

Clickable memories: Hyperlinking and memory contextualization

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Abstract

In the mid-1990s, memory institutions started massively digitizing their analogue resources to make them accessible on Internet. The efforts aimed and still aim at two things: preserving the fragile items by providing digital surrogates, and giving easy, instant access to materials regardless of time or space. Digitizing and providing access to digitized materials is not enough as the digitized materials originally came into being in a context, in an environment, in a time when other related events or experiences were taking place. This point can be analyzed from two perspectives: firstly from the local perspective, that is, materials inside the same institution or in the same country; and secondly, from a global perspective. Hyperlinks are understood as a coding system that virtually connects two or more separate electronic resources. From the local perspective, they should help reconstitute the local or national context in which an experience or event took place. In the global one, they should offer a broader international context, and a broader comparative picture of how the world was like at the time when the event in question occurred in a particular place on the globe. In this paper, hyperlinks are considered from the pedagogical point of view, but before that, they are placed in their historical context with special focus on early thinkers' theories on the association of knowledge.

Key Words: Cultural memory, digital media, digitization, hyperlinking, contextualisation, pedagogy.

Memory, not only as the psychic capacity or faculty to retain and retrieve past information, but also as the ways individuals, groups, or societies make sense of their past, is and has always had the form of a network involving many agents and actors. At a personal, psychic level, one has mostly to rely on external reminders: a clock alarm reminds one that a particular activity is planned at a particular time of the day. A note in the diary or on a wall calendar takes over the alarm and reminds that the event will take place in a particular place, at a particular time, and for a certain duration. A similar network of *aides-memoire* exists at the collective level, where monuments, cemeteries, cathedrals, books, and other *lieux de mémoire* connect the members of a community to some aspects of their past. Many of these

reminders of the collective past connect to one another in some ways, despite spatial and temporal distances that separate them. In the current digital age in which memory resources are [being] digitized and made available on the World Wide Web (Web), each individual resource needs a network of digital *aides-mémoire* that place it in a historical context. This paper discusses the theories about the association of knowledge and the pedagogical potential of hyperlinking when properly applied on cultural memory resources.

1. Association of knowledge

In the late 1930s George Wells was already complaining about the lack of interconnections in the knowledge management mechanisms: 'I dislike isolated events and disconnected details. I really hate statements, views, prejudices and beliefs that jump at you suddenly out of mid-air'.¹ In the 1940s, scientists and media scholars started advocating the entrustment of knowledge to memory machines that would not only store information in an ordered way, but also allow quick and easy retrieval. Vannevar Bush was the first to advocate a clear change in knowledge management and transmission in 1945, when he was proposing a way a machine - the Memex - and a medium - microfiche - could be used to facilitate storage of, and access to information.² Two decades later, J.C.R Licklider (1960) was to call for a 'symbiotic relation between a man and a fast information-retrieval and data processing machine' that would improve the thinking process. Bush was inspired by the model of the human mind, which 'operates by association' and, which, 'with one item in its grasp, [it] snaps instantly to the next that is suggested by the association of thoughts'.

While Bush was suggesting that the human mind could not be duplicated but should rather serve as a source of inspiration, Licklider was hoping for a future where 'human brains and computing machines will be coupled together very tightly', resulting in a partnership that 'will think as no human brain has ever thought'. Writing in the early 1990s, George Landow and Paul Delany confirm the similarity between hypermedia and the mind, suggesting that the former's electronic representation of human memory, fantasy and cognition is 'a much better model of the mind's typical activities'.³ Pierre Lévy perceives the technologizing of knowledge management as a two-way process based on the principle that 'an intellectual technology nearly always exteriorizes, objectivizes, virtualizes a cognitive function, a mental activity', which, in turn, it reorganizes.⁴ Building on Bush's and Licklider's theories, Douglas Engelbart devised a way to associate stored information using hyperlinks that could connect not only different documents, but also enable to link 'directly to something deep in a particular file' like a single word in a paragraph. Besides, he invented the point-and-click mouse that allows jumping from one item to another, 'like magic'.⁵ Since then, hyperlinking has been the underlying principle behind

the Arpanet, the US Defence Department project that later developed into the Internet and the Web. The more popular the Web becomes, the greater is the demand for multi-directionally linked contents in various formats.⁶ The Web and its hyperlinking possibilities are the culmination of all these efforts that aimed to store the pieces of information in a logical way, on the one hand, and to allow easy access to them, on the other.

