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Planning for Long Term Access to Digital Documents: An Initial Investigation

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Abstract

Modern information technology creates opportunities for sharing information in ways never before imagined. Researchers are able to search vast databases in less time than it would take them to drive to a research library. Digital documents can be quickly sent to one or many destinations with the press of a key, but, this efficiency comes with a cost. As each generation of technology is replaced by the next at a dizzying pace, we may lose the technology needed to access many older documents. This process, technological obsolescence, may make many of these records unreadable to future generations (Rothenberg 1995:42). According to Rothenberg, action is needed now to ensure that we do not irretrievably lose access to many of our current digital documents. Conceptual models have been proposed for maintaining access to our digital heritage (Heminger and Robertson, 1998), yet it is not known to what extent organizations are aware of this problem and to what extent they may be making plans to address it. This study looked at a large organization that has embraced the use of digital document storage to learn both its awareness of the problem and the extent to which plans have been created to address it.

Background

History began with the advent of storing information on a physical medium so that whatever was stored could be retrieved in the future. The survival of civilization as we know it depends on this process. For thousands of years, the medium of choice for recording information was stone. Early man wrote or etched words and pictures into the stone. Later, papyrus and eventually paper replaced stone as the medium for recording history. Each of these objects, if properly preserved, can last for centuries. And, just as important, the information on these objects can be read without using any other equipment. As long as a person has a light source and can decipher the symbols he can read the message.

In the past 50 years, however, an entirely new way of storing information has been developed through the use of information technology. The information is stored as a bitstream on a recording medium. This new technology comes with some impressive advantages over printed media, such as sharability, and fast transmission.. Nonetheless, it poses a significant dilemma for long-term access (Rothenberg 1995:42).

The problem

Long-term access to our stored digital documents depends on our ability to later retrieve and read those same documents. However, while earlier methods of document storage required only a light source and knowledge of the written language, digital documents introduce additional requirements for accessing the stored information. There is no "face value" to the document. That is, simply looking at the recorded document does not provide any clue to the encoded information. Additional technology is required to, first, retrieve the bitstream, and then, translate that bitstream into a sensible document that humans can understand.

To further complicate matters, information technology is evolving at a dizzying pace. Superseded technologies are quickly discarded and new technologies are embraced in the hopes of gaining improved efficiency, effectiveness, or capability. With each change of hardware or software, we create yet another potential barrier to being able to retrieve and read older documents (Heminger and Robertson, 1998:6). As generations of information technology come and go, the difficulties of maintaining access to all of our older documents becomes ever greater. Technological obsolescence is a very real risk to our long-term access to our digital documents (Rothenberg, 1995:42).

Given this, it is worth asking the question, "Are organizations that store digital documents with the expectation of having long-term access to those documents aware of the problem, and if they are aware, do they have plans in place to address the problem."

The Study

To answer this question, a survey was developed and distributed to records managers who would likely be in a position to have responsibility for any such concerns and the plans developed to address them. We identified a large government organization with several hundred thousand employees, which has embraced the use of digital documents and which has expectations of long-term access to them. The survey was administered to the

records managers of each of the nine major components of the organization. The organization chosen for this initial study was a large government organization. This organization has millions of records which, for legal and and financial reasons, are expected to be available for many decades. Many of these records will be of historical value well into the future.

This survey addressed the current awareness of the problem, as well as any planning aimed at reducing the impact of technological obsolescence on long-term storage and retrieval of digital information. For the purposes of this survey, technological obsolescence was defined as the inability to read and understand information in digital form due to technical changes to standards and systems (including software and hardware) that leave previously stored documents unreadable. The survey, which was conducted by email, was sent to the records managers of all nine of the major sections of the organization. Six of those responded. The following table summarizes the results of the survey.

