Information on the assembly line : a review of information design and its implications for technical communicators

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INFORMATION ON THE ASSEMBLY LINE: A REVIEW OF INFORMATION DESIGN AND ITS IMPLICATIONS FOR TECHNICAL COMMUNICATORS

by

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B.A. University of Central Florida, 1998

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ABSTRACT

Technological advances have made endless amounts of information on nearly every subject easily accessible, while at the same time fostering an economic climate conducive to international trade and partnerships. The challenge for companies then becomes one of figuring out how best to manage and use this mass of information, a task complicated by the increasingly global nature of business that requires products to be tailored to more specialized user groups in a wider array of formats and in different languages. Hence the emergence of information design, a field that technical communicators would do well to associate themselves with. Information design is centered around solving many of today’s communication problems, and technical communicators are well suited to participate in those discussions. This thesis seeks to understand what information design is and the role that technical communicators can play in this important and emerging field. A comprehensive literature review, this thesis seeks to represent and summarize the overall body of work within the field of technical communication concerning information design and its related issues, as well as to suggest ways in which technical communicators can better participate in the design and implementation of information design systems.
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CHAPTER 1: INFORMATION ON THE ASSEMBLY LINE

I. Is Henry Ford the Precursor to Modern Information Design?

Henry Ford once said, "Nothing is particularly hard if you divide it into small jobs." Applying that truism as a business strategy, Ford developed the assembly line, and in so doing introduced to American industry a radically more efficient and productive way of mass-producing products.

During the 1950s, Ford's assembly line mindset was successfully applied in other industries as well, perhaps most notably in the housing industry. As David Halberstam recounts, most housing companies in post-World War II America were small, producing on average no more than five houses per year (132). Bill Levitt, applying Ford's production techniques, analyzed the current conventions for building homes and found them severely lacking. At the time, small construction teams would build a single house at a time, from start to finish. Not only did this process require skilled teams of workers, but it limited those teams to working on only one house at a time. As a result, the demand for new homes was far exceeding the supply.

Levitt dissected the home-building process and identified twenty-seven separate steps involved in putting together a basic single-family house (Halberstam 132-133). He then hired twenty-seven teams of workers, each team being skilled in one particular aspect of construction. One group would lay the foundation for a group of homes, the next group would come in and put up the frames on each foundation, the next group


would put up the Sheetrock for each house, and so on. In this way, Levitt was able to construct multiple homes at once, and his workers needed to be skilled only in one specialized area of home building, rather than in the entire process. Before long, Levitt was overseeing the construction of about 180 houses each week (137).

As we begin the twenty-first century, the assembly line model is once again being put into practice in the global industry. This time, however, the materials that companies are working with are more intangible; information and development processes are now being analyzed and broken down to their most basic components, as companies try to streamline production processes and reuse content as much as they can.

II. From Ford to Wurman

Richard Saul Wurman, in Information Anxiety, was maybe the first person to predict that information design issues would become an important trend in the business world. Wurman suggested that the proliferation and availability of information would force companies to find ways to organize and structure information in order to make it usable. Wurman said, “As information technology matures, the focus will turn away from the machines themselves toward the information itself. The value of the technology lies only in its ability to manage and exploit the product—information” (Information Anxiety 297).

The focus today has indeed turned from machines to information. Companies are, in effect, being forced to apply assembly line principles to information in order to make sense of all the information they must process and to manage it effectively.

Wurman argues that “successful businesses in the future will be those that can make the best use of information” (Information Anxiety 297). To use information
effectively, companies will, like Bill Levitt, need to examine their processes, break those processes down to their most basic components, and then develop more efficient ways of doing what they do and of managing their assets, both concrete and abstract.

III. A Brief Outline of this Literature Review

So what do these changes in the business world mean for technical communicators? A bit of background is required before this question can be fully answered, but the current changes in the workplace offer opportunities for technical communicators to broaden their roles significantly. What it will take for technical communicators to take advantage of these opportunities is part of the focus of this paper.

I will begin by providing a brief history of the trends in the field of technical communication that have led up the changes the field is currently undergoing. This will then lead into a discussion of trying to figure out exactly what the phrase “information design” encompasses and how to define this emerging field. Next, I will look specifically at single sourcing as an example of an information design strategy in action, and I will consider the effect that single sourcing systems can have on technical communicators. I will move from a discussion of single sourcing as an information design strategy to Extensible Markup Language (XML) as an information design tool, one that will require new or expanded skills and knowledge from technical communicators. I will also consider what is at stake for technical communicators in the evolving work environment. Specifically, I will discuss the importance of technical communicators claiming leadership roles in their companies’ attempts at implementing information design systems. Finally, having covered the topic of information design in detail, I will discuss how humanistic concerns relate to information design and why it is important for
technical communicators to represent these concerns. To end my literature review, I will offer my concluding remarks in which I suggest what technical communicators must do to actively participate in the changing business environment.

CHAPTER 2: A BRIEF TECHNICAL COMMUNICATION TIMELINE

I. The "Great Migrator"

Because of increasingly complex industry demands and customer needs, people who call themselves technical communicators are continually being asked to do more with less. They are asked to create increasing amounts of documentation for increasing numbers of user groups in an increasing variety of formats using decreasing funds and working within shrinking production cycles. Hence, innovation is required, totally new ways of creating products and serving customer needs. These demands present a great challenge for technical communicators, but a great opportunity as well. As technical communicators are asked more and more to organize, manage, store, and output information, they will no doubt have to drastically rethink the processes they have grown accustomed to and will need to invent new skills and technologies.

A brief history of a simple, major trend in the field of technical communication is needed here to provide a starting point. Prior perhaps the advent of the printing press and the introduction of widely available desktop publishing tools in the latter part of the twentieth century, a very clear division line existed between content creation and visual design. Charles Keatsbel refers to this essential period as the "Typewriter Line." During this time, the actual content of a document was considered all-important, while the visual presentation of the information was given no afterthought, a mere "cleaning up" of the information and making it presentable. According to Keatsbel, this mindset
CHAPTER 2: A BRIEF TECHNICAL COMMUNICATION TIMELINE

I. The "Dress Metaphor"

Because of increasingly complex industry demands and customer needs, people who call themselves technical communicators are continually being asked to do more with less. They are asked to create increasing amounts of documentation for increasing numbers of user groups in an increasing variety of formats using decreasing funds and working within shrinking production cycles. Hence, innovation is required, totally new ways of creating products and serving customer needs. These demands present a great challenge for technical communicators, but a great opportunity as well. As technical communicators are asked more and more to organize, manage, store, and output information, they will no doubt have to drastically rethink the processes they have grown accustomed to and will have to learn new skills and technologies.

A brief history of a couple major trends in the field of technical communication is needed here to provide a starting point. From perhaps the advent of the printing press until the introduction of widely available desktop publishing tools in the latter part of the twentieth century, a very clear dividing line existed between content creation and visual design. Charles Kostelnick refers to this extended period as the "Typewriter Era." During this time, the actual content of a document was considered all-important, while the visual presentation of the information was almost an afterthought, a mere "cleaning up" of the information and making it presentable. According to Kostelnick, this mindset...
originated from the early practice of an author writing a piece of work and then sending it to the printer to be set, printed, and readied for distribution. Not surprisingly, the result of this practice was that the author’s work was seen as the primary (and perhaps sole) act of creation—the printer’s role of dealing with issues of typesetting, leading, and paper size and type was seen as a secondary formality. In essence, the visual presentation of a piece of writing mattered little, if at all. Contributing to the subordination of the printing process was that nearly anyone could learn to do it.

Kostelnick refers to this division between the word and the presentation of the word as the “dress metaphor” because visual design was thought to just be a dressing up of a document’s content. As a result, two separate and distinct roles existed between those who created content and those who prepared that content for publication and circulation. Kostelnick points out that until recently textbooks continued to perpetuate the dress metaphor, due in part to the tradition of drawing from neoclassical rhetorical theory (93).

II. The Dress Metaphor Wanes

Kostelnick goes on to point out that with the advent of desktop publishing tools in the latter part of the twentieth century, from page layout software to laser printers, as well as theoretical developments in the fields of technical communication and others, the roles of “writer” and “presenter” began to merge into one. As Kostelnick says, “desktop typography demands a unified rhetoric that acknowledges the interweaving of visual and verbal elements during the document design process” (94). Thus, technical communicators could no longer divorce the content of a document from its visual presentation—the rhetoric of a document encompasses both content creation and visual
design. As a result, the visual design of a document gradually became every bit as important as the document’s actual content. No longer could visual design be thought of merely as an afterthought. The role of content creator and visual designer became one. Saul Carliner makes this point as well, suggesting that the changing nature of technical writers’ jobs “would require many technical communicators to handle most or all their own production, as desktop publishing tools for producing and laying out text and merging text with graphics evolved” (“Emerging Skills” 156). As Carliner explains, the early 1980s saw the role of the technical writer morph into the role of the technical communicator, as the separate and distinct duties of the technical writer, technical editor, and technical illustrator blurred into one broader role (“Emerging Skills” 156).

III. From Technical Communication to Information Design

With the current demands in the business world, it appears that technical communicators are coming full circle. While the importance of visual design continues to be understood, companies have been forced to focus intently on improving processes. Driving this need for greater efficiency is a wide-ranging group of factors. As Carliner explains, the expansion of the global market complicates everything that technical communicators do (“Emerging Skills” 157). Not only must companies present documentation in a wide variety of media and formats, but they must do so while paying special attention to cultural concerns, translating the documentation into any number of different languages, and tailoring their products to an increasing number of specialized and tightly defined markets (“Emerging Skills” 156-157).

