of another person, place, or thing. In addition, memory assigns emotional reactions to different conditions, even to different people. We remember our parents fondly, but a bully from our childhood may bring fear or hatred. When digital memories are stored, they cannot store the emotions, things that are shared when communities and cultures preserve their memories through storytelling methods or through documentaries and autobiographies. History preserves the emotions from the time to build identity in the present – this is true of individuals and of communities, cultures, and nations.

However, saving memories have been complicated in the past. Storage of memories that

were complete in details and emotion as the presenter felt it, were limited to books, which required care and upkeep. Monuments could be built, but lost meaning and weather could destroy them. Today, digital data can be stored in a much more immortal means; however, it still needs caretakers. Someone or some group of people must be responsible for maintaining the memories stored, and this gives individuals the power to determine which historical memories are relevant or appropriate enough to share, save, and store. Currently, cultures are not driven by the risks of the future where their existence can be deemed unimportant, because individuals in many different cultures, communities, and nations are able to store their digital memories in online databases that are free to the user, and often able to be shared through the mass communication channels. However, there are no guarantees that the material will not be removed, as these are still governed by forces typically outside of the control of the users.

People do not simply access their own memories as part of digital access. The Internet is filled with social networking sites and forums where people spend time talking with individuals of similar habits, interests, or hobbies. People interact with each other, sharing memories, storing memories, and engaging in communications that change memories. These communications may even influence how memories are remembered later. Some of these Internet “places” are also accessed through real places, or Internet versions of real places. RFID technologies are infiltrating everything from merchandise through medical items, and even have potential human adaptations. When a person wishes to learn about someone, from history, scanning a small RFID could result in an entire history. However, use of the RFID device to enhance memory sharing is a newer concept, such as by creating items that RFID devices can store information for a visitor

to access. Devices that store information can provide less information overload to viewers by storing the memory outside of the digital resources that currently occupy the largest amounts of space in the Internet – such as websites. RFID devices can be used with a viewer to access the specific information relevant to that RFID symbol on an item.

Scan Memories examines how memory practices in and around death can be stored, retrieved, or even altered by information technologies. This includes the questions about how it can alter memory, or perception of memory, by the storage of the memories. This particular technology is passive in nature, because it can only be accessed by choice, and does not contribute to the greater body of information that is often considered information overload. This type of memory is both individual and cultural in nature. When this memory is stored and presented for access, it contributes to individual, cultural, and community memory by archiving a moment in history and highlighting the life of an individual. Unlike other forms of technology, this type of technology requires a specific tag, RFID tags, which can be read by a program that can be inputted in many different types of handheld devices. When RFID devices are used for this purpose, they are able to transcend time and contribute to long-term history.

When RFID items are placed on tombstones, people can learn about the past of the individual during when they lived. These types of devices can store images, sound, and any other type of information that can currently be saved in a digital format. In the future, it is possible that digital devices will be able to store even more information from more senses. For example, in the future a digital device might share the smell of the steam engine as a train rushes past, or the smell of a person's perfume that was stored with their history. RFID devices could hold all of

this information or possibly use servers that can only be accessed when the RFID item is scanned by the cell phone or other device. Technology has developed many changes over the year, the ability to save all senses to devices may be available in the near future; however, the ability to purchase such technology could be exclusive to only the wealthiest individuals of a society. If these types of technologies are not available to all peoples, it will restrict history saving to only those people able to afford the devices. In addition, sharing of those memories could become restricted as well. Advantages to devices and items, such as the RFID, includes the current technology potential, which could easily become available to all people as technologies change. This would promote much larger use and much better saving and sharing abilities for memories. Technology advances could provide many potential upgrades to technology; however, it could hinder its use as well.

Some cemeteries are already begun implementing RFID into their tombstones and promoting this method for engaging cemetery visitors. The RFID in the tombstone is a small device that is scanned by a handheld device such as a RFID reader or even using a cell phone or iPad. The device receives the location of the information and is guided to that specific information for the user. When the user is done viewing the information, they can simply leave the information. No information is retained other than the memory made by the individual viewing the information. However, the amount of memories stored could be timeless and always available. At this time, images and sound are the only two types of information that can be preserved, if the future promotes other senses as well, those types of information could be

implemented into the stored information as available. These types of devices could also be used in locations to share the history of the area or a monument. The uses would be nearly limitless.

Throughout history, memories have been saved for future generations or for sharing, using documentaries, whether through verbal storytelling, written stories, stories with images, or later through film and digital archives. Documentaries using communication can be flawed, by the second-hand approach of the storytelling or by the simple aspect that no two people can share a moment in the exact same way. Each individual sharing the story will tell the story or memory, in a way, that demonstrates their particular point of view, and in some cases, those points of view are guided and shaped by their past, the past of their culture, the nationality of their families, and more. When each memory is shared it is shared repeatedly into the future, acted upon by the new sharing and the new background brought to the memory. It is reasonable to assess that no memory, shared even by the source, can ever be relived in that exact same way again. It is even suggested that the individual cannot relive personal memories in the exact same way again, as each remembering acts upon the original memory. History is consistent with this perception of stored memories, with each interaction the meaning or emotion changes, even in situations where the message is strong enough to overcome. Not all individuals will review the histories and see the same messages; however, in histories that are near to the past, the community and culture often shares the past with emotions that can remain strong for some time. Examples could be war or deaths.

A project developed to explore memories includes short interviews with users of the RFID project who identify with items inherited from lost loved ones. These interviews explore



the memories that the items bring or that are stored in the RFID device itself. Many different people may wish to recall their ancestors; however, understanding which of these memories are most important can be difficult to assess. When one individual handles a coat from their grandfather, the lingering smell of pipe tobacco overcomes their senses and they are taken back to a single moment in time they spent with him, and yet another person might hold closely to a lost child's blanket, and yet another to the keychain their spouse always carried. Each of these individuals' experiences memories that only an object can provide to them, memories that would be lost without the item and could be lost with their demise.

RFID devices can store digital memories, at this time in technology those are only images and sounds, and these cannot replace feelings, emotions, or even smell. Each individual can only receive a small picture, as if looking through a looking glass, into the lives of those the memories belonged to and they can only imagine what the rest must have been. For centuries, this same process has occurred in reading history through books, as if the only part of the memory that was actually real was the one the reader created into their own mind at the time of the reading; however, the memory was history and, at some point, it had been present. In the future, people will have this same looking-glass approach to this history; however, it will be acted upon by sound and sight. In the future, that might not be enough for people wishing to save their memories, they may want to know how the person felt, remember how they felt, and even understand the sensations as events unfolded.

This future may not be so far away; wearable items have been developed and used in studies for decades. Hanging a camera around a person's neck, programming it to take pictures

in 30-second intervals and snap a shot at a change in light, were only the beginning. Other people have integrated their experiences of life into cameras worn on their heads and “always on” technologies that monitor everything from their actions to their blood pressure at any given moment. Always on technologies are not exclusive to memory capturing devices, around the world in everything from airports to street corners people are being monitored by recording devices capturing video and sound. An individual can recapture not all of these memories, but their existence adds to the amount of information in the world about that individual. Histories are created using information from many different sources, in the future, “always on” technologies could contribute a large percentage of history documenting.

Cameras, recordings, and digital storage of pre-recorded information is not the only methods of saving information; while they are currently the most common and the most accessed. Projects around the world are working towards devices that record emotion, thoughts, smells, and even the way our body responds to different stimuli. One of these types of projects includes the wearable sensors that can be embedded in garments and mobile phones. Sensors like these will be able to monitor heart rates, breathing patterns, body temperature, and more. While they cannot record smells and emotions quite yet, they work towards recording even more than can be gathered just from an image. Imagine if a person looks at the clock and sees that it is late in the evening. The first person might become anxious because they are waiting for someone who is late, and this time causes worry. Another person may actually be checking in anticipation of a television show they wish to watch or another highly anticipated event to begin. Finally, another person might not have been looking at the time; just the flicking of the light had attracted

their eyes as the digital clock changed. Each person exhibits a different set of bodily responses to the clock, so while the picture of a person looking at the clock can simply be a picture, what it means will vary based on many different factors. As images can only explain part of the picture, it becomes the property of the individual viewing it as they make assumptions as to the meaning. In the cases of images with stories, much of the meaning can avoid being inferred, but even words cannot replace the emotions and feelings themselves.

The project to create wearable sensors required the use of many different fields of expertise. It required experience with textiles, clothing, sensors, recording, storage, and more. For example, the wearable sensors would document an instance but need to be able to demonstrate what it was like, what other activities had the same responses, and these required programming of data to be compared and recognized. In addition, the ability to determine if the data is accurate required testing and review. Each aspect of the project was interrelated to each other but strictly reliant on a specific field of knowledge. In the case of this research, understanding how memories are formed, where they may get information from, and what parts of the mind actually use and store memory were relevant to the study. In addition, the research included how to better understand demographic data in relation to responses. For example, studies that demonstrate that older adults respond differently to different types of memories could be important to the ability of the project to identify different aspects when the memories are translated. Understanding how memory works, how it is different between different individuals, and how to create patterns in memory recognition are all-important aspects to this

particular project. The wearable sensors must collect the memory, store it to a device, and the information must become associated with something identifiable.

Wearable technology is not strictly a moment in the future; it is current and part of the present. Individuals already use these same types of technology to monitor diabetes, heartbeats, the breathing in infants, and more. Technology that interacts with the human body is also currently being used and evolving, including sensors that recognize when a part of the body should be moving and then proceed to move an artificial limb in response. Other types of sensor-based technologies communicate for people unable to move most if not all of their body. These types of technologies may eventually become technologies that can be implanted in the body itself. Some of this technology evolution has become a concern for the future of ethics, questioning if it is ethical to enhance the body using machines. Some concerns are the ability of people to use their personal documenting devices and sensors to monitor other people without their consent. Finally, other concerns are expressed in science fiction where writers explore how far these technologies may take the future.

In the present, the technology for wearable absence is bulky, like many other predecessors and current options available to users. Some examples would be cameras in hats or worn over the shoulder, computer packs that provide energy to the items storing information, and even bulky glasses with webcams attached to them. This particular project uses sensors placed into clothing and uses recording devices, in some cases; these types of recording devices can use wireless technologies to feed the information directly to another storage source. Each type of technology that lead to the development of this project has had a form of storage attached to it,

with the exception of more Memex, which was literature rather than application, still approaches where the individual has used multiple devices to record all actions rather than just one item. This technology stores and then accesses saved data to develop patterns and comparisons.

Some technologies are designed to save items just as they are, or how the individual intends others to see the memories. This particular type of memory saving is practiced in social networking in many places around the world, particularly popular using cell phones where individuals can instantly notify each other of their every movement, documenting with text, images, and even sound. Social networking sites cultivate the behaviour by providing users with space to store digital information, allowing instant access, and creating applications that can be used with many different types of technologies. Users share their life as they want others to see it, or in some cases, they share it by sharing live activities. In this way, social networking has guided some technologies, including Google Glasses and other similar glasses type technologies that can record everything the user sees and share it with others instantly. This type of instant access creates “live channels” where anyone can watch a person’s activities as the memories are made and become part of those memories.

The growth of wearable technologies can be perceived as existing in multiple different fields of use, medicine included. In the future, wearable technologies could present doctors with continuous information regarding patients without interfering in the person’s daily life. Monitors could be worn by expecting mothers to give clues on the heart rate and early notice on when labour will begin. This type of technology could easily provide users with early detection systems by monitoring blood pressure, cholesterol, insulin, hormones, and much more. The

ability to apply this technology to the medical field is not the only leading motivator for this type of technology. The gaming industry – an industry providing users with interactive entertainment – focuses on these same features to immerse players into the worlds created for play. The future is perceived to include many new and interesting ways in which a single person can actually “feel”, see, hear, and move within the confines of their home but appear to be in a far off world engaging in entertainment that could range from children’s games of hopping around to catch coins to games of strategy and war.

Some of these new types of technology can be considered invasive, allowing users to control content even when they are utilizing images or activities of other individuals who did not agree to become part of the content. In locations where these types of technology already feature users able to use the products in public places, organizations and citizens alike have voiced complaints about how these products invade privacy and create security risks. A person wearing Google glasses could possibly save the password to the bank account of person at a nearby table. Technologies an individual wears often actively engages in the environment around them, including collecting data from unsuspecting sources. Crowded areas are particularly at high-risk of accidental data collection. In cases where this information can be shared with the public through mass communication of social media, this could become a situation that would be public outcry.

Individuals across technology heavy cities and countries are not alone in the development of social media and networking in creating history to be shared in the present.

HimbaChronotopes is a project that embraces this type of technology and methodology. It takes

the activities of a single tribe, yet untouched by other cultures, and brings their activities and beliefs to the Internet where anyone can access the information for personal viewing.

Additionally, the tribe makes jewellery items, with specific designs, to denote meaning and share their creation through films and videos found on websites. This particular tribe is not alone in their discovery that their way of life may be changing, and the Internet has become a method for saving their history for future generations. The Internet stores videos of many aspects of the tribe's culture, from dance through daily life. Presently, this information is saved and stored for future generations to view. The creation of a digital history enables this group to preserve their past and possibly promote the restoration of their culture in their younger generations.

This particular project focused on the use of digital technologies to share the process and meaning of jewellery creation. The creations were specific in nature, as in they had designs that had special meanings based on the belief system of the Himba culture. In addition, the presentations promoted learning how to create this jewellery, which invites other people to learn the belief system that guides the production of the items. For example, the new creator of the jewellery may wish to make one that demonstrates friendship and good luck, this would require knowledge from the Himba tribe and how they view these particular terms and concepts. Each creation is original and unique, making the Himba tribe able to create these items to have their own individual memory and individual importance. Making these processes available to the public, and providing others with the merchandise, builds a relationship and memory of the Himba tribe.

In the process of creating restorable history for the tribe, this method also has the potential of restoring the tribe in the present. The jewellery created is a product that can be sold. In addition, the videos and the knowledge base invite people to view and understand their plight. With the use of the technology, the Himba people are creating a growing knowledge base of their memories and increasing the chances that their existence will not be forgotten easily. People will not only recall the jewellery itself – whether purchased or self-made – but they will recall the story and the history associated with it. This enables the Himba history, if not its traditions, to become part of the larger body of memories in the world. However, like many other communications, the Himba culture is subject to censorship by others monitoring the Internet or controlling digital sources.

