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*Journal of the Society for Technical Communication*

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# Technical COMMUNICATION

Journal of the Society for Technical Communication

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# Technical COMMUNICATION

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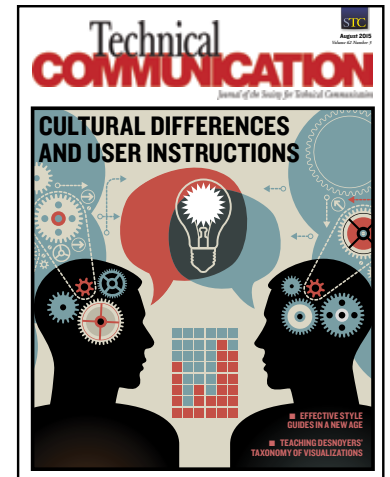
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# INSTRUCTIONS FOR AUTHORS

## About the Journal

*Technical Communication* is a peer-reviewed, quarterly journal published by the Society for Technical Communication (STC). It is aimed at an audience of technical communication practitioners and academics. The journal's goal is to contribute to the body of knowledge of the field of technical communication from a multidisciplinary perspective, with special emphasis on the combination of academic rigor and practical relevance.

*Technical Communication* publishes articles in five categories:

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- **Applied theory** – original contributions to technical communication theory
- **Case history** – reports on solutions to technical communication problems
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- **Bibliography** – reviews of relevant research or bibliographic essays

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Send the manuscript as an attachment to an e-mail message to the editor-in-chief, Sam Dragg (e-mail: [tceditor@stc.org](mailto:tceditor@stc.org)).

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Sam Dragga, Editor



# A Research Journal of Your Making

This issue of *Technical Communication* is a transition issue, filled with endings and beginnings. It includes the final two articles for which Menno De Jong served as editor, managing the review and revision process and making the final decision to accept the manuscripts for publication. This issue, however would be incomplete without my inaugural article as editor. And I am especially pleased that this article was co-authored by Menno De Jong—publishing again in the journal he served for six years as editor-in-chief. The merits of this issue are thus almost entirely his, as editor and as author.

In “Implications of Desnoyers’ Taxonomy for Standardization of Data Visualization: A Study of Students’ Choice and Knowledge,” Rachel Rayl (in her first article in this journal) examines a relatively new system (with a new lexicon) for categorizing scientific and technical illustrations. She considers the potential of this taxonomy as a vehicle for teaching STEM students (Science, Technology, Engineering and Mathematics), in particular, the complexities and efficiencies of data visualization.

In “Key Elements of an Effective Style Guide in the New Age,” Esha Adhya (also writing her first article for this journal), identifies the salient traits of the corporate style guide through both a comparative analysis of several examples as well as through interviews and a survey of technical communicators. The

findings here make the case for the continuing importance and influence of the style guide on corporate communications.

In “Cultural Differences and User Instructions: Effects of a Culturally Adapted Manual Structure on Western and Chinese Users,” Qian Li, Menno D.T. de Jong, and Joyce Karreman initiate a systematic empirical investigation of widely accepted theories about the influence of culture on reading preferences. Their experiment with college students from the People’s Republic of China versus students from Europe and North America generates findings that challenge conventional thinking about cross-cultural communication.

And continuing the journal’s transition is the November issue to be guest edited by Kirk St.Amant of East Carolina University.

The February 2016 issue will introduce several important changes but my intention is to keep *Technical Communication* a journal that every member of STC feels proud of and invested in. I hope only to build on the impressive achievements and innovations of Menno De Jong and George Hayhoe and Frank Smith.

Though I am beginning my time as editor, I have been a member of STC for 26 years and during this period *Technical Communication* has been my journal of choice: I have published seven singled-authored and co-authored articles in *Technical Communication*, more than I

have in any other single journal. I am committed as a scholar in this field and as a member of this organization to the life and reputation of the journal.

I thus especially encourage academic–industry partnerships in the creation and consumption of the research published in the journal. I believe the contributors to *Technical Communication* ought to exemplify and inspire international and interdisciplinary academic–industry cooperation. I am excited to publish articles by academics who find industry collaborators and vice versa and who address the implications of their research for the job and for the classroom.

