The Digitization of Memory: Blessing or Curse?

A Communication Science Perspective

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Abstract

In the ages of type and print, every new media technology meant more memory capacities and a faster circulation of memory contents. But now there is some empirical hint that digital media is a threat to memory. Software and hardware evolve in such a fast way that incompatibility between formats seems inescapable; digital media storage media like CD, DVD or even hard drives do not last for more than 20 years and can be easily deleted; and internet and mail communication tend to be elusive as internet sites vanish without being archived. If these developments prove to be true, collective memory will get lost. I will argue that the digitization of memory is neither blessing nor curse as we have to develop complex theoretical models that explain the interplay of media and social change by relating media technology, media use and media content to society's functions. The presented debate about a loss of collective memory lacks such a differentiate perspective and focuses on media technology thus it can be supplemented by thoughts from Innis and systems theory.

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(1) Introduction

Memory is in transition. On the one hand, there is an increasing number of public discourses on matters of the past, and memory has become more and more a category not only for psychological but also for sociological, historical or political research (Roediger & Wertsch, 2008, p. 10). On the other hand, the acceleration of communication in a multi channel world and the digitization of media arouse interest in the question whether society's memory will be enriched or diminished by these developments. We can fully agree with the editors of the 2008 established scientific journal 'Memory Studies' who write in the founding edition:

> "Public discourses on our past have intensified over the past 30 years. Technological, political, interpersonal, social and cultural shifts affect what, how and why people and societies remember and forget. What is 'memory' then under these conditions?" (Hoskins, Banier, Kantsteiner & Sutton, 2008, p. 1)

The question what and why people and societies remember cannot be answered without looking on the mechanics of remembering. This article therefore draws attention to the role of the changing media of memory and asks for communication science explanations to the interplay of media, memory and society. The significance of media for the transmission of memory becomes more and more a public concern. Media coverage on that topic emerged since the millennium change but still can be considered as sporadic. *CBS* for example, asked in 2003 whether parts of our collective memories will be lost forever because it is stored on digital media that will not outlast very long (Cosgrove-Mather, 2003). A collective amnesia due to digital media is suspected. *The Sidney Morning Herald* (2005) fears: "The quicker we are to record and store our lives in digital form, the bleaker the future of information looks". And *Newsweek* reports on librarians who do not know how to store and maintain digital material (White & Hastings, 2006). Especially scientists seem to be confronted with phenomena of digital loss as Australian researchers have serious problems of tracking down government reports from the last years which were published on the web and are deleted now (Burton, 2007). Another prominent example can be found in NASA's mars missions from the 1970s. In 2003, the data was about to be analyzed again but the researchers could not use the media the data was saved on:

> "The University of Southern California neurobiologists couldn't tread magnetic tapes from 1976 Viking landing on mars. With the data in an unknown format, he had to track down printouts and hire students to retype anything. 'All the programmers had died or left NASA', Miller said. 'It was hopeless to try to go back to the original tapes' (Cosgrove-Mather, 2003)."

When the prediction of some media scholars prove to be true, we are now facing a "Digital Dark Age" (Brand, 2003) which means that there will be a more or less complete, media induced loss

of our cultural memory. Storage on media always caused forgetting, because every media technology can decay. But this decay accelerates in the electronic and especially in the digital era: Papyrus fragments of Egyptian writing from 4,500 years ago do still exist and can be read today, acidic paper may outlast 100 years, acid-free paper some hundred years, but magnetic tapes may be unreadable after 30 years, CD and DVD after 10 or 15 years (Conway, 1996). Besides the problem of lacking long-term stability, formats and hardware change very often. Thus a lot of documents from the last 20 years cannot be decoded by current computer programmes. This leads to my central research questions:

(RQ1) In which ways do digital media potentially effect collective memory?

(RQ2) Which -theoretical model are these effects referred to and in how far is the underlying theoretical approach appropriate to the problem?

In the following, I will first define what is meant by the term 'collective memory' and its interaction with the media system. Second, I will explain these potential threats to collective memory trough medium theory in the tradition of the Toronto School of Communication and confront these findings with current theoretical debates originated in systems theory. Innis' concept of a bias of communication may link medium and systems theory as it provides the idea of media being functional for society. This leads over a discussion on the functions and presumed effects of new digital media on collective memory and communication science answers to the processes of social remembering in the digital era.