Memories are currently able to be stored in digital sources; however, in the case of the Himba memories and many other individuals around the world, the sources chosen for storage are online in Internet servers. Servers can hold data for users, but many servers are subject to rules and regulations that are not necessarily related to the same rules and regulations of the users. Users may not find nudity to be unacceptable content, but the organization in control of the server may find this content to be inappropriate and remove it. This type of control is a risk to all memories saved and store in online sources rather than in servers or sources of personal control. While most memory is subject to different forms of filtering that we do control, such as self-filters, parental filters, or even cultural filters, individuals have little or no control over the filters that effect their digital memory sharing or storage habits. If individuals cannot always control how data is collected, when data is stored, or how long data is stored, the advantages to



these types of technologies could be meaningless. The primary objective is for technology to provide solutions to memory problems.

All of these technologies, and any technologies that require other than personal resources, are subject to regulations. These regulations are developed based on cultural norms and ethics, which later become laws and regulations. However, the use of technology in the present is typically unbalanced between users and providers. Many providers of the resources are not natives of the areas they serve, and servers outside of those areas may impose regulations, ethics, and standards outside the norm for that culture. These particular aspects of technology can put the goals of digital memory storage into a more complicated field of interest. If an individual cannot save their memories to online resources, they must collect them for only personal use. Today, many people collect and store memories for social sharing exclusively.

Social networks make up much of the Internet, regardless of perceived security of information or imposed rules and regulations. Consequences of this behaviour, in society, have included claims of increased theft of proprietary information, misuse of copyrighted materials, and even confiscation of materials on networking sites. However, this particular behaviour of users has been a guiding force in technology changes, including new methods for memory collection and storage, such as Google Glasses and related technologies. In addition, the steadily increasing user base of “gamers” is encouraging breakthroughs in technology that allows users to interact with the content they encounter. Technologies such as these will have an important influence on the future of the Internet, but more importantly on the future of memory saving and

storing devices. As people are better able to gather and store information, the ability to utilize these devices as memory enhancements will increase.

Creating new technology for use in memory collection, organizing and storage is important to the future. However, these types of technology are building on technologies being developed for other types of use, and in this way, the technology benefits from extensive research not required of a single field of study. Examples such as the RFID device were originally designed for use in objects to be applied for tracking the object and reducing the difficulty in monitoring inventory. The RFID device serves many purposes today and could serve many new purposes in the future. Presently, governments, organizations, and medical fields are only implementing them in business. Projects such as the one located here will reapply the principals of RFID similar to how QR codes are now found on packages and advertisements. QR codes provide users the ability to visit the websites and learn more about the product or object with the code. RFID will serve as a similar function.

Similar to the wearable technologies are many other technologies, from technologies that allow the user to monitor their own blood pressure or their glucose levels to the in-progress gaming research that will invite users to immerse themselves directly into a full-body gaming experience. The wearable technology will require technical development at the specifications of many medical applications; however, the integration will require applications much more similar to the applications of gaming software. To develop the project effectively, a temporary database was developed to create the impressions and assign roles. The wearable project would take many years to create if the associations were to be exclusively created in a learning environment, such

as the one created for the AI unit, Watson used in the show Jeopardy, in the US. To bypass the time required, the programming will include pre-recorded information created to be associated with the personal responses of the users, but will have no direct relationship to the people involved.

An example of how the technology will interact with created materials would be to say that the computer would be given descriptions of individuals, and their names, that are not those of the user or the people the user will encounter. The focus will be to discover if the software is accurate by assigning roles to each created profile, such as mother or father, and having the computer recognize those particular responses in the individual when they encounter the actual person in their daily life. These types of responses will contribute to the greater body of knowledge around the study and allow the technology to expand into a new domain of interaction between feeling and association. The computer programming is important to the success of the plan because it will be the method for which all of the emotions are stored, and it must be accurate.

Each of these projects focus on the continued enhancement of memory saving and storing. While the future may have many new methods waiting, current technology is limited to only the senses of sight and sound, because digital storage cannot capture smell, feel, or emotion. In the future, these may be within reach, as a direct result of steady improvement of biosensors that are able to detect even the slightest human movement. RFID devices could essentially reduce the amount of information overtaking the digital world, particularly that of the Internet. In addition, this type of technology utilizes storage choices that are outside the risks of personal loss

and outside the reach of universal regulation. The projects are limited in their current reach, but their use and their success are important indicators and predecessors to the future dreamt of in Memex.

### ***The Future of Memory and Technology***

The projects of Scan Memories, Wearable Absence, and HimbaChronotopes were developed over the course of the past decade, and though may seem outdated, based on current technology, they represent the evolution of technology in memory saving and production. For example, Wearable Absence intends to save information about our body during an activity, since the work of this, more technology has been developed for consumers to monitor their heartrate, and more applications for wearable and tracking information are being developed even today. The fast-speed of technology cannot be ignored, and the human-centred aspects of technology are well seen in consumer markets already. The future dreams, as demonstrated by Memex, were the goals of each of these action research projects. Memories are an important aspect that will continue to be a focus of how we use or develop technology in the future.

In the future, researchers should utilize the current studies on how memory works, from the physical studies of the brain, to determine if different types of technology save memories more completely. Additionally, research should continue to seek out ways in which technology can grow with the needs of individuals to achieve their individual memory goals. Some people may prefer to have information saved for after they are gone; however, other people may seek out memory technology to reduce the impact of forgetfulness or memory related illnesses of aging. Similarly, research should not exclude the impact that technology has on cultures, both in

the ability to store cultural memory and history, and how that method of saving may influence the memories themselves.

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## Appendix A – RFID and Terms Used

### *Profile Concepts Defined:*

- “Owned Profile” – each profile has its owner, identified as a Site Member or Admin, and each profile belonging to that specific account is listed as an “Owned Profile” under that account – an account being specifically the information directed to be available to a specific login name and password.
- “Visible Profile” – Profiles can be public or private, where public profiles can be visible to anyone who has access to the website, RFID, or GPS coordinates, and private profiles are only visible to the owner and people the owner invites. However, if a user can access even a single memory in the profile, the profile itself is visible to that user.
- “Profile Functions” – are actions that profile owners can take, based on specific permissions and access. These functions enable the user to customize their specific experience for their needs, including:
  - “View list of Owned Profiles” is a function that can be done by the Site Member themselves, and provides the user with a list of all profiles created by that member – requires login to the site.
  - “View list of Visible Profiles” – site visitors and members, which defines what profiles that user can view, and does not require login for viewing public profiles, but does require login for user-specific access.

- “View list of All Profiles” – only available to Administrators and project developers, and displays a list of all profiles in the servers.
- “Create Profile” – site members and administrators can use this option to create the profiles for memory storage.
- “Edit Profile” – site members and administrators can use this function to make changes to previously created profiles. Site members must have permission assigned to them if the profile to edit is not one of their “Owned” profiles.
- “Delete Profile” will completely remove the profile from the website by placing it into the “trash” folder on the server, which is cleared regularly by support staff, can be one by site members and administrators.

***Memory Concepts and Usages Defined:***

- *Memories* -can be created by users with at least one-profile and login credentials.
  - Every memory submitted is required to have a “name” and “description”, and it may consist of many different multimedia files.
  - Each memory may be assigned a public or private status, and if set to a private access a group can be assigned and members or visitors invited.
  - Members can access private group content by logging into their individual account and selecting to view *Visible Profiles*.
- “Owned Memory” is a memory created by a member, logged into their individual account, in any Profile that account owns.

- “Visible Memories” are any memories, public or private, which can be viewed by that specific account.
- “Groups” - each Memory can have one or more “Groups” assigned, which allows all Members within the Group to “see” the “Memory”.
- “Location” -each Memory can be assigned to one RFID label or single GPS coordinate.
  - Each RFID label or GPS coordinate can have many Memories from single or different Profiles, but each Memory can only have access to a single “access point” recognized as RFID labels or GPS coordinates.
- “Content” -each Memory has “Content”, which includes the Title, Description, and Media Files such as images, video, audio, and texts.
- “Member Groups” are defined as groups of accounts (login credentials) with one group name, list of accounts able to access the memory, and the ability to invite “new people” to become part of the Group through email.
  - Member Groups have the following functions:
    - Member groups are used to control access to the memories and profiles, without restricting private memories to the owners exclusively.
    - When an email is added to the list of the Member Group emails, a letter is sent to that address with an invitation to join the group, the name of the group, the website the group belongs to, general



information about the group, and a link to join the group through individual login credentials the user can create.

- The owner of the Group can add or delete members as needed.

### ***Profile Timelines***

The Profile Timeline is a visual representation of the memories to be navigated, organized in chronological order that represents years. Users can click on any of these periods to gain access to the content located in that timeframe. A Profile Timeline typically applies to the lifespan of the user or the profile (in case user is a relative of the profile individual), filled with memories as available. The goal of a Profile Timeline is to provide visualization of memory entries and allow users to select the content for viewing.

An Empty Timeline is provided to each Profile created and allows the owner of that Profile to edit the timeline and submit memories within the timeline. The owner can also remove items, change the order of the Memories, and change permissions for each memory in the timeline. Timelines do not change permissions for Memories; all Memories have individual permissions for viewers, either public or private. Users who can view the timeline may have access to only some memories in the timeline, if the memory is not viewable to the user it will not appear in the timeline. Owners of the Timeline will be able to view all memories regardless of their permissions. Memories can be viewed from the Timeline by selecting the Memory icon that represents that memory. Owners can create presentations for the Timelines or the Memories

by adding voice narration over the presentation, and users with permissions to the Memories can view these presentations.

### ***Website Roles***

- “Site Visitor” – a person who enters the website and can navigate the public areas but cannot gain access to any private information or member-designated information such as private memories. Site Visitors can:
  - View main page (Hot News, About Us, FAQ, Informational pages, etc.).
  - View news related pages (News).
  - Visit the Registration page and create an account with login information.
  - Login by entering their login credentials.
  - Password Retrieval (by entering relevant information for new password to be sent to the email account).
  - View a list of “Visible Profiles”, which consist of public profiles.
  - Sort “Visible Profiles” by parameters such as first name, last name, year, location, etc.
  - Sort “Visible Profiles” by fields.
  - View list of “Visible Memories” assigned to “Visible Profile”.
  - View “Content” of “Visible Memory”.
  - “Create Tributes to profiles.
  - Write text comments to memories.

- Download PDA/mobile application.
- “Site Member” is a person who logged into the website using login credentials that were recognized as legitimate by the server, and is designated as an account. “Site Members” have all the abilities of a “Site Visitor” with the exception of registration; however, a member could log back out of their account and log into a new account.

Other “Site Member” abilities include:

- View list of “Owned Profiles” also listed as “My Profiles”.
- Add new profiles.
- Edit current “Owned Profiles”.
- Delete “Owned Profiles” – with confirmation to delete or option to move to Archived.
- Archive “Owned Profiles” or “Owned Memory”.
- Assign Memories to RFID labels or GPS locations.
- Remove assignment of RFID labels or GPS locations from Memories.
- Change permissions on Memories between public and private or Group access.
- Add “Comment” to “Visible Memory”.
- Remove “Comment” from “Owned Memory”.
- Create “Member Group”.
- Add members to “Member Group” – Group Owner only.
- Remove members from “Member Group” – Group Owner only.

- Delete “Member Group”.
- See list of “Owned Member Groups”.
- See list of “Owned Member Groups” members.
- “Site Admin” is a super-user who has access to administration type functions within the website, including server related functions and member management functions, and can perform any actions that site visitors and site members can along with:
  - View a List of Profiles – which accesses all profiles saved to the website.
  - Search “Profiles” by parameters.
  - Sort “Profiles” by fields.
  - Add, Edit, or Delete “Profiles” (all).
  - Add, Edit, Delete “Memories” (all).
  - Add or Remove, “Tributes” (all).
  - Add, Remove, or Manage “Member Groups” (all).
  - Block email addresses, login credentials, or ISPS (as needed).

### ***Server Functionality***

This information demonstrates the intended functionality of the server and any changes that occurred or were needed during the project. The Database tables are located in Appendix E.

- Server side technologies included:
  - Java: Sun JDK 1.6.0 Update 10.
  - Web server: Apache Tomcat 6.0.14.
  - Flex interaction framework: BlazeDS 3.0.

- Database: MySQL 5.0.
- Server abilities include:
  - Users Management
    - Get user by login and username;
    - Update user information;
    - Get list of all registered users;
    - Delete user;
    - Generate new password for existing user.
  - Profiles Management
    - Get list of all available profiles;
    - Update profile;
    - Delete profile;
    - Get list of owned profiles.
  - Memories Management
    - Save new memory;
    - Get specified memory;
    - Get memory by RFID label;
    - Get memory by GPS coordinates;
    - Get all memories;
    - Get available memories (public or owned or all for administrator);
    - Update memory;

- Delete memory.
- Comments Management
  - Get all comments from memory;
  - Get specified comment;
  - Add comment memory;
  - Get comments count for memory.
- Cemetery Services
  - Get list of all cemeteries.
- Role Services
  - Get list of all user roles.
- Uploading
  - Upload avi, mpg, flv, jpg, jpeg, gif, png, and mp3 files to the server;
  - Avi and mpg3 files will be automatically converted to flv format;
- Downloading
  - Download videos in avi format and images in jpg format.

