

APPLIED RESEARCH

SUMMARY

- ◆ Identifies and discusses the effects of single sourcing on the writing process
- ◆ Provides suggestions for incorporating the teaching of single sourcing into technical communication courses

Content vs. Product:  
The Effects of Single Sourcing  
on the Teaching of Technical  
Communication

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INTRODUCTION

In the introduction to the May 2001 issue of *Technical communication*, which focused on future developments in the field, the guest editors summarized the knowledge and tools technical communicators would need to have in the future as evidenced by the key topics addressed by the articles. They concluded that the field has seen accelerating change and that professionals within technical communication would need new audience analysis, design, and tools skills (Grice and Krull 2001, p. 135). I contend that these skills are similar to the skills and knowledge needed by technical communicators for the production of single-source materials.

In one of the few books addressing the topic of single sourcing, *Single sourcing: Building modular documentation*, Kurt Ament asserts that the single-sourcing process does not differ from the traditional documentation process in the beginning of a project. Before developing information, writers identify their users, the types of information and knowledge they need, and “the types of documents that best communicate that information” (Ament 2002, p. 23). However, once information is developed, “the difference between single-sourcing projects and traditional projects becomes dramatic. In traditional projects, you develop one type of document at a time. In single sourcing, you develop modular content once, and then assemble it into different documents for different audiences and purposes” (Ament 2002, p. 23).

Writing modular content differs from the traditional writing process because modular writing “is a cognitive

process. You evaluate content, break it into the smallest possible modules, label the modules by content type, configure the modules into meaningful hierarchies, and then link the hierarchies to related hierarchies” (Ament 2002, p. 23). This cognitive process results in a separation of content from product in the writing process.

For the purposes of this article, I define *content* as the actual information or topics addressed in the writing, and *product* as the final document(s) or deliverable(s) produced by the writing process or through single sourcing, which may include a manual, user guide, a help system, Web site, and so forth. The terms *product*, *document*, and *deliverable* are used interchangeably throughout this article.

THE EFFECTS OF SINGLE SOURCING

Single sourcing consists of “writing information once and using it many times” (Rockley 2001, p. 189)—in other words, creating multiple deliverables or products from one content source. Integral to single sourcing is the ability to analyze multiple audiences and to write and design reusable content. As technical communicators continue to take on the roles of content managers, information designers, knowledge managers, and knowledge creators, learning and teaching the elements of single sourcing becomes increasingly important to industry and academia. Single

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sourcing enables technical communicators to become knowledge, content, and information designers because knowing how to single source means knowing how to write, design, create, and (re)use content for various media.

Because content and knowledge have become valuable assets to companies and organizations, content and knowledge must also be managed (Hackos 2002, p. 18). Single sourcing is an effective way to produce and manage content if any of the following apply:

- ◆ Multiple versions of a product are produced
- ◆ Information is published in multiple languages
- ◆ Similar information is delivered in multiple media
- ◆ Information needs to be updated quickly because of time or multiple releases (Hackos 2002, p. 295)

Some advantages of single sourcing include cost efficiency due to reduced time and resources for production, and the ease of editing, revising, and updating materials because changes are made to one single document (Brierley 2002, p. 15).

The theoretical principles of single sourcing change the landscape of the technical communication classroom. The traditional notion of technical writing emphasizes the symbiotic relationship between content and product because the specific purpose, audience, and context often dictate the information and the document being written. In single sourcing, multiple audiences and purposes inform the content that will be written. Thus, teaching the process of single sourcing entails separate discussions of content and end products.

Obviously, a single document can have more than one audience; however, with single sourcing, the content can be delivered in different products to different audiences. As a result, single sourcing changes the traditional view of the writing process that considers audience, purpose, and context as dependent on the single document or product being written. Rockley (2001) contends that "technical communicators need to understand how information can be used in multiple ways as they write to ensure their content is reusable" (p. 191).

Thus, the increasingly popular practice of single sourcing affects the teaching of technical and professional communication courses in a number of critical ways. The theoretical and pedagogical implications of single sourcing for educating technical communicators call into question the notion of the writing/communication/design process, which begins with discovery of information or content, and concludes with delivery of information or content as product. In contrast, the process of single sourcing emphasizes content and information as separate from the form or design of the content. As a result, teaching the process of single sourcing to students requires that we redefine the "writing" process to include the separation of content from product.

## THE WRITING PROCESS AND SINGLE SOURCING

Redefining the writing process to include consideration of content as separate from product is the first step in incorporating the teaching of single sourcing in the classroom. In other words, content must be written not for a single document but for multiple documents. In the traditional writing process, two elements that have traditionally coincided with one another (many times, the document dictates the content and/or the content dictates the document) become separated. Technical communicators using single sourcing no longer write documents or products. Instead, they need to learn and know how to write content that can be reused in various documents or products. If single sourcing becomes the industry standard within organizations for documentation projects, we can no longer teach only the traditional writing process in our courses where a specific document is the end result. We need to introduce students to the process of writing content and information that can be used in various products or documents.

