

Strategies for Managing Electronic Records: Lessons Learned from the Indiana University Electronic Records Project

Introduction

For archivists and records managers, the decade of the 1990s will undoubtedly be remembered as a period of intense and passionate debate about a host of issues related to the role of these professions in managing and preserving society's documentary heritage. Among the questions being asked: What do archivists and records managers contribute to society? What is their relationship to other information management professionals? What theories, principles and techniques will continue to guide records professionals in their work? When one looks for the primary factors fueling this debate, two primary contributors stand out: the rapid technological changes of the last two decades, and the increasing dependence of society on electronic or digital documentation.¹

Various research projects have been undertaken to address the challenges presented by electronic records. The most prominent are those devoted to developing basic requirements for recordkeeping systems² and to

¹ For analyses of the impact of automation on archival concepts and theories, see Richard Barry, "The Changing Workplace and the Nature of the Record" at <http://www.rbarry.com/aca-pv16/ACA-PV16.html>; David Bearman, "Diplomatics, Weberian Bureaucracy, and the Management of Electronic Records in Europe and America," in *Electronic Evidence: Strategies for Managing Records in Contemporary Organizations* (Pittsburgh: Archives and Museum Informatics, 1994), pp. 254-277; David Bearman and Margaret Hedstrom, "Reinventing Archives for Electronic Records: Alternative Service Delivery Options," *Electronic Records Management Program Strategies*, ed. Margaret Hedstrom (Pittsburgh, PA: Archives and Museum Informatics, 1993), pp. 82-98; Terry Cook, "Electronic Records, Paper Minds: The Revolution in Information Management and Archives in the Post-Custodial and Post-Modernist Era," *Archives and Manuscripts* 22 (November 1994): 300-328; Elizabeth Yakel, "The Way Things Work: Procedures, Processes, and Institutional Records," *American Archivist* 59, No. 4 (Fall 1996): 454-464.

² Lists of functional requirements are available at the following web sites: Department of Defense Standard can be found at <http://jltc.fhu.disa.mil/recmgt/#standard>; The National Archives of Australia, "Designing and Implementing Recordkeeping Systems," at <http://www.naa.gov.au/recordkeeping/dirks/summary.html>; State Archives of Victoria (Australia), "System Requirements for Archiving Electronic Records" at <http://www.prov.vic.gov.au/vers/standard/99-7-1toc.htm>; Canadian State Archives, "Recordkeeping in the Electronic Work Environment" at http://www.archives.ca/06/0603_e.html; Delaware State Archives, "Model Guidelines for Electronic Records" at <http://www.archives.lib.de.us/recman/g-lines.htm>; New York State Archives, "Functional Requirements to Ensure the Creation, Maintenance, and Preservation of Electronic Records" at <http://www.ctg.albany.edu/resources/abstract/mfa-4.html>; Kansas State Historical Society, "Kansas Electronic Records Management Guidelines" at <http://www.kshs.org/archives/recmgt.htm>; The University Pittsburgh Project Functional Requirements at <http://www.lis.pitt.edu/~nhprc/progl.html> ;

identifying documentation or metadata that must be present to create reliable and authentic records.³ There have been, however, very few implementation projects designed to test any of these theories and concepts. The Indiana University Electronic Records Project is an implementation project, which was designed to develop a strategy and methodology for incorporating recordkeeping requirements into IU's transaction processing and information systems.⁴ Questions being asked by project staff include: What is the archivist/record manager's primary contribution to the management of digital objects? Will traditional methods for identifying, appraising, describing records still have value in managing electronic records, or will we have to significantly change the way we do business? What new skills will be needed? What changes need to be made to transaction process systems to make them function effectively as recordkeeping systems? How does one insert the archives program into the process for designing, analyzing, and auditing electronic information

University of British Columbia, "The Preservation of the Integrity of Electronic Records" at <http://www.slais.ubc.ca/users/duranti/>; Indiana University Electronic Records Project, "Functional Requirements for Recordkeeping Systems" at <http://www.indiana.edu/~libarch/funcreqs.html>

³ See the following web sites for information on prominent metadata projects: The University of Pittsburgh Electronic Records Project, Metadata Specifications can be found at <http://www.lis.pitt.edu/~nhprc/meta96.html>