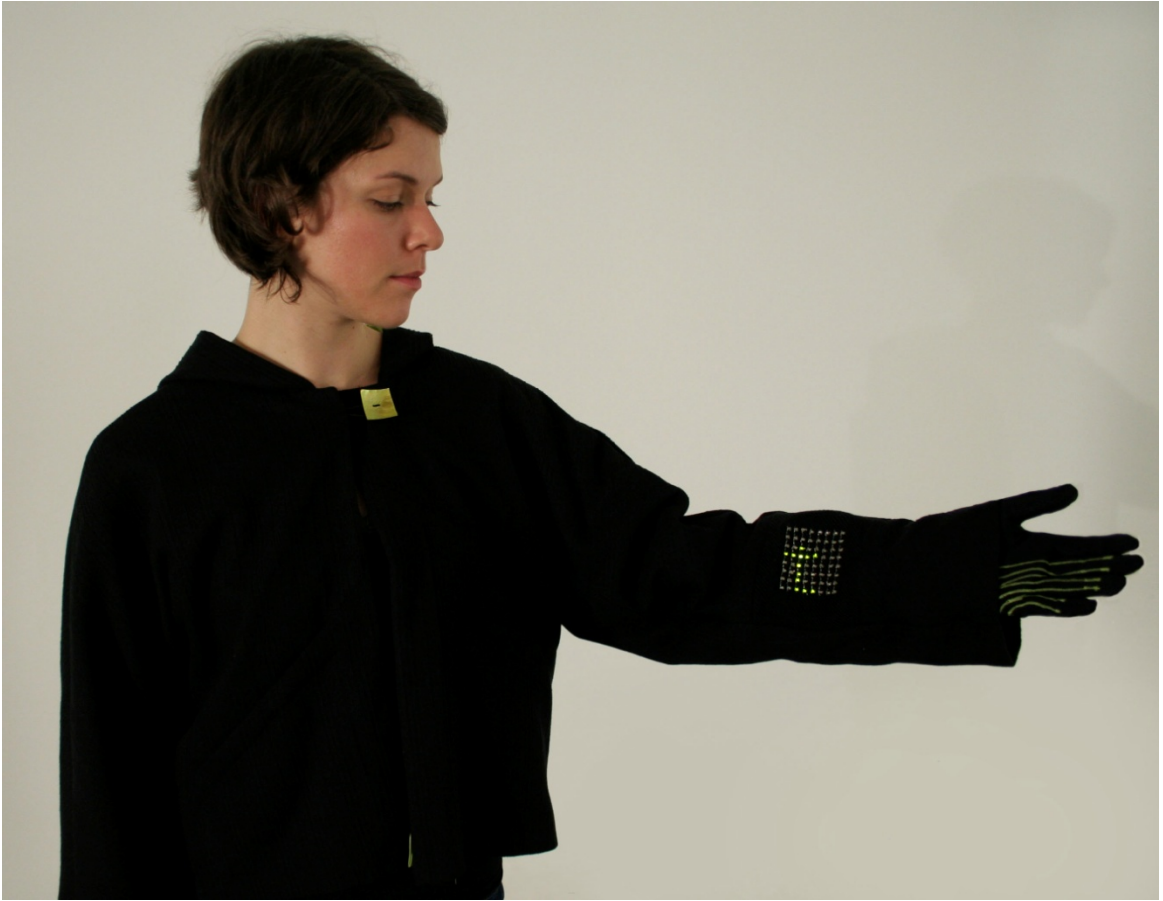
Scan Memories is a project designed to be user friendly, and instituted a number of user-friendly options designed to promote the functionality users are accustomed to in typical website communities. The primary objective was to meet the needs of individuals wishing to store and share memories of deceased family or friends. This could also be used to create journals of children, college or career paths, and more. This project was considered a solution to the project, previously mentioned, which discussed user memories of deceased relatives.

**Appendix B – Wearable Absence Images**









## Appendix C – RFID Applications

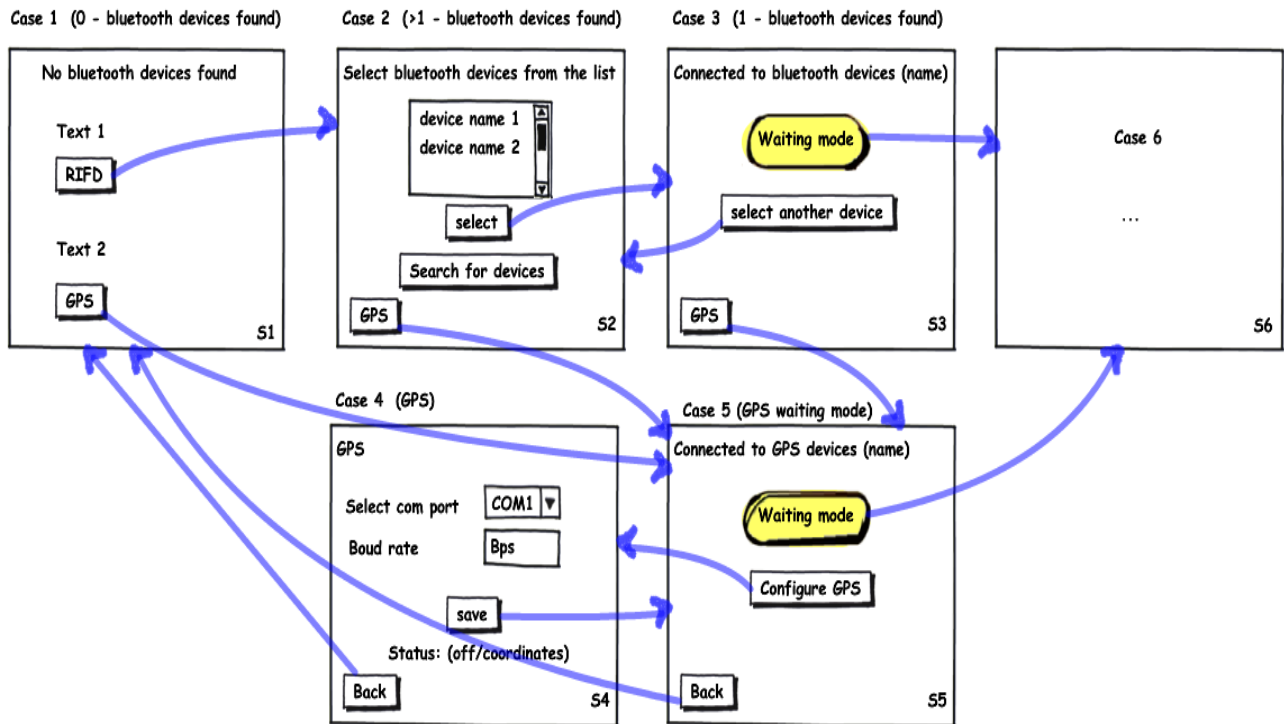
### Use-case PDA-app

1. User start C-application
2. C-application goes to tray and starts flash application.

Policy:

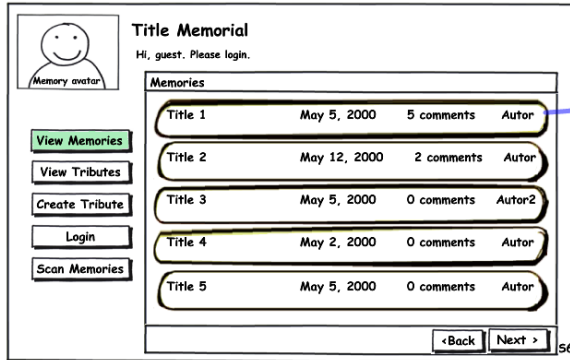
- User never works with C-application
- If C/Flash application is closed by user then flash/C-app. should be closed automatically as well.

3. C-application searches for available bluetooth devices.

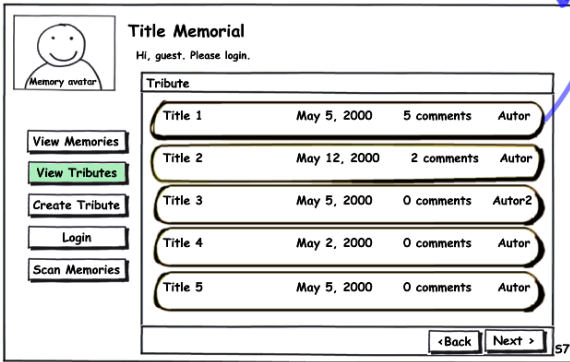


Use-case PDA-app

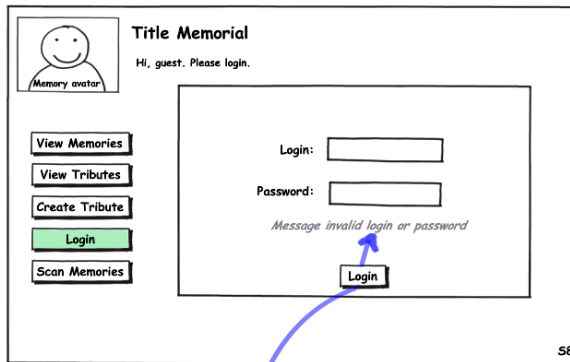
Case 6



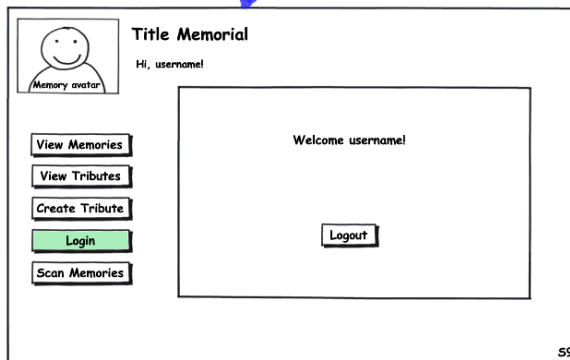
Case 7



Case 8



Case 9



Case 14...

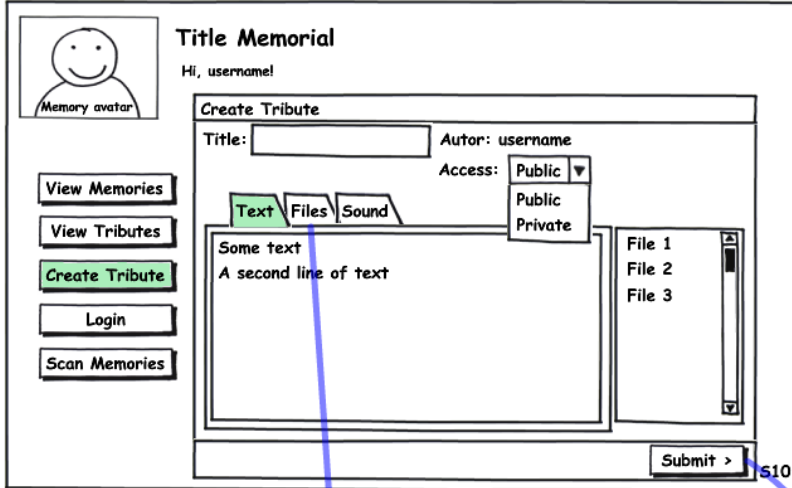
- View Memories
- View Tributes
- Create Tribute
- Login
- Scan Memories

Back to case 1...