I am also instituting Q&A as a regular section of the journal, soliciting your questions about the articles you find in the journal (especially applied theory and applied research articles) and asking authors to answer these questions carefully and thoughtfully, with the Q&A published in a subsequent issue of the journal. These will be genuine question-and-answer exchanges—neither comment and response nor ridicule and refutation. For example, readers might ask “You propose that we should be doing X, but at my company there’s resistance to X. What strategies could I adopt to address this resistance?” or

“Your experience with intercultural communication in the X industry is different from my experience in the Y industry. Do you think your findings are industry-specific? How do we reconcile or navigate the variations among industries?” I anticipate questions of 100-200 words and answers of 500-1000 words. As you read through the articles in this issue, please be thinking of questions you would like to ask the authors and e-mail your questions to [tceditor@stc.org](mailto:tceditor@stc.org).

I hope the interactive Q&A section will make clear that the articles in *Technical Communication* are published not just for other researchers to read and cite but are intended to stimulate thinking and conversation across the field and across STC. This section will be the opportunity for authors and readers to engage each other in rewarding extensions of the original article. Especially lively Q&A exchanges could be the subject for featured presentations at the next STC Summit or for STC webinars.

In addition, I will cultivate greater attention to bibliographic essays. Scores of dissertations are being written in the field, each with a review of literature. Many of these literature reviews have the potential to be key contributions to the body of knowledge—by summarizing,

categorizing, and evaluating existing studies; by explicating productive and unproductive research methods; and by identifying directions and methods for new research.

I am also making the cover of the journal a juried opportunity for the graphic artists among us to address issues pertinent to the field through diagrams, drawings, collages, infographics, cartoons, comic strips, or brief graphic narratives that will edify and energize research. That is, the cover will be instructive and informative instead of only decorative. Submissions will be anonymously reviewed, and a jury of peers will select each issue's cover. Honorable mentions will be published inside the journal.

And I encourage case histories designed as graphic narratives.

I think my aim for the journal is simple but ambitious: What you read in *Technical Communication* today should change how you think tomorrow about your job, your research project, your classroom, or your community.

The success of this effort—the journal's success—hinges on your sharing your insights. Here are seven things you could do:

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And, as always, if you have ideas about the journal, don't hesitate to e-mail ([tceditor@stc.org](mailto:tceditor@stc.org)).



# Cultural Differences and User Instructions: Effects of a Culturally Adapted Manual Structure on Western and Chinese Users

Qian Li, Menno D.T. de Jong, and Joyce Karreman

## Abstract

**Purpose:** Research shows that Western and Chinese technical communicators structure their documents in different ways. The research reported in this article is a first attempt to systematically explore the effects cultural adaptations of user instructions have on users. Specifically, we investigate whether Western (from Europe and North America) and Chinese (from the People's Republic of China) users would benefit from a document structure that is theoretically assumed to reflect their cultural preferences.

**Method:** Using the SDL Trados Studio 2014 translation software package, a 2x2 experiment (N=80) was conducted with manual structure (Western versus Chinese) and cultural background (Western versus Chinese) as independent variables. The Chinese and Western manual structures were based on the literature on cultural differences between Western and Chinese technical communication. Dependent variables were task performance, knowledge, and appreciation of the software and the user instructions.

**Results:** Contrary to our expectations, no significant differences were found between the conditions. Both Western and Chinese participants performed equally well and were equally appreciative when using the Western and Chinese manual structure.

**Conclusion:** The results of our study raise questions about the validity and/or the relevance of the current insights regarding cultural differences in the structures of user instructions. Cultural differences found in content analytic research may reflect the habits of technical communicators rather than the preferences of users. However, caution is needed in interpreting our findings, as our research experiences also raised a number of methodological issues that must be addressed in future research.

**Keywords:** intercultural communication, cross-cultural communication, Chinese culture, user instructions, user manual, structure

## Practitioner's Takeaway

- Cross-cultural research is not only useful for gearing user documentation to international user groups, but also gives us the opportunity to reflect on current practices in Western technical communication.
- A first comparison with Western and Chinese participants shows that cultural adaptations of the structure of user instructions do not seem to matter.
- More empirical research is needed involving a user perspective on cultural differences; content analyses of current practices in technical communication may not be very informative about user needs and preferences.

## Cultural Differences and User Instructions

### Introduction

As a result of the rapid developments in information and communication technology (ICT) and transportation in the past decades, the world has truly developed into a “global village,” such as that predicted by McLuhan (1962). The world has become smaller and smaller, communication around the globe has intensified, and markets are developing into global markets. Cross-cultural and intercultural communication have become increasingly important, not only because of the globalization and internationalization trends, but also because there is a lot of cultural diversity within our national boundaries.

