Flatland to Virtual:
Transcendence & the Digital Dimension

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The title of my presentation alludes to the 19th century book *Flatland: A Romance in Many Dimensions*.[1] A. Square, the author as listed on the title page, lives in two dimensional space. When a sphere from the third dimension visits him, Mr. Square can only see a constantly changing circle where his alien visitor intersects his two-dimensional universe. His challenge is to understand the nature of a radically different environment: three-dimensional space.

In many ways, records professionals – records managers, archivists, and librarians – have also been living in a two-dimensional world.

A quick aside: What does "records professional" mean? It clearly includes records managers and archivists. However, others also deal with records. Librarians sometimes work with records in the conventional sense of the word, but often they may be dealing with published works that serve as formal records, such as proceedings, legal materials, and government documents. Information technologists of all stripes are often the custodians of records. Librarians and information technologists may not have had formal training in records, but the mere fact that they often have custody of records means that they have a role to play.

To return to my point, records professionals have been living in a primarily flat world. Documents are fundamentally flat. Of course there are exceptions. Perspective suggests three dimensions. Stereographs can represent three dimensions. Pop-up books are fully three dimensional. Nevertheless, the vast majority of the things we work with have been flat.

I believe that crossing the boundary from flatland to the virtual demands a complete reassessment of our professions, almost as though we've discovered another dimension. Otherwise we'll be hammering paper pegs into electronic holes.

I often think WWW really stands for the wild, wild, West. The frontier has been characterized as a place of lawlessness and rugged individualism. At first glance, the virtual world has a lot of similarities. There is a lack of laws, or standards, that has resulted in browser wars, hostile takeovers, and boomtowns. There are outlaw hackers and data thieves. And there is a lot of rugged individualism, ranging from the religious fanaticism of Macs versus PCs to Open Source versus Redmond. The reality is different. Standards are essential for software and hardware to interact, and social conventions are embodied in netiquette and human computer interfaces.

Our challenge is to understand this changed and changing environment. The vast majority of electronic information is merely a translation of four-corner documents into an intangible form.

Computers can add the dimensions of space and time. Google Maps presents three-dimensional maps of the terrain, including buildings. We can fly through space in Second Life. We can model buildings in three dimensions.

Possibly the biggest change in the digital era is the Web. First, the Web has led to an explosion of information. We have a lot more to manage. Just as important, the Web has blurred traditional boundaries between records and publications; between technologists, content managers, and content creators; and between librarians, archivists, records managers, and information technologists. At the Arizona State Library and Archives, we're very fortunate to have the State Library, the State Archives, and the State Records Management programs together in one agency. We've learned from each other, and it has been very apparent how work in one area overlaps work in other areas.

[1] Edwin A. Abbott, 1884.

A lot of people see the digital era as a Utopia. I'm one of those who believe that digital information has many benefits and is a good thing. Others might argue that Chicken Little was right; the sky *is* falling. The transformation from paper to electrons is revolutionary. Many I've talked to say "revolutionary" is over reacting, that the process is evolutionary. A colleague who has been working in electronic records and digital information for decades mentioned to me a few years back that had we addressed the issues of digital information years ago, it would have been evolutionary, but because we've waited so long to respond, revolutionary may be an understatement.

If revolution connotes a shift in power, let me offer one observation. When an agency director or CEO gets a call about electronic mail, who does he call: the records officer or the CIO?

If Chicken Little had taken some time to look around and get some perspective, he would have realized that the sky is not falling. It was a big acorn. Rather than panicking about the end of the world, Chicken Little would have done better to develop a response to falling acorns.

I'd like to take some time to look around and offer my opinions on how we might respond to the impact of the digital acorn on the recordkeeping environment. My job today is to be a bit provocative, to get you to think about things from a different perspective. These issues and ideas keep me up at night. I wish I could tell you I had the foresight to know what the virtual future will look like. At most, I can offer you my thoughts on how we need to move ahead.

Retrospective

I'd like to start with some reflections on where we are and how we got here.

Since 1979, the National Historical Publications and Records Commission (NHPRC) has funded nearly a hundred electronic records research projects.[2] Other organizations have sponsored many more projects. A lot of important, good work has been done in electronic records and publications. Unfortunately, practitioners generally don't know how to use this research to do their jobs better.