One result of these marketplace trends is that “some technical communicators have relabeled their work as information design” (Carliner, “Emerging Skills,” 157, his).
Many technical communicators feel that "information design" better describes their broadened roles than does "technical communication." However, an important point must be made here. When the role of "technical writer" graduated into "technical communicator," writers, editors, and illustrators saw their jobs merge into one broader role in which they were expected to possess larger skill sets. While technical communicators were not expected to be experts in all aspects of writing, editing, and design, they were expected to be competent enough in each area that they could create by themselves all aspects of the documents they produced. The same cannot be said for technical communicators who are becoming information designers.

To this point, information design strategies that companies are implementing involve identifying each separate step of the development process, much as Bill Levitt did with the home-building process, and then finding ways to streamline the process as much as possible while reusing content whenever and wherever appropriate. What this means for technical communicators is that they usually end up on teams of workers in which each person has a specific, tightly defined role. Unless they are managing information design systems, technical communicators are being asked more and more to focus on specialized tasks. As a result, technical communicators are increasingly being judged not on the number of software applications they can use or even on the end products they create, but on how well they perform their role in the "design, development, and production of information" (Carliner, "Emerging Skills," 157). In sum, technical communicators are growing into tightly defined roles, rather than being jacks of all trades but masters of none.
Now that we’ve briefly considered what is driving information design, as well as the effect it is having on technical communicators, we can begin to consider what “information design” means.
CHAPTER 3: DEFINING INFORMATION DESIGN

I. “A Profession in its Youth”

My research indicates that within the field of technical communication, definitions of information design vary to a great degree. While very few people seem to agree on just what information design is, everyone does agree that the reason it is so hard to define is that it draws from so many other disciplines and professions. As a result, relevant research is scattered, making it difficult to draw definitive conclusions and to arrive at widespread agreement about where the focus of this new field lies. As Robert Jacobson explains, the emerging field of information design possesses very little research, experimentation results, case studies, or anecdotal evidence that it can call its own. It thereby lacks a “coherent corpus of rules or principles a novice can obey” (6). This means that technical communicators, or information designers, sharpen their skills through experience and through the process of trying things out to discover what works and what does not. Over time, they gain an instinctual feel for what constitutes effective information design. As Jacobson says, this is simply a characteristic of “a profession in its youth” (6).

II. Information Design: A Diverse Background

Nearly everyone who sets out to define information design begins by stating how difficult the field is to define, due to the fact that it draws from such a large and wide-
ranging group of disciplines. Janice C. Redish points out that information design “draws on many research disciplines and many fields of practice, including anthropology and ethnography, architecture, graphic design, human factors and cognitive psychology, instructional design and instructional technology, linguistics, organizational psychology, rhetoric, typography, and usability” (163).

Beverly B. Zimmerman and Jessica R. Schultz point out that research pertaining to information design is difficult to gather, group, and summarize, because the research is actually being performed in other fields, “such as rhetoric, computer-human interaction, social psychology, computer technologies, discourse analysis, and graphic design, to name only a few” (178).

Saul Carliner talks about how the growing number of people calling themselves information designers are coming from a variety of fields, including graphic design, architecture, library science, and “human factors communities” (“Emerging Skills” 158-159).

Robert E. Horn says that the origin of information design lies in a “variety of research foundations, including such disciplines and subject areas as human factors in technology, educational psychology, computer interface design, performance technology, documentation design, typography research, advertising, communications, and structured writing” (22).

Finally, Romedi Passini says the roots of information design lie in a number of disciplines, including the cognitive and behavioral sciences, information theory, and even ergonomics and environmental psychology (85, 87).
I could go on, but I think the point is clear. The number of disciplines and fields of research that I have only sampled here constitutes an overwhelming list to any technical communicator trying to understand and define information design or trying to contribute research to the field. Where does one start? Considering the multitude of fields and disciplines just mentioned, is there any common thread tying them all together? Are all these fields linked to information design in the same way?

III. Information Overload = “Information Anxiety”

I would argue that, in part at least, the reason information design can be traced to so many other fields is simply that modern technology has led to a proliferation of information. In order for us to be able to go through all this information and make sense of it and use it, we need to develop strategies for managing information.

Richard Saul Wurman is a central figure in any discussion on the nature of information design because he was perhaps the first person to really point out why information design is and would be important. As Wurman says in his book Information Anxiety,

> Information anxiety is produced by the ever-widening gap between what we understand and what we think we should understand. Information anxiety is the black hole between data and knowledge. It happens when information doesn’t tell us what we want or need to know. (34)

With that in mind, perhaps we can better see how information design could be traced back to so many different fields of study. Increasingly, a universal concern in all fields of study, and in business as well, is how to make sense of the mass of data readily and widely available on virtually all topics. To again quote Wurman, “the ultra-
sophistication and proliferation of the information delivery equipment has contributed to a strange phenomenon that is at the heart of information anxiety: we have lost the ability to control the flow of information” (310, his).

Therefore, one could argue that one result of the severe glut of information available today is that anyone dealing with information must develop ways to find exactly the information that she or he needs and to make sense of that information by organizing it, grouping it, summarizing it, or structuring it.

So is that what information design is all about, developing strategies for organizing and structuring information in order to make it more accessible and more useful? Some would say so, but as a group, technical communicators seem to disagree about what the central focus of information design is.

**IV. Defining Information Design: Two Perspectives**

To this point, technical communicators who try to define information design tend to fall within one of two mindsets. Either they focus on the graphic and document design aspects of information design, or they take a broader view and focus on the processes involved in information design, including organizing and structuring data.

**A. Information Design as Information Architecture**

1. **Richard Saul Wurman**

Wurman’s thoughts about the focus of information design can probably be inferred from his comments on the root sources of “information anxiety.” Namely, he argues that information is too often available as random bits of context-less facts; without structure and organization, he says, we cannot make use of these facts by converting them
to knowledge in our minds. Thus, the role of the information designer is to uncover "the organizing principles" (Information Anxiety 61) by which a set of information can best be ordered. As Wurman says, "When you arrange information, the structure you create will save you the frustration of juggling unconnected parts. Understanding the structure and organization of information permits you to extract value and significance from it" (Information Anxiety 65).

Not surprisingly, Wurman approached information design from a background in architecture. As Saul Carliner has pointed out, Wurman suggested in Information Anxiety that "organizations would hire information designers to design the structure and appearance of information much as they hire architects to design the layout and look of buildings" ("Emerging Skills" 157).

In fact, Wurman prefers the term "information architecture" over "information design" because in his mind it better indicates the central work involved in the field. The job of the information architect is to build information structures that will enable others to recognize patterns and hierarchy and thus be better able to decipher the information in a useful way. Or, as Wurman says,

Once you have a sense of organization, however casual, you can relax with that knowledge and begin to examine the information from different vantage points, which will enable you to understand the relationship between bodies of information . . . Each vantage point, each mode of organization will create a new structure. And each new structure will enable you to see a different manner of meaning, acting as a new method
of classification from which the whole can be grasped and understood.

*(Information Anxiety 65, 67)*

While Wurman does not offer a definitive definition of information design per se, one can surmise that he would define it as the endeavor to organize and structure information so that it is usable—the job of the information designer is to structure data such that a person can take a piece of information and easily contextualize it, rather than having to assimilate a “context-less” scrap of data.

2. Saul Carliner

Saul Carliner has written at length about the changes that technical communicators are currently facing in the workplace and the challenges (and opportunities) that face them as they assume broader and more complex responsibilities.

Companies today are being forced to automate their processes as much as possible in order to meet the diverse needs of customers in a global environment where information must be delivered in multiple formats and languages. Carliner says that because so many processes are being automated, technical communicators are being asked to add value in new, different, and innovative ways, such as coordinating efforts to embed help in user interfaces (“A Three-part Framework” 561). In other words, technical communicators are being asked to focus less on tools and more on content (“A Three-part Framework” 561).

Carliner is careful to point out that “design is an essential ingredient to the success” (“A Three-part Framework” 561) of technical communicators’ new endeavors but that now the concept of design “broadens the role of technical communicators beyond...
the traditional boundaries of writing and page design” (“A Three-part Framework” 561). What Carliner is saying is that the current focus on (document) design in the field of technical communicator is too narrow to be relevant to the emerging roles that technical communicators are assuming because it focuses too much on the appearance of the end product. That is, technical communicators are still too focused on formatting, layout, and issues of graphic design.

While document design is still very important, Carliner says, technical communicators need to develop a new, broader framework for design that encompasses the more diverse roles that technical communicators are increasingly being asked to perform in the workplace. This is why it is so important to develop a comprehensive and accurate definition of information design—so that it can be clearly distinguished from document design (“A Three-part Framework” 563). As Carliner puts it, “Information design must therefore have a broader focus, one that encompasses not only graphics, text, and reader goals, but also the goals of the sponsor who commissioned the text . . . information design must not be limited to issues of appearance and text” (“A Three-part Framework” 564).

So, how then does Carliner define information design? Simply put, Carliner argues that information design is essentially a problem-solving field because “it considers more than the appearance of the designed product, but also the underlying structure of the solution and its anticipated reception by users” (“A Three-part Framework” 563). According to Carliner, information designers are continually faced with the dilemma of finding the best ways to solve communication problems, given budget constraints, time constraints, and technology constraints. Sound writing and visual design are still
important elements in document creation, but they are no longer ends in themselves. Instead, they are important components of a larger problem.