(2) Changing media, memory and society – A theoretical model derived from medium theory

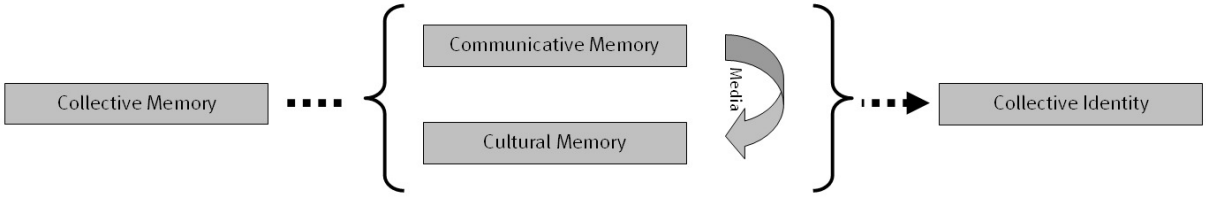
In which ways do media and collective memory interact? And in how far does collective memory influence the organization of society? The assumption that collective memory forms collective identity is widely established in the cultural and social sciences. Some scholars arrived at the conclusion that collective memory depends on certain communication and media technology. Thus society may change when media change. In the following, I will explain that argument and try to show that this mechanism of changing media – changing society is derived from a perspective that is know as medium theory.

(2.1) Collective Memory

As we consider memory as a basic category for social science research, we will have to clarify what is exactly meant by the complex concept of collective (or social) memory. Emile Durkheim introduced a first, rather vague concept of collective memory into sociology by the beginning of the Twentieth Century. It was Durkheim's belief that "every society exhibits and requires a sense of continuity with the past" (Misztal, 2003a, p. 124). Social or collective memory – as the shared knowledge of the group's history – stabilizes membership and fosters solidarity among the members of the group. Memory in this perspective provides a social group with knowledge about its past and lays down the foundation for collective identity. In this respect, the concept of collective memory resembles psychological concepts of human memory that explain memory's function of building a coherent self-image as central for personal identity: "'Collective memory' is a metaphor that formulates society's retention and loss of information about its past in the familiar terms of individual[1] remembering and forgetting." (Schwartz, 1991, p. 302). This basic concept of collective memory as formulated by Durkheim has been developed further by Durkheim's disciple Maurice Halbwachs (1992) and was in the 1990s as well enhanced as popularized into the scientific world by the German cultural scientists Jan and Aleida Assmann. Their theoretical approach differentiates collective memory into two types of social references to the past: communicative and cultural memory (Assmann & Assmann, 1994, pp. 114-115). Communicative memory is the short-term memory of societies and provides remembrance of the recent past, i.e. it is the memory of certain generations. It can be described as the living memory of individuals and is saved and distributed in personal interaction. Communicative memory as generational memory exists as long as the generation, which carries it, exists. Those biographic memories – as far as they seem to be relevant for the following generations – can only be preserved by media. Codified by media, these memories constitute the cultural memory, which can be understood as society's long-term memory. The cultural memory holds the material basis for future remembrance in store, it builds a solid ground for the construction of social memories across time (Assmann & Assmann, 1994, pp. 120-122; Assmann 1999, p. 139). In other times one might say that cultural

memory can be understood as an archive, as the props of a theatre or as a reservoir of stored and therefore only possible memories. I will try to sum up this central concept of collective memory and its function for societies in the following figure:

Figure 1: Communicative and cultural memory



(2.2) Media of Collective Memory

The role of media seems to be crucial for cultural memory, since without media there will be no storage and circulation of memory within societies. In a technological respect, media can function as storage providing "us with a vast reservoir of raw material for later construction" (Zerecke, 1994, p. 165). Havelock discovers in his chief work *Preface to Plato* (1963) the mental structure of oral societies and concludes that the whole corpus of knowledge that might be relevant for future generations had to be transmitted by narration. Canonical knowledge was communicated in the form of verse as this type of language can be easily remembered and repeated. The poet became the personified collective memory. For Havelock, and for Ong as well, this kind of memorial transmission lead to a conservative way of thinking and to a lack of the ability of abstraction and classification. Knowledge, which could not directly prove relevance in the present, was therefore forgotten in oral societies (Ong, 1987, 100). With the invention of type and later print, memory escaped from the human brain and more and more passed onto media, communicative memory became cultural memory: "With the adoption of alphabetical letters, that is Havelock's result, man gains power over his memory. Memory is no longer filled with facts that need to remembered, but becomes a surface for individual reflection and experience" (Assmann & Assmann, 1990, 20[2]). In the ages of print this process accelerates. There are not many restrictions to the capacity of knowledge that can be transmitted, so collective memory stabilizes and increases (Eisenstein, 1997, pp. 234-235). From these theories we can derive a model of the interaction of media, memory and society. First, media change, which directly influences the modes of social remembering in so far that the material basis of storage and retrieval of knowledge becomes altered. These changes again have certain effects on the organization of society as a whole: For example "[…] writing and printing indiced forgetfulness, creating instability for society by posing