National Archives of Australia, Record Recordkeeping Metadata Standard at <http://www.naa.gov.au/recordkeeping/control/rkms/summary.htm>; SPIRT, Recordkeeping Metadata Project at <http://www.sims.monash.edu.au/rcrg/research/spirt/index.html>; see also article on project by Sue McKimmish and Glenda Acland "Accessing Essential Evidence on the Web: Towards an Australian Recordkeeping Metadata Standard" (1999) : at <http://ausweb.scu.edu.au/aw99/papers/mckemmish/paper.html>; Proposed NSW Recordkeeping Metadata Standard : New South Wales, Australia at <http://www.records.nsw.gov.au/publicsector/erk/metadata/NRKMSexplain.htm>; United States, Department of Defense, "Records Management Application (RMA) Design Criteria Standard" and "Standard Revision" and "Certification Test and Evaluation Process and Procedures" at <http://jtc.fhu.disa.mil/recmgt/>;

Indiana University Electronic Records Project, Metadata Specifications at <http://www.indiana.edu/~libarch/phase2.html> ;

University of British Columbia Project, "The Preservation of the Integrity of Electronic Records" at <http://www.slais.ubc.ca/users/duranti/> ; On the British Columbia Project also review the article by Luciana Duranti and Heather MacNeil, "The Protection of the Integrity of Electronic Records: An Overview of the UBC-MAS Research Project," *Archivaria* 42 (Fall 1996): 46-67; The International Research on Permanent Authentic Records in Electronic Records (INTERPARES) Project at <http://www.interpares.org/>; Victorian Electronic Records Strategy, at <http://home.vicnet.net.au/~provic/vers/> ; On the Victorian Project also review the article by Justine Heazlewood, et.al., "Electronic Records: Problem Solved?" in *Archives and Manuscripts*, Vol. 27, No. 1 (May 1999): 96-113; "Record Keeping Metadata Requirements for the Government of Canada at http://www.imforumgi.gc.ca/new_docs/metadata1_e.html

⁴ Information on the IU Electronic Records Project, Phase I and Phase II can be found at <http://www.indiana.edu/~libarch/phase.html>

systems on the IU campus? Who are an archivist's strongest allies in the management of electronic records, and which issues will resonate with these partners? In this article, I will address these issues and describe several lessons we have learned in the implementation process during the past five years.

Defining the Archivist/Records Manager's Unique Contributions

Lesson 1: Records professionals must define their primary and unique contributions to managing digital resources. To do this the profession must not only define itself, but also articulate the mission of archives/records management in relation to the goals and objectives of other related data and information management professionals.

Organizations collect, create, and use a wide variety of recorded documentation. There is data or the raw facts about the organization and its business transactions. There is information, defined as "data that has been refined and organized by processing and purposeful intelligence."⁵ There are documents or "a grouping of formatted information objects regardless of medium or form that can be accessed and used by a person."⁶ More recently there is knowledge, which is defined as something more than information because it includes the expertise, logic and reasoning developed by accomplished experts in a specific field to solve problems and make decisions.⁷ Finally, there is the concept of a business record, which archivists argue is a specific and unique type of information quite different

⁵ Jeffrey L. Whitten and Lonnie D. Bentley, Systems Analysis and Design Methods, 4th ed. (Boston: McGraw-Hill, 1998), p. 38. For additional descriptions and definitions of information and information management, see Judith Gordon and Steven Gordon, Information Systems. A Management Approach (Fort Worth, Texas: Dryden Press, 1999); Kenneth C. Laudon and Jane P. Laudon, Essentials of Management Information Systems (Englewood Cliffs, N.J.: Prentice Hall, 1999); Ralph Stair, Principles of Information Systems. A Managerial Approach (Boston, MA: Boyd & Fraser Publishing Co., 1992).

⁶ Michael J.D. Sutton, Document Management for the Enterprise. Principles, Techniques, and Applications (New York: John Wiley & Sons, Inc., 1996), p. 343. For additional descriptions and definitions of documents, see Larry Bielawski & Mim Boyle, Electronic Document Management Systems (Upper Saddle River, NJ: Prentice Hall PTR, 1997).

