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CONTENTS

Guerrilla Electronic Records Management: Lessons Learned

BY CHRISTOPHER A. LEE

The archives and records management profession could benefit greatly from more "guerrilla electronic records management." We must take action now, given the reality we face

INTRODUCTION

Electronic records have been a concern for decades, and "by the 1980s most archivists and records managers acknowledged that managing and preserving electronic records was among the most challenging problems facing their professions" (Hedstrom and Blouin). Since then, the challenge has increased dramatically. A significant portion of our activities is conducted through the use of computers: business transactions, government services, political activism, informal correspondence, entertainment, and many others. Given well-recognized issues such as technological obsolescence and potential mismanagement of computer files, we must make a concerted effort to ensure that these materials are preserved. We need to act now in the ways that we can, rather than waiting for

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Research can yield a variety of products: propositions, hypotheses, theories, concepts, terminology, frameworks, models, recommendations, exemplars, explanations, and persuasive stories

If instead the desire is for methods, procedures, and systems that can be used to facilitate the long-term preservation of authentic electronic records, then the world is full of answers

better solutions to come along.

The title and theme of this article were inspired by a piece written by Jakob Nielsen entitled "Guerrilla HCI: Using Discount Usability Engineering to Penetrate the Intimidation Barrier." Nielsen is a prominent figure in the world of human-computer interaction (HCI) who advocates a pragmatic approach to designing usable websites. HCI (also called CHI) is the study of how people interact with computers and how computer systems might be better designed to interact with people. With its strong ties to cognitive psychology, the HCI literature tends to emphasize detailed theoretical models, extensive empirical data collection, and rigorous statistical analysis. Such an approach can be quite daunting to someone with a limited budget who just wants to create a website that is reasonably easy to use.

Nielsen's concern is that "insisting on using only the best methods may result in having no methods used at all." The result is often a website put together with no feedback from actual users, which inevitably leads to poor design. A better approach, says Nielsen, is to practice "discount usability engineering." Sitting down with three or four potential users and asking them to "think aloud" as they try to perform a few tasks on a site, for example, can reveal valuable insights about what needs to be fixed. The results might not meet the standards of a research scientist, but they are profoundly better than no results at all.

Likewise, I contend that the archives and records management profession could benefit greatly from more "guerrilla electronic records management (ERM)." We must take action now, given the reality we face. I see this need as much more urgent than the one Nielsen poses. Unlike a badly designed website, which can still be used given enough effort, electronic records that have been mismanaged often will be lost forever.

SOME BACKGROUND

The lessons I describe below are based on my experiences—both as a scholar and as a practitioner—in assisting a variety of organizations in their efforts to manage, preserve, and provide access to digital materials. Many of the observations in this essay are based on my work as Electronic Records Project Archivist at the Kansas State Historical Society (KSHS) from May 1999 to August 2000. The project was funded by a grant from the National Historical Publications and Records Commission (NHPRC) to conduct applied research. Under a previous NHPRC grant, Margaret Hedstrom, associate professor at the University of Michigan School of Information, had consulted Kansas on electronic records strategies and put together an initial draft of the *Kansas Electronic Records Management Guidelines*. Our work under the second grant was an attempt to apply the concepts contained in the guidelines.

In this capacity, I had the opportunity to:

- revise, update, and publish the *Guidelines* to the Web,
- help state agencies to develop and implement retention schedules for electronic records,
- analyze agency recordkeeping and user needs in order to provide recommendations on the implementation of new information technology systems,
- create and maintain an online topical directory of electronic recordkeeping resources,
- participate in a number of state policy efforts, including the development of the state's electronic signature legislation, and
- work to create and then chair the Kansas Electronic Records Committee (ERC).

CHRISTOPHER A. (CAL) LEE has worked on a variety of projects related to the management of electronic records, including his role as Electronic Records Project Archivist at the Kansas State Historical Society. He has spoken to numerous professional conferences and written several articles on electronic records issues. He coauthored a book with Jeffrey MacKie-Mason entitled *Telecommunications Guide to the Internet*. He is currently pursuing his Ph.D. at the University of Michigan School of Information and serves as research assistant on a project called CAMiLEON, which is exploring the use of emulation as one approach to providing long-term access to digital materials.

I was certainly not alone in any of these efforts. The director of the project was Pat Michaelis and other members of the team were Linda Barnickel, Cynthia Laframboise, Matt Veatch and Jason Wesco. Without such a great group of people, the project could not have been so successful. The list of all other individuals outside of the KSHS who contributed to the project in some way would be too long to provide here.

LESSONS LEARNED

I present the following as lessons rather than principles, guidelines or even best practices. They reflect only my own observations, though I believe they convey some key insights for recordkeeping professions.

Research Does Matter.
Like other archivists and records managers, I have been witness to numerous written and spoken debates about the degree to which research contributes to real practice. This is an extremely important issue, since research completely disconnected from practice has little point. Scrutiny by others, researchers and practitioners alike, is a vital component for research to have professional relevance. Many individuals also serve as both researchers and practitioners, which is another important means to provide interchange between theory and practice.

This debate among recordkeeping professions, however, is often characterized by two moves that I see as counterproductive:

- A particular theory is often taken to represent all research. If that theory does not seem to make sense within a particular context, it forever poisons the well.
- When confronted with electronic records issues, our first reaction is often to search for magic bullets and then get upset when they do not exist. This could also be called the attempted over-application of theory.