Of all communication sub disciplines, technical communication may have the strongest need to develop an international and intercultural orientation, as technology does not stop at the border. International collaborations and international markets are increasingly important. As a consequence, we can see a growing interest, both in practice and in the literature, in the (related) issues of translation (for example, Lentz & Hulst, 2000; Maylath, 2013; Maylath, Vandepitte, Minacori, Isohella, Mousten, & Humbley, 2013), localization (for example, Agboka, 2013; Chao, Singh, Hsu, Chen, & Chao, 2012; St. Germaine-Madison, 2009; Zhu & St. Amant, 2010), and cultural differences (for example, Barnum & Li, 2006; Hall, De Jong, & Steehouder, 2004; McCool & St. Amant, 2009).

Despite the practical importance of intercultural and cross-cultural communication and the increased research interest for the topic, our knowledge regarding the role of cultural differences in technical communication is still limited and fragmented. Several factors may play a role at this point. First, the field of intercultural and cross-cultural communication is very broad: So many cultures, with variations on so many different aspects, may be compared to each other. Second, the possible research approaches vary. For instance, some studies take an *emic* perspective and try to understand a culture from within (for example, Yu, 2009), while others take an *etic* perspective and try to compare different cultures more objectively, from an outsider’s perspective (for example, Barnum & Li, 2006). Some studies focus on cultural differences that are manifest in documents; others focus predominantly on differences in users’ needs, preferences, and behaviors. Third, the research is methodologically complex, as language and translation

issues must be taken into account and culture itself may affect the data collected (Hall, De Jong, & Steehouder, 2004; Peng, Nisbett, & Wong, 1997). Fourth, there is no conclusive theoretical framework to systematically investigate cultural differences. Top-down initiatives, such as Hofstede’s cultural dimensions (Hofstede, 2001; Hofstede, Hofstede, & Minkov, 2010), as yet lack a convincing connection with the field of technical communication; bottom-up initiatives, such as Barnum and Li’s (2006) analysis of Chinese and Western documents, lack the comprehensive framework that would help us make sense of all differences.

In this article, we focus on cultural differences between Western countries and China. Those differences are particularly interesting because Chinese and Western cultures are the “most distant from one another and probably influenced one another the least” (Nisbett, Peng, Choi, & Norenzayan, 2001, p. 4). Indeed, several studies have indicated that there are differences within the domain of technical communication between China and Western countries (for example, Barnum & Li, 2006; Honold, 1999; Wang, Q., 2000; Wang, Y., & Wang, D., 2000).

It is important to realize, however, that differences between Chinese and Western technical communication may be attributed to several closely related factors, which cannot be isolated. One possible explanation involves the customs, needs, and preferences of users, which may reflect true cultural differences between China and the Western world. Another factor involves the writing habits that have developed independently of each other throughout the years. Yu (2009), for instance, shows that it is essential to know and understand the traditions of Chinese instructional texts to make sense of the current situation of technical communication in China. It would be too simple to assume a one directional relationship between the two factors: Writing habits may be based on assumptions about user preferences, but may shape user preferences at the same time. A third factor involves the different stages in the development of the field of technical communication: Technical communication and document design have a longstanding tradition in the Western world, but are only beginning to emerge in the Chinese context (Barnum, Philip, Reynolds, Shauf, & Thompson, 2001; Ding, D. D., 2011; Gao, Yu, & De Jong, 2013, 2014; Tegtmeier & Thompson, 1999). Of course, the developmental stage of technical communication is likely to affect the writing habits. Think of the developments in the Western world in the

art of writing instructions in the past three decades (cf. Van der Meij, Karreman, & Steehouder, 2009).

At this stage, it would neither be justified to criticize technical communication in China using Western standards of high-quality technical communication, nor to assume that the current technical communication practices in China reflect optimal technical communication adapted to Chinese culture. In this constellation, content analyses of differences in documents may lead to ambiguous results, as they represent a mixture of anticipated user preferences, writing habits, and technical communication development. We would argue that user research is the key to an understanding of cultural differences between Western cultures and China, and is also the key to developing a technical communication body of knowledge within the Chinese context. For Western technical communication, such user research offers a mirror to reflect on the established technical communication principles that we may hold for universally true.