Some types of documents written by technical communicators include printed manuals, online help, training materials, Web sites, and marketing or promotional material. The content of these documents is similar and probably shares some of the same material if written with the commonality and the purposes and audiences in mind. For some documents, the only difference may be in the design and format of the content. For example, a user guide and online help may differ the most in the format and appearance of the material; however, the content may be quite similar in nature.

Thus, the major difference in the writing process within single sourcing is that "regardless of its audience or purpose, all information resides in one source" (Hackos and Rockley 1999, p. 3). In terms of redefining the writing process, we need to teach the process of writing content as separate from the process of creating documents. As a result, purpose and audience become multi-layered principles when dealing with the practice of single sourcing. Instead of considering one purpose and set of users, technical communicators must anticipate a whole array of purposes, audiences, and documents if single sourcing is to be an effective form of producing various deliverables. In addition, technical communicators must also have a better conceptualization of the audiences and purposes for the content they need to produce.

Single sourcing is more than a complex software package or XML tags; it is a way of thinking, a reconceptualization of the relationship between audiences, purposes, and documents. Butland (2001) maintains that "to create good single-source documents, information must be written and structured so that it makes sense in a number of different contexts" (p. 24). In addition to the traditional writing process, future technical communicators need to have practice writing and labeling content for reuse.

Content, or the information that technical communicators write, becomes separated from the actual products they ultimately produce, even though the various documents and audiences might still dictate the content they write. In a large company, technical communicators may produce several documents where some of the content will inevitably be the same. Single sourcing allows technical communicators to produce these various documents from one source. However, the process is different from the traditional writing process because single sourcing complicates notions of specific purposes and audiences for specific documents.

Because documents will be produced from one source, content must be written with all the audiences, purposes, and documents in mind. Writers must generate certain content that can be used in all documents, while other content is written for a specific document. One obvious advantage to single sourcing is in revising or updating material because it can be rewritten or changed in one source and be reflected in all the documents that use that source.

Writing content for single-sourced materials depends on the writer's ability to write "medium-neutral" text that can be used in multiple documents without having to be rewritten. In other words, "the language and presentation must be appropriate for all media" (Butland 2001, p. 26). JoAnn Hackos and Ann Rockley (1999), two early practitioners of the single-sourcing process, contend that single sourcing actually increases the scope of what writers do rather than narrowing it. They write:

*The process of creating single source materials separates the creation of the input (content) from the output [product]. . . . This means that writers will become more proficient communicators and rely less on the tools that are used to display the final information. . . . If information is to be used in multiple media (e.g., paper, Help, Web) writers are now responsible for writing information for all those media simultaneously. Sometimes the information they write will be reused for all media and sometimes there will be variations. Skilled writers need to understand how their elements of information will work in each of the media. Alternatively, writers may now be responsible for writing information for multiple users or multiple information types simultaneously. (p. 9)*

Thus, writers gain a better understanding of various types of information. To provide "a seamless, transparent single source strategy to users," writers "need to understand what information users want, in what form, and when" (Hackos and Rockley 1999, p. 10). Technical communicators, using the process of single sourcing, can also spend their time writing content rather than formatting

## How do we, as educators, best teach future technical communicators the process of single sourcing?

various documents or updating dated material in different documents.

The implications of single sourcing complicate the practical application in the classroom. How do we, as educators, best teach future technical communicators the process of single sourcing? How do we best implement this process into our technical communication programs? Obviously, the answers to these questions are complicated and depend on the context of the program. Nevertheless, I think it is an important process for our students in technical communication programs to become familiar with and to gain practice, as part of their course work, in the single-sourcing process.

However, courses that must deal with many elements can hardly prepare students to institute the publication workflow required by single sourcing. We might best serve our students by providing them with processes and strategies they can use in a single-sourcing environment. For single sourcing to be effective, technical communicators need to know how to create content that can be (re)used in various documents and addressed to different audiences without being changed or revised for each product. How does single sourcing find a place in the classroom? Through two processes that lie at the center of the process of single sourcing:

- ◆ Information modeling
- ◆ Structured writing

These processes can be taught in various technical communication courses and can aid future professionals in the workplace by providing them with organizational and writing processes and strategies used when creating single-source materials.

