SUMMARY
◆ **Addresses the changing face of technology, information design, and the skills required to ensure effective information development**
◆ **Argues that the use of document databases, single sourcing, and knowledge webs will redefine "writing"**

The Impact of Single Sourcing and Technology

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THE ROLE OF TECHNOLOGY

For the last 15 years, technology has dominated our profession. Technical communicators were plunged into the world of desktop publishing in the mid 1980s. It was no longer enough to be a good writer; you had to know page layout and graphic design. In recent years, technology to develop help materials and Web-based materials has driven the direction of our profession. Employers have looked for new hires who could use the new "hot" technology, and placed a reduced emphasis on effective communication skills and audience and task analysis. Without a strong knowledge of tools, technical communicators have had little opportunity for career growth.

The emphasis on technological skills has diverted the profession from its original role, that of effective communication. Instead, a significant portion of a technical communicator's daily routine has revolved around:
◆ Converting paper-based materials to online
◆ Tracking down broken hypertext links
◆ Identifying and correcting compile errors
◆ Manipulating graphics for effective display in paper or online media
◆ Updating multiple sources of information (paper version and online version)
◆ Hand crafting (manually creating rather than automatically creating) electronic materials

Like many software applications, the tools we use have not been designed to effectively support technical communicators in their tasks. We have had to learn to modify our tasks to match the software instead of having the software enable us to perform our tasks more effectively.

Technology has also forced us to compromise the quality of our materials due to the restrictions of the media:
◆ Text is not as legible on a screen as it is on paper.
◆ Graphics are often distorted when scaled to fit a screen.
◆ Tabular information is not supported well (users cannot scroll the body of a table and "freeze" the column and row titles).
◆ Navigation can be problematic.
◆ The move to HTML has reduced some of the flexibility we had with help tools (HTML doesn't automatically support secondary windows and pop-ups unless you use proprietary software that eliminates access by some users).

The role of technology hasn't been all bad though. Online searching has provided better access to large volumes of information, faster methods for distribution of current information, and contextually appropriate information (for example, context-sensitive help). Ongoing research into effective presentation and access of materials in an online environment has assisted technical communicators in improving the quality of online materials, but our needs have always outstripped the capabilities of the tools.

CHANGING INFORMATION MODELS

Technology is once again changing the way technical communicators communicate. In particular, e-commerce technologies are a force that is changing the way the world does business. This model, in conjunction with e-publishing and single sourcing, is causing a radical shift in the way we communicate, a profound paradigm shift. This paradigm shift is illustrated in the four levels of single sourcing. Note that single sourcing means writing information once and using it many times. It does not mean writing it and then copying and pasting it into another source, or modifying the information for different needs such that you have multiple sources. Information elements are "referenced" into the document for reuse or drawn from a database.

Single sourcing level 1: Identical content, multiple media

Until recently, technical communicators have developed documents for one medium or another (for example, paper or online). When these materials have been single-sourced (derived from the same content), the content has been identical. For example, many communicators have produced help from their paper-based user guide. Others have produced an Adobe Acrobat PDF document from their paper guide. Little attempt was made to differentiate the content or the presentation of the information to accommodate the differences in media and usage. If the materials were modified to fit the media or address the fact that online information is used differently than paper-based information, the materials became quite different and were not single-sourced (updates had to be made to two sources).

When the content and often the presentation are identical, there are legitimate concerns that information used in one type of documentation is not necessarily well suited for another (for example, screen images in paper-based documentation may not be relevant online). There is also the issue of effectiveness in an online environment. This is particularly true for the PDF file, as it is essentially a paper-based manual provided online. PDF files are rarely optimized for use online; rather, users tend to print the guide for use.

Technologies' role   The issue of identical content in multiple media has largely been imposed by the limitations of the tools. Vendors did not consider it beneficial to be able to identify differences in content to accommodate differences in media and usage. Until fairly recently, it has not been possible to "tag" information for inclusion in one medium and exclusion from another, or to easily change the presentation. For example, in the paper medium, you might want to have information such as graphics or conceptual information "inline" so that users get all the information they need in the single location, whereas online you may want to link to graphics or conceptual information (to give users the option of choosing to look at them or not) or present the information in a secondary or pop-up window.

Single sourcing level 2: Static customized content

Level 2 single sourcing provides much more opportunity for effectively designed information. This type of single source material is customized to meet the needs of the user, the type of materials to be developed, and the media. In level 2 single sourcing, there is a core of content in common (the single source) as well as customized content. The technical communicator deliberately "builds" the customized output from the single source to meet specific user needs or output. This results in customized information

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that is static (that is, it cannot be changed without the intervention of the technical communicator). Examples of level 2 single sourcing include the following.