In this article we report on a first experimental study we conducted into the use and effects of culturally adapted user instructions by Western and Chinese participants. Western participants were defined as users from Europe and North America; Chinese participants were born and raised in the People's Republic of China. In this study we focused on the structure of the user instructions. We designed two culture versions of user instructions, and compared how Western and Chinese participants reacted to and worked with them. Our hypothesis was that Western users benefit most from user instructions based on Western structuring principles, and Chinese users benefit most from user instructions based on Chinese structuring principles.

Before we describe the design and results of our study, we will first discuss the context of technical communication in China, the existing theories on cultural differences, and earlier research into Sino-Western cultural differences in technical communication.

### Technical Communication in China

As a consequence of the fast economic growth of China and its gradual transition from a producing into a creative economy, technical communication as a profession and career opportunity is growing in China (Gao, Yu, & De Jong, 2013, 2014). Many large multinational companies, including Ericsson, Cisco, Motorola, Alcatel-Lucent, and Nokia Siemens, have

set up their own specialized departments to develop technical documentation for the Chinese market. At the same time, originally Chinese companies such as Huawei, Haier, and Lenovo are rapidly expanding internationally, and thus need to be able to sell products as well as user support to foreign customers. The prospects for technical communicators in China are favorable.

However, the academic support for the profession is still lagging behind. Despite earlier attempts to introduce the American version of technical communication in China (Barnum et al., 2001; Tegtmeier & Thompson, 1999), and pioneering activities by U.S. based scholars (Ding, D. D., 2010; Ding, D. D., & Jablonski, 2001; Ding, H., 2010; Duan & Gu, 2005; Yu, 2010), comprehensive academic programs on technical communication are still not offered by Chinese universities, although there are some international collaborations with Western programs and several universities are now offering standalone technical writing or technical communication classes. From the available accounts of such courses, it becomes clear that they focus less strongly on competencies related to the technical communication body of knowledge (cf. Coppola, 2010) than on more or less general (English) language skills (Ding, D. D., 2010; Ding, D. D., & Jablonski, 2001; Ding, H., 2010; Duan & Gu, 2005). Some researchers even advocate integrating technical communication into English for Specific Purposes (ESP) (Duan & Gu, 2005; Hu, 2004) or English Related to Individual Disciplines (ERID) (Ding, H., 2010) programs.

Other researchers emphasize the strong traditional relationship, in the Chinese context, between technical translation and technical communication, and argue that technical communication could be further developed in close relation to translation programs (Miao & Gao, 2010; Wang, C., & Wang, D., 2011). Indeed, as argued by Maylath (2013), due to the rise of machine and computer-aided translation, the boundaries between technical translation and technical communication are gradually disappearing.

Despite various initiatives to promote and further technical communication in China, there is still much room for improvement. H. Ding (2010), for instance, argues that the quality of Chinese instructions produced, not to mention the English instructions, is unsatisfactory. Technical communication practitioners largely do not have a specialized education in technical communication, and have little or no access to formal

## Cultural Differences and User Instructions

training or meetings. The research that is necessary to support the academic development of the discipline is still in its infancy, and a professional association (parallel to STC) and an academic journal (like *Technical Communication*) are still missing. Therefore, “no specialized profession of technical communication exists” (Ding, H., 2010, p. 301).

### Theories on Cultural Differences

Several general theories have been developed to make sense of cultural differences. French and Bell (1979) proposed the so-called Iceberg Model. According to this model, a culture consists of two interrelated parts: “a visible top that represents the facts, the technology, the price, the rationale behind things, the brain (and hands of an engineer), the written contract of a negotiation in an explicit way,” and “an invisible bottom of emotions, the human relations, the unspoken and unconscious rules of behavior in an implicit way” (cf. Ulijn & St.Amant, 2000, p. 221). The main contribution of this model is that it raises awareness to the complexity and implicitness of culture, as the largest part of an iceberg is below the surface. Cultural differences may become manifest in explicit document characteristics or explicit user behaviors, but can (and should) be traced back to differences in the unspoken and unconscious rules between cultures. This corresponds to Hofstede’s Onion Model of culture, which states that values are at the core of a culture and there are various layers around this core (rituals, heroes, and symbols) (cf. Hofstede et al., 2010). These models help to conceptualize the general phenomenon of culture, but do not have any explanatory value regarding differences in technical communication between two cultures.