Much of the research has focused on a very narrow aspect of the problem. For example, there's been a lot of interest in long-term preservation of electronic records, in techniques to counter the fragility of digital information and the rapid obsolescence of hardware and software. Unfortunately, the findings can suffer from tunnel vision. By focusing on only one piece of the puzzle, the research can get tripped up by letting the perfect be the enemy of the possible. It may not be possible to preserve the exact presentation of a document over time, but some perspective reminds us that perfect replication is not always essential. We've accepted microfilm for decades, even though that usually means a loss of color.

Much of the research has been in an academic environment and targets other academics. Many agencies funding research are looking for novel, theoretical insights. As a result, some of the research produced ideas that are more esoteric than immediately practical. Often this research can take on the tone of religious zealotry, such as the arguments between emulation and migration.

The research is scattered hither and yon. It's hard for someone wanting to begin learning about electronic records to know where to begin. Starting with some of the better known works, such as the InterPARES project, is like diving into the deep end. Cal Lee's article "Guerilla ERM" is a great place to start, but unfortunately it is relatively obscure.[3]

Finally, reading much of the research in digital information requires a fairly sophisticated knowledge of information technology. Records professionals have to learn a new language. In fact, my work revising the Society of American Archivists *Glossary* grew out of a need to find a tool to translate between many different agencies with overlapping responsibility for electronic records management in state government.

[2] http://www.archives.gov/nhprc/projects/electronic-records/projects.html. Checked 24 May 2008.

[3] "Guerilla ERM: Lessons Learned from Some Time in the Trenches." Published in Ohio Archivist (Spring 2007, 3-7). Online at http://www.ils.unc.edu/callee/guerrila_erm.htm (checked 31 May 2008).

I'd like to stress that I'm not discounting this work. We wouldn't be where we are without this work, only that it takes a fair amount of tenacity for novices to get their bearings or practitioners to know how to use this in their daily work.

At the same time, practitioners bear some responsibility for where we are. Ten years ago, many records professionals – including myself – were looking for ways to avoid the issue of electronic records. The problems of electronic records are hard, and there's no guarantee that we'll find an answer. It's no surprise that individuals resist change, especially radical change. Some records professionals' plan to deal with electronic records is to retire. The bad news is that some of those people still have another two or three decades before they retire. The good news is that this number seems to be getting smaller and smaller.

I suspect that many records professionals would be willing to tackle digital materials, but they honestly don't know what to do. There are no clear best practices. Many vendors offer solutions, but at high prices. Moreover, those solutions help with only a piece of the puzzle.

Another aside: "Best practices" is not the best phrase. A records professional needs solutions that are tailored to his or her organization's needs. They may not be the best, but may be good enough. In other words, we need solutions that are well-established, tested methodologies.[4]

The reality is that moving to the digital dimension takes a lot of work. We're asked to make this transition while at the same time continuing to live in a growing world of paper records. Often, we're asked to do this without additional resources. To complicate matters, the explosion of digital information places us under enormous pressure to make the transition quickly.

A Curatorial Rationale

So how do we move forward? How do we learn to survive – to thrive – in this digital dimension? Several times I've referred to pieces of the puzzle. One thing that I feel is missing is the big picture. We don't know how the pieces might fit together.

I'm convinced that we need a curatorial rationale that fits the age of electronic information, one that works in the digital dimension. That curatorial rationale assembles an integrated, scalable, systematic approach to all the functions that we undertake:

- Selection
- Acquisition
- Processing (classification, arrangement, description)
- Storage (housing, packaging)
- Reference and access
- Preservation

I want to spend some time thinking about three important words that form this description of a curatorial rationale.

Integrated Solutions

We have got to look at how the pieces fit together. We can't look at one in isolation. When selecting materials, we should consider – in addition to their appraised value – if they are in a format we can preserve over time and if they are in a format our patrons can use. We need to consider how reformatting or migration will impact the integrity of the materials.

In short, we need to think about workflow and business processes. One of the most useful tools I've found is the template for a concept of operations that helps you think through all the pieces of a project, starting with why and ending with how.

Scalability

[4] At the conference, Reynolds Cahoon argued against the phrase "best practices." He suggested "good practices" to emphasize that in many instances it isn't necessary to be perfect.