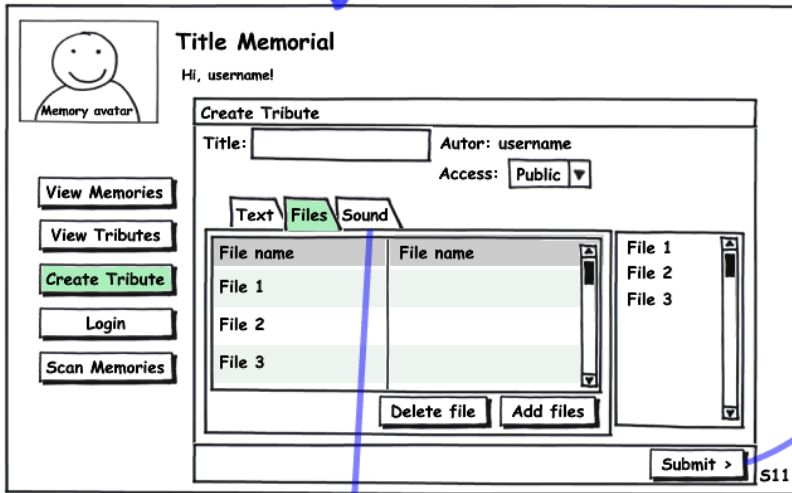
If login - Next case 10...  
else

Use-case PDA-app

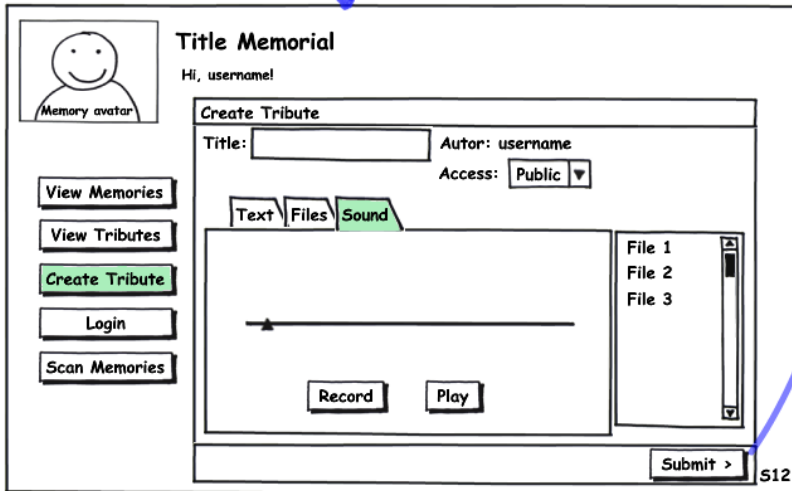
Case 10



Case 11



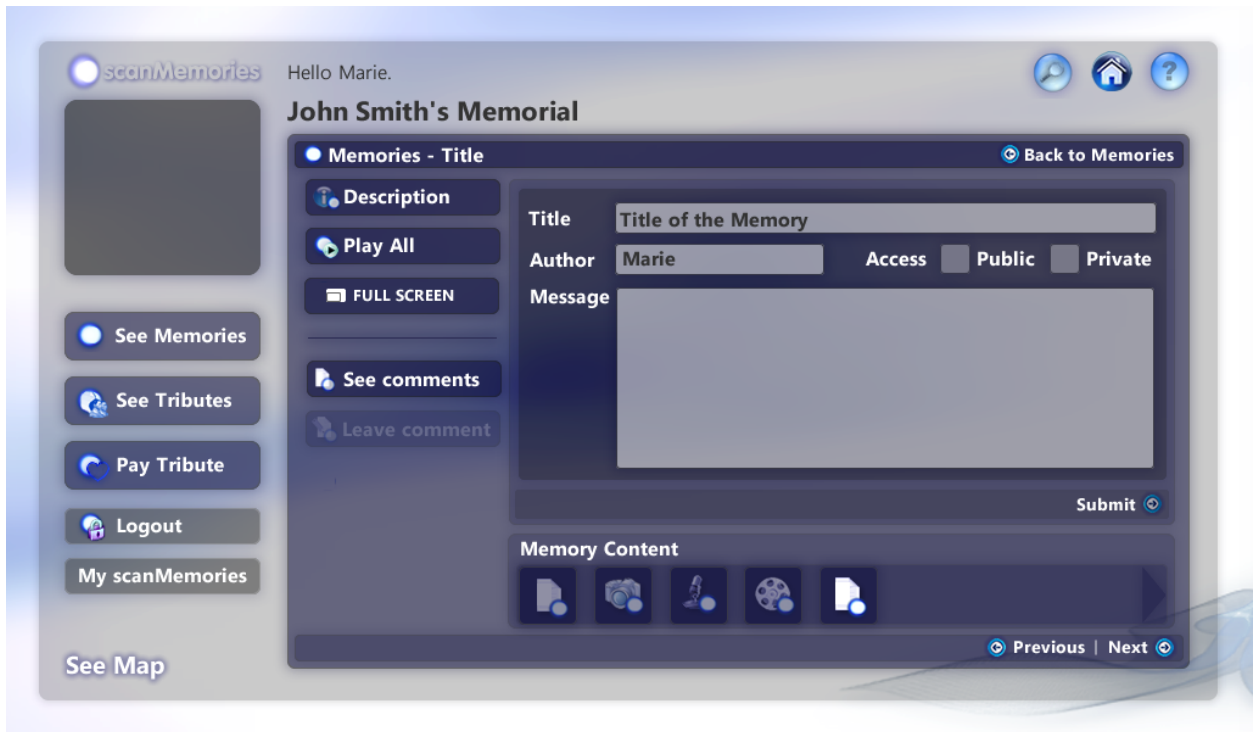
Case 12



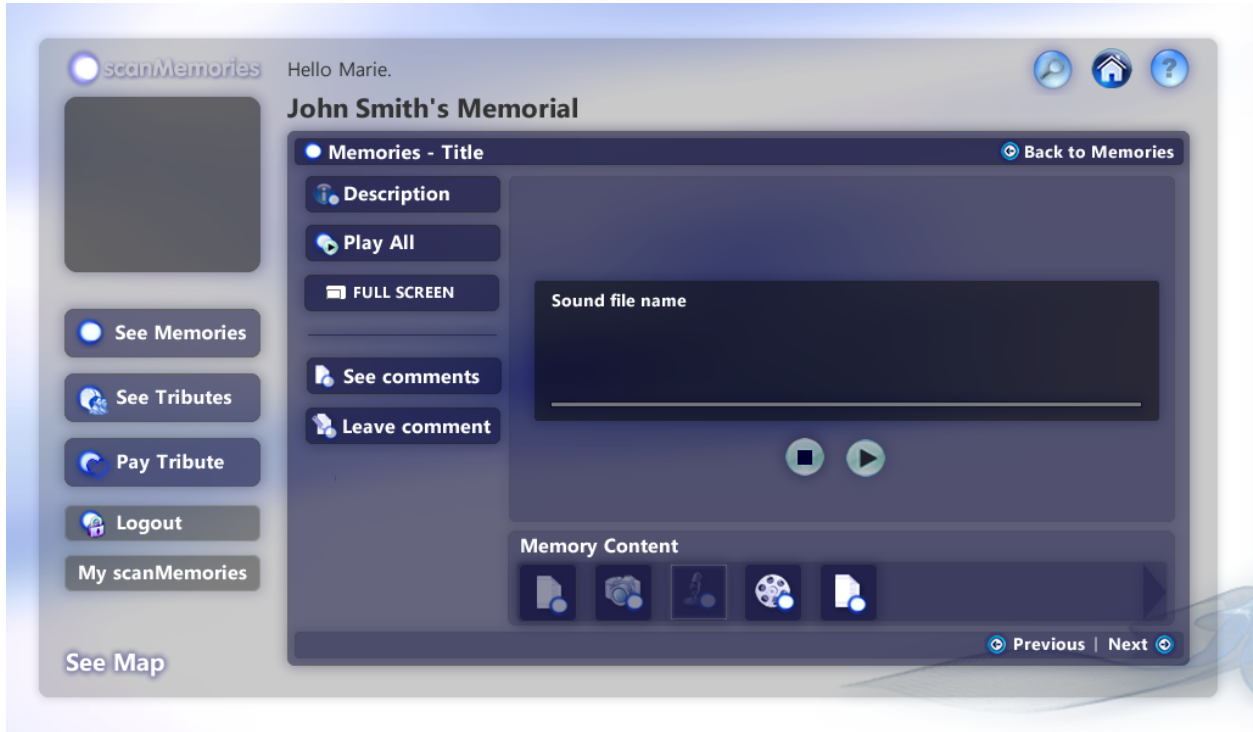
Goto case 7...

## Appendix D – Scan Memories Screen Shots

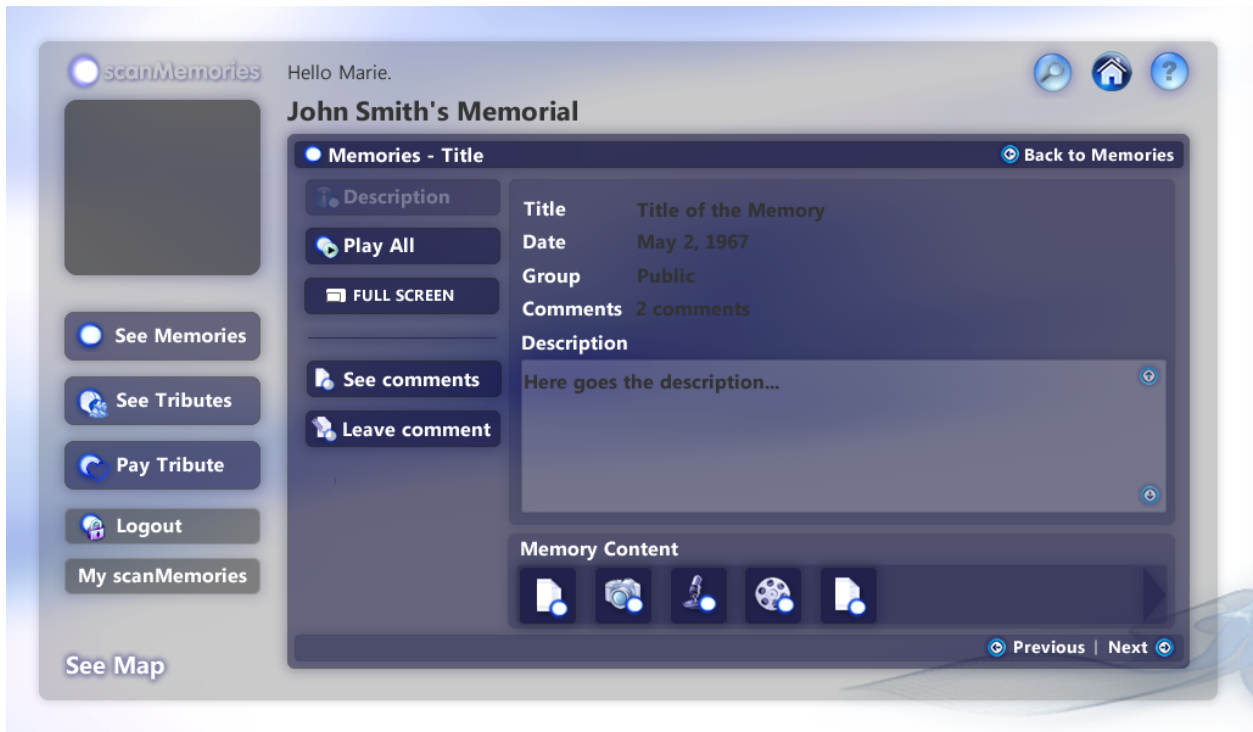


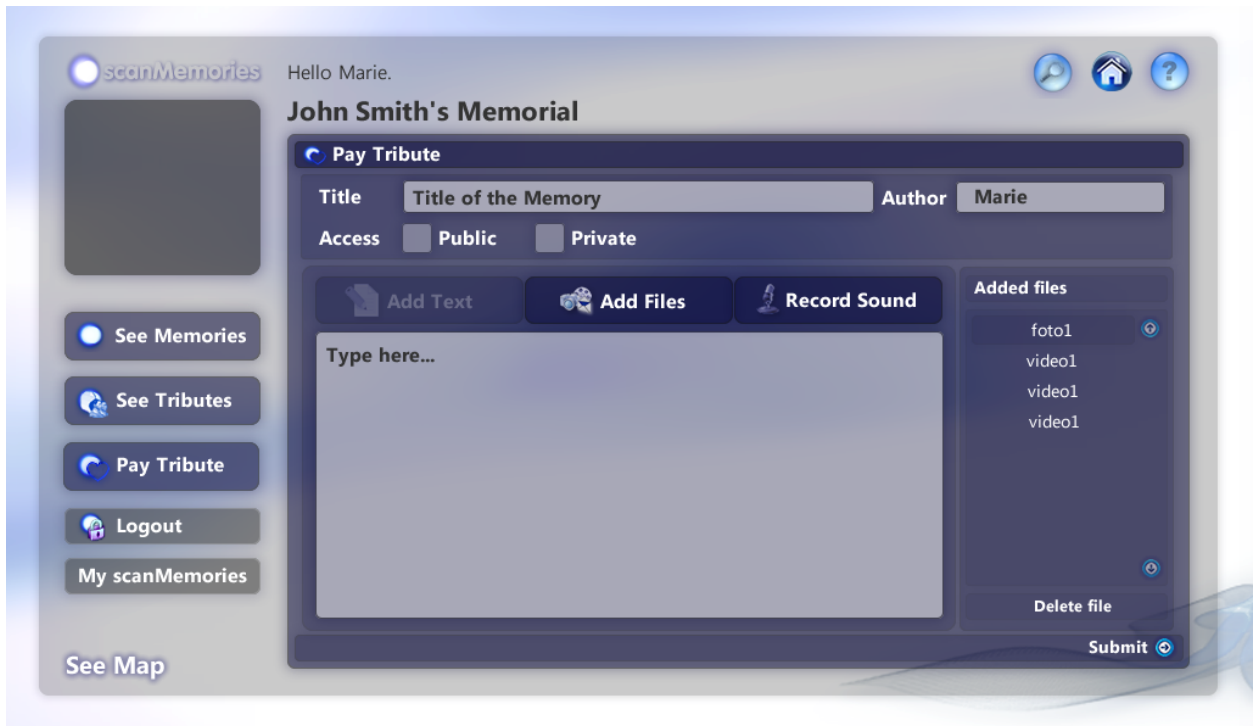
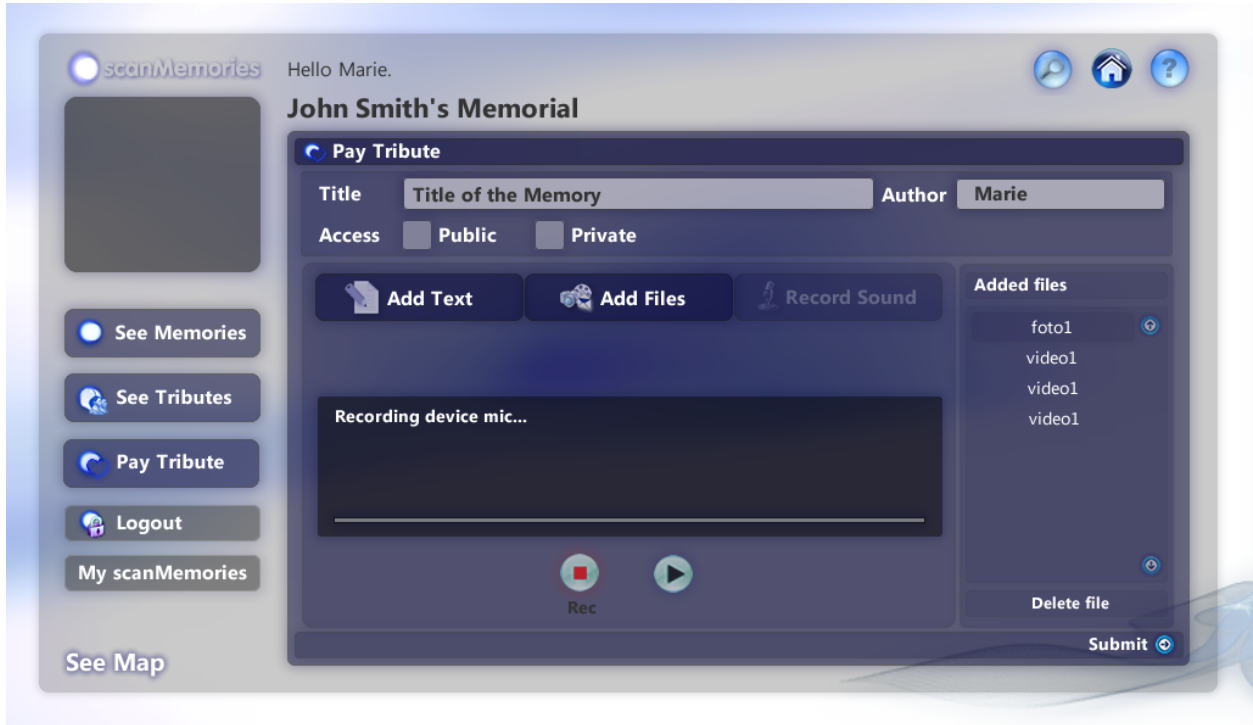












scanMemories Hello Marie.

## John Smith's Memorial

**Pay Tribute**

Title  Author

Access  Public  Private

| Name   | Date taken | Tags | » |
|--|------------|------|---|
| Lust, Caution (2007) Uncut Version             |            |      |   |
| Visions of the Future - Part 2 of 3 - The B... |            |      |   |
| Visions of the Future - Part 3 of 3 - The Q... |            |      |   |
| visions of the future part 1                   |            |      |   |

Added files

- foto1
- video1
- video1
- video1

[See Map](#)

scanMemories Hello Marie.

## John Smith's Memorial

**Tributes** Sort by:

|                                   |             |            |         | Date |
|-----------------------------------|-------------|------------|---------|------|
| My early days in the beautiful... | May 2, 1966 | 2 comments | by Paul | Name |
|                                   |             |            |         | User |
|                                   |             |            |         |      |
|                                   |             |            |         |      |
|                                   |             |            |         |      |
|                                   |             |            |         |      |
|                                   |             |            |         |      |
|                                   |             |            |         |      |
|                                   |             |            |         |      |

[See Map](#)

[Previous](#) | [Next](#)

scanMemories Hello Marie.

**John Smith's Memorial**

Memories Sort by:

|                                   |             |            |        | Date  |
|-----------------------------------|-------------|------------|--------|-------|
| My early days in the beautiful... | May 2, 1966 | 2 comments | Public |       |
|                                   |             |            |        | Name  |
|                                   |             |            |        | Group |
|                                   |             |            |        |       |
|                                   |             |            |        |       |
|                                   |             |            |        |       |
|                                   |             |            |        |       |
|                                   |             |            |        |       |
|                                   |             |            |        |       |
|                                   |             |            |        |       |

See Memories

See Tributes

Pay Tribute

Logout

My scanMemories

See Map

Previous | Next

scanMemories Hello Marie.