Other researchers have proposed frameworks of cultural dimensions, to characterize differences between cultures. Hofstede and colleagues developed in total six cultural dimensions, which reflect the underlying values in national cultures (Hofstede, 2001; Hofstede et al., 2010). The dimensions were originally derived from a worldwide survey of cultural differences, among 100,000 IBM employees in 50 countries. The six dimensions are:

- High versus low power distance: The extent to which people accept and expect hierarchy and unequal distributions of power.
- Individualism versus collectivism: The extent to which people prefer a loose network in which they basically should take care of themselves, or a tight network in which people take care of each other and are loyal to each other.
- Masculinity versus femininity: The extent to which people value competition, achievement, assertiveness, and material awards, or cooperation, well-being, care for the weak, and quality of life.
- High versus low uncertainty avoidance: The extent to which people feel uncomfortable with uncertainty and ambiguous situations.
- Long-term versus short-term orientation: The extent to which people value thrift and education and prepare for the future, or hold on to old traditions and view change with suspicion.
- Indulgence versus restraint: The extent to which people value enjoying life and having fun, or value the regulation of such pleasures with strict social norms.

Hofstede’s dimensions are very influential in the research into intercultural and cross-cultural communication. They help to characterize differences between cultures beyond the eye-catching and superficial differences. Although there have been several attempts to translate the cultural dimensions into specifications for interface design or user support (for example, Marcus & Gould, 2000; see Reinecke & Bernstein, 2011 for an overview), the translations of the value-based dimensions into specific design guidelines are not validated and are often somewhat far-fetched. The step from Hofstede’s dimensions to the practice of intercultural or cross-cultural technical communication appears to be a big one.

Another influential dimension is Hall’s (1976) distinction between high-context and low-context cultures. Hall’s dimension is based on the communication characteristics among people, and are, as a result, conceptually closer to the practice of technical communication than Hofstede’s six dimensions. According to Hall, “high-context cultures find the majority of the information in the physical context or internalized in the person, while very little is in the coded, explicit, transmitted part of the message, whereas low context cultures are the opposite” (p. 91). In general, Western countries are on the lower end of the scale, and China is on the higher end of the scale. The implication for technical communication could be that Western users need more explicit and detailed

instructions, and Chinese users may be used to work with more implicit and general instructions. However, these assumptions have not been tested so far.

It is important to note that these theories imply several simplifications regarding the phenomenon of culture in communicative processes (and the same applies to the research we describe in this article). They are clear examples of *etic* approaches, aiming more at objectively pinpointing differences than at understanding a culture from within. Furthermore, they approach culture as a static and homogeneous concept, whereas it is plausible that culture in real life is dynamic: It evolves over time, it can be situation or context dependent, and it may involve the interaction between different systems or layers of culture. Much emphasis is given to differences between national cultures, but it is likely that there are cultural variations within geographical boundaries—for instance based on regional differences, organizational or occupational differences, sub groups, and individual variations. An example of a more dynamic and heterogeneous approach within technical communication can be found in Sun (2006). In addition, Fang (2005-2006, 2012) challenges the validity of bipolar dimensions, and proposes a Chinese worldview that comprises “both-and” relationships between the poles of a dimension instead of the underlying “either-or” approach. From this perspective, cultural dimensions themselves already represent a culturally-biased Western view on culture. The simplifications help us understand differences between national cultures, but at the same time may obscure similarities between national cultures as well as differences within a national culture.

Furthermore, the theories mentioned above represent top-down approaches for studying cultural differences. The cultural dimensions may be translated into very specific characteristics of the communication. As such, the theories can be helpful for making sense of the notion of culture, and for making broad generalizations about differences between cultures. However, they seem to offer relatively little clear-cut guidance for designing interfaces and user instructions. Their influence in the technical communication literature is therefore limited. In the following section, we will present an overview of the insights about cultural differences based on technical communication research. The research can be characterized as a bottom-up approach, it starts with pinpointing very specific differences and, where possible, tries to generalize the findings.

## Technical Communication and Cultural Differences

Several studies have been conducted into the cultural differences between Western countries and China within the field of technical communication. In total, we found and analyzed nine such articles (Barnum & Li, 2006; Ding, D. D., 2003; Dragga, 1999; Honold, 1999; Wang, J., 2007; Wang, Q., 2000; Wang, Y., & Wang, D., 2009; Yu, 2009; Zhu & St.Amant, 2007). We will first provide a broad overview of the studies. After that, we will focus on the differences found with respect to the structuring of user instructions, as this is the topic of our research.