Therefore, in defining information design, Carliner takes a holistic approach, suggesting that it involves identifying communication problems, setting objectives that address those problems, developing a plan to meet the established objectives, creating the components necessary to carry out that plan, and then evaluating the overall effectiveness of the entire effort ("A Three-part Framework" 564). This is a very broad definition that certainly encompasses much more than merely presenting a set of information effectively in a document. The focus is on content rather than on tools, on solving communication problems rather than on formatting problems, on developing effective processes rather than on developing proficiency with various software applications.

3. Nathan Shedroff

In defining information design, Nathan Shedroff takes an even broader view than Carliner. For Shedroff, "information design" by itself is too limited a term. He argues that information design accounts for only one-third of what he calls, for lack of a better term, interface design (Shedroff par. 1). Collectively, says Shedroff, sensorial design, information design, and interaction design are the "three-component collection disciplines needed to do good interface design" (par. 1).

Sensorial design concerns visual design, but also all the elements of sound, touch, and smell that may go into an information presentation (Shedroff par. 2). Interaction design, says Shedroff, "is more about the audience's experience, whether it's a performance, an electronic product of some sort, or even a book" (par. 4). Information
design, then, primarily concerns the actual content of an information presentation and the means through which that content is communicated to its audience. Shedroff explains the difference between interaction design and information design by saying that interaction design is about "the experience that you’re creating and how you’re communicating those messages through what you’re allowing the audience to do" (par. 4), while information design is "more about the messages themselves, and recognizing how you’re communicating them" (par. 4).

Shedroff echoes Wurman in saying that today we are continually "being bombarded with all these meaningless, contextless, scraps of data" (par. 17). The job of the information designer, therefore, is to transform data into information, and then convert information into knowledge (par. 19). Shedroff, like Wurman, says that data can be converted to information by providing context for the data, by grouping it, by organizing and structuring it and then presenting it clearly. Converting data into information generally involves elements of information design. However, turning information into knowledge requires combining elements of information design, interaction design, and sensorial design in order to create a total experience for the intended audience (par. 19). Therefore, interface design is not just about structuring and organizing data, nor is it just about formatting the data for presentation; rather, interface design encompasses the entire process of creating and presenting data on the one hand, and assimilating that data on the other. For Shedroff, interface design involves not just the designer’s creation of the content, but the audience’s reception of the content as well.

This is a very broad approach indeed, and one that would benefit from an example. Shedroff himself provides a very good example of effective interface design
that is worth repeating here. The Vietnam War Memorial in Washington D.C., says Shedroff, is a very good example of effective interface design. Even though the data contained in the memorial is very dry, the total presentation of that data makes for a very powerful experience (par. 6). As Shedroff points out, the names of the service men and women who died in the Vietnam War are listed in the memorial not in alphabetical order, but chronologically, based on the dates they were killed. This organization provides a kind of connection or relationship among the names and is an important aspect to the memorial's overall effect. As Shedroff explains:

When you enter, you’re at ground level and the wall is starting below you. As you walk down into it, it grows really high until it overwhelms you. You get the reverse experience as you walk out. This experience of submersion is because of the chronological arrangement: that’s how the death toll mounted. You’re starting small, then at the height of the War, it’s overwhelming. You’re covered with names of dead servicepeople, and then it trickles off again. (par. 8)

Thus, the Vietnam War Memorial effectively combines elements of information design, interaction design, and sensorial design to create a total experience that leads to a profound emotional experience for the visitor. The memorial teaches us in a memorable way how the death toll quickly rose in Vietnam. And according to Shedroff, this is really the only way that knowledge is gained—“through an experience” (par. 19). Thus, for Shedroff, creating the conditions for knowledge to be gained is the ultimate goal of the information designer.
B. Information Design as Document Design

The authors I discuss in this section provide a representative sample of technical communicators who consider information design to be a close cousin of document design. In defining information design, these technical communicators tend to emphasize the end result of the information design process, with a focus on visual design, formatting, and presentation.

1. Michael J. Albers

Like Shedroff, Albers makes distinctions among data, knowledge, and information, saying that "People don't want data; they really don't want information; they want knowledge" (161). However, his definition of information design is considerably different than Shedroff's. For Albers, information design is concerned solely with the presentation of text, not with the text itself (161). Albers approaches information design from the standpoint that textual content is a pre-existing given for the information designer, whose job is to take that text and "design" it in such a way that the intended audience can use it and make sense of it. In other words, information design is concerned with such issues as "how the page looks and how text appears on the page, without worrying about the text itself" (161).

Specifically, says Albers, elements of design that the information designer may address include "the white space, the rules, the font choices, use of special typefaces, the placement and ordering of data, and so forth. The actual text sits below this level and is not a part of information design" (161). Thus, where Carliner and Shedroff took very broad, holistic views of information design, Albers specifically limits it to issues of...
presentation and appearance; authoring the text used by information designers falls into a separate category. Ultimately, for Albers, the role of the information designer is to convert data into information, so that the user can convert this information to personal knowledge, instead of trying to make sense of random bits of data. In other words, information designers try to connect the dots, so to speak, for the users so they do not have to do that extra work themselves. As Albers says, “we must remember that the text must carry the message and the surrounding design supports the text and never distracts from it” (161).

2. Janice C. Redish

As I mentioned earlier, Redish is one of the many technical communicators to point out that information design draws from a number of diverse backgrounds. Part of the difficulty in defining information design, says Redish, is that the term is often used in both a broad and a narrow sense, both of which are correct (163).

Redish argues that many technical communicators correctly interpret “information design” to mean either “the overall process of developing a successful document” (163) or “the way the information is presented on the page or screen (layout, typography, color, and so forth)” (163). The first interpretation of information design perhaps approaches the kind of broad view taken by Carliner and Shedroff. However, I have included Redish in this section of the paper because she does list the second interpretation of information as being as equally correct as the first. To be fair, Redish does say that current workplace trends will make a broad view of information design necessary for technical communicators; however, she maintains that both the broad and narrow definitions of
information are "intertwined" (164). Taken together, Redish's two definitions of
information suggest an emphasis on visual design elements that is noticeably absent from
the definitions of information design offered by Wurman, Carliner, and Shedroff. Where
Wurman, Carliner, and Shedroff focus on process, structure, and organization, Redish
seems to focus more on the end product, and thus on formatting, visual design, and
presentation.

3. Robert E. Horn and Romedi Passini

The decision to group Horn and Passini into this group is not as obvious a choice
as Albers and Redish because Horn and Passini are more indirect and subtle in linking
information design with visual design.

Passini sets out to try to establish some professional boundaries for the field of
information design and to begin to provide a sound knowledge base on which to build a
kind of intellectual foundation for the field. He discusses the concept of building
information systems as a way to structure knowledge and information gained from
experience—as new knowledge is gained, it can be plugged into this information system
so that an organized history of information is compiled that can be reused as needed (92-
94).

However, Passini begins his discussion by establishing the idea that information
design has grown out of the field of graphic design (85). Passini states early on that he is
using the term "information design" to mean "communication by words, pictures, charts,
graphs, maps, pictograms, and cartoons" (84). He then suggests that information design
encompasses graphic design but is expanded to focus as much on content as on form (85).
In other words, information design begins with the field of graphic design as its base, and it expands on that essential foundation to include a focus on research and content that is absent from traditional graphic design practices.

Horn also offers a broad definition of information design, defining it as “the art and science of preparing information so that it can be used by human beings with efficiency and effectiveness” (15). Like Wurman, Horn believes that information design has emerged as a field because the glut of information available today causes people to feel lost and lacking direction (16). The job of the information designer, in part, is to help people navigate today’s complex maze of information to find what they are looking for when they need it. Horn also echoes Wurman in suggesting that “structured writing . . . is foundational to some areas of information design” (23). Recognizing the importance of structuring information so that it can be better managed would seem to align Horn more closely with Wurman and Carliner than with Albers and Redish.

However, looking more closely at Horn’s definition shows that he, like Passini, uses graphic design as the starting point in defining and understanding information design. In explaining the diverse fields that information designers come from, Horn explains that information designers often use other names for the field, such as information graphics, presentation graphics, business graphics, scientific visualization, graphic recording, signage, wayfaring, or, simply, design (16-17). These titles show a clear focus on visual design, indicating that Horn, like Passini, sees information design as growing out of the field of graphic design. Horn even explains how the emergence of “visual language” is integrally tied to the emergence of information design (27-28).
Thus, while Passini and Horn both offer broad definitions of information design, they use the field of graphic design as their starting point, thereby essentially emphasizing graphic and visual design over other elements of information design.

C. Summarizing the Two Perspectives

My research suggests that technical communicators tend to fall into one of two mindsets when trying to define information design. They either take a very broad view and emphasize the need to structure and organize information, or they take a somewhat narrower view by defining information design as essentially an expansion of graphic or document design.

Perhaps for the technical communicators represented by Wurman, Carliner, and Shedroff, the term “information design” would be better replaced with “information architecture,” “information management,” or “knowledge management.” Their focus is clearly more on the up-front tasks of information design, such as planning and process. Their goal is to structure, organize, store, and manage information as effectively as possible so that they can be flexible and efficient in using (and reusing) that information.