the danger of cultural discontinuity […]" (Gladney, 1991, p. 95). Two major classes of effects can be described:

(1) effects on the quantity and plurality of knowledge (aspect of cultural memory)
(2) effects on the current references to history (aspect of collective memory)

Without certain media for storage and transmission a society will only develop a small amount of knowledge and refer to unique aspects of its past (e.g. myths of foundation), whereas a society which mainly uses long term-stable media can establish diversified knowledge systems and a pluralistic views of its past(s).

Table 1: Media of collective memory

	Orality	Literacy	Print	Electronic Media
Storage	human	scripture	book	digital media outlets
Circulation/ Communication	rituals	recitation, collective reading	solitary reading, public communication	globalized media networks
Social Effects	small communities	standardization of knowledge; enlarged communities	broad transmission of knowledge; nation states	transnational communities

on the basis of: Assmann & Assmann, 1994, p. 131, 139

Media technology as formative basis for media content and the concept of media as a societal a priori which has the power to change society can be referred to medium theory. In *Empire and Communication* Harold A. Innis tries to examine the causes of the rise and decline of civilizations (1950, 3), which he explains by changes in the system of societal communication. To put it in a nutshell, revolutions in communication media are followed by revolutions in culture and society. This statement also describes the axiom of the so called Toronto School of Communication's research program (short: medium theory), first formulated by Innis and then – in quite different ways – developed by Marshall McLuhan, Eric A. Havelock, Walter J. Ong and many others. Medium theory as one theory of media effects looks for the social influences of communication and media technologies and favours an a priori of technology (Hansen, 2006, p. 297; Lüders, 2008, p. 684; McQuail, 2005, p. 102). Medium theory means a paradigm shift from content to technology, effects are primarily not caused by media content but by the material basis of communication. In this perspective, the development of social memory is deeply embedded in the development of media. Media function on the one hand as material extensions of human's incorporal memory, on the other hand as archive for society as a whole. As memory follows media, society might change as well. The history of collective memory can be seen as the history of its media.

(3) The Digital Amnesia Debate

Digital media becomes a threat to collective memory. If we try to systematize causes and effects of digital media on collective memory by analyzing the sporadic scientific discourse, we can basically distinguish between three dangers to collective memory and archives in the digital era which all lead to 'digital amnesia' (Assmann, 2004, pp. 74-77; Brand, 2000, pp. 89-93):

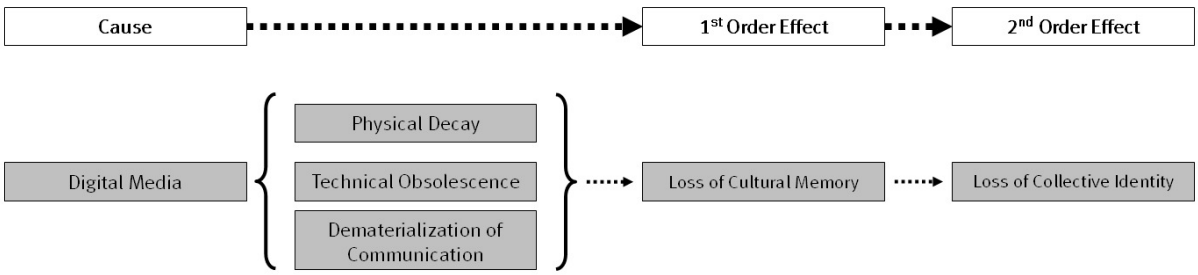
(1) Soft- and hardware evolve in such a fast way that incompatibility between formats seems inescapable,
(2) digital media storages like CD, DVD or even hard drives do not outlast for more than 20 years and can be easily deleted,
(3) internet and mail communication tend to be elusive as internet sites vanish without being archived.