We've got to find ways to work that will scale to the volume of electronic records. In the 19th and early 20th centuries, the historical manuscript tradition carefully described each individual item in great detail. In the mid 20th century, records managers and archivists started thinking in terms of record groups and aggregate-level control. Today, we've got to jump another order of magnitude to the digital dimension. I wouldn't be surprised if the President's email alone has more items than almost any paper-based archival collection. I fear for the archivists at the Presidential libraries. Given the number of overlapping statutes controlling access to the records, they are forced to make decisions about each item individually. Bill Underwood in Georgia is doing a lot to help automate the process so that it's faster. Currently archivists at the George H. W. Bush Library report that even with automated assistance, it takes roughly five minutes to review a presidential record. Assuming 10,000,000 email messages (probably a low number) and assuming the poor fellow works on nothing else, never goes to a meeting, and never takes a break, vacation, or holiday, we're looking at four hundred years.[5] You thought the budget deficit was the only thing being passed on to future generations!

The only solution here is to develop business rules to help us process the records. We won't be working with individual records or series. We'll be working with rules to process our collections. To some extent, we have business rules now in processing manuals and procedures. The trick is that to deal with the volume of records, we've got to find ways to automate those rules so that machines can do the work for us. For example, in Arizona we're developing rules in middleware to assign administrative, discovery, and preservation metadata to incoming records and to put those in packages for archival and dissemination package.

Systematic

[Systematic management] I believe the most important key is a systematic approach. One lesson we've learned is that automating business processes reveals the idiosyncrasies and oddities in manual processes. One of the classics is filing a name beginning with Mc as though it were spelled Mac. Another is skipping the initial article (the, a, an, and as we're in the Southwest el, la, los), unless it's part of a name. So we sort some titles starting with El Paso under E and others under P, depending on whether it's the city or something else.

For years, archivists resisted efforts to develop descriptive standards because they all thought their collections were so different, so unique, so special that general rules couldn't do the materials justice. After twenty years, we've largely gotten over that misconception and learned the benefits of a general standard that can be applied systematically. We need to continue to find ways to make our work more systematic by reducing complexity and increasing efficiency.

All this boils down to reducing complexity. We don't want to maintain many different systems; we want to be able to manage one uniform process - or at least as few as possible.

Developing a Curatorial rationale

I believe that developing a curatorial rationale requires three basic steps.

Rethinking fundamental principles

We need to reconsider the fundamental principles of our profession. We need to spend some time thinking about the theory that underlies our practice. I believe that one reason some people question the value of electronic records research is that it seems like so much navel gazing, it's a lot of ethereal speculation that has little impact on how to do our jobs.

I disagree. The value of revisiting first principles is that it reminds us of the fundamental reasons *why* we do what we do. We may know and follow the principles of original order, provenance, and retention. But unless we carefully consider the significance of those principles, we may find ourselves missing their point in the digital dimension.

[5] 10,000,000 messages × 5 minutes/message = 50,000,000 minutes ÷ 60 minutes/hour = 833,333 hours ÷ 2080 hours/year = 400.6 hours.

Let's look at one of the most central concepts to our profession: the record. In an age of dynamic websites, documents that are automatically updated from external data sources, and the like, talking about records seems so retro. In order to keep with the times, professional associations have shifted their focus to content management, information management, knowledge management, and the like. (Given jargon creep, it seems like the only thing left is omniscience management – a market of one, but what a market!)

The previous edition of the Society of American Archivists' glossary reads, "A document created or received and maintained by an agency, organization, or individual in pursuance of legal obligations or in the transaction of business." The current glossary has a more encompassing definition.

1. A written or printed work of a legal or official nature that may be used as evidence or proof; a document.
2. Data or information that has been fixed on some medium; that has content, context, and structure; and that is used as an extension of human memory or to demonstrate accountability.
3. Data or information in a fixed form that is created or received in the course of individual or institutional activity and set aside (preserved) as evidence of that activity for future reference.
4. An instrument filed for public notice (constructive notice); see recordation.

What makes a record a record? I've heard endless arguments about the difference between records and documents. I think that discussion is a waste of time because it misses the critical essence of what makes a record a record and masks other important issues. So what is a record? What distinguishes it from information, content, and knowledge?

After I wrote recent definitions for the 2005 glossary, I've come to believe that the definition must be simplified further. Today, my own definition is "A record is information in fixed form that is used as evidence of the past." And in fact, that's very similar to the definition in the 1974 glossary, which read, "Recorded information regardless of media or characteristics."

A record is not information. Information can change or disappear. My watch gives me information – the time and date. It constantly changes. A record contains information in some form – textual, visual, aural, tactile. But unless the information is fixed, unless the information persists over time, it is not a record. (Note: fixity is not a synonym for static. For example, motion pictures move, but they move in exactly the same way each time you view them.)