⁷ For definitions and descriptions of knowledge and expert systems, see Efraim Turban, Decision Support and Expert Systems: Management Support Systems (New York, NY: Macmillan Publishing Company, 1993), p. 465-552; Kenneth C. Laudon and Jane P. Laudon, Essentials of Management Information Systems (Englewood Cliffs, N.J.: Prentice Hall, 1999), pp.370-399; Ralph Stair, Principles of Information Systems. A Managerial Approach (Boston, MA: Boyd & Fraser Publishing Co., 1992), pp. 356-379.

in its creation and purpose than any of these other types of recorded documentation.

Archivists have identified two distinguishing characteristics of records. First of all, records reflect business processes or individual activities; a record is not just a collection of data, but is the consequence or product of an event. Of course, this is not new concept; older definitions identify records with a process or an activity. What is new is the emphasis on defining more precisely and conceptually when the record is created by the business event or personal activity. The other part of the definition of a record stresses that records provide evidence of these transactions or activities. In other words, recorded documentation cannot qualify as a record unless certain evidence about the content and structure of the document and the context of its creation are present and available.⁸

So, what do archivists/records managers contribute? What is their role in any partnership? The IU Archives team has defined its mission and its contribution as the identification and appraisal of records generated in the context of business processes, and the creation of systems that capture, manage, and preserve these records. In other word, records and recordkeeping systems are our main and primary responsibilities. In the past few years, some archivists and records managers have argued that our professions need to become more involved in related disciplines, such as information and knowledge management. I think this would be a grave mistake. Recordkeeping is what we do best, and few others in the data and information management community are committed to or trained in preserving reliable and authentic records. Recordkeeping is a full-time job,

⁸ For discussions of the evolution of the concept of the record and redefinitions of the term, see Richard Cox, "The Record: Is it Evolving?" The Records and Retrieval Report 10, No. 3 (1994): 1-16; Richard Cox, "The Record in the Information Age: A Progress Report on Research," The Records and Retrieval Report, No. 1 (January 1996): 1-16; David Roberts, "Defining Electronic Records, Documents and Data," Archives and Manuscripts 22, No. 1 (May 1994): 14-26; Glenda Ackland, "Managing the Record Rather Than the Relic," Archives and Manuscripts 20, No. 1 (1992): 57-63; Sue McKemmish, "Are Records Ever Actual?" in The Records Continuum, Ian Maclean and Australian Archives First Fifty Years, Sue McKemmish and Michael Piggott, eds. (Clayton, Vic: Ancora Press, 1994), pp. 187-203; David Bearman, "Managing Electronic Mail," in Electronic Evidence: Strategies for Managing Records in Contemporary Organizations (Pittsburgh: Archives and Museum Informatics, 1994), pp. 188-91; Charles Dollar, Archival Theory and Information Technologies. The Impact of Information Technologies on Archival Principles and Methods (Macerata, Italy: University of Macerata, 1992), pp. 45-48; National Archives of Australia, "Managing Electronic Records: A Shared Responsibility" at http://www.naa.gov.au/recordkeeping/er/manage_er/summary.html

and it is our unique, though complementary, contribution to the management of the institution's resources.

Partnerships

Lesson 2: Forming partnerships with other information professionals is essential.

It has become a truism that the effective management of electronic records requires the archivist/records manager to form partnerships with various professions.⁹ What has not been sufficiently demonstrated through real-life experiences is who are the most important partners and how these partnerships will work. Based on experience, I have found three partners most valuable: decision support personnel, systems analysts, and internal auditors. Of the three, the IU archives has had the most experience and success working with internal audit.