If these developments prove to be true "[...] we are now in period that may be maddening blank to future historians – a Dark Age – because nearly all of our art, science, news, and other records are being created and stored on media that we know can't outlast even our lifetimes" (Brand, 2003). Digital media are vulnerable both to accidental and deliberate erasure (dematerialization), they are not long-term durable (destabilization), and the communication output under digital media conditions accelerates and proliferates which may lead to an information overload (deflation). In 2006, I have examined the works of seven authors – most of them German cultural scientist – who worked on the changing of collective memory by digital media. As a result of my study it became quite clear that all of the authors referred implicitly or explicitly to medium theory to explain the societal effects of digitized collective memory. Five out of seven authors (Assmann, 2004; Bertman, 2000; Brand 2003; Ernst 2002; Osten, 2004) present negative effects: Digital media might change collective memory and lead to 'digital amnesia' and furthermore to the loss of history and collective identity. Nonetheless, three of the examined authors (Ernst, 2002; Reck, 2000; Serres, 2002). accentuated positive effects, too: Digital media might democratize access to archives (online catalogues, databases), they form the precondition for plural cultures of remembrance (mnemonic internet sites), and they relieve human's corporal memory. Democratizing and relief are both effects, which Havelock has stated for the transition from oral to literate societies as well. Regardless of whether a more optimistic or pessimistic outlook is given, all of the authors agree in the underlying concept that communication and media technologies have the ability to change society.

The absence of historical sources for the interpretation by future historians is not only an academic problem as regards the whole society. The importance of this issue may be illustrated by

the fact that meanwhile even a specific UNESCO charter on the preservation of our digital heritage[3] does exist. But the problem is even under experts not well know. A 2004 survey of libraries in the UK found out, that only 41.8% of the respondents were aware of the material problems of digital media and had been currently taking responsibility for the preservation (Muir, 2004, p. 80). But why is the problem of digital loss a problem to the whole society? Why is the loss of collective memory regarded as a danger? As we have seen in the precedent chapter, a social group cannot develop a social identity without any historical foundation: Without a fundament you cannot build a house, metaphorically speaking. In this perspective a social long-term memory cannot evolve, because in the digital era there is no media available which can store relevant experiences for later generations. Some scholars state that the history of civilized societies depends on both, the evolution of media and the establishment of institutions of remembrance (Bertman, 2000, 43). Since the enlightenment, history and memory have been an ever growing sector, especially in the twentieth century, media technologies are continuing to decay in the same period (Convay, 1996). On top of that, Assmann states that a loss of memory, history and reality is about to come (2004, 77), and will create a nearly totalitarian society in which history for technical, and not for ideological reasons will be excluded (Assmann, 1996, 132). We can summarize the 'digital amnesia' debate in the following figure:

Figure 2: Causes and effects of digital media on collective memory



The current debate about the negative consequences for collective memory by digital media can be integrated in a more abstract theory. We can conclude that the above-presented description and explanation of phenomena of digital loss and their predicted effects follow the argumentation of medium theory. From a communication science perspective the idea of an a priory of communication and media technology has been criticized a lot, as far as medium theory overestimates the effects of technology and often explains complex social phenomena by simple linear causal models (McQuail, 2005, p. 104). Medium theory, especially in the following of McLuhan, is regarded as technological determinism: "Innis argued that social change is dictated by communication technology" (Fishman, 2006, p. 570).

(4) Memory follows Media? Media follow Memory?

Digital loss might be a fact toady, as digital media turned out to be not long-term stable. But does digital loss undoubtedly lead to digital amnesia? In the perspective of medium theory it does. We have seen that the current scientific and media debate about a future digital dark age is referred to a concept of media as a societal a priori. Technological determinism neglects the question in which ways and why media come into society. As digital media did not emerge ex nihilo, we will have to ask whether other theoretical perspectives are more appropriate to explain the current change in so far as they take into account society's demand for the invention of new media. I will try to argue that Innis' theory of the bias of communication is not a technological determist perspective but may function as link between medium and systems theory. If we take a closer look at Innis' concept with reference to our problem of media changing memory we might discover a slightly different reading, which will lead us in combination with recent approaches from systems theory to a better explanation of the causes and effects of the digitization of memory.

(4.1) Innis: Beyond media determinism?