Technical communicators represented by Albers, Redish, Horn, and Passini, on the other hand, seem to focus more on the end result, on the form and appearance of the products being created. This is perhaps a natural result of viewing information design as an outgrowth of visual or graphic design.
CHAPTER 4: SINGLE SOURCING AS AN INFORMATION DESIGN STRATEGY

I. What is Single Sourcing?

Now that we have discussed the range of definitions ascribed to information design by technical communicators, perhaps it will be helpful to look at a practical application of information design theory in the workplace.

An information design strategy increasingly being used in the workplace is single sourcing. As its name implies, single sourcing involves developing a variety of information products from a single set of content. As JoAnn Hackos and Ann Rockley define it, single sourcing is a development system that involves mapping out all information requirements first and then developing them from a single source ("White Paper" 3). Single sourcing does not involve amassing all content in one place; instead, "in single sourcing, rather than assembling files to create documentation, writers break information down to the element level (e.g. section, paragraph, sentence), then write and compile all elements into a single source file" ("White Paper" 3). Thus, an essential task in any single sourcing system is to figure out how to break down the content in question and how to identify what constitutes an "element."

It is difficult to get much more specific than that in defining single sourcing because single sourcing systems can vary so much in how they are set up and maintained, depending on what the system needs to accomplish. Regardless, Hackos and Rockley are
careful to make a distinction between single sourcing content and merely converting content into different formats. Conversion involves taking an existing piece of documentation, such as a compiled HTML Help file, and then using that exact same content to produce a Web site and printed document as well. With conversion, the content is not specifically tailored for each medium in which it is used. With single sourcing, however, the goal is effective reuse of information ("White Paper" 3). Rather than using identical content in each different medium or format, a single sourcing system allows one to author a single set of content and then use it again and again in various formats, while also ensuring that the content can be tailored for each type of output required ("White Paper" 3).

In a practical sense, single sourcing systems often involve a team of people contributing content, from writers to graphic artists to programmers. Single sourcing systems can even involve people from different departments contributing content, such as technical writers and marketing employees ("White Paper" 3-4). All of this content usually gets stored in some sort of database, where it can be structured, organized, and managed. Once the content is in the database, it can also be exported to whatever outputs are required, such as print manuals, PDF files, compiled online help files, Web sites, and even brochures and pamphlets ("White Paper" 4). The exporting process is usually handled using templates and an array of automated procedures.

Understandably, single sourcing systems require a great deal of up-front planning and costs. However, Hackos and Rockley insist that based on their experience, an effective system, once implemented, can lead to cost savings as high as 25-60%, particularly in cases where content is translated into several other languages ("White
They list a number of additional benefits to single sourcing as well, including shorter production cycles, greater consistency, higher quality content, reduction of "busy work" and repetitive tasks, and easier updating procedures ("White Paper" 5). Perhaps more importantly, say Hackos and Rockley, single sourcing systems allow companies to be much more flexible in producing information, which allows them to create products for specific customer needs and to tailor their products towards niche markets ("White Paper" 5-6).

II. The Need for Single Sourcing

Hackos and Rockley's definition of single sourcing indicates that there are a number of potential worthwhile benefits to implementing a single sourcing system. However, companies are turning to single sourcing not so much because it sounds good but because, quite simply, they have to. It is not unusual today for a company to have to produce several different versions of the same information for several specialized groups of users: a print version, an online version, a PDF version, an HTML Help version, versions in different languages, not to mention marketing pamphlets and brochures. As Hackos and Rockley point out, the key is not just to merely "copy" the same set of information into each different format, but to tailor that information in a manner appropriate to each different medium. More than anything, marketplace demands are driving the need for single sourcing.

In fact, many technical communicators have made clear that workplace demands are changing the way they do things. Deborah Rosenquist provides a good example of these sentiments. In summarizing the main themes that emerged from an extended online discussion among a group of project managers, Rosenquist highlights three main points.
First, the managers all agreed that greater productivity is expected even though production budgets are being reduced (194). Second, the project managers all agreed that higher quality and improved usability were also expected, meaning that the faster production cannot come at the cost of reduced quality (194-195). Finally, the managers pointed out that to meet these new challenges, companies need supportive and flexible atmospheres, which generally spring from innovative leadership (195). Innovative leadership is also important because “correct analysis and planning are the key success factors to satisfying customers as well as to lowering costs and increasing productivity” (195).

**III. Real World Example: A Single Sourcing Success Story**

Perhaps an example will help me to illustrate in a small way the potential that single sourcing systems can offer to companies today. A few years ago, the company for which I now work was faced with the dilemma of needing to increase drastically the number of software training courses that it could offer to customers; in addition, the company needed to meet this need using current staff and resources. The ultimate solution was to develop and implement a single sourcing system that would streamline the development process. Prior to implementing this new process, the company was able to produce about four to six CD-based products per year, with a staff of about sixteen programmers; with the single sourcing system now in place, the company can produce 25-30 CD-based (and online) courses with a staff of about eight programmers (though the number of writers has stayed the same). Thus, simply changing the development process resulted in five or six times the output with only half the staff. Such is the problem-
IV. How Single Sourcing Affects Technical Communicators

Quantifying the effects of single sourcing on technical communicators is difficult because there is not a lot of agreement as to exactly how these new processes do affect workers.

A. "Pure" Writers or Working "Drones"?

Hackos and Rockley see single sourcing as a great opportunity for technical communicators to improve their standing in the workplace. They argue that the type of writing single sourcing requires is very difficult and complex; therefore, skilled writers who are able to effectively write a single set of content that can be used in multiple formats for multiple user groups will become a prized and integral element of the development team ("White Paper" 9-10). Melissa L. Guthrie, on the other hand, argues that there is a very real danger that single sourcing can cause the technical communicator's standing to drop in some cases. Because single sourcing systems are largely automated, says Guthrie, many technical communicators will be called upon to be "merely" writers. That is, they will no longer be involved in the layout or design of documents (2). And while Guthrie agrees with Hackos and Rockley that the writing process is more complex in single sourcing systems, she remains unconvinced that all employers will appreciate how difficult such writing is. Therefore, to avoid being labeled as a "mere" writer, technical communicators will have to work hard to adjust to the new
processes and writing styles while also striving to take advantage of any opportunities that may arise to expand their roles or learn new skills (2, 5).

B. Tightly-defined Roles or Flexible Teams?

Most technical communicators who address the subject agree that single sourcing systems will require technical communicators to work on diverse teams of workers. No longer will a single person be expected to write the content while also handling all the layout, formatting, and presentation duties. However, not everyone agrees about how these single sourcing teams will work.

Hackos and Rockley argue that single sourcing systems will involve teams in which everyone has a specific, tightly-defined role. The roles that technical communicators will play on these teams will vary, but many people who now call themselves technical communicators will assume the role of “pure” writer (“White Paper” 9). Pure writers are not dependent on tools; rather, they write without worrying about layout, formatting, or appearance. This allows them to focus solely on the content, which, say Hackos and Rockley, in time makes them “more proficient communicators” (“White Paper” 9). As I have briefly mentioned already, Hackos and Rockley see the role of pure writer as a vital one because such writers are required to create a single set of content that can be used (and reused) in a number of different media and distributed to a number of different user groups (“White Paper” 9-10). This has the added benefit of freeing technical communicators from a lot of the repetitive busy work that is currently part of their jobs (“White Paper” 9). Hackos and Rockley also point out that some technical communicators will assume the role of “tools expert” (“White Paper” 10). Since single sourcing “separates the creation of content from the output” (“White Paper”
tools experts are needed to create and maintain the templates, automated processes, and content management systems required to export content into each required format ("White Paper" 10).

Deborah Rosenquist, on the other hand, offers a different view of how single sourcing teams will work. She agrees with Hackos and Rockley about the basic tasks that such teams are asked to complete; however, she sees the roles on these teams as being much more flexible. Rather than suggesting that everyone on a single sourcing team will have a tightly-defined role, Rosenquist thinks that the roles on each individual team are flexible and will take shape according to the strengths and unique abilities of each member on that team. Rosenquist sees single sourcing teams consisting of diverse groups of people working closely together and moving into "a grayer area where they cross over disciplines" (195). This flexibility in the roles of each team member might manifest itself in a marketing specialist contributing some writing, or a technical writer contributing some web design work.

C. Focus on Tasks, Not on Tools

Regardless of their disagreements on some points, technical communicators do seem to agree that information design systems, single sourcing included, are focused more than anything on process. Remember that companies today often need to produce several different versions of the same information for several specialized groups of users: a print version, an online version, a PDF version, an HTML Help version, versions in different languages, and so on. And this content must be provided in the face of increasing budget constraints, time constraints, and technology constraints. This is why
Carliner’s definition of information design focuses around the problem-solving aspects of the field: how do we do more with less, without sacrificing quality or usability?

This focus on process, as opposed to a focus on just the end result, is bringing about another change for technical communicators. Ann Rockley explains that in the days of desktop publishing, technical communicators were forced to bend their tasks to work within the limitations of whatever tools they were using (“Impact” 189). In fact, says Rockley, the better technical communicators were able to modify the tasks to fit the tools, the more valuable they became in the workplace. Now, however, the mindset is changing. To create more efficient processes, technical communicators are trying more and more to figure out how to make the software do exactly what they need it to do (“Impact” 89). Here, again, the problem-solving nature of information design comes into play.