Research can yield a variety of products: propositions, hypotheses, theories, concepts, terminology, frameworks, models, recommendations, exemplars, explanations, and persuasive stories. These products are based on information from a limited number of cases, so their relevance to new contexts is always an open question. A previously supported hypothesis may be falsified through new empirical observations. One may need to refine the boundaries of a longstanding concept based on the emergence of unforeseen circumstances. A policy recommendation may become obsolete, if world events radically alter the social conditions that the researcher took for granted. Stories may lose their relevance if they no longer help individuals to make sense of their current situations. Such situations should not discourage us from paying attention to research. On the contrary, this fallibility should remind us of the role each of us can play in the perpetual cycle of conducting research, documenting the results, attempting to apply those results in new areas, and then documenting the results of those attempts.

We Do Have Answers
In relation to electronic records, it is tempting for archivists and records managers to fall into the mantra, "All we can do is raise the issues. We don't have any answers." I believe such a claim again reflects unrealistic assumptions, this time about what constitutes an answer. If the desire is for a method that will allow all electronic records to be stored on one type of computer for the rest of time without any technological difficulties, then indeed we do not have this answer and there are very good reasons to assume that we never will. If instead the desire is for methods, procedures, and systems that can be used to facilitate the long-term preservation of authentic electronic records, then the world is full of answers.

By 1991, there was "a pressing need for the preservation of electronic data that archivists already know how to preserve" (NHPRC). Given the experience and tools we have continued to accumulate, along with the massive growth of materials created in electronic form, this need to apply the answers currently at our disposal is even more pressing today. Justine Hazelwood summarizes the situation as follows:

Stories of digital loss and electronic decay abound in our e-mail lists and newsgroups. While there is some truth in these tales of woe, the real situation is not so grim. There are things we can do today to ensure that the electronic records we are creating today will survive for as long as we need them for our businesses and even into the future for our descendents. (Hazelwood, 97)

If we view the electronic records literature as a source of guidance from which to sample, as appropriate to our own social and technological contexts, then it can prove extremely valuable

Taking the time to document what we have learned can also save us and other information professionals from the proverbial reinvention of the wheel

When planning to undertake research, it is important to remain sensitive not only to the distinct characteristics of the external organizations that we serve but also to our own institutional contexts

In general, it is best to err on the side of specificity. One will often find it easier to broaden the scope of a research problem along the way than to salvage a project that has been too broadly defined

If we tell all the stakeholders whom we encounter that we have no answers to their electronic records questions, then we are effectively telling them two things:

- We can no longer meet the responsibility of dealing with most records created by society.
- Whenever we sit at the table with them, we will have nothing constructive to contribute. In many cases, the result will be that they stop inviting us to join them.

YMMV (Your Mileage May Vary)

In Internet lingo, "YMMV" is a common caveat to bold statements. It is based on the standard disclaimer that American car manufacturers attach to mileage ratings (Raymond, p. 390). It can be taken as shorthand for something like, "This has been the case, in my experience. But your situation may be a bit different." If we view the electronic records literature as a source of guidance from which to sample, as appropriate to our own social and technological contexts, then it can prove extremely valuable. If we assume an implicit YMMV in all conclusions, then we can view them with both professional engagement and healthy skepticism.

I think the Functional Requirements for Evidence in Recordkeeping project at the University of Pittsburgh is a good example. The details of that work (functional requirements, production rules, and metadata specifications) are too often approached as monolithic checklists for good recordkeeping, while losing sight of the "literary warrant" concept that is so essential to their interpretation (Duff). Several projects have attempted to apply the Functional Requirements in specific contexts, yielding many important insights about technical and organizational differences.

In my own work, I have received a great deal of conceptual guidance from the Pittsburgh project's documents. This does not mean, however, that the Pittsburgh model will necessarily be a good fit for all information environments. Another NHPRC-funded project called "Expanding the Options," for example, has investigated the recordkeeping practices within informal collaborative groups. One of the reported findings is that the concept of "warrant" was "relevant to only a small segment of records" (Hedstrom and Wallace).

Some other examples of YMMV guidance include the Reference Model for an Open Archival Information System (OAIS), the Recordkeeping Metadata Standard for Commonwealth Agencies from Australia, the recently completed CURL Exemplars for Digital ARchiveS (CEDARS) project, and the work between the U.S. National Archives and Records Administration (NARA) and the San Diego Supercomputer Center (SDSC). The documents associated with these projects can seem overwhelming at first. They are much more palatable if we sample from them, rather than trying to swallow them whole. If we can identify parts that are helpful to our institutions' electronic records efforts and flag others as seemingly inappropriate, we will be much better off than if we had failed to look at them at all.

Think Globally, Research Locally

In 1991, the Minnesota Historical Society sponsored a working meeting, funded by an NHPRC grant, "to examine issues related to the identification, preservation, and long-term use of electronic records and to produce a national agenda for research in the archival management of such records" (NHPRC). At that meeting, Margaret Hedstrom presented a paper entitled "Understanding Electronic Incunabula: A Framework for Research on Electronic Records," in which she stated:

> The research needed to respond effectively to electronic records issues will be time-consuming, expensive, and complex, but posing broad questions about the significance of electronic records does not mean that archivists will conduct abstract research on global issues. Rather, a research framework can provide the structures for a series of smaller, practical projects that build on each others' results, contribute to an understanding of broader issues, and yield cumulative results from what might otherwise be disparate efforts. (Hedstrom, 339)

Research is about taking educated guesses, subjecting those guesses to some sort of analytical or empirical scrutiny, and then documenting the results. Just as Nielsen argues that small-scale user testing is important to designing usable websites, so too is

small-scale local research important for meeting the needs of our stakeholders.