While initial efforts were almost exclusively targeting scientific records and information, the storage, access, and hyperlinking gains are largely applied in other realms of knowledge, including cultural memory. In the latter case, Pierre Nora remarks, ‘an invisible thread links objects which have no obvious connections...and there is...an unconscious organisation of collective memory which we have to make self-conscious.’⁷ The past being a foreign country, David Lowenthal maintains that its vestiges ‘become intelligible only when woven together as stories’. This can happen only if ‘explanatory linkages’ are made between the various vestiges. Although writing about a decade before the first cultural memory digitization initiatives, Lowenthal opposes the linear nature of narratives, arguing that they ‘constrain historical understanding’.⁸

The auditor or reader has to follow a single track from start to finish. But awareness of the past involves more than linear movement; social, cultural, and myriad other circumstances are superimposed on the narrative, together with histories of other peoples, other institutions, other ideas...historical narratives back-track to clarify causal connections.⁹

Digitization projects are massively bringing new materials to the Web, and these materials, generally located in distant places, could be related to one other. Josephine Bryant *et al.* note that the most interesting feature of digital materials is not only the facility with which they are integrated with other resources, but also the ability to cease to be isolated pieces and become a coherent and useful system of relationships.¹⁰ It is also argued that ‘historical value of an object depends not so much on the nature of the object itself as on its associations’.¹¹ Hyperlinking favours those associations and constitutes a powerful tool especially when it is properly applied to ‘develop links between internal collections and external resources all from a seamless single access point’.¹²

There is a need, as Cameron and Robinson point out, for a substantial revision of the ways information is documented, since digital databases should be constructed and structured in a way that ‘enables users to link information’ and narratives to work together.¹³ Even in their original or analogue forms and formats, cultural memory resources need some structure

that ‘clarifies, places things in context’, because ‘no physical object or trace is an autonomous guide to bygone times’.¹⁴ Once interconnected, digitized cultural memory resources become a valuable education tool.

2. Pedagogical tool

Beside the records that initially form[ed] one collection that could reunite thanks to digitisation and the Web, the online inter-connection of related and complementary materials is highly beneficial, especially for educational purposes. Abby Smith hails digital technologies for providing extraordinary access to remote and hard-to-access materials, and, more importantly, for bringing together research materials that are widely scattered around the globe, allowing viewers to conflate and compare items that can be examined side by side.¹⁵ It should be stressed that this optimism remains mostly theoretical, as many memory institutions still have to hyperlink their digital materials to internal and external related resources. One such case is the *Table clock* by Henry Jones, whose picture and explanatory text are on The British Museum’s website. The three-paragraph, no-link text begins as follows:

Following the introduction of the pendulum by Christiaan Huygens in 1657, table or bracket-mounted, spring-driven clocks became a popular furniture item for those who could afford them.¹⁶

The most important piece of information in this sentence is that Huygens’ Pendulum Clock is the ancestor of Jones’ Table Clock. The no-link text offers no other option to know more about the ancestor – the Pendulum Clock - before jumping to its descendent – the Table Clock. The Museum Boerhaave in Leiden, The Netherlands, not only preserves the original Pendulum Clock, but also has a Web page with its picture and a hyperlinked text to explain it.¹⁷ The most striking example can be found on the American Memory’s website, where for instance the learner can trace the different stages the 1863 Emancipation Proclamation went through. President Abraham Lincoln’s initial hand-written manuscript begins with the title: ‘By the President of the United States of America. A Proclamation’ and goes on: ‘I, Abraham Lincoln, President of the United States of America, and Commander in chief of the army and the navy thereof, do hereby proclaim and declare that...’¹⁸ The final version, which has entered history, has dropped ‘A proclamation’ from the title, and its body begins quite differently with: ‘Whereas on the Twenty-Second day of September, in the year of our Lord one thousand eight hundred and sixty-two, a Proclamation was issued by the President of the United States...’¹⁹ Astonishingly, none of the web pages refers or links to the other, which makes the learner’s task harder as it

does not invite him or her to compare the two documents, based on the differences between them. There are even risks of stopping at the manuscript draft level, since the learner is not told that it is the beginning of a process, not its end.