In sum, my research suggests that single sourcing presents both challenges and opportunities for technical communicators. Technical communicators must not passively allow drastic changes in practices and processes to occur without their input; rather, they should strive to actively participate in information design discussions to ensure that they are valued members of single sourcing teams and are not relegated to the status of worker bees who are “merely” writers with little or no say in how single sourcing systems work.
CHAPTER 5: XML AS AN INFORMATION DESIGN TECHNOLOGY

I. What is XML?

Extensible Markup Language, or XML, is simply that—a markup language. Like HTML, XML uses markup tags surrounded by angle brackets (<>) to enclose and identify content. However, outside of that fundamental similarity, XML is drastically different than HTML.

HTML is comprised of a standardized set of tags. For example, the opening and closing <B> and </B> tags are understood to indicate bolded text in any HTML document. While different browsers may have their own ways of interpreting how some of those tags are meant to format text, there is nevertheless a finite set of tags with agreed-upon meanings. XML, on the other hand, contains no standardized tags at all.

While there are strict rules that XML documents must adhere to, the tags in those documents are created completely by the document’s author(s). XML tags, therefore, do not indicate formatting; instead, they are used to describe whatever data they enclose.

It is also important to keep in mind that XML, unlike HTML, is not primarily used to create Web-based content. Rather, XML has much broader uses. XML provides a way to create structured data so that it can be easily organized and stored, or shared among incompatible applications, for example. An XML document is, essentially, a text document, and since it is so structured and because it follows such strict rules, it is easy
for computers to process and read. As with HTML, any basic text editor can be used to open and create XML files.

Another characteristic of XML that is important to understand is that XML, by itself, has very limited uses. The real power of XML cannot be realized until it is combined with any number of related technologies. For example, a typical XML document may actually be comprised of three separate elements. There is the XML document itself, which contains and describes the data being worked with. There may also be a Document Type Definition (DTD) or a schema, which defines the structure and hierarchy of the tags used in the XML document. DTDs and schemas can be thought of as meta-markup languages—the XML tags describe the content, while the DTDs or schemas describe the XML tags. The third element that may be used is a style sheet, which indicates the formatting and layout for the content in the XML document. For example, to display an XML document as a Web page, one must first create a CSS or XSLT style sheet (to list just a couple examples) that tells the browser how all the XML content should be arranged and formatted.

One useful aspect of these additional elements is that one DTD (or schema) and one style sheet can be applied to any number of XML documents. So any changes made in the DTD or style sheet are applied to all the attached XML documents.

In sum, the key point to remember is that XML is not an evolution of HTML; rather, it provides a structured, non-proprietary way to organize, store, and share information. XML will not replace HTML—the two will be used together in the future to deliver information on the Web in more dynamic ways. But keep in mind, XML has uses
far beyond HTML; ultimately, XML is an information management tool, not just a Web development tool.

II. How Can XML Be Used as an Information Design Tool?

Given that XML is a flexible markup language, how then can it be used in single sourcing systems or in other dynamic ways as an information design tool? Why, in fact, is Microsoft betting the farm on XML, so to speak, in developing its much publicized .Net initiative? Microsoft’s current CEO, Steve Ballmer, has said that “XML is the ‘lingua franca of the Internet,’” (Berger par. 4) and it seems clear that Microsoft’s strategy for the future is to use “XML as the standard for developing its software to deliver new applications and Web services” (Berger par. 7).

First of all, XML separates content from its formatting. This allows one to store a single set of content and reuse it multiple times in different formats. For example, a single set of XML content could be exported and combined with any number of different style sheets, each of which formats that data for a specific medium, be it print, online, or otherwise.

Second, XML is well suited to handling very large amounts of information. Specifically, DTDs and schemas are a large part of what makes XML such a powerful technology. DTDs and schemas lay out the hierarchy and structure for the XML documents they are attached to; the attached XML document must follow the “rules” laid out in these documents. The ability to specify hierarchy and structure means that any company, organization, or other group can adopt a common DTD or schema as a way to impose a common, agreed-upon structure and hierarchy for all the documents they create.
And using these shared structures allows for easily sharing information across different platforms, since XML is non-proprietary and license-free.

In addition, Paul H. Tyson describes what he sees as three primary advantages to creating structured data using XML. First, he says, XML is a standardized markup language, meaning that data marked up in XML is easily accessible to other people and can be conveniently shared and exchanged, even across varying platforms and systems (52). Second, XML allows one to add additional context and meaning to documents by indicating the relationship of each piece of data to other pieces of data and to the processes or objects that they discuss (52-53). In other words, one can “endow . . . technical documents . . . with meaning beyond the literal sense of the words” (53, his). Finally, Tyson also argues that well structured data is higher quality data because it can more easily be manipulated to accomplish what it is needed to do—it is more organized and easier for others to look at, understand, measure, and control (53).

Of course, XML allows one to do much more, but to go on would risk delving into a more technical discussion beyond the scope of this paper. Suffice it to say that XML is a flexible, robust, open standard technology that will provide developers dynamic and flexible ways to manage and present information, both on and off the Web.

III. XML's High Learning Curve: Implications for Technical Communicators

Given that XML will become an integral part of what technical communicators do in the workplace, how exactly will this affect what they are asked to do? What changes are in store for technical communicators as a result of the widespread implementation of XML-based systems?
First of all, XML is, by itself, easy to learn. Because XML allows one to create one’s own markup tags, learning it really is just a matter of learning the rules that must be followed for any XML document to be valid and work properly. But, as I have already pointed out, XML by itself will not get anyone very far. The real difficulty lies first in figuring out which related technologies need to be learned to be able to use XML. Would schemas work better than DTDs? Is CSS preferable to XSLT? Once the decision has been made to use specific XML technologies, these extra languages or technologies, all of which involve a pretty high learning curve, must then be mastered. Saul Carliner concedes that while XML provides a viable option for setting up information design systems and effectively reusing information, it also “adds a layer of technical complexity” (“Emerging Skills” 156).

In fact, Michael Smith, a content developer who works with XML for a living, actually recommends to technical communicators and others interested in document authoring not to learn XML. Smith argues that XML is not at all like HTML and that if one wants to be able to actually use XML in useful, practical ways one will have to also learn any number of related technologies, depending on what tasks need to be completed. He even provides a list of the XML-related technologies that are often mentioned in books and articles about XML, as follows: “XSLT, XPath, XSL-FO, XPointer, XLink, XBase, XInclude, XML Schema, XQuery, XHTML, DTDs, DOM, SAX, RDF, CSS” (Smith par. 8). He goes on to point out that learning any one of these technologies is a “substantial challenge” in its own right.

Does this mean the task of learning to use XML is an insurmountable or impractical one for most technical communicators? Smith might argue yes, and that may
be true for some, though certainly not all, technical communicators. Smith does, however, propose an alternative solution that I think is worth mentioning. He suggests learning DocBook, which is essentially a very large DTD "specifically designed for marking up structured documents of all kinds, especially documents related to computer software and hardware" (Smith par. 25). As Smith explains, DocBook is designed to allow marking up content with reuse in mind, making it especially suited for single sourcing systems.

According to Smith, there are several advantages to learning DocBook as opposed to learning XML and several related technologies. For one, DocBook does not take much longer to learn than HTML, and DocBook files can be written in a basic text editor, just like HTML code. DocBook is also aimed at the type of document creation that most technical communicators produce. Finally, DocBook has an established community of users that provides new users with a kind of support system that would be unavailable to the developer trying to create custom XML solutions from scratch.

Smith is admittedly biased in this matter, as he has a vested interest in DocBook's success. But his article is worth mentioning because he makes clear the very high learning curve involved in using XML. Technical communicators will need to take into account the complexity of XML as they evaluate the technologies they want to use to convert their existing information systems to systems that better allow for reuse of information.

This topic of learning and implementing new information design technologies brings up another important question: what role are technical communicators likely to play in the transition that many companies are making to new technologies, new
processes, and new systems? Are they likely to assume leadership roles in the transition to XML? That is the subject of my next section.
CHAPTER 6: LEADERSHIP OPPORTUNITIES FOR TECHNICAL COMMUNICATORS

I. Technical Communicators: Managers or Implementers?

Implementing information design systems that facilitate effective, sustained reuse of data is no small task. Given the complex nature of setting up such systems, what role can technical communicators expect to play in their planning, design, and implementation?

Some technical communicators believe that the transition to information design systems provides members of the field with an important opportunity to claim leadership roles in their companies. Rather than beginning to travel down the foggy, arduous road to learning XML and its related technologies, why not instead claim a leadership role in the company’s attempts to transition to better information management? Technical communicators are in many cases uniquely suited to leadership roles in such capacities because they can represent the concerns of the users of the information, they possess the skills to coordinate efforts among departments to develop a system that is beneficial to all, and they possess an understanding of what the end result needs to be for the information to be communicated effectively.

By taking leadership roles in setting up information design systems, technical communicators would free themselves from the daunting prospect of having to figure out which XML technologies (if any) they want to use and then learning those technologies
well enough to design a custom information design system. However, by taking leadership roles, technical communicators will still need to understand the technology and the issues involved well enough to know what can and cannot be done and which tools are best suited for certain tasks. Gaining this knowledge will require a great deal of research, but technical communicators are generally very capable researchers, and gaining this knowledge is certainly a more manageable task than gaining the advanced technical expertise that is needed to develop a custom information design system.