◆ **Multiple media output**
With multiple media output, the content can remain the same (single source) but the presentation may change to meet specific media capabilities (for example, help, paper, and Web presentations), or you may choose to present common content with differentiated content for the different media.

◆ **Multiple platform**
Documentation for multiple platforms often shares concepts and functionality (single source), but the content is customized to reflect the differences based on each platform the information is intended for (for example, NT and Unix).

◆ **Product families**
Frequently, corporations sell product families or suites of products. Product families or suites have functionality in common that is documented as the single source; then additional content is customized to reflect the product-specific components of the suite.

◆ **Multiple information products**
Corporations rarely create just one type of information. More often, they produce multiple types of information such as a user guide, help, a reference card, and/or training material. These are known as information products. Each of these information products draws on a core of common information. For example, a reference card usually includes short and precise tasks; the help information may use the same succinct task information as the reference material but builds on it with additional explanation and field reference information; the user guide includes the same content as the help but builds on it with graphics and possibly a different organization of information; and the training material builds on the same content as the user guide but adds examples, scenarios, and exercises. In this way, the core content is augmented with appropriate information for the various information products.

◆ **Multiple audiences**
Information sets can have multiple audiences. Rather than providing generic information that must meet

many audience needs, you can produce information for each specific audience by reusing the common information and augmenting it with information specific to a particular audience.

◆ **Multiple releases**
Products go through release cycles. Documentation must reflect these releases. Some corporations maintain parallel releases, others have consecutive releases. In each case information builds on the existing information set, the single source.

Technologies' role   Traditional help tools have begun to offer flexibility in the identification and inclusion of specific types of information in different outputs. However, more importantly, content management systems have introduced the concepts of information elements (objects) that can be identified for use in one output or another and reused where appropriate.

The paradigm shift begins   Developing information in this way moves away from traditional documentation (sections, chapters, and files) to object-oriented information. This is not to say that writers write individual objects; rather, they create information in context that can be extracted into objects that can be reused. This approach requires writing to structured information models and writing with reuse in mind. Technical communicators need to understand how information can be used in multiple ways as they write to ensure their content is reusable.

Single sourcing level 3: Dynamic customized content

Level 3 single sourcing, provides complete, "on-the-fly," customized documentation to meet users needs. Information elements are stored in a database. Users access information through three methods:

◆ **User profiles**
Users are assigned a login name. Each user has a user profile associated with the login name that identifies the user's role and information needs. When users log in, they see only information that is relevant to them.

◆ **User selection**
Users have the opportunity to identify the type of information they want to view. They usually do this by selecting from options on a form. It is no longer necessary for users to "wade" through large volumes of information to find the information they need to know; answers to a few simple questions can help the system narrow down the content to a customized relevant presentation of information.

◆ **Profiles, selection, and personalization**
Using a combination of user profiles and user selec-

tions, the system learns the user's information patterns and determines what additional information may be relevant. The system then "pushes" the information to the user or provides selectable links.

Technologies' role   The functionality of e-commerce is the driving force behind this approach to providing information. While e-commerce deals with the purchase of products based on specific customer requirements, the technologies used to drive e-commerce—portals, databases, metadata, and customer profiles—can be used by our industry to dynamically build information that meets the needs of users on request. Information is drawn from a database, not from static, pre-built files of information.

The paradigm shift intensifies   Information is further "objectized" based on intensive research and design to meet your user needs. Based on a thorough understanding of your users' needs, you design information models to provide the framework for how the dynamic information should be "built" to meet the users' requirements on request.

Single sourcing level 4: EPSS

An EPSS (electronic performance support system) provides "just-in-time" information based on user needs. This information provides the user with training material, answers to usage questions, reference material, and other types of information to aid in the decision-making process. An EPSS is helpful when users accomplish their tasks on the computer and the system can determine what information users need to know at any point in time. This level of information is most appropriate for definable users (those that you can build a profile for). Products employed by a large variety of users make it nearly impossible to provide the scope of information required for an EPSS.

This model builds on the previous level (dynamic customized content), but information is made available to users when they need it, often before they know they need it.

Technologies' role   Again, e-commerce technology is the driving force behind EPSS solutions and the ability for

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these systems to learn from user actions and requests for information so they can provide relevant information. Of course, this approach also builds on the technology developed for EPSS systems in the past but with much greater flexibility and much reduced cost.

The paradigm shift continues Information continues to be created as objects, but user research must increase if we are to build models that can predict the appropriate information for the particular user at the right time.