**John Smith's Memorial**

See Memories

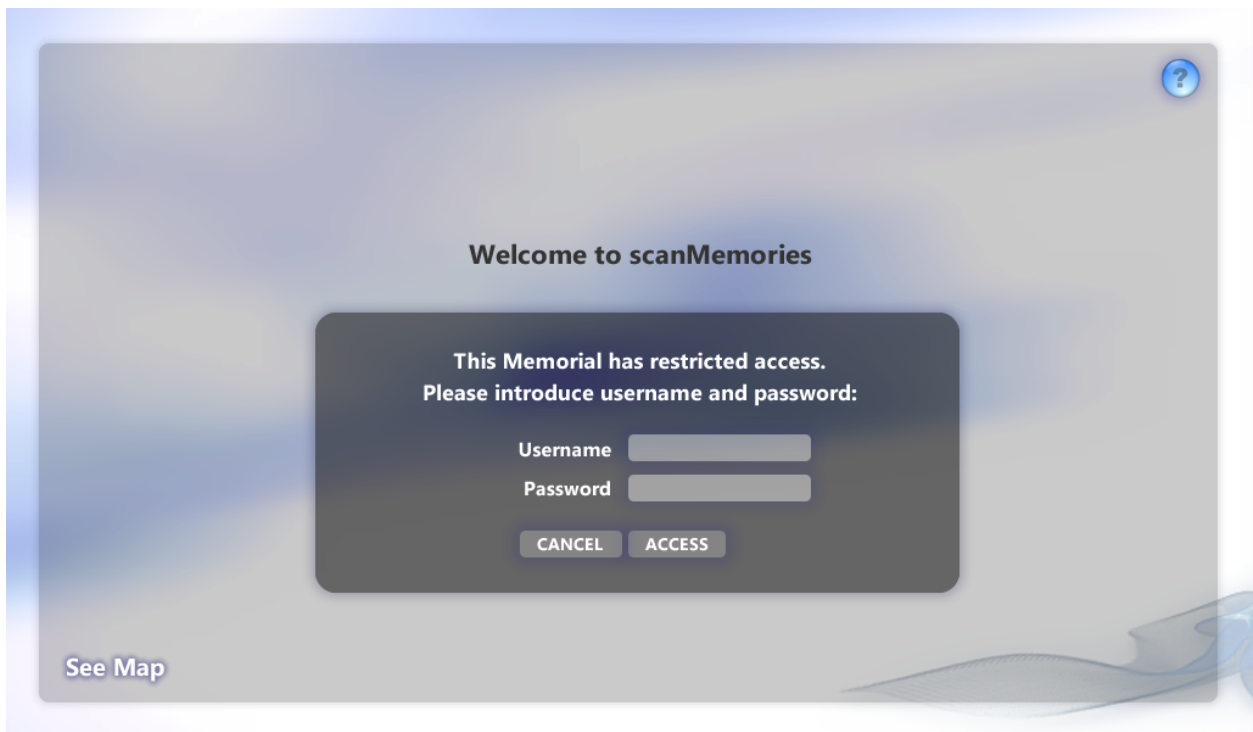
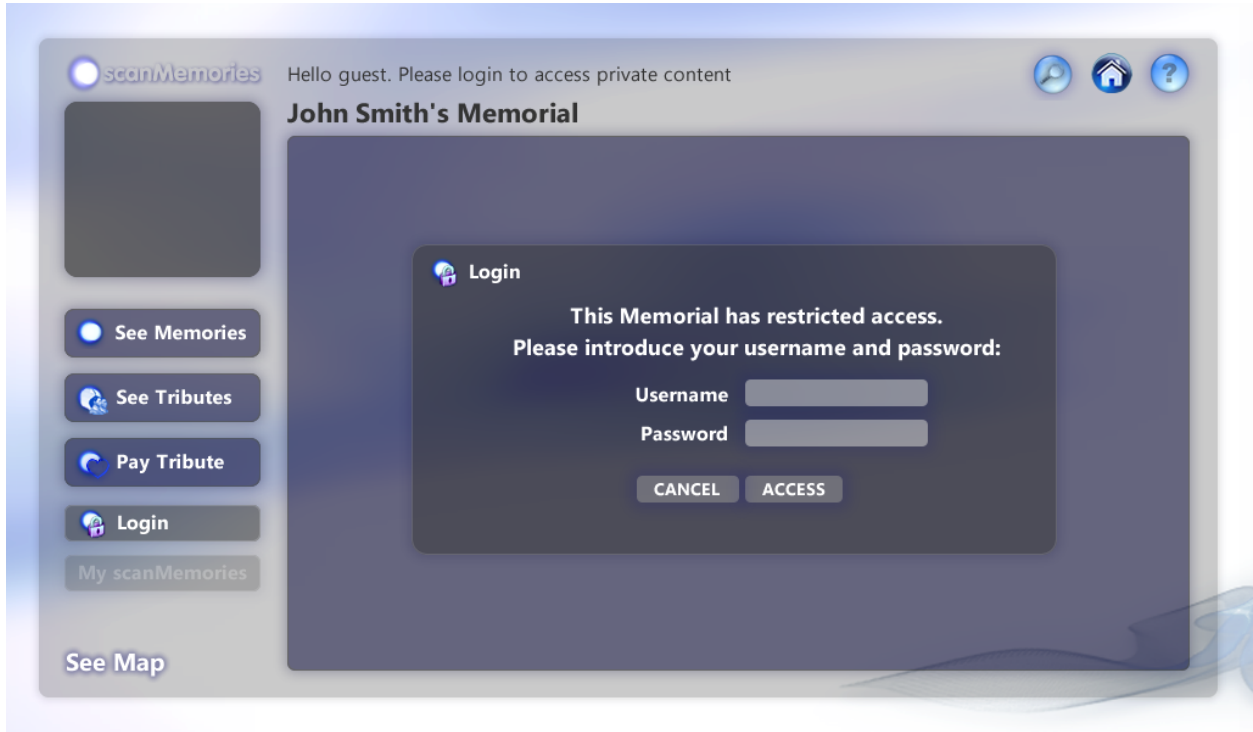
See Tributes

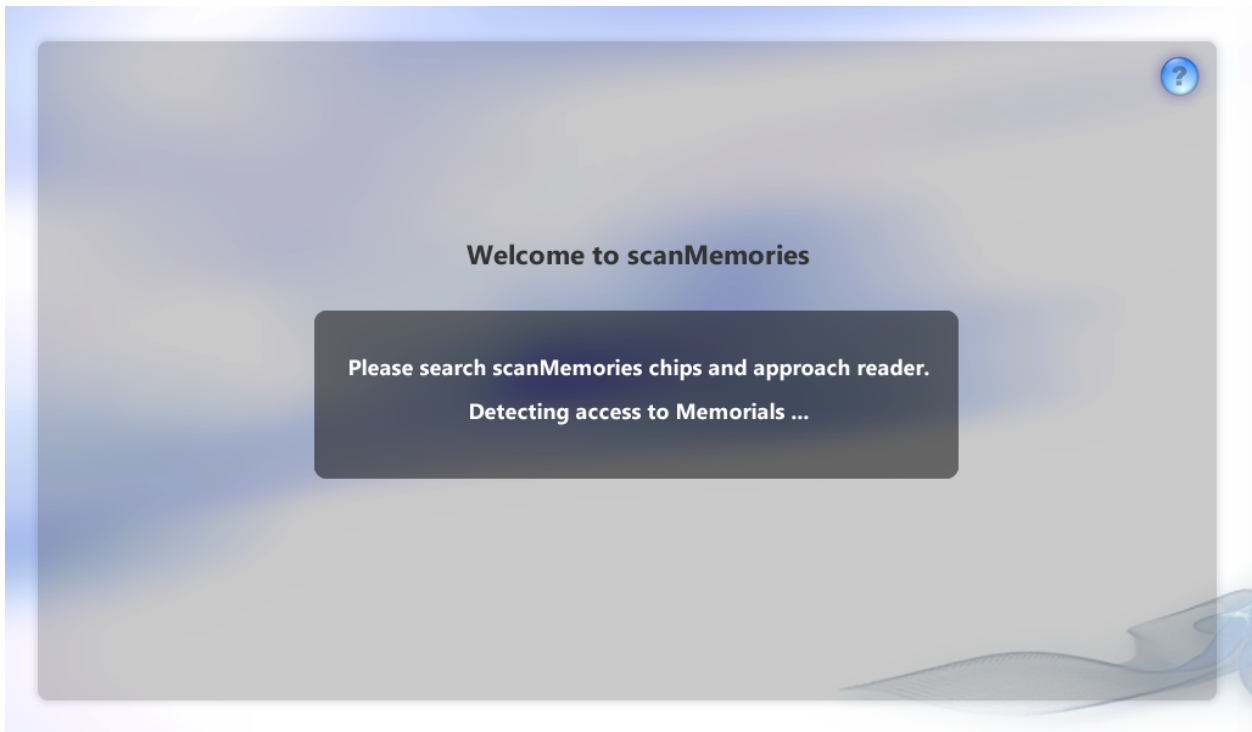
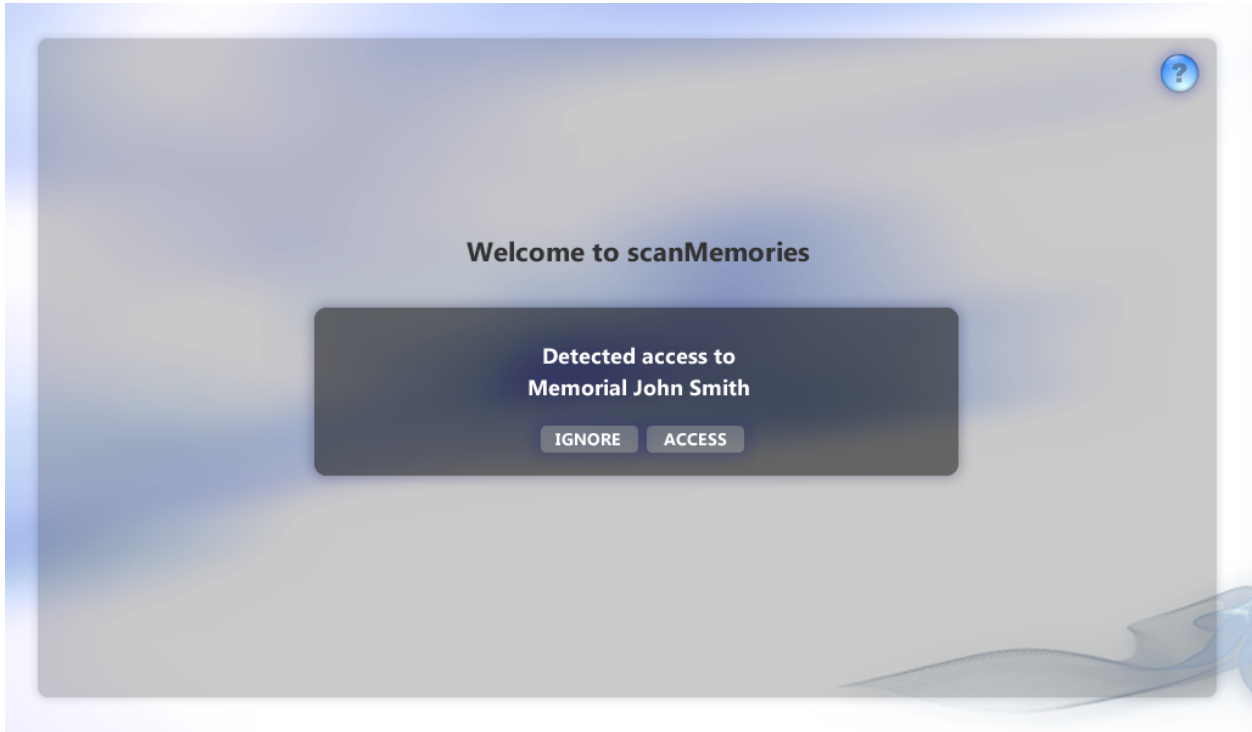
Pay Tribute

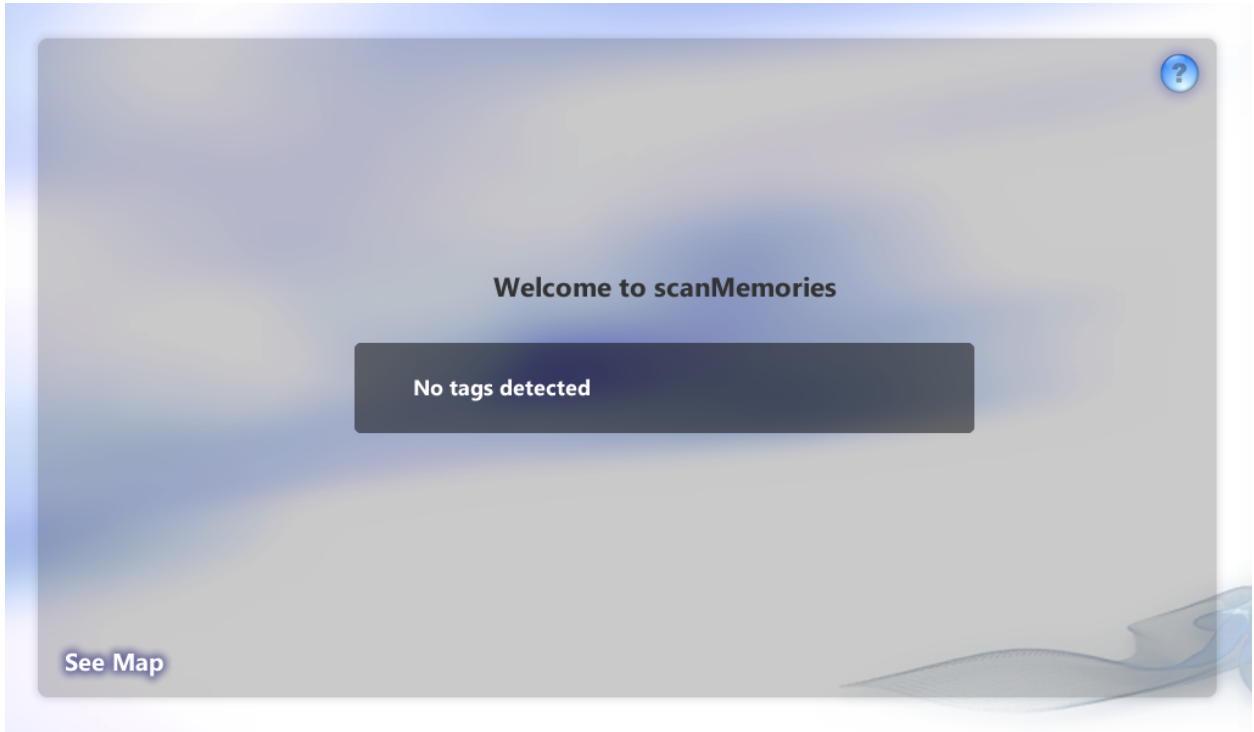
New Login

My scanMemories

See Map







## Appendix E – Himba Project Progress Tables

|                           |   |  |   |
|---------------------------|---|--|---|
| <b>Progress report I</b>  | <b>Field Work</b>   |  |   |
| <b>20 days</b>            | Development   | Objectives   | Result  |
|                           | <ul style="list-style-type: none"> <li>▪ Localizing Himba tribes</li> <li>▪ Exchange with Head of Tribe mediated my translator.</li> <li>▪ Selection of volunteers and sample of crafts to document (10 objects)</li> <li>▪ Film process following 10 people, using a process based on sociolinguistic narratives.</li> <li>▪ Arranging collaboration with Crafts Cooperative in Windhoek to tag objects</li> </ul> | <ul style="list-style-type: none"> <li>▪ Adapting to the Himba environment on a daily routine</li> <li>▪ Annotating narratives through video and interviews</li> <li>▪ Learning about the Himba’s way of life to capture processes by which objects are made functional more clearly</li> <li>▪ View the Himba in a larger world-perspective in terms of present influences and dangers of Diaspora</li> </ul> | <ul style="list-style-type: none"> <li>▪ <b>Editing of raw mini-DV footage containing narratives</b></li> <li>▪ <b>Script translation of notes and interviews</b></li> <li>▪ <b>Liaison with cooperatives</b></li> <li>▪ <b>Diary of experiential outcomes</b></li> </ul> |
| <b>Progress report II</b> | <b>Film Editing</b>   |  |   |
|                           | Development   | Objectives   | Result  |