### DEVELOPING REUSABLE CONTENT

Being able to author material that can be reused is one of the most important skills for future technical communicators. The first step in creating content for various documents is information modeling. Structured authoring of this content is the second process used to ensure that content is reusable. Students who learn how to model information and how to author content in a structured way can more easily adapt to a single-sourcing environment. Knowing these two processes can make technical communicators more valuable to a company or organization because being

able to reuse content for different purposes and audiences can add value to the content.

The benefits of single sourcing to companies, organizations, and writers include the ability to reuse content in various documents and to update this content quickly. The key to implementing single sourcing in a company or organization is “determining what you want for deliverables in terms of content and form” (Brierley 2002, p. 15). Determining the information or content that must be created in a single source begins with the process known as information modeling. Using a tagging language—which is very similar to the imposition of styles used in software such as Word or FrameMaker—to describe the elements of a document based on its content rather than appearance is known as structured writing (Hackos 2002, p. 68). The following sections define these two processes.

### **Information modeling**

According to Hackos (2002), “an information model provides the framework for organizing your content so that it can be delivered and reused in a variety of ways” (p. 123). It can also be used to put all the information resources in categories and provides a foundation for the deliverables, including print and electronic. In other words, information modeling consists of identifying all relevant information requirements. The theory of single sourcing is based on being able to articulate this information model and on a thorough audience and information analysis (Kostur and Rockley 2001, p. 2). The process of constructing an information model takes into consideration the users’ needs and the information that must be communicated.

Hackos (2002) identifies a three-tiered structure of the information model:

- ◆ Dimensions or attributes
- ◆ Information types
- ◆ Content units (p. 126)

In the first tier, the dimensions “identify how your information will be categorized and labeled for both internal and external use in your organization” (Hackos 2002, p. 126). The second tier of information modeling “identifies the range of information types used to produce content in your organization” These information types “are subject-matter-related categories of information that authors use to create a consistent, well-structured topic” (Hackos 2002, p. 161). The third tier of the information model defines the content units that make up the information types. The content units are especially important to writers because they “guide the author in writing a particular instance of the information type” (Hackos 2002, p. 168). The content units are most effective in single sourcing when they identify the “nature of the content rather than its appearance on the screen or page” (Hackos 2002, p. 169).

The first level of modeling or creating information for

reuse entails identifying the dimensions or attributes based on how users need to use information. For example, two common dimensions (or user scenarios) of a user guide include a company’s software version and information delivery, as there may be more than one version of the software, and delivery of the user guide may consist of print, PDF, and Web versions, as well as additional material or a more extensive Web site (Hackos 2002, pp. 148–149). A user may want to access a procedure for a specific software version in a user guide in PDF form or on the company Web site. The information would be the same in both places, but anticipating the user scenarios and implementing a system where users could find the information they need depends on how effectively the dimensions of the information model are defined.

The second level of information modeling defines the types of information that authors will use to develop topics. Some information types for “technical information include concepts, procedures, and reference models” (Hackos 2002, 40). Information types can also be thought of as modules since they often refer to “self-contained chunks” that can be reused. Other possible information types include task modules, solution modules, concept modules, and reference modules. Each of these types of information focuses on a different user’s need. For example, task-related information helps a user learn a new procedure or task (Hackos 2002, p. 195).

The third level consists of content units, which form the “building blocks” of the information types. For instance, four content units that make up the type of information known as a procedure include the task title, introduction, action steps, and feedback statement. Having students create an information model provides them with a strategy for organizing information and conceptualizing the content they may have to write.

### **Structured writing**

Structured writing changes the traditional writing process in a number of ways. The traditional writing process focuses on the final product, its appearance, and the way that it may be structured and best communicated to its audience. Writers may begin the process by writing content, but they will inevitably have to address formatting and design issues as the document evolves into its final product and form. Structured writing allows writers to focus strictly on writing content without having to worry about the formatting or final look of the document. The content units identified in the information model dictate what content needs to be written. The formatting and final products are defined within the document type definitions (DTDs), which are similar to stylesheets. After the content is written, the different types of documents are produced according to these definitions.

In a structured writing environment, writers create content and do not have to worry about formatting or the final products (Scriptorium 2002, pp. 20–21). According to Hackos (2002), “structured authoring implies that the author begin by using a tagging language to identify elements of the document based on their content rather than on their appearance” (p. 68). This process is similar to using a stylesheet, which many organizations require of their writers. As a result, writers will need to learn how to label and describe their content with labels known as meta-tags. Although the thought of structured writing sounds more complicated than it is worth, “many authors find that it is actually easier because they can concentrate on content rather than format” (Hackos 2002, p. 68). Writers within a single-sourcing environment will probably know these potential document types they are writing the content for; however, they will not necessarily need to know, and they will not have to format their content for the different products.