Taking the time to document what we have learned can also save us and other information professionals from the proverbial reinvention of the wheel. I must admit that this is a lesson I struggle with myself. It often feels much more rewarding to do, than to document what is being done. If we are serious about our professional charge to manage and preserve social memory, however, it is hard for us to deny the importance of documenting our activities for purposes of ongoing organizational and professional learning.

Within the realm of electronic records, research has often taken the form of developing some sort of guidance documentation (e.g., models, metadata standards, guidelines), attempting to apply existing guidance, or some hybrid of the two. The first NHPRC-funded electronic records project in Kansas took the first form, while the second project took primarily the second form.

With the "Kansas Electronic Records Management Guidelines" from the first project in hand, we set out to put them into practice, with an eye toward components that were particularly useful or problematic. We were pleasantly surprised how much of the Guidelines we could apply, and we learned numerous valuable lessons along the way. Some of those lessons are reflected in this article. As mentioned above, the Pittsburgh project yielded several forms of guidance, and allied efforts then focused on testing them in various contexts.

The Trustworthy Information Systems (TIS) project in Minnesota—also funded by the NHPRC—played the dual roles of developing and attempting to apply guidance materials. For two reasons, this project serves as an excellent example of the previous point about sampling from existing requirements to meet one's needs. First, the *Trustworthy Information Systems Handbook* draws from a rich variety of previous work and existing federal policy, and then it incorporates numerous details about particular legal requirements within the state of Minnesota. Second, in the words of the handbook itself, it "provides a thorough, effective, and practical set of tools to craft procedures based on the specific and unique needs and information requirements of your government agency" (Rounds and Klauda, 5).

As Robert Horton, state archivist of Minnesota, has explained to me, trustworthiness is more a matter of "family resemblance" than strict definition. That is, recordkeeping systems that meet more of the criteria will be more trustworthy, but the correct balance for a given set of records to be considered trustworthy will vary by circumstances. (The concept of family resemblance comes from Ludwig Wittgenstein's philosophy of language, and is often a helpful way to think about thorny archival questions such as, "What is a record?") The project team worked through the TIS criteria in a number of agencies to see how they applied in each case. The TIS Handbook is very much a "live" document, currently in its third version.

When planning to undertake research, it is important to remain sensitive not only to the distinct characteristics of the external organizations that we serve but also to our own institutional contexts. Some factors to consider are the following:

Budgetary constraints. Organizations differ widely in both available resources and the discretion with which resources can be allocated. Limited funding does not preclude research, but it does place significant constraints on its potential scope.

Outside funding sources. One way of addressing the constraints above is to solicit funds from somewhere else. A given granting institution will tend to fund only certain types of activities and organizations. The appropriate places to look for outside research support will vary considerably, depending on whether one works for a university department, large corporation, small nonprofit organization, academic library, or government agency.

After identifying potential sources of funds, it is a good idea to identify their funding process and monitor their activities for possible shifts in program focus. The NHPRC, for example, is currently undertaking a project called "Electronic Records Research Agenda," which will "re-visit the NHPRC's 1991 *Research Issues in Electronic Records* report, assess the work done to date under its direction, analyze factors that will affect work in the future, and determine what revisions need to made to the research agenda" (Minnesota Historical Society).

The National Science Foundation and Library of Congress recently sponsored a workshop on April 12-13, 2002, "to identify the research challenges in the area of

Finding out about previous work is an essential component of research

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All records have numerous layers of meaning, which we attempt to manage through their content, context, and structure

Electronic recordkeeping systems must be explicit about which components will be preserved and how they will be reflected

long-term preservation of digital information and to develop a set of priorities for research" ("NSF Workshop on Research Challenges in Digital Archiving"). Such activities are likely to have an impact on the focus of future research funding.

Organizational culture. Organizational culture has been defined in terms of a variety of factors (O'Reilly, Chatman, and Caldwell; Xenikou) and examined from a variety of theoretical perspectives (Smircich), all of which somehow relate to "the way things are done around here" (Robbins, 509). Stephen P. Robbins provides a list of seven characteristics: innovation and risk taking, attention to detail, outcome orientation, people orientation, team orientation, aggressiveness, and stability (Robbins, 510-11). All of these can have an impact on the appropriate nature, planning, scope, time frame, justification, and documentation of potential research within an organization.

Research Should Be Systematic

There are several research considerations that one should address, regardless of organizational context. As suggested above, research involves making these considerations explicit and addressing them in a structured way. This not only contributes to planning and management of the work, but it also feeds into the process of reporting research results to others. Note that there is a difference between being systematic and being stubbornly rigid (see "Remain Flexible" below). One can be clear about goals, priorities, and process, while still remaining open to change.