Why is fixity important? It means that a record can serve as an unchanging reference from the past. It transcends time. Memory fades and fails; recollections may be distorted, either unintentionally or maliciously. But records say the same thing over and over, without change. And that's the point. That's *why* we must pay attention to in the digital dimension. It's easy for digital information to be altered without detection, either intentionally or accidentally, in innocence or with malice. We must pay attention to how to fix information so that it is reliable evidence of the past, so that it is a record.

Needless to say, not all records are trustworthy. Records are as fallible as the people who make them. Before we look to a record as evidence, we want to ensure its trustworthiness. We want to ensure its authenticity, that it is what it purports to be, that it is genuine. We want to ensure its integrity, that in fact it has not been changed.

I think that we need to be thinking more about these fundamental concepts of fixity, authenticity, and reliability rather than fretting over the difference between a record and a document. In fact, I'd argue that the term 'non-record' is something of an oxymoron because a non-record can become a record at any time. To the extent that Orwell's *1984* is a work of fiction, it is a document; because Eurasia and Europa never existed, the work is not evidence of the past. At the same time, the novel is a record of Orwell's creative process and of the cultural and political environment of its time.

My overarching point is that without a strong understanding of the principles of our profession – the *why* behind the what – it's hard to translate the ideas into another space. We must be able to talk about those ideas in ways that others involved in e-records will understand so that the systems do what we know they really need to do.

Re-engineering or discovering new best practices

The second step in developing a curatorial rationale is to recognize that the way we worked in the past won't work in the future. Period. If I may, I'd like to use a thorny example.

I believe email is one of the most important, yet most intractable problems facing our professions.

As an aside, from my perspective, the biggest problem with email is not records management; it's people behaving badly. Huge volumes of email don't motivate CEOs to implement records management to dispose of old email to save storage costs. The real motivation is that message about something unethical, illegal, or embarrassing. Often, email management seems to be more about getting rid of incriminating evidence than anything else. Getting people to do the right thing is not a records management problem. Rather, records professionals should take heed of Justice Brandice's admonition, Sunshine is the best disinfectant. We should ensure that we have authentic, trustworthy records that hold people accountable.

The volume of email does present a real records management problem. We need to find a way to distinguish and get rid of messages that don't merit preservation, while capturing those that do. Much of the advice I've read about email management attempts to recreate paper-based retention techniques. In my opinion, they don't translate into the digital dimension and are doomed to failure.

I don't know how many times I've heard that you can't schedule email because email is a mode of delivery, not a series. Conventional wisdom is to sort email by subject, project, or some other aspect of content, and then determine retention based on that classification. This approach is perfectly rational, but it just won't work. We've tried building email systems that force people to classify their email; the users find work-arounds, often by declaring everything or nothing a record. We've tried auto classification, but that doesn't seem to work very well.

Here's where knowledge of fundamentals can help. Archivists have traditionally accepted records in their original order. You'll frequently hear about records professionals working with the record creators to organize the records so that they're easier to manage. Guess what? Record creators were motivated to file paper documents to facilitate access because they didn't want to sort through hundreds of documents individually when they needed to find one in particular. That just wasn't practical, and they found a solution that was reasonable: filing.

Unlike paper documents, email has this nifty search function that eliminates the need to file. In fact, I find it harder to search my email if I've filed the messages. In general, records creators really don't care about records or records management; they care about getting the work done. They're evaluated on productivity, not process, even if it creates headaches in the future. So filing is dead. Long live search!

The reality is, any attempt to change the record creators' behavior will fail. As records professionals, we're caught between a rock and a hard place. On the one hand, we have users that don't want to be bothered with cleaning up their email – hard drives are cheap, time is precious! At the same time, we have lawyers pushing us to find ways to manage email because of discovery.

I've been intrigued by applying the notion of macro appraisal to email. We don't schedule the email, per se. We schedule the records based on the individual's function within the organization. The director is important; we'll keep all her records permanently (even the ephemeral ones). The accountant who deals with payables is administrative; we'll keep her records somewhere between three and seven years. The average receptionist is – no offense – not that critical a function, we keep those records a year. Of course, if your receptionist is Rosemary Woods or Fawn Hall, you may want to keep the records longer, as their work is an extension of the executive's. This approach is simple, it's elegant, and it could easily win you a trip to Club Fed.