Innis cannot be easily condemned on wholesome as a technological determinist, even though he himself has inspired rigid technological determinism among his disciples. Communication and media technologies first and foremost distribute knowledge; some technologies are effective in delivering knowledge over time, and some are more effective in delivering knowledge over space. The term 'bias of the media' marks this basic principle of the organization and transmission of knowledge in given societies (Innis, 1950, p. 7). The bias of media refers to administration and government. Thus some civilizations had to use time emphasizing media as stone, the political regime could not expand over large territories as an effective communication of rules, laws and other organizational matters with this types of media is impossible. The invention of paper, print and later electronic media enabled effective communication over space and therefore the development of geographically outstretched political entities. On the other hand, space emphasizing media are not as durable as time emphasizing media, because it is not functional. Each medium carries along its own characteristics which predestine certain possibilities for the time rsp. spacious transmission of knowledge (Innis, 1997, p. 95). In addition with Innis' view that political institutions solve the problem of organization by using new media (1950, p. 170), this brings us to the conclusion that (1) media cannot be described in general as a societal a priori and that (2) media enable and not determine social development: "It has seemed to me that the subject of communication offers *possibilities* in that it occupies a crucial position in the organization and administration of government [...] (Innis, 1950, p. 7; italics AD). Innis' findings that technological change is engineered and affected by society's strategies and choices make him a "social constructivist" (Blondheim 2003, p. 171). If we define collective memory as shared knowledge of the

past, it depends on media as precondition of storage and transmission (Acland, 2006, p. 176), but whether media for remembrance exist is bound to social decision. A modern society will not rely on just one basic medium for all partial systems: If democracy is oriented to the present, as Innis has stated (1997, p. 119), the government will use flexible, fast and short-lived media for political communication as it is functional to their needs. In addition to that space emphasizing media used by the government for administrative concern, other, more time emphasizing media can exist:

> "Concentration on a medium of communication implies a bias in the cultural development of the civilization concerned […]. Introduction of a second medium tends to check the bias of the first and to create conditions suited to the growth of empire." (Innis, 1950, p. 170)

Media serve different functions within society. While print might be the more appropriate medium of remembrance, digital media technologies and mail rsp. internet communication tend to fulfil the economic, political and cultural needs for immediate and global communication. In other words, the interaction between media and society is not one-sided or unidirectional. The idea of co-evolution of media and society is already existing in Innis' studies, but it is not written out in full. However, Innis often is regarded as a technological determinist, wrongly as I have tried to show. In the same way, medium theory cannot be used as an explanation for social decline by new media which is in our case the loss of collective memory by digital communication and media technologies. Besides the inadequate overestimation of the bias of media, the application of Innis' findings to modern societies and media is not appropriate as Innis derived them from the study of ancient cultures. Innis himself had a strong bias for these ancient cultures, this might explain, why he was quite sceptical to the evolution of new media: "His was an orientation toward historical consciousness, tradition, and memory, rather than future-orientedness" (Blondheim, 2003, p. 178). But a personal bias, an opinion why digital media might destroy those institution oneself as a scientist admires, is not a satisfying answer to the question what effects new media on collective memory might cause.

(4.2) Media follow memory - Complexity theory

The integration of communication and media technologies into concepts and theories of media effects on society wavers between the poles of technology obsession or technology oblivion. Organizational and social change is traced backed to the fact of a changing media environment as presented in the debate about a 'Digital Amnesia' (chapter 2) or in a more abstract quality in medium theory (chapter 3). According to such theories "technology is seen to determine the structure and behavior of organizations and their members and to therefore shape social systems" (Barett, Grant, and Wailes, 2006, p. 7). Taking up Innis' argument that media evolves as a

solution to problems of the organization of government, we can switch the focus to functional differentiation of society and the evolution of media as a consequence of this process. The increase of communication, the multiplication of media channels and media outlets over the last years result in a growing amount of information out of specified knowledge clusters. Figures from 2002 indicate an enormous amount of information world wide – seven years after, the numbers must have increased:

Table 2: Worldwide production of original (i.e. new) information in 2002

Storage Medium	Amount of Information in Terabytes
Paper	1,634
Film	420,254
Magnetical (analog video tapes etc.)	5,187,130
Optical (DVD etc.)	103
Total	**5,609,121**

source: How much information 2003

Nearly six Exabyte of new information were produced worldwide in 2002, which is six million Terabytes – one Terabyte can store the information which is printed on 50,000 trees made into paper. It becomes quite clear that this huge amount of information can neither be stored nor administrated with traditional paper-based media. Archives which are confronted with an ever growing and more and more confusing load of information need to find strategies how to cope with that problem. Digital media features better access, storage and administration of high amounts of data (Qvortrup, 2006, p. 350). In the perspective of systems or complexity theory, the invention and establishment of new communication and media technologies takes place as a result of societal demands (Degele, 2002, p. 171; Ziemann, 2007, pp. 24-26), which exist because of continued functional differentiation and therefore increased social complexity: „The reduction of external complexity needs the constitution of internal complexity, and to solve particular social and societal problems which have led to the constitution of the system." (Görke & Scholl, 2007, p. 646). A functionalist conception of the interplay of media, memory and society leads to the assumption that media for storage and transmission of collective memory are dependent of certain societal demands or wishes to store their own history long time-stable rsp. that not every societal subsystem requires durable media to deliver efficient communication. Remembrance and forgetting become functional, they are no ends in themselves (Ziemann, 2008, p. 162).

Does a 'Digital Dark Age' loom, sooner or later? And what are the consequences for our societies? We have discovered two, quite oppositional explanations. Medium theory argues that new media will resemble the whole complex of societal remembering by its materiality. As digital media is

not adequate for long time storage, future generations will not have the opportunity to construct a picture of their history. They will lose collective memory and in consequence collective identity. In comparison, complexity theory – based on Luhmann's understanding of media – emanates from a specific social determinism: It is society that creates new communication and media technologies to solve specific problems. If storage and retrieval will become a problem, new media will be established rsp. old media will be applied again. There may be basic or leading media within a society which communication and central organization are structured around, but other, older media can fulfil the function of social remembrance. It is Innis' work that bridges both arguments: Societies depend on certain media for their ways of organization, but an equilibrium of space and time emphasizing media is not unthinkable. All in all, modern societies are provided with a mixture of media which fulfil certain functions; while digital media allow immediate and global communication, high dissemination and a capacious storage, they function only as a short term memory. But this is a problem of media technology. If it will not be solved by better digital systems or data migration, old media will take over the function of remembrance. The question what is worth to get preserved is a societal question, too. Archives had to answer that question even before the digital era and developed certain heuristics whether to store or whether to abolish accumulating materials. The end of history is an often heard story, which never proved true until today. If we look into the history of memory, we will find lots of debates about this fading, NYU's professor Marita Sturken wrote: „Throughout history, the most prominent characterization of memory has been the idea that it is in crisis. Memory has been seen to be threatened by technology since the ancient times" (1997, p. 17). And Plato can be considered as the first media critic with regard to memory. In his dialogue *Phaedrus*, he tells the story of the ancient Egyptian king Theut who rejects the gift of letters offered by the god Theut because he fears forgetfulness:

> "But when they came to letters, This, said Theuth, will make the Egyptians wiser and give them better memories; it is a specific both for the memory and for the wit. Thamus replied: O most ingenious Theuth, the parent or inventor of an art is not always the best judge of the utility or inutility of his own inventions to the users of them. And in this instance, you who are the father of letters, from a paternal love of your own children have been led to attribute to them a quality which they cannot have; for this discovery of yours will create forgetfulness in the learners' souls, because they will not use their memories; they will trust to the external written characters and not remember of themselves." (Plato, n.d.)

The crisis of collective memory – as a crisis of media for storage and transmission – got worse as far as new media mean more complex encoding and decoding technologies. Public or scientific debates about the advantages and disadvantages of new communication and media technologies and prophecies about democratization or loss seem to belong to their implementation. What does memory mean under digital media conditions then? The question therefore shifts from "Is digital memory possible?" to "Which possibilities and types of digital memory can be observed?"