II. Guiding the Flow of Information

It is useful to look at how a few technical communicators believe their roles are changing in the workplace. Saul Carliner and Jonathan Price, for example, both see technical communicators as becoming architects of information, much as Wurman predicted.

Carliner concedes that the emergence of XML has made technical communicators' jobs more technical in nature and more complex (“Emerging Skills” 157). However, he does not see technical communicators as being primarily responsible for designing or implementing information design systems. Rather, he suggests that technical communicators will be coordinating information design projects, being asked, among other things, to develop “business cases for proposed projects, management skills for bringing in projects on time and within budget, marketing their services, and developing strategic growth plans” (“Emerging Skills 157). While these tasks do not require an advanced level of technical proficiency, they do require a thorough understanding of the technical issues involved in information design. Underlining Carliner’s description of the duties of technical communicators’ role in information
design is Wurman’s description of the information architect, the person who develops and coordinates the plan to put in place new processes centered around the goals of managing information for better storage, reuse, and customizable output.

Carliner is careful to point out that the role of information designer differs from that of project manager, saying that “the skills that make someone a good information designer are not the same as those that make someone a good project manager” ("Emerging Skills" 159). Project managers manage projects, while information designers coordinate processes.

Like Carliner, Jonathan Price sees technical communicators as having broad and varied responsibilities in the role of information designer. Price asserts that the changes in the marketplace that require technical communicators to handle so much more information than before is forcing technical communicators to pay a great deal more attention to the structure of information than ever before (69-70). Relying upon the same analogy to architecture that Wurman and Carliner employ, Price says that in dealing with electronic information, “one virtual brick may communicate through links with a dozen other arches, several walls, and one or two virtual brick factories” (70). As I have already made clear in earlier sections of this paper, the focus on structure that Price depicts makes the job of the technical communicator considerably more complex.

Price believes that these new demands being placed upon technical communicators will not force them to become proficient XML programmers. Rather, he sees technical communicators inheriting a range of diverse tasks and responsibilities, ones that perhaps involve “working with purchasing procedures, project management skills, training skills, diplomatic skills, training skills, and incredible stamina” (71), to list
a few possible examples. Indeed, the technical communicator's entire workplace environment is changing significantly. Specifically, Price sees current workplace demands forcing technical communicators to redefine our work, relaxing our grip on individual structures, turning our attention from writing particular documents and organizing large assemblages of interactive objects, to guiding the flow of an enormous river of information, standardizing access mechanisms, and responding to individual requests, while continuing, at other times, to be authors and organizers. (73)

The key phrase in this quote that I would like to highlight is guiding the flow of information. Given XML's steep learning curve, the niche in the realm of information design that technical communicators are best suited for is probably in this role of information flow-control.

Given that Price believes this role of guiding the flow of information requires technical communicators to be able to "structure information of an unprecedented degree of complexity" (73), how exactly does he propose that technical communicators go about preparing themselves for these new, more complex and demanding responsibilities?

Primarily, Price argues, technical communicators need to adopt more architect-like approaches to handling information. In practice, adopting an architectural mindset towards information involves viewing information with an object-oriented approach (72). Once one breaks a set of information down into a set of basic elements, or objects, he or she can decide how best to organize, group, and relate those objects so that they can be reused in whatever formats are required (72). And, as Price points out, "because one
object calls out to another, as a word yearns for its definition, an object orientation approach to publishing information facilitates the making of many, many links” (72), an essential element of reuse.

In the end, then, I think it reasonable to suggest that technical communicators will not be asked to design and implement information design systems so much as they will be expected to take on the more conceptual responsibilities of envisioning how sets of information can be broken down to their most basic levels and then figuring out how to relate those individual pieces of information together in a way that facilitates both efficient reuse of data on the one hand and user comprehension on the other. No small task indeed.

III. An Indictment of Technical Communicators

Some technical communicators believe most of the members of the field are not yet ready to assume the complex responsibilities described by Carliner, Price, and others. Corey Wick, for one, argues that most technical communicators approach information design with an outdated mindset dominated by the common practices of the past ten to fifteen years. Wick, who prefers the term “knowledge management” over “information design,” believes there are four basic knowledge management perspectives.

The first is the document-centered perspective, in which documents are the vehicle through which employee and company knowledge is extracted, analyzed, and presented to customers (516).

The second perspective is the technological perspective, which centers around information technology. As Wick describes it, knowledge management in this perspective is “primarily considered an issue of developing (or applying prepackaged)
applications and the supporting infrastructure for those applications” (517). The danger of this perspective, says Wick, is that it places too great an emphasis on knowledge management as a “technological issue” at the expense of the other perspectives (517).

The third knowledge management perspective is the socio-organizational perspective, which emphasizes “the social nature by which knowledge is constructed and shared” (517). The central focus in this perspective is to create an environment in which collaboration and knowledge sharing are encouraged and supported, and employee relationships are nurtured. The socio-organizational perspective revolves around the idea that “the majority of human knowledge is tacit knowledge” (518, his), and that social interaction is really the only way to share or pass on this type of knowledge.

The knowledge organization perspective is the final type of knowledge management perspective, and for the company adopting this approach, creating and leveraging knowledge is a core source of value, a form of competitive advantage, a core driver of its business, and a mission-critical activity permeating almost every aspect of the organization. (519, his)

Such companies often have higher proportions of intangible assets than they do of tangible assets (519, 521).

I have taken the time to introduce these knowledge management perspectives because Wick’s argument is that technical communicators as a group tend to adopt the document-centered approach, which is the most tightly and narrowly defined of the four perspectives. The implication therefore is that technical communicators approach knowledge management with far too narrow a focus.
Wick believes the benefits of learning to look more broadly at knowledge management will be threefold. First, by looking at knowledge management as a "continuum" (521), technical communicators will be better equipped to take more active and informed roles in their companies' information design efforts (521). Second, "understanding the full spectrum of approaches to knowledge management allows [technical communicators] to transcend narrow interpretations imposed by disciplinary or departmental influences" (521). And finally, and most important, by understanding knowledge management from perspectives of increasing depth and complexity, [technical communicators] are able to ask crucial questions about knowledge management and about technical communication. (521)

In sum, Wick is saying that technical communicators must considerably broaden their thinking and approach to information design before they can expect to gain leadership roles in their companies. So how exactly do they go about changing their mindset, specifically? First, says Wick, a broader perspective calls for broader technical skills and knowledge (524). However, he is careful to clarify this suggestion. The real key, says Wick, is for technical communicators to stop focusing on their portfolios and on the software tools they have mastered, and instead "shift attention away from the products technical communicators typically produce and toward the competencies they employ to create them, competencies that enable them to do other things as well" (524). In other words, Wick wants technical communicators to focus not so much on what they can do as on what they know, the unique tacit knowledge that only technical communicators possess. Therefore, technical communicators can increase the value they
bring to their companies by developing "a more comprehensive understanding of the technologies that serve knowledge management as well as business in general" (527).
The key word here is "understanding." Like Price, Wick does not believe technical communicators need to develop the technical skills necessary to implement information design systems; however, he does believe they need to broaden and deepen their understanding of technical issues so they can better guide the flow of information.

In addition, by claiming active roles in the process of planning, designing, and implementing information design systems, technical communicators will realize the added benefit of increasing the value they bring to their respective companies. As Michael Hughes explains, helping to implement more efficient practices and processes is one way to increase a company's competitiveness and wealth (283, 284). For example, by implementing a single sourcing system and creating all the templates used in that system, the technical communicator can not only create documents more quickly and cheaply, but he or she has also embedded within the company a very secure type of knowledge and efficiency (279-280). That is, if the technical communicator leaves the company, those processes and templates can still be used by the next person or people to fill that position. Thus, the processes become part of the company's culture and help to make that company more efficient (283). In the end, then, single sourcing may not only allow technical communicators to meet increasing customer demands, but it may also allow them to increase their value within their companies by allowing them to embed a certain level of knowledge and expertise into their companies' practices.
I. Facilitating Knowledge Creation Through Social Interaction

It would be fair at this point to ask if gaining a better understanding of technical issues is all technical communicators need in order to position themselves in leadership roles in their companies' efforts to implement information design systems. Some, at least, believe that increased technical understanding is only a small, secondary component of graduating into leadership roles. More important, they say, is to see information design as ultimately centering around people, rather than around processes or tools or technical trends.

Yogesh Malhotra and J. D. Applen, among others, stress the importance of understanding the "strategic difference between information and knowledge" (Applen 306). Malhotra makes the point that companies have been budgeting huge expenditures for IT-related issues, but in America at least, no real gains have been achieved despite all the investment in technology. Malhotra suggests this lack of progress may be attributed to "an economic transition from an era of competitive advantage based on information to one based on knowledge creation" ("Deciphering" 58). The difference, he argues, is that computers can handle information satisfactorily; however, knowledge creation requires creative thought from people, and it only "occurs in the process of social interaction" ("Deciphering" 59). As a result, companies are spending a great deal of money
developing information, when they really need to be investing in hiring and retaining creative, imaginative people and creating an atmosphere of employee collaboration and contribution. Unlike information, knowledge is intrinsically human, and it can only be created through the active involvement of people.