### Broad Overview of the Available Research

Figure 1 gives an overview of possible research approaches. We first distinguish between analytical approaches (without formal data collection), and empirical approaches (with formal data collection). A second distinction, within the empirical approaches, is that between a focus on documents and a focus on users. In the case of a focus on documents the research method is a (qualitative or quantitative) content analysis. In the case of a focus on users, a distinction can be made between experimental (or quasi-experimental) research and evaluation research. In experimental research, randomized groups of participants are exposed to manipulated document versions and the results are compared; in quasi-experimental research, the division of participants over conditions cannot be random (for instance when Chinese and Western participants are compared). In evaluation research, the reactions of one group of participants to one document version are examined.

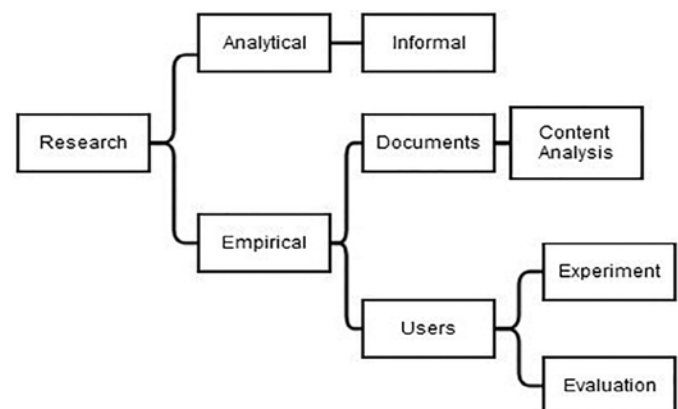


Figure 1. Overview of Cultural Differences Research Approaches



## Cultural Differences and User Instructions

Of the nine studies, we categorized one as an analytical approach (Dragga, 1999). The majority of the research could be categorized as content analysis (Barnum & Li, 2006; Ding, D. D., 2003; Wang, J., 2007; Wang, Q., 2000; Wang, Y., & Wang, D., 2009; Yu, 2009). Only two studies were (quasi-) experimental (Honold, 1999; Wang, Y., & Wang, D., 2009) and one study could be characterized as evaluation research (Zhu & St.Amant, 2007). However, it must be noted that the content analyses were generally rather informally conducted and reported, and that the two (quasi-)experimental studies did not meet the rigor that is normally associated with experiments. Although inspiring, the available research into cultural differences is methodologically not very strong, and the user's perspective is both qualitatively and quantitatively underexposed.

Together, the nine studies identified potential differences between Chinese and Western technical communication in four main categories: structure, style,

visual design, and user behavior. *Structure* is about the organization and clustering of documents, including the ordering of information, the use of headings, introductions, paragraphs, and links. As structure is the theme of our research, we will discuss the findings within this category in more detail in the next sub section.

*Style* involves the language use in documents. In general, simplicity and clarity seem to be valued higher in Western cultures than in China, given a preference for authoritative and official jargon, poetic language, and indirect and general expressions in Chinese documents (Barnum & Li, 2006; Zhu & St.Amant, 2007). *Visual design* involves the document layout as well as the use of tables and figures. In general, Western documents seem to use more page design elements (Barnum & Li, 2006; Wang, Q., 2000) and fewer illustrations (Wang, Y., & Wang, D., 2009) than Chinese documents. Besides, the relationship between visuals and text appears to be different: redundant and explicitly connected in Western

**Table 1. Cultural Differences Regarding Document Structure**

Overall category	Specific differences
<b>Holistic versus analytic approach</b>	Synthetic/relational structure in Chinese documents (Barnum & Li, 2006)
	Relations between parts stressed in Chinese documents (Ding, D.D., 2003)
	Many instances of "flashback text" (Zhu & St.Amant, 2009) Chinese: structure based on entire interrelation; German: structure based on individual elements (Wang, Y., & Wang, D., 2009)
	More contextual information in Chinese documents (Wang, Q., 2000)
<b>Yihe versus xinghe prominence</b>	Fewer structure elements in Chinese documents (Barnum & Li, 2006)
	Headings less common in Chinese documents (Barnum & Li, 2006)
	Lack of topic sentences in Chinese documents (Barnum & Li, 2006)
	Indirect organization, both on the text and the paragraph level (Zhu & St.Amant, 2009)
	Less finely and detailed structure in Chinese documents (Wang, Y., & Wang, D., 2009)
<b>Inductive, chronological, and gradual order</b>	Chinese: inductive order; Western: deductive order (Barnum & Li, 2006. Wang, Y., & Wang, D., 2009; Zhu & St.Amant, 2009))
	Chinese: spiral organizational pattern; Western: inverted pyramid organizational pattern (Barnum & Li, 2006)
	Enhancing understanding: basic to advance; familiar to unfamiliar in Chinese documents (Wang, Q., 2000)
	Chinese: general to concrete; German: concrete to general (Wang, Y., & Wang, D., 2009)
	More chronological order in Chinese documents (Barnum & Li, 2006) Structures based on the chronology of operations activities in Chinese documents (Wang, Y., & Wang, D., 2009)