The following ten questions can be helpful in evoking and articulating assumptions. I have adapted them from a list that Dennis Severance originally posed to a group of doctoral students at a national consortium in the early 1990s and Judy Olson later introduced to the doctoral seminar at the University of Michigan School of Information, as a tool for guiding our research process and presentations. They are listed in roughly the order in which it makes sense to answer them throughout the course of research, though it will often be desirable to vary the order somewhat. It is also common to refine or revise answers to the earlier questions, based on information gained through the process of research.

1. What is the problem? Research requires resources. Since resources are limited, it is important to have some specific purpose in mind before undertaking a new research project. This problem could be as abstract as the presence of inconsistencies in a widely accepted theory or as concrete as the inefficiency of one phase of a production process.

When formulating a problem statement, there is a tradeoff between specificity and generality. If a problem is defined too narrowly, very few people will find the answer relevant. If it is defined too broadly, one will find that either it is impossible to answer or the answers are too vague to be useful for guiding real-world practice and future research. In general, it is best to err on the side of specificity. One will often find it easier to broaden the scope of a research problem along the way than to salvage a project that has been too broadly defined.

2. Who cares? This question gets at the interplay between research and application that I described above. It serves as a healthy reality check to new research ideas. Who are the stakeholders in this work? If it were to yield one or more positive answers to the research problem, who would benefit from those answers? Who might be interested in reading the results? Are there other researchers or practitioners working in this area who would see the research as a novel contribution?

3. What have others done? Luckily for us, there are very few completely novel research problems; most have some degree of similarity with problems that have been addressed by others in the past. Finding out about previous work is an essential component of research. In formal scholarly research, this generally means a review of existing literature, but it can take a variety of other forms (see "Ask for Help" and "Look for Help" below).

4. What is my approach? The answer to this question will distinguish this specific research project from those identified in the previous question. With the exception of an occasional study intended to exactly replicate someone else's experiment, each research effort should be characterized by some unique contribution. Is this an application of a familiar idea to a new context? Does it combine techniques in some previously untested fashion?

5. What am I going to do explicitly? Before jumping headfirst into the research itself, it is a good idea to think carefully about methodology. What will be the steps of the process? Who should participate? How will participants be recruited? When initiating the research, do I already have some sense of what factors will be most important in addressing the problem? If so, can I define those factors as variables that can then be tested or observed?

Depending on the type and specificity of these variables, different methods may be appropriate. If one is trying to analyze a completely unfamiliar work process in order to identify its associated recordkeeping requirements, for example, it may be best to interview those who take part in the process and even watch them work, in order to get a better sense of the various components. If, instead, one is trying to determine the degree to which users of a records management application are taking advantage of a particular metadata field, then it would probably make sense to carry out some measurement and statistical analysis of system logs.

It can be helpful to consider, as early in the process as possible, how the problem and the methodology match each other. This can minimize the chances of discovering, after a great deal of information collection, that the information is not in a form appropriate to answer the question at hand.

6. What are the expected and actual results? This question contains two distinct but related components. The first addresses what one thinks will happen, and the second addresses what actually did happen. I stated earlier that research is about taking educated guesses, subjecting those guesses to some sort of analytical or empirical scrutiny, and then documenting the results. Answering this sixth question involves articulating one's guesses up front, then describing whether or not the guesses held up under investigation. In some cases, this process can take the form of hypotheses about what empirically observable outcome (dependent variables) will result from the introduction of some new element (independent variable) into a situation. In other cases, the expected result may be a "proof of concept" for some new software design, or a formal set of recommendations that have a positive impact on policy decisions.

Electronic records issues cut across a wide diversity of disciplines. When working in such an area, we will often run into conflicting assumptions about research products:

> A problem that often arises when talking with someone from a different intellectual tradition involves "results." What counts as a "result" in your field? A theorem? A policy prescription? An experimental outcome? A newly theorized concept? As you start talking to people, you will be surprised to discover just how diverse the various fields' conceptions of a "result" can be. People who have been socialized into a given school of thought will habitually search anything they read for the specific type of "result" that they are accustomed to. Even neighboring subfields of the same intellectual tendency within the supposedly same field can fail to communicate because they are trying to discover incompatible types of "results" in one another's work. This failure of communication can be calamitous. Each side may perceive the other to be doing poor work—or, literally, no work at all. (Agre 2002)

I have found it is important to remain cognizant of such tensions, while trying not to blow them out of proportion. If we pretend that differences between traditions do not exist, we are likely to fall victim to confusing conversations at best, and complete professional impasses at worst. If, on the other hand, we decide to treat such differences as lines in the sand which we are never willing to cross, then we will prevent ourselves from learning from others and reduce all interdisciplinary conversations to fruitless sectarian name calling.

7. What do the results mean? In order to be more than mere facts and figures, research must involve concerted acts of interpretation. While some research methods attempt to remove subjective biases as much as possible from the task of collecting data and only introduce acts of interpretation near the end of the research process, other methods are based on ongoing interpretation and reinterpretation of data as it is being collected (Glaser and Strauss). Regardless of when the interpretation happens, it should serve to tie observations or findings back into the original research question. As with the earlier discussion of results, the conception of appropriate interpretation will vary across organizations and disciplines. The important thing is to tell an honest but persuasive story. The exact definitions of both "honest" and "persuasive" will depend on the audience.

8. Who cares (again)? This is an opportunity to revisit the scope of this research's relevance, given the results. Has it provided an important answer to the original question? Why is it important?