Responses (There were responses to 6 of the 9 surveys sent out)	
1. Were you aware of the potential impact of technological obsolescence on long term access to digital documents?	Yes: 6 No: 0
2. Does your organization store information in digital form with the expectation of retrieving that information in the future?	Yes: 5 No: 1
2a. If yes, for what length of time will the information need to be accessible? (Choose all that apply)	<3 years: 4 3-9 years: 5 >9 years: 3 Indefinitely: 1
2b. If no, do issues of technological obsolescence play a role in your decision?	Yes: 0 No: 1 N//A: 5
3. Does your organization have a plan for dealing with the impact of technological obsolescence on long-term access to information in digital form?	Yes: 1* No: 6* *one answered yes and no
3a. If yes, describe your plan: The respondent who answered yes reported that one organizational unit stores information both electronically with duplicates on paper. Expense keeps other units from following suit.	
3b. If no, which of following reasons help explain why? (Check all that apply)	Unnecessary: 0 Lack of expertise: 0 Funding: 5 Unsure how to proceed: 2 Lack of standards: 4 Other: 2
4. Does your organization share information with other organizations that are expected to be thinking about long-term accessibility to information in digital form on your organization's behalf?	yes: 4 No: 2
5. The impact of technological obsolescence on long-term access to information in digital form **should be** an immediate concern of my organization.	Strongly agree: 5 Slightly agree: 1 Neutral: 0 Slightly disagree: 0 Strongly disagree:0
6. The impact of technological obsolescence on long-term access to information in digital form **is** an immediate concern of my organization.	Strongly agree: 1 Slightly agree: 1 Neutral: 3 Slightly disagree: 0 Strongly disagree:1
7. The impact of technological obsolescence on long-term access to information in digital form **will be** a future concern of my organization.	Strongly agree: 4 Slightly agree: 1 Neutral: 0 Slightly disagree: 0 Strongly disagree:1

Discussion

Based on the responses to question #1, there was a consistency in reporting an awareness of the potential impact of technological obsolescence on long-term access to information in digital form. The majority of the managers also acknowledge that their organization stores information in digital form with the expectation of retrieving that information on a short- and long-term basis. This would suggest that they should be actively planning to deal with the impact of technological obsolescence. On the contrary, they are not. Of the six reasons listed, the survey results support two major areas, funding and policy, affecting planning efforts.

Two managers stated that the lack of policy (Category: Other) contributed to their organization's lack of planning for dealing with the impact of technological obsolescence on long-term access to information in digital form. One manager pointed out that the issue has been recognized and is being discussed, and expects that a policy statement will be issued soon. Another manager felt strongly that funding was the most important roadblock in implementing a digital storage strategy. She has assumed a "wait and see" posture.

Finally, managers were consistent in their perceptions that the impact of technological obsolescence on long-term access to information in digital form should be an immediate concern or will be a future concern of their organization. They were split, however, on their perception that the impact is an immediate concern of their organization. Perhaps this would suggest that, like other important but not urgent problems, the awareness of the problem exists but the resources to solve it are unavailable or otherwise committed.

Conclusions

This preliminary study was undertaken to follow up on previous research on the potential problems associated with maintaining long term access to digital documents. While the sample size is too small to draw firm conclusions, it suggests that this is an issue that merits further investigation to learn if the results gathered here are supported by a larger, more diverse sample.

Bibliography

American Research Libraries. "Preserving Digital Information," *Transforming Libraries: Issues and Innovations in Preserving Digital Information*, Issue 5. WWWeb, http://www.arl.org/transform/pdi, 10 March 1998.

Butler, Meredith A. "Issues and Challenges of Archiving and Storing Digital Information: Preserving the Past for Future Scholars," *Journal of Library Administration*, 4: 61-79 (1997).

Conway, Paul. "Digitizing Preservation: Paper and Microfilm Go Electronic," *Library Journal*, 119: 42-45 (February 1994).

Conway, Paul. *Preservation in the Digital World. The Commission on Preservation and Access*, March 1996.

Dollar, Charles M. *Archival Theory and Information Technologies: The Impact of Information Technologies on Archival Principles and Methods*. Macerata: University of Macerata Press, 1992.

Graham, Peter S. "Digital Preservation Archiving Workshops: Focusing the Agenda," *National Endowment for the Humanities Proposal*. (26 June 1997).

Hedstrom, Margaret. "Digital Preservation: A Time Bomb for Digital Libraries." Essay, 7 pages. WWWeb, http://www.uky.edu/~kiernan/DL/hedstrom.html. 17 April 1998.

Heminger, Alan R. and Steven B. Robertson. "Digital Rosetta Stone: A Conceptual Model for Maintaining Long-term Access to Digital Documents." *Proceedings of the Thirty-First Annual Hawaii International Conference on Systems Sciences, Digital Documents Track, Vol. 2*: 158-167 (1998).

Marcum, Deanna. "The Preservation of Digital Information," *Journal of Academic Librarianship*, 22: 451-454 (November 1996).

National Archives and Records Administration. "NHPRC: Research Issues in Electronic Records," article, 17 pages. WWWeb, http://www.nara.gov/nara/nhprc/erreport.html. 7 February 1998.

Rothenberg, Jeff, "Ensuring the Longevity of Digital Documents," *Scientific American*, 42-47 (Jan 95)

Task Force on Archiving of Digital Information. "Preserving Digital Information," *Report of the Task Force, commissioned by the Commission on Preservation and Access and The Research Libraries Group*, May 1996.

Waters, Donald J. and Anne Kenney. *The Digital Preservation Consortium: Mission and Goals*, March 1994.