CHANGING ROLES
The paradigm shift we see in levels 3 and 4 (object-oriented documentation designed for reuse, multiple media, and specific user requirements) will significantly impact the traditional roles of technical communicators.

The team approach
In the past, technical communicators tended to create a "document," most often working on their own to create that document. Sometimes a team of writers created a document suite. With single sourcing, writers must move to a team approach for development. This does not mean that writers are no longer responsible for ownership of their information or that they will lose control over the structure of the final output. Rather, it means that someone may be responsible for writing the core information (the information that is reused) while others are responsible for identifying how the information set needed for a specific solution differs from the core and adding information that covers those differences. Or it may mean that a number of writers work on different aspects of the core and work together to ensure that all the information is integrated.

Writers
The process of creating customized single source materials separates the creation of the input (content) from the output (media or information type). This means that writers will become more proficient communicators and rely less on the tools that are used to display the final information. Writers who enjoy working with the tools may choose to take on a different role—that of the information technologist.

However, rather than narrowing the scope of what writers do, single sourcing actually increases the scope. If information is to be used in multiple media (for example, paper documents, help, Web-based documents), writers

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must now write information for all those media simultaneously. Sometimes the information they write will be reused for all media and information requirements, and sometimes the information will vary depending on the requirement. Skilled writers need to understand how their elements of information will work in each case. Information developers become more like architects than construction workers; they identify the building blocks of information and the ways the blocks will fit together.

Alternatively, writers may now be responsible for writing information for multiple users or multiple information types simultaneously. It makes sense that the writer who knows the most about a product or service should create all the information pertaining to that product or service. This could range from a brochure or product sheet, to manuals and online materials. Thus, the writer will gain a better understanding of and proficiency with many types of information. Providing a seamless, transparent single-sourcing strategy to users means that, more than ever, writers need to understand what information users want, what form they want it in, and when they want to use it.

Overall, writers gain by creating single-source materials. No longer do they have to contend with the "boring" job of updating materials. Now updates are always related to new content, and information that stays the same is untouched. Changes to existing material are fast; a change to a single element automatically updates it wherever it is used. Time that was previously wasted doing mechanical or "busy" work can now be spent on creating new material and creating innovative changes in information delivery.

Information designers
Information designers play a key role when information types are initially designed. They are responsible for building the information models. The design of these models and accompanying templates facilitates the writing and assembly process.

Information modeling involves analyzing information to determine current and required structures and building models that identify information product models, elements, and reusable components.

This skill set is a new one for the technical communication industry. Information designers will need to understand:
- Effective information structures
- Customer requirements
- Structured writing techniques
- Information modeling
- Effective metadata design (Metadata is data about data—a way of "tagging" elements with more information about the element, for example, output [this element belongs only in the help, not paper], customer [applicable to Acme Industries only], platform [Unix or NT].)

◆ Effective design for multiple media
◆ Database access to information

The role of the designer can be a separate role, or it may be assumed by a writer.

Editors

Standards and consistency are important in creating seamless single-source materials. Many organizations have reduced or eliminated the role of the editor. However, single sourcing makes this role an important one to ensure that information can be reused effectively. Editors will need to understand

◆ The information models being used
◆ Effective information structures
◆ Customer requirements
◆ Structured writing techniques
◆ Writing for multiple media

It is particularly important that editors not just look at the words, but look at the use of information to ensure that it is effectively written to meet customer needs.

Information technologist

Typically, writers have been responsible for creating the content, formatting the content, and "publishing" the content in a variety of formats. These roles have meant that writers have had to become tools experts—oftentimes "jacks of all trades and masters of none." Single sourcing separates the creation of content from the output. As a result, the writer is responsible for content, and the information technologist is responsible for handling all aspects of the output. This job may include knowledge of

◆ Authoring tools (implementation of the models in the tool through templates or DTD [SGML or XML document type definition])
◆ Content management systems (including database design and maintenance)
◆ Workflow creation

◆ Output (style sheets to output to multiple media)
◆ Portals and dynamic document engines
◆ User profile definitions

Writers who have shown a strength and interest in working with a variety of tools may want to move into the role of information technologist.

CONTROLLING TECHNOLOGY

In the past, technology has driven us and determined what we can provide for our users. While technology is still the driving force, it is now we who must drive the configuration of the technology. The success of dynamic documentation is dependent on the information models, metadata, and configuration of the underlying database, all components controlled by information developers. The technology supports us in our task but does not predetermine how information should be presented. Only information developers can effectively configure the technology to support user needs. Without a clear understanding of information, media, and user needs, our use of the new technologies will fail. We now have a wonderful opportunity to make technology work for us and our users. T**C**

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