9. Who should I tell? Research results do little good if no one finds out about them. Who needs to hear about this research? Where would it get the most visibility and legitimacy? How should it be reported to other departments within one's own organization? Are there scholarly or professional journals where it should be submitted? How about papers or presentations to conferences? It can be helpful to consider these issues early on, for at least two reasons. First, the assumed audience will have methodological implications, for reasons described above. Second, the distribution, publication, and presentation of results can require considerable resources, and there are often deadlines that must be met months in advance.

10. What next? What seem to be the most appropriate next steps, given the results of this research? Should this same problem be researched again, but using a different methodology? Should the results now be applied elsewhere? Are there still numerous related pending questions that should be addressed before attempting to apply these results? Within research publications, this question is often answered in a section near the end, bearing a title such as "Open Questions" or "Future Work."

This leads us to some general lessons. Regardless of whether or not each of us considers our work to fall within the scope of "research," we can still draw from and contribute to the continuously growing body of knowledge about how best to tackle the issues of electronic recordkeeping.

Resources Are Limited, Meaning Is Expensive

Archivists and records managers have

known for a long time that capturing the context of records is not an exact science. File plans and retention schedules, archival arrangement and description, appraisal and references services all influence what meaning will be made of records for which we are responsible. We must make compromises about what is said and what is left unsaid. All records have numerous layers of meaning, which we attempt to manage through their content, context, and structure.

With electronic records, technological dependencies make these issues even more apparent. The layers of meaning are manifested in traditional recordkeeping systems in ways that are often relatively implicit and change only gradually over time. Electronic recordkeeping systems, however, must be explicit about which components will be preserved and how they will be reflected. In order to manage the complexity of technological components necessary to turn some charges on a physical medium into the meaningful records we desire, these components are broken into various layers of abstraction.

> Computer science is largely a matter of abstraction: identifying a wide range of applications that include some overlapping functionality, and then working to abstract out that shared functionality into a distinct service layer (or module, or language, or whatever). That new service layer then becomes a platform on top of which many other functionalities can be built that had previously been impractical or even unimagined. How does this activity of abstraction work as a practical matter? It's technical work, of course, but it's also social work. It is unlikely that any one computer scientist will be an expert in every one of the important applications areas that may benefit from the abstract service. So collaboration will be required (Agre 2000).

Ask for Help

Lest we get turned off by the technical implications of the first few sentences of Agre's quote, it is important to remember the punch line. Even computer scientists are not experts in everything related to computers. In order to tackle technical issues, they break them into parts. Different people specialize in different parts of the problem, and if they run into issues with which they are not familiar, they ask for assistance from someone else who might be.

Studies have demonstrated that most information seekers tend to look for answers close to home before venturing out into the rest of the information universe (Harris and Dewdney, 21-26). When encountering an issue related to electronic records, it is often very helpful to find out how our peers have been addressing it. This interaction need not be face-to-face. Electronic mailing lists, Usenet newsgroups, online forums, and even good old telephone calls and snail mail can assist in this effort.

Look for Help

Of course, interpersonal contact is not the only way to gain useful guidance. Sources of information that can help us address electronic records often take the form of documents. In the majority of cases, these documents are available through the Internet, though there are also some that will require a trip to a major research library.

It is important to realize that traditional sources of guidance, such as records management and archives journals, are just the tip of the iceberg. Since electronic records touch on so many areas, it is best to remain open to numerous avenues of information.

The following are just a few of the areas that may prove relevant to archivists and records managers: legislation, policies, and regulations; legal theory and case law; organizational theory; human-computer interaction; computer-supported cooperative work; information retrieval (Ribeiro-Neto and Baeza-Yates); digital libraries (*D-Lib Magazine*; *RLG DigiNews*); science and technology studies; management information systems; document management systems; development of new file format; networked and distributed computing (Tanenbaum); information economics (Kahin and Varian; Shapiro and Varian); electronic commerce; and project management methodology (for project management guidance specific to electronic recordkeeping, see Ellis).

I maintain a topical directory of electronic recordkeeping resources, a more actively updated version of the directory I created in Kansas, which points to some online materials that I have found to be relevant.

Conferences and coursework are also important options. Several members of the KSHS staff attended the Cohasset Managing Electronic Records (MER) conference in 1995, which informed them of many important issues and greatly contributed to their decision to pursue their first NHPRC grant. When I started my work in Kansas, I had recently completed a master's degree from the University of Michigan School of Information (SI), which provided me with many relevant skills and concepts.

There are also other educational options for those unable to attend conferences or take on more formal coursework. The NHPRC has been placing increasing emphasis on new avenues for archival education, as reflected by projects such as "Educating Archivists and Their Constituencies," which is being managed by Minnesota and is focusing heavily on metadata and the eXtensible Markup Language (XML).

We Get Extra Points for Copying off Our Neighbors

Most of the issues that each of us confront are also being confronted by others. Whenever possible, we should borrow their ideas and bend the ideas to fit our own situations. This will save time and effort and establish connections with our peers in other institutions. The KSHS has lived by this lesson. The "Kansas Digital Imaging Guidelines for State Government Records," for example, is an adaptation of guidelines developed by the state of Alabama.