But I will suggest that an underlying principle in this approach might be useful. Macro appraisal can be a good risk management tool. Focus your attention on the offices creating the most interesting (archival) records and those that are most likely to involve you in litigation. If you never get to the less important records, c'est la vie.

No doubt, this is sloppy heresy to many. It's not a perfect solution, but I've yet to see an organization with a records management program that has scheduled as series and sees that all records are disposed of properly. I firmly believe in the digital era, we cannot let perfection be the enemy of the possible. Moreover, in conversations with Ken Withers, a driving force behind the Sedona Principles and the new federal Rules for Civil Procedure, courts are reasonable. If you have a rational approach for managing your records, one that is defensible and implemented, they will tend to forgive imperfections. So you're

missing some records from the receptionist; the plan is reasonable, consistently implemented, and you may be afforded some leniency. (Jason Baron, who is speaking after me, was also actively involved in developing the Sedona Principles, and he may correct me. He's a real lawyer, so pay attention.)

Learning knew skills, tools

Finally, the last step in developing a curatorial rationale is to learn about the materials themselves.

Paper and virtual records have different characteristics. In their wonderful book *The Myth of the Paperless Office*, Sellen and Harper talk about the affordances of paper, characteristics that make that particular media very easy to use for certain purposes. Their praise for the affordances of paper is not a Luddite argument against new media. They recognize that digital media have their own affordances that, in some situations make them preferable to paper.

How often have you heard arguments that paper is easier to manage and preserve, ignoring the benefits of digital media? In some instances, paper may be preferable, but we have to be able to explain how the benefits of paper outweigh the benefits of digital media. In order to avoid the appearance of being Luddites, we also have to be able to argue the benefits of digital media.

If we don't understand the materials themselves, it will be hard to work with them. Records professionals have to have some understanding of the paper materials they work with, although they may have never formally studied the subject. We grew up surrounded by books, correspondence, postcards, photographs, motion pictures, and other formats. When I read Luciana Duranti's book on diplomatics,[6] I realized that I had only a rudimentary understanding of textual records, even though I had been working with them for years.

I believe all records professionals need to be equally familiar with digital materials. We learned to categorize documents by form and function, such as memos, deeds, wills, purchase orders, and the like. Likewise, we need to be familiar with similar and other digital forms and functions: email as correspondence and memos, blogs as diaries, and websites as publications. Few of us will assimilate this knowledge the same way we learned about paper. We're going to have to discipline ourselves to study.

I do not believe that digital resources is a specialization. In fact, over time, it may be traditional media that demand specialization. I suspect the rapid adoption of digital photography is making knowledge of darkrooms, film, and chemistry largely irrelevant. This shift has another precedent. One archivist who specialized in ancient manuscripts was dismayed at how few archivists had skills in paleography and couldn't read older forms of handwriting. As digital media predominate, they must be the core of our professions.

Second, records professionals need to learn the tools to work with these materials. Again, I think most records professionals learned many of the tools and techniques of working with paper records through observation and through cultural assimilation. We learned to read and write, to alphabetize, to folder. Many learned techniques specific to the records profession on the job, such as how to write a finding aid, how to schedule, how to do reference.

I believe we need parallel skills in the digital era. We won't use boxes to transfer electronic records and digital publications; we'll use disks, tapes, and network protocols. Photo archivists learned tricks to test for deteriorating nitrate negatives; now we must learn how to use hash values and other tricks to test for deterioration of digital information. We need to know something about databases and queries so that we can manage catalogs of our holdings. And it will help to know instant messaging and web markup to support remote reference.

When I helped the University of Arizona's library school develop a certificate for digital information management, I pushed hard for the students to learn what many would consider far afield of the records professions. I wanted them to learn the Linux operating system so that they would be exposed to a command line interface. I wanted them to implement the Apache web server so that they would understand network architecture and the organization and distribution of information the web. I wanted them to learn MySQL and PHP so that they had some knowledge of databases and programming. I didn't expect the students to come out of

[6] *Diplomatics: New Uses for an Old Science* (Society of American Archivists and Association Canadian Archivists in association with the Scarecrow Press, 1998).

the program with the skills to get a job in IT. I wanted them to get under the hood so that they had a good knowledge of how the engine worked and could talk intelligently to the mechanics.

When I was president of the Society of American Archivists, I organized a colloquium called New Skills for the Digital Era. The colloquium was sponsored by the National Archives, the Society, and the Arizona State Library, Archives and Public Records. I will keep my ideas about skills and tools short by directing you to the proceedings, which are on the SAA website. I would like to bring out a few observations, though.