Why is internal audit such a useful partner for the archivist/records manager? The answer can be found first in the fact that the missions of the two professions share many points in common. Both professions are interested in creating systems that are accountable, compliant and trustworthy, and that produce accurate, reliable and authentic records. Both professions acknowledge the importance of risk assessment and the value of understanding business requirements. It is not only the similarities in mission, however, that make this partnership or any partnership work effectively. Participants must also gain something valuable and unique from the collaboration. To be effective, the partnership must result in a win/win scenario. In the IU Archives/Internal Audit partnership, mutual benefits occur in several ways. The audit process employs a methodology based on detailed sampling of certain transactions, while the objectives of the archives methodology is to achieve a broad, but less detailed analysis of all system functions. When combined these two methodologies complement one another, and both partners agree it results in a much more detailed, more complete analysis of the system. The two professions also complement one another in terms of the functions or issues they focus upon in their analysis of systems. For auditors, the primary concerns include data authenticity and

⁹ For an interesting discussion of partnerships, which argues that the archivist's most important partners are lawyers, auditors, and senior manager, who are concerned with records and risk assessment, see David Bearman, "Archival Strategies," *American Archivist* Vol. 58 (Fall 1995): 380-413.

accuracy, system security, adequate internal controls, documentation (written procedures and instructions), and backup procedures and contingency planning. The archives staff, on the other hand, tends to focus on recordkeeping issues, such as record identification and capture, record metadata, access, and long-term preservation. Again, the result is a complementary analysis, which provides each partner with new and valuable information. The auditors gain access to previously unavailable analyses of systems from a recordkeeping perspective, and the archivists gain detailed knowledge about system security, data accuracy and input procedures, and system documentation.

Ultimately, however, I believe the greatest advantage for the archival program in this partnership is that it involves archives staff in the authorized and routine review of information systems. The value of partnering in the systematic, daily review of systems with a unit like internal audit, which has an institutional mandate and the authority to conduct these reviews, cannot be over emphasized. Working with audit is an effective strategy for inserting the archives/records management program into the mainstream process of designing, analyzing, and modifying electronic information systems.¹⁰

Skills Required

Lesson 3: One of the conclusions arrived at by most archivists involved in electronic records management is that the archival profession needs to add some new skills to its “tool kit” in order to be effective in this world of automated records.

Based on the IU experience, the most difficult question one faces is not whether new skills are needed, but rather which skills and how much. In other words, how much specialization is needed? How do you determine when you have acquired enough information to do your job? At what point do you hand the ball off to your partners for them to do their thing?

¹⁰ For a more detailed description of the partnership between the IU Archives and Internal Audit, see Philip Bantin, “The Indiana University Electronic Records Project Revisited,” The American Archivist, Vol. 62, No. 1 (Spring 1999): 153-163.

In addressing these questions, I would first say that I agree with Margaret Hedstrom when she writes that "the challenge is to strike a balance between teaching known methods and techniques- built around traditional archival functions- and teaching archivists how to evaluate, apply, and modify theory to address the changing needs of advanced technology."¹¹ In other words, to be a good manager of electronic records, a solid grounding in basic archival principles and techniques is essential. Beyond that, experience has demonstrated that new and different managerial and technical skills are required to be successful in the world of automated records.

I would group the new skill sets that I have found most important into three basic categories. The first is obtaining basic knowledge of automated systems and how they process data. Of particular importance is acquiring a good working knowledge of the most prevalent systems presently being employed in most institutions: Transaction Processing Systems (TPS), Database Management Systems (DBMS), Management Information Systems (MIS), Decision Support System (DSS), Data Warehouses and Electronic Document Management Systems (EDMS). In addition, one must obtain a thorough understanding of all the various metadata systems, such as data dictionaries, information resource dictionary systems and transaction logs. Understanding these systems and how they manage digital objects throughout their life cycle is the starting point in the quest to develop recordkeeping systems. Before archivists can begin designing recordkeeping systems, they must first be able to articulate why a TPS or EDMS is not performing as required.

A second basic set of skills that I have found essential are information system analysis and design skills. In particular, I would emphasize the ability to create conceptual models for representing records and system requirements. Of these models the most important are business process models. These models depict the business functions and business processes - transactions and the inputs and outputs - required to respond to business events. The value of business models for archivists is that they can depict precisely when, where and how record creation occurs. Process models are the blueprints, the maps for record identification and capture. They provide the archivist with a conceptual model based on depiction of real-life activities of the context for creation, and consequently provide the

¹¹ Margaret Hedstrom, "Teaching Archivists About Electronic Records and Automated Techniques," The American Archivist, Vol. 56, No. 3 (Summer 1993): 427.

information needed to precisely describe and define for system designers which pieces of data need to be captured as evidence of business transactions. I consider the ability to create conceptual models of business processes as an absolutely critical and essential skill for the 21st century archivist/records manager.¹²

The third skill set I would like to emphasize is obtaining the management skills required to translate this knowledge into a strategic plan. More than ever before, records professionals must be effective managers who can translate a set of goals and objectives into a realistic and effective implementation project. More specifically, we must learn effective techniques for communicating archival needs, capabilities and contributions. We must develop strategies for positioning the archives/record management program within the broader context of information resources management. We must learn how to define mutually beneficial activities, and how to negotiate “win/win” alliances.