When asked about the use of Dublin Core tags in state websites, we often pointed people to the "User Guide to Minnesota Metadata." The "Electronic Records Draft Guidelines" from Mississippi also provided us with helpful guidance. Along with several other states and the government of Canada, we took our lead on website issues from "Guidelines for Electronic Records Management on State and Federal Agency Websites" by Charles McClure and J. Timothy Sprehe.

The Kansas electronic records project benefited most, however, from work being carried out in Ohio. The Kansas Electronic Records Committee (ERC) was inspired by and modeled after the ERC in Ohio. Records series from the Ohio ERC General Schedule for Electronic Records Subcommittee served as templates for many of our own. We car-

ried out a case study to implement recommendations from the Ohio ERC File Management Subcommittee as a way of managing the files on our own internal network at the Kansas State Historical Society. The Kansas work on e-mail guidelines has also benefited from the existence of guidance in this area from Ohio, along with guidance from several other states.

In turn, the Ohio ERC has borrowed and modified the Kansas Electronic Records Management Guidelines (which also drew heavily from existing documents) for use in Ohio. Ohio and Kansas cooperated on an effort to borrow the *TIS Handbook* from Minnesota for application in other states. The Kansas ERC's work on the Kansas Statewide Technical Architecture has also contributed to similar work on a statewide architecture in Minnesota.

Everyone Can Be a "Techie"

It is unfortunate that, when confronted with electronic records issues, archivists and records managers so often claim, "I'm not a technical person, so I can't really talk about that." As I stated above, no one has a thorough understanding of every detail of computer systems, and more importantly, even people whose jobs are intimately tied to computers often understand only a tiny portion of what they could potentially know. In order to be a sales manager for a software company, for example, it is not very likely that one would need to know how to write programs in C++. In order to be a systems analyst for an Internet security company, it is also not likely that one would have to know the intimate details of how instruction sets differ on the Pentium IV processor versus the Pentium III.

More important than any of the details of how particular computer systems work is the language used to describe them more generally. Learning this language takes some effort and ongoing vigilance, but it does not take a Ph.D. in computer science. If I were trying to devise a plan for preserving a database, it would be a very good idea for me to know what tables, records, and data dictionaries are, but I would not have to have the entire Oracle 9i operator's manual memorized in order to take part in such a conversation.

If someone uses a term with which I am not familiar, I will either ask them to explain it, or look it up. The Electronic Recordkeeping Resources site includes links to numerous online dictionaries of technical terms. It is often a pleasant surprise to find that learning a handful of terms related to a given system, component, or process qualifies us to discuss recordkeeping issues related to it. If a question arises about the relative worth of two different software applications, one can visit the websites of the companies that make them and read reviews in the trade literature.

The point is not to become a "computer expert" (as if such a category was even meaningful). Instead, we must simply be able to articulate to those who are responsible for computer systems what it is that we are asking of them and how they might go about doing it. That final point is important to emphasize. If we expect programmers, system managers, or anyone else to implement our requirements, it is best to articulate them as more than simply statements of need. Learning how to express concerns in terms of data models, use cases, business rules, and functional requirements is extremely helpful in getting things done.

Once again, it is often a pleasant surprise how easy some of this jargon is to pick up and use. It is not about the bits and bytes, the algorithms or the subtle nuances of writing good code. It is about learning to "speak the language of the technologist" (Bantin, 30) so others with skills in implementing our ideas can make them into a reality.

Open Systems Are Our Friends

In order to manage the complexity of computer systems, breaking them into layers of abstraction, as described above, is only part of the story. It is also very helpful to develop and adopt conventions, generally called standards, for how those layers will work. That way, if I have the same layer on my system as you do on yours, we can be confident that they will be compatible. Important examples of these standards are protocols (such as TCP/IP and HTTP) and file formats (such as HTML). These standards allow us to exchange information through the Web, even though we do not all use the same hardware or software. In both the physical world and digital environment, standards address a common problem: Each interface (i.e., point of contact between systems) adds complexity.

Standards turn an "N times N" problem into an "N plus N" problem. Stated another way, the number of necessary technical pieces that must be built between components in order for them to exchange information is greatly reduced by allowing all components to interface with a common standard rather than having to all interface with one another. This is much like the idea behind the language Esperanto, which could (if widely known) allow individuals from different countries to converse with one another in one common language rather than attempting to learn the native languages of all other countries in the world.

Data management, interchange, interoperability, migration, and ongoing accessibility are greatly facilitated by the adoption of open standards which serve this Esperanto role for computer systems. As stated in the Kansas Electronic Records Management Guidelines:

> Whenever feasible, file formats, protocols and other system specifications adopted by state agencies should be those developed and adopted by recognized standards bodies. Since the requirements for fulfilling these standards are both publicly documented and generally supported by more than one vendor, agencies that adopt them will be much less likely to find themselves stuck with valuable but inaccessible records than will agencies that adopt more closed systems. The appropriate standards body will depend upon the nature of the technology involved, but three particularly important sources of standards relevant to electronic records management are the International Organization for Standardization (ISO), Internet Engineering Task Force (IETF) and World Wide Web Consortium (W3C).