This suggests that cultural memory institutions are adding little value to their resources by not ‘presenting the information within a broader context estimated to be relevant to the information user’.²⁰ Pedagogically speaking, especially in this specific case of the Table Clock, ‘there is a need to connect an object to an origin, a past, and a chain of events’.²¹ This context-creating possibility is one of the major differences between analogue media and their electronic counterparts. With analogue media ‘messages are often separated in time and space from their source, and thus received out of context’.²² Transferring cultural memory resources to electronic media, as most institutions are doing, is one stage which does not include that those institutions’ uses of digital technologies defer from their analogue predecessors.²³ Fiona Cameron and Helena Robinson suggest that institutions still have to go a step further by transforming collection documentation into ‘effective and sustainable knowledge environments’, a step that can perhaps ‘lead to unforeseen interpretations of collections’.²⁴ For this reason, cultural memory institutions have to position themselves as experience brokers and to work closely with educators to

enable the creation of a range of user contexts and preferences, drawing the user’s attention to a specific object, its relations to others, and suggesting routes through information based on specific profiles...Likewise, the tasks of collection managers may witness a greater emphasis on creating and linking digital resources.²⁵

Demonstrating the power of hyperlinks as an organizing principle, Alexander Halavais explains that allowing the instant jump to other resources in collections of documents broadly on the Internet, makes the hyperlink ‘the basic element of organization for the Web’.²⁶ Despite being the basis of the Web, and thus something supposed to be self-evident on every Web page, Cameron and Robinson regretfully wonder why cultural memory institutions ‘largely fail’ to take advantage of digital technologies to provide broader historical contexts for their collections, and to exploit the inherent plural meanings embedded in collections.²⁷

Moreover, it is in the advantage of cultural memory institutions to include as many links in their digital collections as possible, because the more hyperlinks to or from the page, the more authority it gets.²⁸ This explains why extensively hyperlinked Wikipedia is becoming more and more popular. About 10 percent [78 words excluding notes] of the 886-word article

dedicated to Christiaan Huygens is hyperlinked to related articles. The hyperlinked key words include ‘René Descartes’, Huygens’ friend; ‘the University of Leiden’, where he studied Law and Mathematics; ‘light’ and ‘waves’, which he extensively theorised; ‘Blaise Pascal’ who encouraged him to write the first book on ‘probability theory’ [also linked] ; the ‘Pendulum Clock’, his breakthrough discovery in timekeeping; the ‘Museum Boerhaave’, where most of his heritage is preserved; etc.²⁹ Even though such an anonymous user-generated piece of writing still poses the problem of accuracy and authoritativeness, there is no doubt that it provides the reader with a maximum of information about the person, his time, his environment, his schooling, his oeuvre, etc. Each jump to another page provides a similarly hyperlinked text and pictures. Moreover, as Eric Picard puts, it ‘lets them [readers] choose their own focus on what interests them, and ultimately consume media at their own pace – on their own terms’.³⁰

In addition to the navigational function, hyperlinks guide the learner or reader to the particular resources that are relevant, and through which he or she traces a path that suits his or her interests.³¹ For instance, a quick scan of the text allows him or her to detect what other important resources are available, and offers him or her a possibility to use forward and backward arrows, or to open multiple windows, to navigate through resources or have them side by side. From the Huygens page on Wikipedia, a user interested in the Pendulum Clock would most likely click on the ‘Museum Boerhaave’ link after reading ‘The oldest known Huygens style pendulum clock is dated 1657 and can be seen at the Museum Boerhaave’.