(5) Digital Memory – Conclusion and Outlook

The model applied in medium theory results from the inquiry of oral or literate societies and focuses on the change from word to letter and letter to print. There is no evidence that this model also functions for the changes in the media system we are about to face today. The inference from collective memory to collective identity to stabilize and legitimate government is also deduced from the study of ancient or medieval societies and might not prove as appropriate for modern democracies: "It appears that what matters for democracy's health is not social remembering per se but the way in which the past is called up and used" (Misztal, 2005, p. 1336). Our focus therefore shifts from media technology to media content. Digital media, especially the internet offer possibilities for individualization and in consequence pluralisation of remembrance. Certain topics or minority points of view, which were excluded by official memorial discourses, can be easily published on the internet. *Google* lists round about eight million matches sites which cover the combination of '9/11' and 'memory'. If only 10 percent of these sites are private memorial homepages, it becomes clear that the potential for an individual remembering is enormous. The internet is the place where individual memories can become collective and vice versa: „The state is ever-present, but it is neither ubiquitous nor omnipotent. Civil society is where many groups try to work out their strategies of remembrance alongside the state, sometimes against it" (Winter & Sivan, 1999, p. 30). At the same time, user generated history is discovered by the mainstream media. In Germany, the magazine *Spiegel* holds an online edition which has started a section called *einestages.de* [*once.de*]. *Einestages.de* provides articles about the past, which were written by readers and not by professional journalists, and claims to be a part of Germany's collective memory – bottom up history. Because of its success, *einestages.de* is published since January as a printed magazine as well. Another example for the internet as a tool of remembrance is the Centre for History and New Media:

> "Since 1994 under the founding direction of Roy Rosenzweig, the Center for History and New Media (CHNM) at George Mason University has used digital media and computer technology to democratize history—to incorporate multiple voices, reach diverse audiences, and encourage popular participation in presenting and preserving the past. CHNM uses digital media and technology to preserve and present history online, transform scholarship across the humanities, and advance historical education and understanding. Each year CHNM's many project websites receive over 16 million visitors, and over a million people rely on its digital tools to teach, learn, and conduct research." (http://chnm.gmu.edu/)

These random examples illustrate that the changing of media and memory and in further consequence can not only be examined nor explained by looking at the emergence of new communication and media technologies. Of course, technologies produce unintended effects like phenomena of digital loss, but after having experienced such negative or dysfunctional consequences of

media use, people are sensitized to the problems and can work of solutions. And of course, digital loss may become without technological and social solutions a greater problem for research and remembrance, but similar problems in the physical decay of paper got solved too: Today mostly acid-free paper is used.

All in all, the digitization of memory is neither blessing nor curse. Digital media offers both possibilities for individualization rsp. pluralisation by simplified publishing (aspect of transmission, circulation → communication) and limitations by only short term-durable storage devices (aspect of archival storage → media). The debate about a 'Digital Amnesia' lacks an empirical basis as well as a differentiated concept of the interplay of media and society. Instead it is based on technological determinism. As we have seen a complex study has to integrate societal demands, media content and media use to draw a complete and differentiated picture of collective memory in the digital era. I will try sum up my findings in the following points:

- Media do not cause linear effects in the organization of society, collective memory in the ways of storage and transmission will be still existing in specialised societal subsystems. Media and memory both depend on societal demands. Thus media and memory are social determined and rely on different storage and dissemination media which shape to a certain extend the content.
- Media of collective memory will be improved digital devices –as far as the problem is known it will be solved on the technological level – or old but stable media like print. In so far, there are time based memories and space based memories within societies. Some groups gather around global memories in the internet, others rely on book based local memories. One has to make aware the specified memory-qualities of each medium.
- The debate about a 'Digital Amnesia' acts on the assumption of strong linear effects and neglects media users and media content. But the history of memory is not at all the history of storage media, remembrance needs to be executed by people. A DVD or a book cannot remember on its own. On the whole, it is not a question of media or technology, it is a question of society what and how to remember. The digitization of collective memory is social driven. That means, transmission into time is not at first referred to media but to selection whether to keep some information for later generations. If a decision about selection is done, the appropriate media hast to be chosen. Storage and transmission are no longer – if they have ever been – owes its existence to coincidence.
- Collective memory in the digital era seems to pluralize and elude from official monopolies of knowledge about the past.

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[1] Such a concept transfers findings from individual to collective phenomena and therefore it is correctly announced as a metaphor or a practically working definition, which means that we always have to reflect the boundaries of its heuristic potential (Krippendorf, 1975, pp. 15-16). Fur further discussion on the matter of social science's (and especially communication science's) definition of collective memory see also Donk, 2009; Misztal, 2003b.

[2] Translated from German by the author.

[3] http://portal.unesco.org/ci/en/ev.php-URL_ID=1539&URL_DO=DO_TOPIC&URL_SECTION=201.html