Finally, I would like to comment briefly on how to maintain the proper perspective or balance in the acquisition of new skills. In regard to the hand-off point, I always keep in mind that the goal is to manage and preserve records. I am not in the business of managing data, information, knowledge or documents. Keeping focused on records management issues will help one stayed focused on the basic skills required. Remember, the goal here is not be become a programmer, systems analyst or decision support specialist, but rather an archivist/records manager who can speak the language of the technologist, understands how various data and information systems function, and is able perform some basic tasks related to modeling and describing business processes.

¹² For descriptions of the technique known as “Modern Structured Analysis,” consult the works of Tom DeMarco, Structured Analysis and System Specification (Englewood Cliffs, N.J: Prentice-Hall, 1978), Stephan McMenamin and John Palmer, Essential Systems Analysis (Englewood Cliffs, N.J: Prentice-Hall, 1984), James and Suzanne Robertson, Complete Systems Analysis (New York: Dorset House Publishing, 1994), Jeffrey Whitten and Lonnie Bentley, Systems Analysis and Design Methods, 4th ed., Edward Yourdan, Modern Structured Analysis (Englewood Cliffs, N.J.:Yourdon Press, 1989); and Jeffrey Hofer, Joey George, and Joseph Valacich, Modern Systems Analysis and Design. 2nd ed. (Reading, MA: Addison-Wesley, 1999).

Recordkeeping Deficiencies Commonly Encountered

Lesson 4: The primary data and information systems employed by most institutions are poor recordkeeping systems.

Transaction Processing Systems Employing DBMS Software

The most basic business system and the heart of most organizations is the Transaction Processing System (TPS). A transaction processing system "is a computerized system that performs and records the daily routine transactions necessary to the conduct of business." The primary goal of these systems is to automate computing intensive business transactions, such as those undertaken in the financial and human resource functional areas. The emphasis is on processing data (sorting, listing, updating, merging), on reducing clerical costs, and on outputting documents required to do business, such as bills, paychecks and orders. The guiding principles of these systems are to create data that is current, up-to-date, accurate, and consistent. To achieve these goals, these systems employ Database Management System (DBMS) software. One of the primary advantages of DBMS is its ability to limit and control redundant data in multiple systems. Instead of the same data field being repeated in different files, the information appears just once. Another advantage of DBMS is that it improves data integrity. Updates are made only once, and all changes are made for that data element no matter where it appears.¹³

TPS does not routinely capture records

Without question, TPS are very good at supporting current business needs for information, minimizing the amount of data stored in the system, improving overall efficiency of the system, removing obsolete data and providing an organizational resource to current data. Archivists universally agree, however, that these systems do not routinely and systematically capture records. In these automated systems, business records are not routinely stored as stable, finite, physical entities. Rather, these systems create records by combining and reusing data stored in discrete units organized into related fields that form files. Once created, a record of a

¹³ For descriptions of how these systems function, see Judith Gordon and Steven Gordon, Information Systems. A Management Approach (Fort Worth, Texas: Dryden Press, 1999), pp. 192-233, 364-400; Kenneth C. Laudon and Jane P. Laudon, Essentials of Management Information Systems (Englewood Cliffs, N.J.: Prentice Hall, 1999), pp. 41-43; Ralph Stair, Principles of Information Systems. A Managerial Approach (Boston, MA: Boyd & Fraser Publishing Co., 1992), pp. 152-164, 238-258.

business process may not, indeed, likely will not be captured as a physical entity.