The adoption of such standards will greatly simplify our lives, regardless of whether we are taking physical custody of electronic records ourselves or advising record-creating entities (individuals, businesses, government agencies, etc.). Anytime a number of systems conform to a standard, it allows us to learn about the standard, rather than all of the details of each system. If someone says that she is creating policy documents as web pages that comply strictly with the W3C Recommendation for the hypertext markup language (HTML), Version 3.2, for example, then knowledge of HTML would allow

us to quickly determine many of the preservation implications for those documents. The same cannot be said for documents created in XYZ Company's proprietary file format, which requires special software from the XYZ company to read.

Even standards change over time, and software vendors tend to add "extensions" to formats that only work in their own software. The report on "Risk Management of Digital Information" provides a discussion of the preservation implications of such extensions (Lawrence et al.). Even HTML, which I mentioned above as an example of an industry standard, has fallen victim to this phenomenon. A big part of the "browser wars" between Netscape Navigator and Microsoft's Internet Explorer has been the constant shifting of what nonstandard HTML tags each browser recognizes. This is still much better, however, than having to deal with completely different formats for every collection of electronic records.

We need not take a passive role when it comes to standards development. A number of prominent metadata standards initiatives have benefited greatly from the participation of archivists, librarians, and others concerned about the preservation of digital materials. As we learn about industry standards and identify issues that seem not to be addressed or elements that seem to be missing, we can make our concerns known to the appropriate standards body. Though they will not always operate as quickly as we might like, many of the efforts are surprisingly open to new contributions.

There are also cases in which we can develop standards through our own professional organizations. Regardless of the approach, another advantage to taking part in standards development is that it facilitates the sort of specific articulation of our requirements described in the previous section (Hedstrom, 337).

At a more local level, one of the greatest avenues for advocating electronic records issues in Kansas was the development of the Kansas Statewide Technical Architecture (KSTA). The KSTA is a broad document, providing guidance to state entities on how to develop, manage, and maintain information technology. This is Kansas's own effort to manage some of the complexity involved in facilitating government services through computer systems across the state. Serendipitously, the KSTA development effort began right around the time that our second NHPRC project was getting started.

As stated above, we were able to introduce electronic records provisions into a number of the KSTA chapters and eventually even developed an entire chapter for the KSTA on Electronic Records Management and Preservation. This process greatly increased the visibility of our concerns among the information technology managers of the state. The need to create and maintain the electronic records chapter for the KSTA was also a major selling point for the creation of the Kansas Electronic Records Committee (ERC).

We Have to Pick Our Battles

I do not think I will ever forget the meeting several colleagues and I had with the director of a small nonprofit case management agency in Michigan as part of a project to improve their document management systems and procedures. As a group of us huddled around a form that was a photocopy of a photocopy of a photocopy, with several items that were no longer appropriate and others that were no longer even readable, he explained that they had created a much easier version of the form to use internally. They still needed to use the old form, however, when sending a copy on to the agency that created it. "Couldn't you get the other agency to accept your new, improved form in place of the old one?" one of our project team members asked. The agency director shrugged and gave us a look that hinted at years of belabored arguments over minutiae such as copies of such forms. He stated simply, "That's not a hill worth dying on."

In our efforts to apply our guidelines in Kansas, we encountered a number of hills that we eventually decided to abandon. Some were agencies that had originally agreed to take part in case studies, then failed to return our repeated calls and e-mail messages, or who seemed uninterested in ever adopting retention schedules for their records. Others were laws or regulations that did not quite reflect the spirit of our electronic records guidelines but would have cost months of effort and huge political capital to address. Still others related to annual budgeting constraints that did not support the sort of long-range planning that we knew was most appropriate for the preservation of electronic records.

We did have noteworthy successes along all of these lines:

- some agencies did engage in case studies
- reorganization and addition of several new series to the state General Retention Schedule
- contribution to and testimony on digital signature legislation
- contribution to the KSTA
- ongoing cooperation with the Chief Information Technology Officer of the Executive Branch and a number of his support staff on the formation of state information technology policies that address electronic records as part of information technology project planning, budgeting, reporting, and oversight.

Remain Flexible

All of the accomplishments listed above required both persistence and compromise. None of them turned out exactly as we had planned. In fact, many of our most important objectives emerged over the course of the project. If we had attempted to stick too rigidly to a preestablished agenda, we would have missed some extremely important opportunities. The statewide effort to develop the KSTA, for example, emerged after the KSHS had requested and received approval of the grant from the NHPRC. We quickly revised our project objectives to include work on the KSTA. This work became the foundation of most of our successes, since it gave us visibility, legitimacy, and a specific reason to form the ERC.

We Must Learn and Then Address the Concerns of Our Stakeholders

In order to be an effective advocate for the preservation of electronic records, we must be aware of the current concerns of the parties involved. Much of this essay has been focusing on state government, but this lesson applies equally to other arenas. Managing electronic records appropriately takes resources, in the form of mental energy, time, expertise, and often technology. If we want to convince others to commit such resources, we must speak in terms of their current goals and values. For one person, this might be fear of legal risks, for another it might be providing services more efficiently, for still another it could be the need for public accountability or a sense of her community's history.

This point is closely related to the need to remain flexible. If a local newspa-

per is running a series on how various agencies are complying with the state's open records (i.e., sunshine) laws, this is an excellent opportunity to raise the issue of managing electronic records. If a top administrator starts telling everyone that "knowledge management" is the wave of the future, it is probably a good idea to explain how the management of authentic electronic records is a pivotal component of knowledge management.