Mike Thelwall distinguishes four sorts of hyperlinks: *selflink* is a link from any page in a site to any page in the same site; *inlink* refers to ‘a link to any page in a site from any page in a different site’; *outlink* refers to ‘a link from any page in a site to any page in a different site’; and finally *interlink* which refers to ‘a link between two different websites’.³² Herbert van de Sompel and Patrick Hochstenbach note that these links could be either static – with targets computed in advance – or dynamic – with targets assigned on the fly, and advocate the use of the latter or a combination of both, as they are likely to create a fully interlinked environment.³³

Van de Sompel and Hochstenbach also remark that the Web’s ubiquity has created new experiences that make it not ‘comprehensible that secondary sources, catalogues and primary sources, that are logically related, are not functionally linked’.³⁴ Lévy calls these experiences a return to nomadic practices whereby, ‘rather than following tracks and migrations within fixed domains [poorly or not hyperlinked Web pages], we leap from network to network, from one system of proximity to the next’.³⁵ This new form of nomadism - digital nomadism – requires not a physical presence of the learner – or digital nomad – in a memory institution, as ‘telepresence technologies’ enable them to follow digital tracks – hyperlinks – and thus to

be ‘simultaneously here and there’.³⁶ Beside the logical links that hyperlinks [should] make functional, the latter also speed up the search-and-finding process, as related pieces of information are always interconnected and easy to detect thanks to the hyperlinks’ special features – generally blue-coloured and underlined. Hitchcock suggests that while speed is the most crucial feature of the Web, hyperlinks are its currency.³⁷ Angelina Russo and Jerry Watkins advise cultural institutions to emphasize ‘learning opportunities’ and be audience-focused in their digitization efforts, which proper hyperlinking can greatly and valuably contribute to.³⁸

3. Conclusion

The few theories that explored the mapping of digital technologies for cultural memory and their hyperlinking potential are unanimous in pointing to its contextualisation and pedagogical values. Not only are items placed in networked environments, but also each user is given the possibility to become ‘a spatial wanderer, traversing information and freely selecting trajectories and viewpoints, rather than a “passive,” directed observer’, whom memory institutions can seduce by carefully arranging arguments with the help of hyperlinks.³⁹ It was also stressed that boundaries between sister-collections are likely to, and should actually, vanish, but for this to happen, cultural memory institutions have to lay down cooperation strategies both locally and globally to monitor and detect interconnections among digital cultural memory resources. Once interconnected resources have been identified, they could be hyperlinked in a meaningful, pedagogical, coordinated, and multi-directional way

Notes

¹ H George, *World Brain*, Methuen & Co. Ltd, London, 1938, p.2.

² V Bush, ‘As We May Think’. *The Atlantic Monthly*, July 1945
<http://www.theatlantic.com/doc/194507/bush> (Accessed 16 November 2009)

³ G Landow and P Delany, ‘Hypertext, Hypermedia and Literary Studies: The State of the Art’, in *Hypermedia and Literary Studies*. P Delany and G Landow (eds), The MIT Press, Cambridge, 1999, p.8.

⁴ P Lévy, *Becoming Virtual : Reality in the Digital Age*, Plenum Press, New York, 1998, p. 50.

⁵ D. Engelbart, ‘The Click Heard Round The World’. *Wired* , Issue 12.01, January 2004.
<http://www.wired.com/wired/archive/12.01/mouse.html> (Accessed 20 September 2008)

⁶ S Hitchcock et al., *Linking Everything to Everything: Journal Publishing Myth or Reality?*, Electronic Press Ltd, London , 1997.

<http://journals.ecs.soton.ac.uk/IFIP-ICCC97.html> (Accessed 29 September 2008)

⁷ P. Nora, 'Entre Mémoire et Histoire : La problématique des lieux', in *Les lieux de mémoire I- La République*. P. Nora (ed), Editions Gallimard, Paris, 1984, p. XVI : '...un fil invisible relie des objets sans rapport évident...Il y a un réseau articulé de ces identités différentes, une organisation inconsciente de la mémoire collective qu'il nous appartient de rendre consciente d'elle-même.'

⁸ D Lowenthal, *The Past is a Foreign Country*, Cambridge University Press, Cambridge, 1985, p. 218.

⁹ Lowenthal, p.223.