The writer’s responsibilities in this process are to write content that can be used in different products and label the content accurately so it can be used in various ways. This writing process also ensures consistency within all of the documents produced from the content source. For example, an introduction for a specific task would be written and labeled as an introduction for that task. Then the introduction is placed where it needs to be placed according to how the structure of each document is defined. The same would be done for task title, action steps, and feedback statement. Thus, writers would be responsible for writing these sections of content and labeling them accurately, and they would not have to worry about the page design or how the final product will look.

### THE TECHNICAL COMMUNICATION CLASSROOM

How does this translate to the teaching of single sourcing in technical communication courses? One way to teach the elements of single sourcing to students is by incorporating information modeling and structured writing in various technical communication courses. The process of information modeling could be integrated into a discussion of audience and purpose, and structured writing can be part of a larger discussion on using and/or creating styles and templates. Another option may be to offer a special topics course on single sourcing or structured writing. Because the process of single sourcing is often implemented in a variety of ways and at various levels within organizations and corporations, students need to understand, first and foremost, how the single sourcing of materials can happen. Students who understand and have practiced information modeling and structured writing in several courses or just one course have gained skills that can transfer to the workplace. What follows is one way that the elements of single sourcing can be incorporated into a technical communication course.

You might require students to work on a project that has two specific deliverables. Because the detailed process of single sourcing is highly technical, and teaching specific software is difficult to do in a short semester, students could instead focus on the two processes explained previously: information modeling and structured authoring. As a result, students practice writing content separate from product, and they can focus on writing rather than learning how to use specific software.

This approach ensures that, if software changes, then students will still be able to adapt to the process of single sourcing within organizations. One advantage of this approach is that these two processes can be incorporated into various technical and professional communication courses.

Before writers can begin writing content for a single-sourcing project, they must create an information model that dictates the types and kinds of content that must be written. The information model is an important first step to ensure the success of single sourcing. For example, students might write the content for course descriptions offered by a specific department at their school, which might be delivered in a print brochure and a Web page. The information model for this project would include the dimensions, information types, and content units as explained previously. The dimensions or attributes, according to user/audience analysis, include students, advisors, and the type of delivery. The information type is a course description, and the content units are course number, course title, course description, and credit hours. Rather than creating the print brochure and then the Web site separately, both deliverables can be produced from the same source because the content will be the same, but the products will be different. As for learning the process of structured writing, students need to practice writing content and labeling it according to the DTDs or templates.

In a large organization, the technical communicator may be responsible only for writing the content according to the information model. To prepare for this approach, students author the content according to the content units defined in the information model. They also label the content they write according to its type. Students write the course number, title, description, and credit hours and label each element accordingly. They do not have to worry about how the content or the text is formatted on the page. All of these formatting characteristics are defined within the DTDs or templates.

For example, in the print brochure, all course numbers and course titles will be bold-faced. Course descriptions will begin on a new line and credit hours follow. For the Web page, course numbers will be bold-faced, course titles will be in a different color, and a list of the course number and titles will appear at the top to provide links to the descriptions. If the content is written and labeled accurately and if the document structure is defined in a template, the

information can be exported into these two different product types. If a course description changes or is amended, the information can be changed in the content source, and the change will be reflected in the print and Web version without having to change the description in both products.

The software knowledge possessed by the students and the instructor as well as their access to the requisite technology will dictate whether or not students will be able to complete this exercise by actually producing the two products as they would be produced in an automated single-source environment. Increasingly, software enables its users to create content and label it according to how it will be used. If access to this technology is not readily available, then the above assignment might act as an introduction to the elements of single sourcing and a cognitive exercise in thinking about these processes.

As a result, having students practice information modeling and structured writing in a technical communication course provides them with two strategies for learning the process of single sourcing. As the roles of technical communicators continue to change, knowing these two strategies allows them to take their place as writers in single-sourcing environments.

## CONCLUSION

In her article on single sourcing and technology, Rockley (2001) contends that the roles of technical communicators will continue to evolve. Knowledge management specialist, content management specialist, information architect, and information technologist are just a few of the new roles that may be played by technical communicators. Depending on the interests of technical communicators, the single-sourcing process provides a wide variety of roles for them to play in organizations. As these roles of technical communicators continue to change, educational practice should be aware of industry practice. Single sourcing is one practice that will continue to affect the technical communication classroom.

While implementing the process of single sourcing in organizations or in the classroom may not always be easy, educating students about the process of single sourcing is important if they are to become effective technical communicators in industry. In an effort to educate students who will work as technical communicators in various roles, we must introduce them to elements of single sourcing because it changes the way documentation and other de-

liverables are written. With practice in what Ament terms "a cognitive process," our students will be able to adapt to the process of single sourcing. With classroom practice in information modeling and structured writing processes, our students will be better prepared to become productive members of the writing teams they join. **TC**

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