|                |   |   |   |
|----------------|---|---|---|
| <b>20 days</b> |   |   |   |
|                | <ul style="list-style-type: none"> <li>▪ Script development</li> <li>▪ Use of non-linear narratives editing tools (Final cut pro)</li> <li>▪ Video encoding techniques for web and mobile formats</li> <li>▪ Post-production (music and art direction)</li> </ul> | <ul style="list-style-type: none"> <li>▪ Produce an engaging video-narrative that reflects the Himba spirit</li> <li>▪ Video pieces compatible with web and mobile platforms</li> </ul> | <ul style="list-style-type: none"> <li>▪ <b>Individual footage for each object</b></li> <li>▪ <b>Each footage will be frame-annotated</b></li> <li>▪ <b>Online trailer introducing the project</b></li> <li>▪ <b>Short film describing Himba objects</b></li> </ul> |

|                 |   |  |   |
|-----------------|---|--|---|
| <b>P.R. III</b> | <b>HimbaChronotopes Web Platform</b>  |  |   |
|                 | Development   | Objectives   | Result  |
| <b>10 days</b>  | <ul style="list-style-type: none"> <li>▪ Generic relational database (scaleable)</li> <li>▪ Web application architecture design</li> <li>▪ PDA Interface Design</li> <li>▪ CMS development</li> <li>▪ Interactive media design for the HimbaChronotopes Visualisation engine using Actionscript.</li> </ul> | <ul style="list-style-type: none"> <li>▪ Web 2.0 site to allow participation</li> <li>▪ New objects produced in cooperatives will be easily updated on the system using a Content Management System</li> </ul> | <ul style="list-style-type: none"> <li>▪ <b>Online website himbachronotopes.com where to check the history of the object purchased once logged in.</b></li> <li>▪ <b>Users will be able to upload and annotate the objects with their own experiences and share them with others</b></li> </ul> |
| <b>P.R. IV</b>  | <b>HimbaChronotopes RFID/IDtags</b>   |  |   |

|                | Development  | Objectives  | Result  |
|----------------|--|---|---|
| <b>10 days</b> | <ul style="list-style-type: none"> <li>▪ RFID/PDA integration</li> <li>▪ RFID in physical space test)</li> <li>▪ Data retrieval and display tests</li> <li>▪ Tagging objects using RFID or stickers with an ID number</li> </ul>   | <ul style="list-style-type: none"> <li>▪ RFID tag embedded in object or ID number printed with a username.</li> <li>▪ Sample of 3 objects for installation with RFID and wireless.</li> </ul> | <ul style="list-style-type: none"> <li>▪ <b>Scaleable process to tag Himba objects</b></li> <li>▪ <b>RFID system for exhibition display: mobile pda with wireless/RFID reader to scan the tag embedded in the Himba Object and retrieve video narrative.</b></li> </ul> |
| <b>FINAL</b>   | <b>Outcomes / Events</b>   |   |   |
|                | <ul style="list-style-type: none"> <li>▪ <b>Theoretical development (narrative, chronotope theory, global diaspora)<br/>Presenting at New Media and the Global Diaspora Conference Roger Williams University, Rhode Island, USA</b></li> <li>▪ <b>Online community <a href="http://www.himbachronotopes.com">www.himbachronotopes.com</a> where each object has an entry in the database. Users can create a Chronotope by adding comments in their own object or others once logged in.</b></li> <li>▪ <b>Interactive installation for people to access videos from the Himba objects displayed using their mobile phones (3gp video via Bluetooth) or pda with wireless (RFID).</b></li> </ul> |   |   |

## Appendix F – Script/Video Essay



**Script/Video Essay**

|                                   |  |
|-----------------------------------|--|
| 1                                 | 00:01:31,300 --> 00:01:32,100            |
| 00:00:09,500 --> 00:00:13,100     | places,..                                |
| Dedicated to the memory of Inyong |  |
| Cho                               | 9  |
|                                   | 00:01:32,200 --> 00:01:33,500            |
|                                   | and objects,..                           |
| 2                                 |  |
| 00:00:27,130 --> 00:00:36,030     |  |
| "Oblivion is a higher form than   | 10                                       |
| memory"                           | 00:01:33,600 --> 00:01:35,800            |
|                                   | that become storages of memories...      |
| 3                                 |  |
| 00:00:49,220 --> 00:00:51,180     |  |
|                                   | 11                                       |
|                                   | 00:01:35,900 --> 00:01:40,500            |
|                                   | defined by your feelings and emotions.   |
| 4                                 |  |
| 00:00:51,190 --> 00:00:53,130     |  |
|                                   | 12                                       |
|                                   | 00:01:41,700 --> 00:01:44,300            |
|                                   | But they way you recreate your           |
|                                   | experiences...                           |
| 5                                 |  |
| 00:00:53,140 --> 00:00:55,170     |  |
|                                   | 13                                       |
|                                   | 00:01:44,500 --> 00:01:46,400            |
|                                   | not only is a mental process,            |
| 6                                 |  |
| 00:01:27,400 --> 00:01:28,500     |  |
| Along your life,..                |  |
|                                   | 14                                       |
|                                   | 00:01:46,600 --> 00:01:49,600            |
|                                   | but a combination of social processes,.. |
| 7                                 |  |
| 00:01:28,700 --> 00:01:31,200     |  |
| you accumulate experiences with   |  |
| people,..                         |  |
| 8                                 | 15                                       |

00:01:50,200 --> 00:01:51,900

material objects,..

16

00:01:52,300 --> 00:01:53,600

physical spaces,..

17

00:01:54,000 --> 00:01:55,000

relations,..

18

00:01:55,200 --> 00:01:58,800

and the metaphors you use to  
remember.

19

00:02:02,500 --> 00:02:07,200

All of them allow you to reconstruct the  
past,..

20

00:02:07,900 --> 00:02:09,600

understand the present,..

21

00:02:09,900 --> 00:02:11,900

and imagine your future,..

22

00:02:12,500 --> 00:02:14,600

It defines your identity.

23

00:02:14,800 --> 00:02:16,000

It is your Memory.

24

00:02:16,800 --> 00:02:19,000

Your memory, is you.

25

00:02:19,200 --> 00:02:23,300

It is painful when people start  
forgetting  
about my son.

26

00:02:23,800 --> 00:02:28,000

I think to myself: "They have not even  
brought him a single flower..."

27

00:02:29,600 --> 00:02:31,400

"they have already forgotten him..."

28

00:02:32,600 --> 00:02:34,100

"he is past".

29  
00:02:36,700 --> 00:02:37,900  
Coming here...

30  
00:02:41,000 --> 00:02:44,100  
is...sometimes a bit hard,..

31  
00:02:46,000 --> 00:02:51,200  
but here I feel very close to you,  
Alvarito.

32  
00:02:53,400 --> 00:02:56,800  
To remember and fill  
the absence of the beloved ones,..

33  
00:02:57,500 --> 00:03:00,800  
we keep links with the deceased.

34  
00:03:01,200 --> 00:03:05,400  
Places, material objects, clothes,...

35  
00:03:06,100 --> 00:03:08,600  
are mementos used like metaphors...

36  
00:03:08,700 --> 00:03:10,600  
to preserve the memory of the  
deceased...

37  
00:03:10,700 --> 00:03:13,700  
and remember them.

38  
00:03:13,900 --> 00:03:19,200  
Virtually any material object can store  
personal memories...

39  
00:03:19,800 --> 00:03:23,300  
and be a catalyst of emotions,  
feelings...

40  
00:03:23,800 --> 00:03:25,100  
and memories.

41  
00:03:29,200 --> 00:03:32,600  
scanMemories creates and manages a  
digital epitaph,..

42  
00:03:32,700 --> 00:03:34,500

|   |  |
|---|--|
| adaptative and interactive,..           | 48                                     |
|   | 00:03:57,300 --> 00:03:58,700          |
| 41                                      | everyone has different memories...     |
| 00:03:34,600 --> 00:03:40,300           |  |
| whereby information technologies        | 49                                     |
| replace other material metaphors, like  | 00:03:58,900 --> 00:04:04,200          |
| photography,..                          | and forget details or remember         |
|   | different things.                      |
| 43                                      |  |
| 00:03:40,400 --> 00:03:46,500           | 50                                     |
| creating an intimate and participatory  | 00:04:04,300 --> 00:04:06,800          |
| experience when recreating memory.      | To document and recreate those stories |
| 44                                      |  |
| 00:03:46,600 --> 00:03:46,600           | 51                                     |
|   | 00:04:06,900 --> 00:04:08,500          |
|   | make us closer to the loved ones that  |
|   | passed away.                           |
| 45                                      |  |
| 00:03:46,700 --> 00:03:50,200           | 52                                     |
| My family has always loved telling      | 00:04:10,800 --> 00:04:15,600          |
| stories.                                | Memory metaphors not only are          |
|   | constructed with emotions,..           |
| 46                                      |  |
| 00:03:50,300 --> 00:03:53,900           | 53                                     |
| Now I collect stories of family         | 00:04:16,000 --> 00:04:19,200          |
| members.                                | but they need social practices,..      |
| 47                                      |  |
| 00:03:54,000 --> 00:03:57,200           | 54                                     |
| As they are from different generations, | 00:04:19,400 --> 00:04:21,500          |
|   | sensory experiences,..                 |

|  |   |
|--|---|
| <p>55<br/>00:04:21,700 --&gt; 00:04:25,700<br/>and even the characteristic technologies<br/>of each time.</p> <p>56<br/>00:04:26,000 --&gt; 00:04:34,000<br/>Technologies that define the metaphors<br/>and store and transmit information as<br/>memory.</p> <p>57<br/>00:04:39,300 --&gt; 00:04:40,400<br/>Well, my name is TJ.</p> <p>58<br/>00:04:40,600 --&gt; 00:04:46,100<br/>My parents came to Spain from Taiwan<br/>around 30 years ago.</p> <p>59<br/>00:04:46,300 --&gt; 00:04:49,200<br/>I'm getting inspired...<br/>I'm in my element...</p> <p>60<br/>00:04:51,300 --&gt; 00:04:52,000<br/>Ready?</p> | <p>61<br/>00:04:52,400 --&gt; 00:04:54,400<br/>Now I am in charge of the shop,..</p> <p>62<br/>00:04:54,700 --&gt; 00:05:00,800<br/>as my dad died last year of heart<br/>attack.</p> <p>63<br/>00:05:02,400 --&gt; 00:05:08,200<br/>He wanted to be buried in the Cemetery<br/>of Zaragoza</p> <p>64<br/>00:05:08,300 --&gt; 00:05:10,600<br/>he was very happy here.</p> <p>65<br/>00:05:11,000 --&gt; 00:05:14,900<br/>We used to spend a lot of time<br/>together,</p> <p>66<br/>00:05:15,000 --&gt; 00:05:16,900<br/>we have lots of pictures here.</p> <p>67<br/>00:05:23,200 --&gt; 00:05:27,000</p> |
|--|---|



Ours acts connect us with the past,..

68

00:05:27,300 --> 00:05:33,600

Words, images, sounds, traditions,..  
help us preserve it in time

69

00:05:34,000 --> 00:05:36,400

El tiempo no es oro.

70

00:05:36,700 --> 00:05:38,600

No para mi.

71

00:05:39,500 --> 00:05:40,600

No para mi.

72

00:05:41,000 --> 00:05:43,100

Who was Ángela López?

73

00:05:43,300 --> 00:05:47,400

Ángela López was my wife

74

00:05:47,500 --> 00:05:50,400

but she preferred the word 'lover'...

75

00:05:51,500 --> 00:05:53,400

and she was the mother of my  
daughter.

76

00:05:53,700 --> 00:05:56,300

We used to spend hours in the Sitios  
Square,..

77

00:05:56,800 --> 00:06:01,400

enjoying the trees and the relative  
silence...

78

00:06:02,000 --> 00:06:03,700

also the kiosk is very near,..

79

00:06:05,200 --> 00:06:07,100

and when our daughter was young...

80

00:06:07,500 --> 00:06:11,800

she used to play there.

81

00:06:12,900 --> 00:06:15,000

Memory is the base of culture.

82

00:06:15,700 --> 00:06:17,900

We accumulate memory through language,..

83

00:06:18,100 --> 00:06:22,000

and we make it independent of knowledge through writing...

84

00:06:22,100 --> 00:06:24,500

and other forms or representation.

85

00:06:25,000 --> 00:06:28,200

We distribute memory through material objects as mementos,..