What does this mean for companies, then? Quite simply, Malhotra says, they need to de-emphasize tools, processes, and technical skills, and instead create a workplace environment that effectively fosters human-centered endeavors such as communication, collaboration, creativity, imagination, problem-solving, experimentation, critical analysis, and abstract thought (“Knowledge Management” 10). In so doing, they will realize a couple of crucial benefits. First, as Applen explains, companies who take the time to facilitate the human-centered aspects of development will see significant savings in production times and expenses. These savings will come because the environments that workers find themselves situated within are often complex social constructions that cannot be learned from a book. When hard-to-come-by knowledge is not articulated between an organization’s members, others have to “relearn” this knowledge on their own, and that process can be costly and inefficient. Finding someone with the know-how one needs can be facilitated with a well-integrated knowledge management infrastructure. (307, his)

Another benefit of a “well-integrated knowledge management infrastructure” is that it fosters the kind of “outside-the-box” critical thinking that so often leads to innovative ideas. As Malhotra says, such an atmosphere “encourages the questioning of all given assumptions” (“Knowledge Management” 10).
A critical and ever-questioning attitude is crucial for technical communicators to adopt. In order to claim their roles as "knowledge managers" (Applen 302) in the workplace, technical communicators must employ their unique skills, abilities, and tacit knowledge to look more critically at current communication technologies so as to expand their understanding of how best to use those technologies. They need to free themselves from unexamined mindsets and seek to find creative ways to better leverage the existing "human capital" (Applen 307) in the workplace. Being aware of their socially constructed environments can help technical communicators think and work outside of those limitations.

II. The Intrinsically Social Aspects of Relational Databases

The social nature of technological development discussed by Malhotra and Applen can perhaps be better understood through specific examples. To start, Rebecca H. Chatfield has studied the way that relational database systems are used by groups of coworkers in the workplace. But before I go any further, I should make clear the relevance of relational databases to this discussion. Single sourcing systems, as well as other information design systems, generally require information to be stored in a single location; from that location, the data can then be exported into whatever formats are required. Relational databases are often the tool used to store information for such purposes.

Chatfield calls for companies to put aside traditional database design, which focuses solely on tools and processes, and instead adopt a system of "participatory design" (2) in which databases are treated as continually evolving works-in-progress being adapted to meet user needs. In this case, the "users" are the team of content
developers who use the database to enter new data and work with existing data. In other words, databases are not static objects that are created and then put to use; rather, they are but one element of an organic social process (6). Like Malhotra and Applen, Chatfield stresses the importance of centering development around people and shaping the tools and processes to fit their unique needs and skills (2), rather than vice versa.

The result of adopting a participatory design approach, says Chatfield, is that the database users gradually begin to develop their own individual sets of competencies and areas of expertise. What is interesting, says Chatfield, is that these individual skill-sets “do not suggest themselves beforehand but instead come about somewhat organically” (6). In time, user groups usually develop into very efficient teams, and they learn to “rely on each other for assistance” (6) because each team member knows the particular strengths and competencies of every other team member (6). The conclusion Chatfield draws from these observations is that procedural knowledge and conceptual understandings are group dimensions. Not everybody knows everything, but overall the group possesses competencies and skills that can be mapped . . . The implication is that skill—expressed here as procedures and concepts—is distributed among the user group and managed in a deeply social way. Skill, then, is not something easily measured on an individual basis, person to person.

(12)

As Applen says, technical communicators need to be aware of the intrinsically socially nature of technological development and content creation so they can better develop environments that allow for imaginative and efficient production.
The picture that Chatfield paints of ever-evolving relational database systems being developed according to user needs is similar in many ways to my current work experience. The company I work for employs a single sourcing system in which all of the content is created and managed in a relational database, in this case a Microsoft Access database running on an SQL server. All new content is entered directly into the database; the content is then edited and revised in the database as well. And indeed, the database is still far from what the company would call complete. Rather, the database is continually being adapted to meet the current needs of its users, whether through new features, altered features, or a combination of the two, much like Chatfield describes. For example, the reports in the database change often, as the information we need to track changes. Quite often, we will find that some reports no longer suit our purposes, so they get revised or removed from the database altogether. In addition, the company still has a number of longer-term goals for the database that are being developed gradually, as time allows.

The situation that has developed where I work is very much like what Chatfield, as well as Hackos and Rockley, describes. Namely, a group of developers primarily handles the writing and editing duties, while one "tools expert" has emerged who maintains and continues to develop the database and the various automated systems we use for developing products. In fact, when the database was first implemented, a group of managers and developers held weekly "conversion" meetings to discuss all the issues involved with converting the company's development processes to this new single sourcing system, which, of course, centered around the database. Almost three years later, these "conversion" meetings are still held twice a month so that developers can
suggest and discuss ideas for making the database better while also getting an idea from the tools expert what can and cannot be done and how long each new wrinkle will take to implement. This ongoing discussion is, as Chatfield describes, a deeply social and organic process, and the company has no end goal in mind when work on the database will cease.

III. XML as a Critical Analysis Tool

So, how do we tie all these disparate threads of discussion together? What does XML and single sourcing have to do with technical communicators taking leadership roles in the workplace? And why is it important (and relevant) to recognize the social aspects of database design and use in the workplace?

To answer these questions and show how these seemingly disparate threads can be woven together and how they relate to technical communicators, one should consider that technical communicators are often viewed as mere “translators” of information; that is, other people gather the information, and then technical communicators simply make the information more accessible to the average user (Applen 301). To combat this perception, technical communicators should strive to empower themselves to become “knowledge managers” (Applen 302) who have integral roles in how companies manage information to create knowledge.

Becoming a knowledge manager is not a matter of learning XML inside and out or of gaining a wide range of technical skills. Rather, technical communicators should see themselves not as mere architects or developers, but as facilitators of social interaction in the workplace who enable coworkers to better leverage and enhance knowledge (Applen 302). Recalling Malhotra, Applen says, “There is a strategic
difference between information and knowledge, and human attention is what is all too often left out of the equation that allows us to distinguish between them” (306).

Being able to facilitate social interaction requires a critical and ever-questioning mindset. Technical communicators must always be willing to question common truths because what gets passed on as truth tends to go unexamined and unchallenged. By accepting common truths, technical communicators are, in effect, boxing themselves in to certain mindsets. What values, assumptions, and practices underlie these truths? Technical communicators must always ask themselves such questions because only by recognizing the socially constructed tenets of our accepted practices can we move beyond them. In other words, being aware of our socially constructed environments can help us to think and work outside of and beyond those limitations.

In addition, learning to model information using XML can help technical communicators become more involved in knowledge management efforts in the workplace while also providing a better understanding of the nature of how knowledge gets articulated (Applen 307-310). Without delving into an in-depth discussion of how XML works, it is important to explain that marking up data in XML requires one to closely examine the information being worked with so as to identify its most basic elements. Once all the basic information components are recognized, one must then figure out the hierarchical structure of the information and understand how all the components relate to each other and should be organized. Tagging data in XML is, in fact, a very similar process to constructing a typical relational database.

Ultimately, identifying and naming elements, as one is required to do in XML, can lead to more broad questions about how we as technical communicators, or
companies, or even societies, are identifying and naming—in such actions, what are we privileging and what are we ignoring (Applen 309)? What are the values and assumptions invisibly underlying our decisions? As Applen points out, "the very nature of XML allows technical communicators to think critically about knowledge. It demands that they break information down and reconsider its value" (311).

In sum, understanding how XML works can help technical communicators to adopt a more critical and questioning mindset. This critical approach better enables technical communicators to think outside the box, so to speak, because they are able to see beyond the limitations imposed by common assumptions and values in the workplace and in the broader society as well. And being able to think beyond or outside of common assumptions and mindsets will allow technical communicators to facilitate better communication and social interaction in the workplace and thereby become knowledge management leaders.

As Wurman laments, information overload is leading to information anxiety. Technical communicators, who traditionally have strived to represent the concerns of the average user or customer, are well suited to the task of helping people make sense of the limitless sea of information that has become so readily available. The trick is to provide people with not just data, "but data with context" (Applen 307), so that they can easily convert information to knowledge. No small task, to be sure, but technical communicators would do well to recall Henry Ford’s example. No job is too hard or too big if it is broken down into a series of smaller tasks. And no set of information is too vast or overwhelming if it is broken down to its most basic elements and contextualized.
Herein lies the technical communicator’s opportunity, and perhaps responsibility, in the immediate future.
CHAPTER 8: CONCLUSION: THE NEED TO LEARN DATABASE DESIGN PRINCIPLES

I. Why Databases Are Important

A. Databases as Single Sourcing Tools

Having discussed information design at length, I would now like to focus on one aspect of this topic that I believe does not receive enough attention among technical communicators: database design. Understanding what databases are, how they work, and how they can be used is central to understanding many of the issues involved in developing information design strategies.

As the research presented in this paper suggests, the central goal of information design is to effectively organize and manage information so that it can be used as often as is needed in whatever formats are needed in such a way that it is meaningful to users. As Carliner, Hackos, Rockley, and others would point out, the essential key to success in information design is effective planning. Before one can design an information design system, one must fully understand exactly what information is being managed and how that information will be used by the end-users. But when the planning is complete, what are the first steps that information designers will take as they begin to work with a given set of content? And what is the actual, concrete tool that developers use to organize, store, manage, and manipulate data? Quite simply, databases are the essential ingredient to managing large amounts of information in useful ways.
Information designers are required to break down a given set of information to its most basic components, identifying each individual element and specifying how all of those unique elements relate to each other (i.e., how the elements are hierarchically structured). There are two reasons information must be broken down in this way. First, information can more easily be managed, maintained, and reused if it is broken down into small pieces (remember the assembly line motif). Second, these steps are required before any information can be entered into any kind of relational database system (that is, any database more complex than, say, a phone book). In order to enter data into a database, one must first be intimately familiar with all the individual pieces of information that will get inputted, so that one can properly define the tables and relationships that serve as the database’s foundation. Thus, amidst all the planning, analyzing, researching, and brainstorming, information designers use databases as the fulcrum around which the rest of their information design systems turn.