First, it's important to remember that technology skills are not monolithic. The IT field is diverse and has many specializations, including systems engineers, database designers, web developers, and hard core programmers. No IT professional will be master of all those areas, and no records professional will be, either. But record professionals need to know something about the different specializations and when to call on one or another.

Second, not all records professionals do the same job. The director of a repository doesn't need the same technical knowledge as someone processing records, and a reference archivist doesn't need the same skills as a field professional working with the record creators.

Finally, I firmly believe that the more technical skills records professionals have, the better. I'm very fortunate to have some knowledge of database design, procedural programming languages, and the web. I don't know any of these things well enough to get a job. At the same time, even my limited knowledge has helped me know what technology can and can't do, and as a result, I see where technology can be very useful. Not everyone agreed with me. In fact, one of my biggest insights from the colloquium is that soft skills are as important as the hard IT skills. Knowing how to translate records professionals' requirements to language programmers understand, how to manage contracts, project management, and team building are just as important.

Recap

So let me recap. A curatorial rationale describes an integrated, scalable, and systematic approach based on a rich understanding of the fundamental principles that motivate why we do things a certain way, incorporates best practices that fit the situation at hand, and is appropriate for the materials. What a nice, neat package, single sentence of a few dozen words! Of course, if it's that straightforward, why has it taken me thirty minutes to talk about it?

Developing a curatorial rationale is not easy. It means breaking well-established patterns of thinking. Thinking outside the box requires imagination and a leap of faith. It also demands that we get out of the weeds and get a high-level perspective. That's often difficult, especially when your work focuses on only part of the process. And it takes time for contemplation and speculation, time that is in short supply for everyone I know.

Moving Forward

Some days I feel like Chicken Little; the sky has fallen for records professionals, technologists have reinvented our profession and made us obsolete, and we just haven't figured it out yet. If you remember the end of the story, Chicken Little and all his friends were devoured by Foxy Loxy.

On the other hand, when I look around and get some perspective, I believe that records professionals can have a significant role to play in the virtual world.

Most of the time, I think records professionals bring very important ideas to the table. So many people in organizations are caught up in the transaction, the business of the moment. Records professionals recognize the importance of records as memory and the value of records to preserve trustworthy information about the past. Records professionals are not about the records; they should be about how those records are used. In an age when records are created and used in Second Life, records professionals can offer guidance on how to ensure those records are truly fixed and trustworthy.

So where do we go from here? What do we need to do so that we don't become obsolete? How can we plan for falling acorns?

First, find time to get your bearings and find ways to be proactive. I know that for many of you this advice is roughly equivalent to, "First, buy a winning lottery ticket." If you can't find time, your first task is a time management course to help you get organized and set priorities. You don't necessarily need a lot of time. Even a few minutes a day is a start. Then use that time to re-examine the fundamentals, understand the materials, and learn new skills.

Read something new to refresh your understanding of the fundamentals, to get insights into how we might work in the digital dimension.

- Abigail Sellen & Richard Harper, *The Myth of the Paperless Office*[7]
- Thomas Davenport, *Information Ecology: Mastering the Information and Knowledge Environment*[8]
- JoAnne Yates, *Control through Communication: The Rise of System in American Management*[9]

Learn about the materials.

- David Levy, *Scrolling Forward: Making Sense of Documents in the Digital Age*[10]
- James Gleick, *What Just Happened?: A Chronicle from the Information Frontier*[11]
- John Seely Brown & Paul Duguid, *The Social Life of Information*[12]

Learn some new skills. Get under the hood and poke around. This might be best done by taking some courses, either a certificate program or online training.

- New Skills for a Digital Era Proceedings
- University of Arizona
  School of Information Resources & Library Science
  Digital Information Management Certificate
- W3 Schools
  http://www.w3schools.com/default.asp
- Community colleges

Lastly, just do it. It's a scary world out there. I didn't jump in because I saw the enormous risks. I like to be successful at work, and that didn't seem likely. So I'll share with you the words that gave me the courage to dive in. Fynnette Eaton, then at the Smithsonian, told me, "Whatever we do we may fail. But if we do nothing, failure is guaranteed." So let's dive in!

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[7] (MIT Press, 2007).

[8] (Oxford University Press, 1997).

[9] (Johns Hopkins Press, 1993).

[10] (Arcade, 2003).

[11] (Vintage, 2003).

[12] (Harvard Business School, 2002).