86

00:06:28,400 --> 00:06:32,100

and through social practices in the Communities.

87

00:06:32,600 --> 00:06:36,200

This allows us to transform how we communicate.

88

00:06:37,000 --> 00:06:42,600

Digital information through networks together with mobile devices...

89

00:06:42,900 --> 00:06:46,600

is provoking the latest of those transformations.

90

00:06:48,600 --> 00:06:51,900

scanMemories is an interdisciplinary art project...

91

00:06:52,100 --> 00:06:55,900

that uses mobile devices, digital communication networks...

92

00:06:56,200 --> 00:07:02,000

and RFID technology to reconstruct memories.

93

00:07:05,400 --> 00:07:07,400

Hello? Yes?

94

00:07:13,400 --> 00:07:15,800

They look very tasty.

95

00:07:15,900 --> 00:07:20,200

There is beef as main dish today.

96

00:07:20,800 --> 00:07:24,900

All right, all right.

Bye...

97

00:07:27,900 --> 00:07:33,400

He is still very present in our lives.

98

00:07:33,800 --> 00:07:36,200

I always carry his picture in my wallet.

99

00:07:39,200 --> 00:07:42,800

This picture was taken in the Zaragoza  
Festival.

100

00:07:43,000 --> 00:07:50,500

I remember that year he didn't miss  
them.

101

00:07:51,000 --> 00:07:54,000

"I like walking in the old part, mom..."

- he used to tell me.

102

00:07:54,200 --> 00:07:55,900

"and walking by the river Ebro..."

103

00:07:56,100 --> 00:07:57,900

"the river is so magnificent".

104

00:07:58,200 --> 00:08:02,500

He used to take pictures in the evening.

105

00:08:02,700 --> 00:08:08,600

I first came to Zaragoza and then I  
wanted to bring my two children...

106

00:08:09,100 --> 00:08:11,000

finally I managed.

107

00:08:16,700 --> 00:08:18,700

What happened after, ..

108

00:08:20,000 --> 00:08:21,900

Though moments in life...

109

00:08:22,100 --> 00:08:26,000

like the death of my son being so young.

110

00:08:26,200 --> 00:08:27,300

20 years old.

111

00:08:27,500 --> 00:08:31,800

Alvaro came here to Spain full of dreams.

112

00:08:32,100 --> 00:08:33,800

He started working in construction.

113

00:08:34,500 --> 00:08:37,400

But who could think that one day...

114

00:08:37,700 --> 00:08:40,700

he could have an accident.

115

00:08:42,500 --> 00:08:45,900

I will never forget that 7th of October,..

116

00:08:46,500 --> 00:08:49,000

we were getting ready for the Zaragoza Festival.

117

00:08:49,500 --> 00:08:53,400

He was very happy because he got an extra pay...

118

00:08:53,600 --> 00:08:56,700

"What do you want me to get you, mom?" - he asked me

119

00:08:56,900 --> 00:09:00,100

"We are going to enjoy the Festival, mom!"

120

00:09:11,500 --> 00:09:13,400

I love going to the Pilar Square.

121

00:09:13,700 --> 00:09:17,500

This is where I always went with my  
dad.

128

00:09:43,400 --> 00:09:47,300

122

He loved the park.

00:09:17,700 --> 00:09:22,900

He used to go walking there...

My parent came from Taiwan 30 years  
ago.

129

00:09:47,500 --> 00:09:53,400

123

My mom goes to the cemetery to visit

00:09:23,300 --> 00:09:27,000

his grave quite often.

First they lived in Barcelona and then  
they came to Zaragoza.

130

00:09:54,400 --> 00:10:01,900

124

I go with her when I am free.

00:09:27,200 --> 00:09:30,800

I was born here, I am a Zaragozano!

131

00:10:02,500 --> 00:10:05,200

125

She likes remembering and telling the

00:09:31,000 --> 00:09:38,100

stories...

I think I can help you find it - I am  
looking for something like this, look...

132

00:10:05,400 --> 00:10:09,300

126

of how they met and fell in love...

00:09:38,300 --> 00:09:39,700

It was hard in the beginning,..

133

00:10:09,600 --> 00:10:14,400

127

and how life was in Taiwan and here in

00:09:39,800 --> 00:09:43,000

Spain.

but my dad loved living here in

Zaragoza,...

134

00:10:15,200 --> 00:10:21,100

Like flashbacks, I imagine how their life  
was through images.

141

00:10:52,400 --> 00:10:54,600

spending the evening with dad.

135

00:10:21,300 --> 00:10:27,000

I feel closer to my mom and knowing  
her better.

142

00:10:56,200 --> 00:10:59,600

I like using mobile phones...

136

00:10:27,200 --> 00:10:28,800

"Mom, what food are you preparing?"

143

00:10:59,800 --> 00:11:04,200

and share with friends the pictures I  
take around.

137

00:10:32,500 --> 00:10:39,000

when my mother goes to the Cemetery,

144

00:11:04,400 --> 00:11:07,000

One of the habits my family has for  
many years...

138

00:10:39,200 --> 00:10:42,000

she brings some Taiwanese food,..

145

00:11:07,200 --> 00:11:10,900

is to visit dead relatives 'graves in the  
Cemetery.

139

00:10:43,000 --> 00:10:46,900

and also some pictures of my father.

146

00:11:11,100 --> 00:11:15,100

We've done it since we were kids and  
feels very natural.

140

00:10:47,100 --> 00:10:52,200

She spends a few hours there in the  
Cemetery...

147  
00:11:15,300 --> 00:11:19,000  
But how I really like remembering my  
grandmother...

148  
00:11:19,200 --> 00:11:20,100  
is coming here.

149  
00:11:20,300 --> 00:11:25,100  
Being able to access and remember all  
the stories...

150  
00:11:25,200 --> 00:11:28,400  
in the place where we used to spend so  
much together...

151  
00:11:28,600 --> 00:11:32,000  
is how I like remembering her,  
combining both things.

152  
00:11:32,200 --> 00:11:36,600  
Everyone can add their own stories...

153  
00:11:37,000 --> 00:11:43,000  
but I prefer remembering her with my  
own memories.

154  
00:11:43,200 --> 00:11:46,300  
It is more intimate.

155  
00:11:46,500 --> 00:11:48,800  
This is what my family and I have for  
breakfast

156  
00:11:48,900 --> 00:11:50,700  
and also what my grandmother had.

157  
00:11:51,000 --> 00:11:57,400  
My mom and her sisters told us lots of  
stories of their childhood,..

158  
00:11:57,600 --> 00:11:59,000  
stories of my grandmother...

159  
00:11:59,100 --> 00:12:01,900  
of how she travelled around Spain

due to her father's job.

160

00:12:02,100 --> 00:12:05,000

She was born in Morocco and then came to Spain.

161

00:12:05,200 --> 00:12:08,900

I know many stories about her life there.

162

00:12:09,100 --> 00:12:11,800

I loved listening to those stories.

163

00:12:12,200 --> 00:12:15,000

I first started storing my grandma's stories writing them,..

164

00:12:15,600 --> 00:12:17,200

then recording them,..

165

00:12:17,800 --> 00:12:23,500

Now I document and share the stories with the phone.

166

00:12:23,800 --> 00:12:27,400

Having images makes the memories more vivid.

167

00:12:27,600 --> 00:12:31,000

I recorded my mom in this cafe talking about my grandma...

168

00:12:31,400 --> 00:12:35,800

and how often they came here for breakfast.

169

00:12:36,000 --> 00:12:43,600

Everything I record is also available in the Cemetery for everyone to see.

170

00:12:44,200 --> 00:12:46,800

Like this we can carry on with our traditions

171

00:12:47,000 --> 00:12:51,900

and create new ways of sharing stories and recreating memories.



|                                       |                                       |
|---------------------------------------|---------------------------------------|
| 172                                   | 00:13:38,600 --> 00:13:42,500         |
| 00:12:52,100 --> 00:12:53,600         | But the easiest questions cannot be   |
| It makes me really happy.             | made, right?                          |
| 173                                   | 180                                   |
| 00:13:15,000 --> 00:13:22,000         | 00:13:43,600 --> 00:13:45,400         |
| For me that encapsulates the fighting | Like, where is she now?               |
| spirit she had...                     | 181                                   |
| 174                                   | 00:13:47,000 --> 00:13:48,000         |
| 00:13:22,100 --> 00:13:25,000         | Nobody knows.                         |
| against all the problems in life,..   | 182                                   |
| 175                                   | 00:13:48,200 --> 00:13:52,400         |
| 00:13:25,200 --> 00:13:28,000         | Some bishops think they know but      |
| including against her own illness.    | truly, no one knows.                  |
| 176                                   | 183                                   |
| 00:13:30,000 --> 00:13:33,100         | 00:13:52,700 --> 00:13:56,000         |
| What was she the most proud of?       | Angela had a contagious enthusiasm... |
| 177                                   | 184                                   |
| 00:13:33,600 --> 00:13:35,300         | 00:13:56,200 --> 00:14:02,700         |
| The answer is very easy:              | and optimism in her friendships.      |
| 178                                   | 185                                   |
| 00:13:35,800 --> 00:13:37,000         | 00:14:02,900 --> 00:14:06,000         |
| her daughter.                         | She knew when someone was             |
| 179                                   | suffering...                          |
|                                       | 186                                   |

00:14:06,200 --> 00:14:07,900  
or sad,..

187  
00:14:08,200 --> 00:14:10,700  
or needing help.

188  
00:14:11,000 --> 00:14:15,100  
She always tried to know more.

189  
00:14:15,600 --> 00:14:21,400  
She had lots of energy, like a small  
tornado full of vitality.

190  
00:14:21,800 --> 00:14:21,000  
When she was not travelling,..

191  
00:14:21,200 --> 00:14:26,700  
She was always ready to go for a walk  
in Zaragoza.

192  
00:14:27,600 --> 00:14:29,900  
Wander about the streets...

193

00:14:31,000 --> 00:14:32,400  
which meant not only walk...

194  
00:14:32,600 --> 00:14:33,600  
but look...

195  
00:14:33,900 --> 00:14:35,200  
talk, stop...

196  
00:14:35,300 --> 00:14:36,200  
nose around...

197  
00:14:36,400 --> 00:14:39,000  
experience the different environments  
of Zaragoza

198  
00:14:39,200 --> 00:14:42,300  
She wrote a book called: "Zaragoza,  
Spoken City"...

199  
00:14:42,400 --> 00:14:45,400  
collective memory of women and  
men...

200  
00:14:45,600 --> 00:14:47,900  
their opinions about some areas of the  
city...

201  
00:14:48,100 --> 00:14:49,200  
feminine spaces

202  
00:14:49,400 --> 00:14:50,500  
dangerous spaces,

203  
00:14:50,600 --> 00:14:52,100  
masculine spaces,

204  
00:14:52,300 --> 00:14:54,300  
semi-private spaces

205  
00:14:54,500 --> 00:14:59,100  
Scan Memories transforms spaces  
related to memory reconstruction

206  
00:14:59,300 --> 00:15:00,800  
into 'augmented spaces'.

207

00:15:01,000 --> 00:15:04,200  
These spaces allow access to digital  
interactive narratives...

208  
00:15:04,400 --> 00:15:06,700  
and to participate with tributes,..

209  
00:15:06,900 --> 00:15:11,900  
creating social networks of memory  
along time in the physical space.

210  
00:15:13,000 --> 00:15:15,700  
We spent lots of time going for walks,..

211  
00:15:15,900 --> 00:15:19,800  
crossing the bridge and along the  
riverside.

212  
00:15:20,200 --> 00:15:25,200  
From the Stone Bridge we could see  
how the river Ebro was like...

213  
00:15:25,300 --> 00:15:26,700  
Whether it was high or low,..

|  |   |
|--|---|
| <p>214<br/>00:15:26,800 --&gt; 00:15:30,300<br/>Whether it was talking or was silent.</p>                            | <p>Mobile devices and communication networks allow new ways of producing personal and collective information.</p> |
| <p>215<br/>00:15:32,400 --&gt; 00:15:34,800<br/>The characteristic technologies of each time...</p>                  | <p>221<br/>00:16:10,800 --&gt; 00:16:13,600<br/>They allow you to store and to retrieve it.</p>                   |
| <p>2216<br/>00:15:35,000 --&gt; 00:15:37,300<br/>conditions the way we remember.</p>                                 | <p>222<br/>00:16:14,600 --&gt; 00:16:18,100<br/>Speed, ubiquity, accessibility...</p>                             |
| <p>217<br/>00:15:45,300 --&gt; 00:15:48,300<br/>The physical size of a traditional photo album...</p>                | <p>00:16:18,300 --&gt; 00:16:20,700<br/>and the way we experience information...</p>                              |
| <p>218<br/>00:15:48,500 --&gt; 00:15:52,700<br/>has been replaced by the size in bytes of digital information...</p> | <p>223<br/>00:16:20,900 --&gt; 00:16:27,000<br/>define the narratives that emerge from those technologies.</p>    |
| <p>219<br/>00:15:52,900 --&gt; 00:15:55,000<br/>and the algorithms that regularize it.</p>                           | <p>224<br/>00:16:27,800 --&gt; 00:16:31,100<br/>To create emotional and meaningful ways of using them...</p>      |
| <p>220<br/>00:16:01,400 --&gt; 00:16:10,600</p>  | <p>225<br/>00:16:31,400 --&gt; 00:16:34,400<br/>is the challenge of networked societies.</p>                      |

226  
00:16:34,800 --> 00:16:39,000  
scanMemories allows to situate virtually  
digital memories...

227  
00:16:39,100 --> 00:16:45,300  
by placing an RFID chip in the objects  
or places where the deceased wanted  
to be remember,..

228  
00:16:45,500 --> 00:16:49,300  
restricting access to the databases.

229  
00:16:52,000 --> 00:16:59,700  
As it is possible for you to document,  
store and share your memories  
throughout generations,..

230  
00:16:59,900 --> 00:17:02,700  
myriads of stories perdure.

231  
00:17:03,800 --> 00:17:15,300  
Hierarchies, totalitarian and universal  
knowledge structures disappear.

232  
00:17:15,500 --> 00:17:20,000  
Individual practices emerge to  
select information.

233  
00:17:20,500 --> 00:17:21,900  
To remember.

234  
00:17:22,700 --> 00:17:26,000  
To remember without filters or  
censorship.

235  
00:17:26,500 --> 00:17:27,800  
Transparency.

236  
00:17:28,400 --> 00:17:29,500  
Singularity.

237  
00:17:29,700 --> 00:17:32,700  
"We brought a camera when we went  
to see the body..."