As Chatfield has already made clear, a large, relational database is generally the tool used to collaboratively enter, edit, and output content in single sourcing systems. Increasingly, technical communicators do not sit at their desks and write content in word processing or page layout programs; rather, they enter content directly into a database so that it can be exported from there into any number of different mediums. Therefore, it behooves technical communicators to understand how these databases they are using are structured and how they work, so that they know what is going on behind the scenes, so to speak.
B. Similarities Between XML and Databases

Understanding database design is necessary for one other very important reason: the process of tagging data in XML is very similar to the process of constructing a relational database.

Recall that I have already discussed how learning XML is really a matter of learning the set of rules that one must strictly adhere to in order to create valid XML documents. Many of these rules involve breaking information down into its most basic elements, identifying all the individual information elements in the set of content being marked up, and defining the relationships among all those different elements. Sound familiar? Indeed, tagging information in XML requires one to follow many of the same basic steps that are required in constructing a relational database. In other words, designing an Oracle database and tagging a set of information in XML are essentially the same process.

The value to technical communicators of learning how to design databases should now be more clear. Once one understands how to go about analyzing a set of information and constructing a database to store and manage it, one has taken a giant step towards understanding how to mark up data using XML. And, because XML promises to play such a major role in the professional lives of technical communicators, and because information design systems will rely so heavily on databases for storing information for easy retrieval, I believe it is important for technical communicators to know what is involved in designing information for database systems. Having performed a fair amount of research on current discussions in the field, I believe that the field of technical communication as a whole does not yet recognize the value of understanding database
II. The Value of Broadening Technical Understanding

A. The Over-emphasis on Visual Design Among Technical Communicators

Earlier I argued that current discussions in the field of technical communication suggest that two primary schools of thought exist about how best to define information design. On the one hand, Wurman, Carliner, and others focus on developing processes through organizing and structuring information. On the other hand, Albers, Redish, and others define information design as being akin to document design.

It is the continued prevalence of this latter school of thought that I believe provides cause for concern. Too many technical communicators, it seems to me, still approach information design with an outdated mindset, the mindset of the recent past in which technical communicators were expected to be tools experts who did a little bit of everything. In other words, the type of jack-of-all-trades communicators that Kostelnick saw evolve as the Typewriter Era came to an end with the development of readily accessible desktop publishing tools. This kind of mindset naturally leads to a focus on the finished product, the final presentation of a set of information. Such a focus is harmful now because it tends to ignore, or at least subordinate, the absolutely crucial planning stages that are the true measure of whether any information design system will actually be effective. And, to reiterate Carliner, the field of information design has already broadened the concept of design "beyond the traditional boundaries of writing and page design" ("A Three-part Framework" 561).
Remember that Albers defined information design somewhat narrowly, suggesting that it had less to do with a given set of text and more to do with the way that text was presented (Albers 161). Recall also that Redish said that “information design” can be interpreted to mean “the way the information is presented on the page or screen (layout, typography, color, and so forth)” (Redish 163), and that Horn and Passini described how information design evolved from the field of graphic design. Presumably, those who see information design as a kind of extension of visual design believe that other issues such as database design and XML-tagging fall into some other category outside the realm of information design. But, as I have discovered through my research, the visual design aspects cannot really be separated from the information design process as a whole. In fact, information design systems often use automated processes to output content; in such cases, templates are created for each form of output required, and then the content is exported from the database or wherever it is stored and run through each template. The elements of visual design really could not be separated from this kind of process—all aspects of the process, from planning, to breaking down the information to its most basic elements, to constructing the database, to designing the templates, all fall under the umbrella of information design and must be managed together. Therefore, I believe a focus on visual design is dangerous for technical communicators because if they do not understand the importance of the initial planning and organizing stages in information design systems, then they are unlikely to achieve success in trying to implement such systems.

More specifically, however, even technical communicators who stress the importance of the early planning stages of information design systems do not seem to
address the issues involved in figuring out how to break down, organize, and store data. Ann Rockley, for example, explains that effective information design is more complex than merely copying and pasting the same set of content into several different formats. Rather, she says, a great deal of planning goes into creating an information design system, and then “information elements are ‘referenced’ into the document for reuse or drawn from a database” (“Impact” 189). However, Rockley seems to accept the process of placing the information elements into a database as a given—she says nothing further about database design or the issues involved in deciding how best to store and relate data.

B. Becoming Leaders by Better Understanding Technical Issues

Learning the concepts of database design is, in my opinion, not as easy as one may think, and it is certainly more difficult than simply learning how to use an application. Consider Microsoft Access, for example. Unlike Microsoft Word, one cannot simply open Access and start playing around and trying things out until eventually becoming familiar with the application. Before even thinking about opening Access, one must first have a set of data to base the database on and then figure out how the data should be broken down, organized, and related.

In addition, effective database design requires one to follow a set of basic rules, the most basic of which are commonly referred to as the rules of normalization. The purpose of these rules is simply to ensure that one’s database is built on a solid foundation that will allow for meaningful use of the data it contains. For example, one must ensure that all information is appropriately broken down and that data does not get repeated in different fields or tables as data gets entered into the database. One must also decide when to group related information together into one table, and when to split
related information into two or more separate but related tables. And of course, the larger and more complex the database, the more complex the issues of structure and organization become.

In short, the basic concepts of database design are something anyone can learn, but they are complex enough that they do require a fair investment in time and effort. To this point, the topic of database design has been largely overlooked within the field of technical communication. But I believe that technical communicators need to make the effort to learn database design so they can understand the issues involved in using XML and in designing and maintaining information design systems. However, they do not need to learn these concepts so completely that they can become professional database developers themselves. Rather, they simply need to approach the subject with the idea of learning the issues involved so they can better claim roles as "knowledge managers," to borrow Applen's term.

Recall that Price sees technical communicators broadening their roles in the workplace by "guiding the flow of an enormous river of information" (73). To expand their roles in this way, says Price, technical communicators need to change their mindsets to look at information more in terms of reuse. Says Price,

Writers have traditionally tended to adopt various formatting and structuring strategies on the spur of the moment, or on a chapter-by-chapter basis, so many organizations have ended up today with legacy documents that are inconsistently organized and formatted, both within themselves and from one document to another. (70)
In order to manage information more effectively, Price urges technical communicators to adopt an object-oriented mindset because doing so will "help us analyze our existing information, take it apart in useful chunks, and reassemble those chunks into packages that address the needs of our users" (70). In calling for an object-oriented approach, Price is echoing the architecture metaphor espoused by Wurman and Carliner, encouraging technical communicators to break information down to its most basic elements and then reassemble those pieces into modular packages that are optimized for future, as well as present, use (70). And again, at the risk of over-stating my point, adopting an object-oriented approach is appreciably facilitated by a thorough understanding of database design.

Adopting an object-oriented mindset implies a responsibility on the part of the technical communicator to become more technically savvy. This responsibility is smartly addressed by Wick, who acknowledges that the continued growth of knowledge management and information design provides technical communicators with a tremendous opportunity to assume leadership roles (523). The key to earning these leadership roles, says Wick, is to stop focusing on computer skills, portfolios, and the number of software tools that one has mastered. Instead, Wick wants to "shift attention away from the products technical communicators typically produce and toward the competencies they employ to create them, competencies that allow them to do other things as well" (524). Wick, like Applen, is calling for technical communicators to recognize and develop the tacit knowledge they posses that uniquely suits them for leadership roles in the realm of information design, competencies such as strong communication skills and an understanding of user needs and concerns. In other words,
technical communicators needs to shift their attention from they do to what they can do (Wick 524, mine).

In conjunction with developing their tacit knowledge, technical communicators also need to better grasp the technical issues that drive and complicate the work of information design. Wick says that leadership roles are there for the taking, and to seize these opportunities, we must also realize that moving into broader leadership roles mandates the broadening of our skills as well. For technical communicators, this means developing a stronger understanding of the technology serving knowledge management as well as e-business in general. (524)

And to reiterate this point one last time, the first and best way to begin understanding the technology that is running information design systems is to gain a comprehensive understanding of what databases are, how they are put together, and how they work and can be used.

Henry Ford once made the task of building a car much more efficient by breaking that one large job into a series of shorter, smaller, and more manageable tasks. Technical communicators would be well served to follow his example today and approach the daunting task of managing "an enormous river of information" (Price 73) by breaking that information into small, manageable chunks that can be easily reused and contextualized. This challenge calls for new ways of thinking and new approaches to the way they do their jobs, but in gaining an understanding of the technical issues inherent in trying to implement information design systems, and in maintaining a critical attitude that keeps the user always in mind, technical communicators can put themselves in position to
earn leadership roles in their companies and thereby contribute to the marketplace’s current need to guide the flow of information in ways that allow users to disseminate that information in constructive ways.

It is fitting here to give the last word to Wurman by reiterating his assertion that “When you arrange information, the structure you create will save you the frustration of juggling unconnected parts. Understanding the structure and organization of information permits you to extract value and significance from it” (Information Anxiety 65).
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