TPS does not systematically preserve inviolate records

Not only will the record not be captured at the time of creation, it may be impossible to recreate at some later date. Databases are dynamic, volatile systems, in a state of continual change. Data updates occur frequently, and with DBMS software managing the system, these revisions are made in every file containing that revised data element. Moreover, databases typically maintain only the current value for any given data element. Historical data, if kept at all, is usually incomplete or summarized. Consequently, historical "snapshots" of a database do not routinely capture the data values needed to reconstruct a specific record.

TPS does not systematically preserve complete, fully documented records (creating a complete set of record metadata and maintaining a physical relationship between the metadata and the record)

Even if all data values are captured in historical versions of the database, archivists argue the system is still not capturing and preserving records; retaining database tables preserves data not records. In most automated systems the physical relationship between the record content and the metadata that gives the content meaning often does not exist. Vital links between metadata and the record content data may exist only in computer software program, or may not be a part of the automated system at all, but exist only as a paper document totally disassociated with the records it is describing.

Archivists have also discovered that system metadata as typically defined by systems designers and technologists is often not as complete as necessary to describe a record. Transaction logs maintained in typical TPS do contain some critical data on updates and revisions, but on the whole, archivists generally agree that these logs do not provide sufficient evidence. Of particular concern is the relative lack of metadata related to the context of creation and use - metadata that addresses the questions of why the record was created, who were the users of the record, and who had custody of the record? The availability of this contextual metadata, archivists argue, could make the difference between a useful and a useless record, particularly when viewed over longer periods of time. Another deficiency of typical system metadata from a recordkeeping perspective is the absence of some critical documentation on the structure of the record. Of particular importance is

structural metadata describing how to open and read a record as it was originally created and viewed. Taken as a whole, the absence of critical metadata has meant, as one archivist has noted, that "most collections of electronic data, electronic documents, or information are not records because they cannot qualify as evidence." ¹⁴

New Techniques and Methodologies Required

Lesson 5: Traditional records management strategies established for paper records will have to be altered in significant ways to accommodate electronic records.

Experience would strongly suggest that archivists/record managers will have to implement new techniques and methodologies to be effective in the digital world. Whether this results in a major overall reengineering of the process is not clear. My experience would indicate, however, that the change will involve more than a mere tweaking or refining of traditional methodologies for managing records. I believe that records management professionals will have to devise new strategies for addressing some of the most basic issues, such as how we identify and capture records in automated environment, how we ensure that inviolate records are preserved for as long as necessary, how we appraise the value of records, how we document records, how we ensure that a complete record is captured, and when, at what point, we undertake these tasks. More specifically, there are two major and profound changes I would like to highlight.

Archivists Involved Throughout the Records Continuum

Experience at IU and other institutions would strongly indicate that the archivist's role in managing electronic records as articulated in the traditional life cycle model is far too limited. Experience would suggest that to be successful in managing electronic records, the archivist must be part of the team managing records throughout their life cycle – from the creation of records (and before creation, in the design of the system) through to the

¹⁴ David Bearman, "Introduction. Constructing a Methodology for Evidence," in *Electronic Evidence*, p. 2. For discussions on the need for metadata documenting content, context and structure, see David Bearman, "Item Level Control and Electronic Recordkeeping," *Archives and Museum Informatics*, Vol. 10, no. 3 (1996): 211-14; David Bearman, "Documenting Documentation" in *Electronic Evidence*, pp. 222-252; David Wallace, "Managing the Present: Metadata as Archival Description," *Archivaria* 39 (Spring 1995): 11-21; Margaret Hedstrom "Descriptive Standards for Electronic Records: Deciding What is Essential and Imagining What is Possible," *Archivaria* 36 (Autumn 1993): 53-63.

preservation and use of records as archives. Experience suggests that a more effective model or framework would include a more expansive role for the archivist, such as that defined in the newly formulated conceptual framework known as the “Records Continuum Model.” Perhaps the most basic difference between the continuum model and the life cycle approach is that while the life cycle model proposes a strict separation of records management responsibilities, the continuum model is based upon an integration of the responsibilities and accountabilities associated with the management of records. It is a strategy that undercuts and destroys the distinction between active and inactive, and archival and non-archival records, and blurs or wipes out the defined set of responsibilities associated with managing records at each stage. As a result, archivists and archival functions are propelled forward in the records management process. In other words, according to the Continuum model strategies and methodologies for appraising, describing, and preserving records are implemented early in the records management process, preferably at the design stage, and not at the end of the life cycle. Advocates of this model argue that lacking a strategy for active and early intervention by the archivist in the records management process, electronic records documenting vital transactions may never be created, may never be fully documented, or may never survive.¹⁵