¹⁰ J Bryant et al., *Digitizing Cultural Resources: A Practical Guide for Public Libraries*, Bertelsmann Stiftung, Gütersloh, 2004, pp. 12-13.

http://www.public-libraries.net/html/x_media/pdf/digitizing_cultural_resources.pdf (Accessed 2 October 2008)

¹¹ L Woolley, *Digging up the Past*, Pinguin Nooks Ltd., Harmondsworth, [1930]1954, p. 16

¹² Bryant et al, p.12

¹³ F Cameron and H Robinson 'Digital Knowledgescapes: Cultural, Theoretical, Practical, and Usage Issues Facing Museum Collection Databases in a Digital Epoch', in *Theorizing Digital Cultural Heritage: A Critical Discourse*. F Cameron and S Kaderdine (eds) , The MIT Press, Cambridge, 2007, p.168.

¹⁴ Lowenthal, pp.224 and 238.

¹⁵ A Smith, *Why Digitize?*, Council on Library and Information Resources, Washington, D.C., February 1999, p.7.

¹⁶ The British Museum, Table clock by Henry Jones,

http://www.britishmuseum.org/explore/highlights/highlight_objects/pe_mla/table_clock_by_henry_jones.aspx (Accessed 19 September 2008)

¹⁷ Boerhaave Museum,

<http://www.museumboerhaave.nl/AACollection/nederlands/M03V20.html>
(Accessed 19 September 2008)

¹⁸ American Memory,

<http://memory.loc.gov/service/rbc/lprbscsm/scsm0231/001r.jpg>
(Accessed 15 March 2009)

¹⁹ American Memory,

<http://memory.loc.gov/service/rbc/lprbscsm/scsm0907/001r.jpg>
(Accessed 15 March 2009)

²⁰ H.van de Sompel and P. Hochstenbach, 'Reference Linking in a Hybrid Library Environment. Part 1: Frameworks for Linking'. *D-Lib Magazine*, Volume 5 Issue 4, April 1999.

http://www.dlib.org/dlib/april99/van_de_sompel/04van_de_sompel-pt1.html

²¹ F Cameron, 'Beyond the Cult of the Replicant: Museums and Historical Digital Objects – Traditional Concerns, New Discourses', in *Theorizing Digital Cultural Heritage: A Critical Discourse*. F Cameron and S Kaderdine (eds), The MIT Press, Cambridge, 2007, p.58.

²² Lévy, p.51.

²³ P Walsh, 'Rise and Fall of the Post-Photographic Museum: Technology and the Transformation of Art', in *Theorizing Digital Cultural Heritage: A Critical Discourse*. F Cameron and S Kaderdine (eds), The MIT Press, Cambridge, 2007, p.31.

²⁴ Cameron and Robinson, p.165.

²⁵ Cameron and Robinson, p.185.

²⁶ A Halavais, 'The Hyperlink as organizing Principle', in *The Hyperlinked Society: Questioning Connections in the Digital Age*. J.Turow and L. Tsui (eds), The University of Michigan Press, Ann Arbor, 2008 pp.42 and 53.

²⁷ Cameron and Robinson, p.174.

²⁸ RM Henzinger, 'Hyperlink Analysis for the Web'. *IEEE Internet Computing*, January-February 2001, p.49.

²⁹ Wikipedia, http://en.wikipedia.org/wiki/Christiaan_Huygens (Accessed 19 September 2008)

³⁰ E Picard, 'Hyperlinking and Advertizing Strategy', in *The Hyperlinked Society: Questioning Connections in the Digital Age*. J.Turow and L. Tsui (eds), The University of Michigan Press, Ann Arbor, 2008, p.159.

³¹ Halavais, pp.39-40.

³² M Thelwall, *Link Analysis: An Information Science Approach*, Amsterdam, Elsevier Academic Press, 2004, p.5.

³³ Van de Sompel and Hochstenbach

³⁴ Van de Sompel and Hochstenbach

³⁵ Lévy, p.31.

³⁶ Lévy, p.37.

³⁷ S Hitchcock, 'Web publishing: Speed changes everything'. *Computer*, vol: 29 issue 8,1996, pp. 91-93.

<http://csdl.computer.org/dl/mags/co/1996/08/r8091.pdf>

³⁸ A Russo and J Watkins, 'Digital Cultural Communication: Audience and Remediation', in *Theorizing Digital Cultural Heritage: A Critical Discourse* F Cameron and S Kaderline (eds), The MIT Press, Cambridge, 2007, p.162.

³⁹ Cameron and Robinson, p.179

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