238  
00:17:32,800 --> 00:17:37,100

"because we wanted a last picture with Alvarito..."

239

00:17:37,200 --> 00:17:40,000

"but they told us: no! you can't do that..."

240

00:17:40,200 --> 00:17:42,300

"It is our tradition..."

241

00:17:42,500 --> 00:17:50,100

"She was very aware of the importance of making time for her friends, family..."

242

00:17:50,300 --> 00:17:53,400

"I used to make her smile....I loved that..."

243

00:17:53,900 --> 00:17:56,600

"Some things cannot be done..."

244

00:17:56,800 --> 00:17:58,300

"I love remembering her using this photograph..."

245

00:17:58,500 --> 00:18:03,900

"because her calmed sight reflects how she was"

246

00:18:03,900 --> 00:18:09,800

"She looks so pretty. Always calmed and peaceful".

247

00:18:10,000 --> 00:18:15,500

"He used to spend hours playing taiwanese games after dinner..."

248

00:18:22,300 --> 00:18:26,300

Memory is deeply rooted into the issue of identity.

249

00:18:26,800 --> 00:18:28,800

Who decides who we were?

250

00:18:29,400 --> 00:18:31,700

How would we like to be remembered?

251  
00:18:32,100 --> 00:18:34,700  
But as we try to store images,..

252  
00:18:34,900 --> 00:18:36,400  
sounds..

253  
00:18:36,500 --> 00:18:37,300  
texts...

254  
00:18:37,500 --> 00:18:39,900  
biometric and genetic parameters...

255  
00:18:40,100 --> 00:18:41,400  
feelings,

256  
00:18:41,500 --> 00:18:42,500  
emotions,

257  
00:18:42,700 --> 00:18:44,100  
dreams...

258

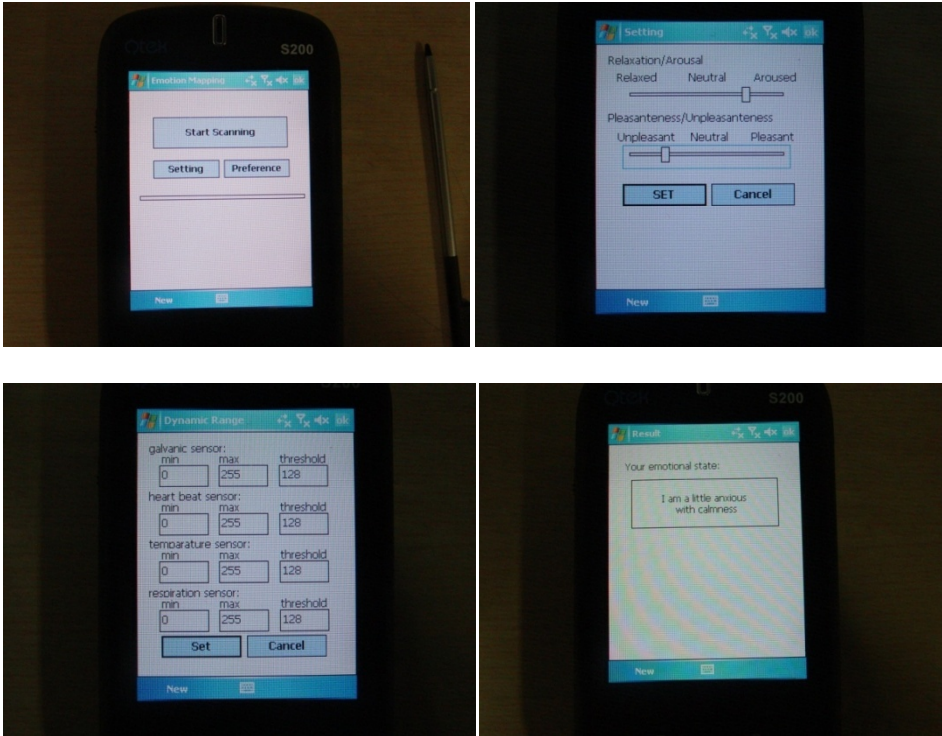
00:18:44,700 --> 00:18:48,100  
Forgetness, absence, finiteness,

259  
00:18:48,400 --> 00:18:51,000  
are still part of our memory...

260  
00:18:51,600 --> 00:18:53,500  
part of our wish to perdure.

## Appendix G - Wearable Absence Elements and Design

Here is a trace of the first implementation of the biofeedback mobile prototype:



Main steps to download the player:

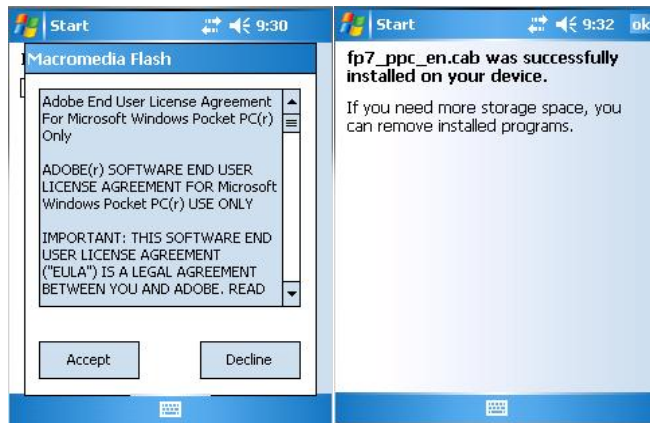
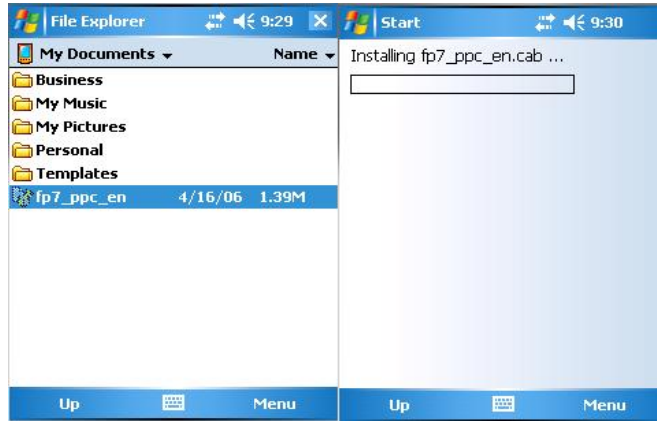
- *Download the player.*

[http://www.adobe.com/products/flashplayer\\_pocketpc/downloads/player.html](http://www.adobe.com/products/flashplayer_pocketpc/downloads/player.html)

The downloaded file should be fp7\_ppc\_en.cab

- *Copy fp7\_ppc\_en.cab to My Documents in Pocket PC.*
- *Open fp7\_ppc\_en.cab in File Explorer*

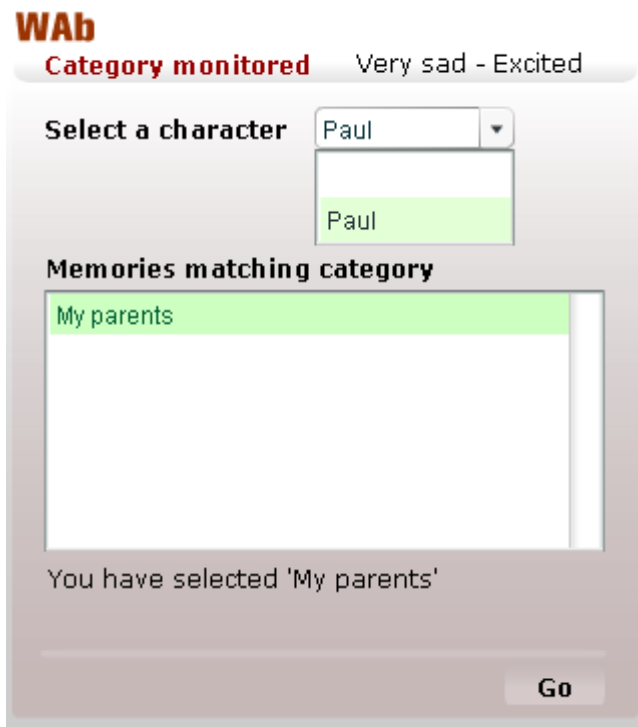




Steps for recognition and tracking of related emotions.



*b. The user selects a character in the drop down menu.*



c. The panel with memories is populated with the memories matching the category

**WAb**

**Category monitored** Very sad - Excited

Select a character

**Memories matching category**

- My parents

You have selected 'My parents'

d. The description of the memory selected is displayed

**WAb**

**Paul's Memories**

**Title** My parents

**Date** 1/11/1965

**Category** Very sad - Excited

**Description**

A picture of my beloved parents

*e. The content is displayed (video, photos, sounds and text)*



Once the flash object is created and embedded into the html/php page, the code generated looks as it follows:

```
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"  
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#version=7,  
0,79,0" width="550" height="400">  
<param name="movie" value="wab.swf?date=24&catID=16" />  
<param name="quality" value="high" />  
<embed src=" wab.swf?date=24&catID=16" width="550" height="400" quality="high"  
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-shockwave-
```

```
flash"></embed>
</object>
```

The query string to invoke the service will be:

```
http://www.andres-clavera.com/wab/wab.php?catID=1
```

The server side language chosen to communicate is PHP that controls the queries to the database, and xml formation in the admin tool.

The initial script lods the parameters sent by the resident application:

```
<?php
$catID = $_GET["catID"];
$vars = "" ;
$vars .= "ok=ok&" ;
$vars .= "vID=" . $catID;
$vars .= "&a2=load" ;
?>
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
<head>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />
<title>wab</title>
<style>body {margin:0px;} </style>
</head>
```

```

<body bgcolor="#ffffff">
<!--url's used in the movie-->
<!--text used in the movie-->
<!-- saved from url=(0013)about:internet -->
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#version=7,
0,19,0" width="320" height="385">
  <param name="movie" value="wab.swf?catID=<?php print($catID); ?>" />
  <param name="quality" value="high" />
  <embed src="wab.swf?catID=<?php print($catID); ?>" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-shockwave-
flash" width="320" height="385"></embed>
</object>
</body>
</html>

```

Characters.xml sample code for the creation of memory for a character.

```

<?xml version="1.0" encoding="UTF-8"?>
<dataGRID>
<!--###PAUL###-->

```

```

    <memory character="Paul" id="1" title="Me, the Bedouin" category="16"
content="mixed" date="22/09/1977">It was all life and energy while I lived with the Bedouins
by the Black Sea.

    <content name="bedouin" amount="2" type="video" format=".flv"></content>
    <content name="bedouin" amount="4" type="img" format=".jpg"></content>
    <content name="soundSea" amount="0" type="sound"
format=".mp3"></content>

    <content name="textSea" amount="1" type="text" format=".txt">Oh that the
desert were my dwelling place,[br][br]With only one fair spirit for my minster.[br][br]That I
might forget the human race,[br][br]And hating no one, love her only.[br][br]Paul</content>

    </memory>

<!--####END ITEM###-->

(...)

```

The information is processed by the action script native code that interprets the data and loads the right objects:

```

var categoryIO:String = catID.toString();
var currentCharacter:String = "";
var cbListener:Object = new Object();
var IListener:Object = new Object();
var cat:Array=["Anxious - Calmed",
              "Anxious - Excited",

```

```
        "Very anxious - Calmed",
        "Very anxious - Excited",
    "Joyful - Calmed",
    "Joyful - Excited",
        "Very joyful - Calmed",
        "Very joyful - Excited",
    "Sad - Calmed",
    "Sad - Excited",
        "Very sad - Calmed",
        "Very sad - Excited",
    "Content - Calmed",
    "Content - Excited",
        "Very content - Calmed",
        "Very content - Excited"
    ];
```

```
var indexCharacter: Number = undefined;
```

```
dataSetMC.selectedMem.text = "There are no memories selected";
```

```
//Initialization////////////////////////////////////
```

```
dataSetMC.nameCat.text =cat[categoryIO-1];//nameVideo.toString();
```

```
// Add event listener and event handler function.
```



```

dataSetMC.my_cb.addItem({data:0, label:""});
for(var i:Number=1; i<=memoriesArray.length; i++){
    if (memoriesArray[i-1]._character <> currentCharacter){
        dataSetMC.my_cb.addItem({data:i, label:memoriesArray[i-1]._character});
        currentCharacter = memoriesArray[i-1]._character;
    }//end if
}

goMC._alpha=20;
cbListener.change = function(evt_obj:Object):Void {
    dataSetMC.selectedMem.text = "There are no memories selected";
    var currentlySelected:Object = evt_obj.target.selectedItem;
    dataSetMC.my_list.removeAll();
    for(var i:Number=0; i<memoriesArray.length; i++){
        if ((memoriesArray[i]._character == currentlySelected.label) &&
(memoriesArray[i]._category == categoryIO)){
            dataSetMC.my_list.addItem({label:memoriesArray[i]._title, data:i});
        }//end if
    }//end for
};

```

```

dataSetMC.my_cb.addEventListener("change", cbListener);
dataSetMC.my_list.addEventListener("change", IListener);

IListener.change = function(evt_obj:Object):Void {
    trace("Selected memory" + dataSetMC.my_list.selectedItem.label);
    goMC._alpha=100;
    dataSetMC.selectedMem.text = "You have selected '" +
dataSetMC.my_list.selectedItem.label + "'";
    selectedMemoryName = dataSetMC.my_list.selectedItem.label;
    indexCharacter = dataSetMC.my_list.selectedItem.data;
}
play();

```

### 3.6 Rich Media Content, Metadata and Memory Objects

Every time a new memory is created for a character, there are four main elements that can be produced and uploaded to be retrieved: Video, photos, audio and text.

At the same time, there are certain parameters or metadata that will indicate the application what type of information is. Whenever we want to create another memory, we need to give the following values that will be converted to xml:

```

character="Paul"

id="1"

title="Me, the Bedouin"

category="16"

```

```
content="mixed"
```

```
date="22/09/1977"
```

```
description=It was all life and energy while I lived with the Bedouins by the Black Sea.
```

When a new element is added and uploaded to a memory, some variables describe each video, image, sound or text:

```
name="bedouin"
```

```
amount="2"
```

```
type="video"
```

```
format=".flv"
```

#### ***a. Creating .flv videos***

The application uses action script, xml, php to create the data:

USERNAME

PASSWORD

ENTER

Characters Memories Help

- Create New Character
- Delete Existing Character

Characters Memories Help

> CREATE NEW CHARACTER

NAME:  **SUBMIT >>>**