The Value of Conceptual Models

A second profound change I believe is needed is the creation of an overall strategy that views conceptual model building as the primary methodology for dealing with many or most of the issues the profession faces in attempting to manage records in automated environments. In other words, rather than physically reviewing records and systems to conduct such basic activities as appraisal and description, records professionals would be creating and employing conceptual models designed to analyze and document record systems. Using this approach the equivalent of a traditional records survey would be the creation of business process models,

¹⁵ The primary proponents of the continuum model have been archivists in the Australian archival community. The research project that most embodies the premises of the continuum model is the University of Pittsburgh Functional Requirements project. For descriptions of the records continuum model see Frank Upward, “Structuring the Records Continuum. Part One, Post-custodial Principles and Properties,” *Archives and Manuscripts*, Vol. 24, No. 2 (November 1996): 268-285; Greg O’Shea and David Roberts, “Living in a Digital World: Reorganizing the Electronic and Post-Custodial Realities,” *Archives and Manuscripts*, Vol. 24, No. 2 (November 1996): 286-311; Adrian Cunningham, “Journey to the End of the Night: Custody and the Dawning of a New Era on the Archival Threshold - A Commentary,” *Archives and Manuscripts*, Vol. 24, No. 2 (November 1996): 312-321; and David Bearman, “Item Level Control and Electronic Recordkeeping,” *Archives and Museum Informatics*, pp. 242-245.

i.e., conceptual models of functions and transactions that identify business records. Appraisal of records would be still be undertaken by employing traditional appraisal values, but the analysis would be based on conceptual models of the processes and records rather than on a physical review of data content. Evidential values would be derived from business process and metadata models, and informational values from reviewing data and metadata models. In documenting records, a complete, authentic and reliable record would be captured not by physically reviewing the record but by analyzing metadata and data models and by comparing the results to an established set of metadata specifications and recordkeeping requirements.

Concluding Remarks

The digital world presents great opportunities and but also great risks for records professionals. There is plenty of evidence of what appears to be a nationwide concern that automated systems are out of control and need to be better managed. I believe it is also true that records professionals are increasingly viewed as part of the solution, even is their role is not yet truly defined or understood. Therein lies our opportunity. The risks we face are that we will not adapt to our changing environment, and consequently will not meet the challenge. In meeting the challenge, we must at the very least continue to make the case for recordkeeping systems, and not abandon our role or mission as the primary manager of this type of digital resource. However, it will require more from us than that. Experience at IU has demonstrated to me that records professionals working with automated systems will need to make some significant changes in the way they do business. I am convinced that traditional methods for identifying, appraising and documenting records will not be effective without major modifications. I am also convinced that records professionals will need to develop new strategies and techniques to gain entrée to the systems and access to information managers and system documentation. In other words, it is not necessarily true that the mandate and lines of authority archivists/records managers created for paper records will carry over into the automated world. New partnerships, new management skills will be needed to firmly place records professionals within the process for designing, analyzing, and auditing electronic information systems.

In another article, I concluded that “a rigid allegiance to strongly held notions of the past on how to manage records seems counterproductive in

the present environment characterized by rapid changes in many aspects of our professional life.” I still believe this, and I continue to endorse the notion that “what is needed at this point in time are archivists who are willing to experiment with creative combinations of ideas, old and new; who are courageous enough to seek out and form partnerships with information specialists whose language and methodologies are presently foreign to them; who are motivated to learn new skills; and ultimately, who are committed to developing realistic strategies for managing electronic records, no matter where this journey may lead them.”¹⁶

¹⁶ Philip Bantin, “Strategies for Managing Electronic Records: A New Archival Paradigm An Affirmation of Our Archival Traditions?” Archival Issues. Journal of the Midwest Archives Conference, Vol 23, No. 1 (1998): 30.