For those who serve a lot of genealogists, attending some of their meetings and speaking to them about digital preservation concerns could be a good idea. The more they know about the issues, the more likely they will be to make smart decisions about preserving their own digital materials and the more actively they will advocate for the allocation of public resources to address these issues.

When creating documents to inform others about electronic records issues, it is also often a good idea to have multiple versions. Three documents that we used most often for this purpose in Kansas—the Guidelines, KSTA chapter, and *Kansas Electronic Recordkeeping Strategy: A Whitepaper*—provided largely the same content, but in very different styles and lengths. We found that the Whitepaper, for example, was a great document to give to someone who only wanted an "executive summary" of the issues.

In order to design and implement recordkeeping systems that serve their intended purposes, we should be particularly attentive to the needs and concerns of system users. Research on the adoption of computer-mediated communication systems demonstrates that users will resist, work around or simply ignore new information technology that does not align with their organizational goals and incentives (Orlikowski; Balter), and it is difficult to get individuals to contribute valuable content into a system if they do not perceive any direct benefit to themselves (Grudin, 96).

Explore Multiple Modalities

In *Code and Other Laws of Cyberspace*, Lawrence Lessig warns that decisions are getting made all around us on very important issues, based on society's move to digital technologies. He calls on the reader to identify values that are being affected and determine how best to address them. One of the major insights of the book is that we can break these considerations down into four broad modalities of regulation or constraint: norms, law, market, and architecture/code.

Though Lessig's conclusions tend to be relatively pessimistic, I prefer to read his book as a powerful call to action. As he states, recognizing the transitions that are occurring can hopefully give us some guidance on "how we might reclaim the values that are important in this [cyber] space, and how we might insist on bringing to it values that are now absent" (Lessig, 23). He points out that the modalities are malleable. Contrary to much of the contemporary hype related to the "information revolution," very little of what we take to be the current digital environment is actually inherently or naturally determined. Technology is a human creation and can be reconstructed to take on just about any attributes we value enough to build into it.

For those of us trying to advance the cause of electronic records management and preservation, thinking of our efforts as choices related to these four modalities can help us determine how to promote our values. Focusing on these values and ways to promote them in a changing environment could be a much more productive enterprise than what often currently amounts to debating about whether or not our core practices are still relevant.

Many of our traditional archival concepts (arrangement and description, reference, custody, intellectual control, appraisal, and retention scheduling) will continue to be important, particularly in facilitating internal professional discussions, but we should not forget that many of our concepts have only instrumental worth. We use them because they help us to promote our professional values such as accountability, cultural memory, respect for the rights of creators, promotion of authentic narratives, and service to current and future secondary users.

Given these values, we can use Lessig's four modalities as a means to define our landscape and strategies for action. Though the details vary greatly across organizational and social contexts, I see some clear general changes in all four modalities that are relevant to electronic records:

Code/architecture. Technological complexity continues to grow, raising serious preservation issues, especially through obsolescence and contemporary lock-in to (thus often future lock-out from) proprietary systems.

Market. Economic forces drive many of the changes effecting electronic records, promoted greatly by public policy that tends to facilitate sweeping intellectual property right claims by large firms.

Law. Legal warrant for management and access to records (especially public government records) is often on our side, though it is up to us to assert this fact. Internal political forces, related to funding and relative power, often minimize the promotion or enforcement of existing laws. New policies also continuously arise, which either fail to address or openly abandon our values.

Norms. Popular attitudes about history, accountability, and cultural heritage have changed dramatically in recent years. Individuals are ultimately responsible for record creation, management, preservation, and decisions about resource allocation, so norms are an extremely important part of the equation. Without individuals recognizing the relevant social values, it is unlikely the other three modalities will have the desired effect. We should be extremely attentive to trends in the change of norms.

When we are able to recognize radical change in one or more of the modalities—what we could call a "strategic inflection point" (Grove)—it is time for us to decide how to either resist or adapt to this change in order to continue promoting our values effectively. Although "latent ambiguities" in existing laws, policies, and principles can often be challenging, they can also provide us with an open door into new opportunities. When an ambiguity in the traditional version of a modality arises, it provides us with a chance to attempt a resolution of that ambiguity that promotes our values.

Lessig shows us that the modalities interact with each other in dramatic ways, and scoring a victory relative to one can often help to promote our values relative to the others. It can be helpful to monitor both the shifting of modalities within our local institutional contexts and within the much broader society (Castells).

It Will Only Break If We Don't Play with It

If we do not act to preserve electronic

records, they will quickly become useless, through medium degradation, mismanagement, and technological obsolescence. We know the general approaches for dealing with these issues, and there is an urgent need for us to apply them. As new situations arise, the only way to discover what techniques to apply to them is to make an attempt. Colin Webb has indicated in a recent interview that the National Library of Australia can attribute a great deal of its success on this front to an attitude of "learning by doing."

Records work has never had the benefit of certainty. Retention scheduling and appraisal decisions run the risk of destroying too much or not enough. Descriptive practices always run the risk of emphasizing attributes of our collections that will not best facilitate future research. Allocation of resources to conserve one collection rather than accessioning another (or vice versa) often looks foolish in retrospect. Finally, with electronic records, there is one certainly on which we can rely. Failure to act immediately will result in massive loss of cultural memory. With that certainty in mind, any ERM, even guerrilla ERM, starts to look pretty good.

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