documents, and complementary and not connected in Chinese documents (Barnum & Li, 2006; Ding, D. D., 2003; Wang, Q., 2000; Wang, Y., & Wang, D., 2009). *User behavior* refers to differences in the way users handle instructions. The literature suggests that Chinese users may have a better understanding of images than Western users, a stronger urge to immediately apply instructions, a stronger tendency to learn by heart, and an inclination to use online sources and interpersonal communication (Honold, 1999; Wang, Y., & Wang, D., 2009).

Of course, it cannot be emphasized enough that these conclusions should be treated with caution. We merely summarize findings that are reported in more detail and with more grayscale in the specific studies. Furthermore, it should be noted that many of these findings are based on single studies, conducted in very specific contexts.

### Chinese and Western Views on Document Structure

Below, we will discuss the research findings on document structure in more detail. Fortunately, the research findings on structural differences are more elaborate than those on differences in style, visual design, and user behavior. Table 1 provides an overview of the cultural differences regarding document structure that we found. We construed three overall categories to group the findings: (1) holistic versus analytic approach, (2) *yihē* versus *xinghē* prominence, and (3) inductive, chronological, and gradual order. All findings regarding structure are based on content analysis; user research is not available as yet.

**Holistic versus Analytic Approach.** According to Nisbett *et al.* (2001), the cognitive processes of East Asian people tend to be more holistic, whereas Western people have a tendency towards an analytic thinking pattern. Holistic thinking focuses predominantly on understanding an object in its entirety; analytic thinking assumes dissecting an object in its parts and figuring out how these parts contribute. This distinction is quite fundamental, and can be seen in many different fields, such as science, medicine, and art.

It seems plausible that such differences in thinking affect the way people write and use documents. Indeed, several studies found evidence for that. Barnum and Li (2006) observe that Chinese documents generally reflect a holistic approach, referring to it as “synthetic” (as opposed to “Cartesian”) thinking patterns. They connect this characteristic to eschewing headings (which

would disrupt the flow) and an inductive organization (we will discuss these two characteristics under the other two sub headings). D. D. Ding (2003) further specifies the holistic thinking patterns by referring to a stronger emphasis on interrelations between instructions and other parts of a document. Likewise, Zhu and St.Amant (2009) notice relatively many instances of “flashback text” in a document: referrals to earlier parts, which Westerners would not find very useful and even potentially confusing. Comparing German and Chinese manuals, Y. Wang and D. Wang (2009) conclude that “a system was structured on the basis of an entire interrelation or context in the Chinese documents, but individually and separately structured as individual elements in the German ones” (p. 45). Furthermore, Q. Wang (2000) argues that new ideas are presented with more contextual information because of the holistic and relational thinking patterns.

***Yihē* versus *Xinghē* Prominence.** An important difference between Chinese and Western languages can be summarized using the *pinyin* terms *yihē* and *xinghē* (somewhat related but not entirely identical to the linguistic terms parataxis and hypotaxis, respectively; cf. Li, 2011). Liu (2006) defines *yihē* as “the way to connect words and sentences by meanings and logics, but not linguistic forms (including lexical and morphological means),” and *xinghē* as “the way to connect words and sentences by linguistic forms” (p. 74). In a *yihē*-prominent language, clauses can be placed after each other without using means to make their relationship explicit; in a *xinghē*-prominent language, the relationship between clauses is specified. Lian (1993) speaks of “semantic coherence” versus “formal cohesion” (p. 46). The distinction appears to connect to the aforementioned notions of high-context and low-context cultures (Hall, 1977; cf. Wang, Y., & Wang, D., 2009). See the following examples:

*Yihē*-prominent language: It snowed hard. The plane was canceled. I had to postpone my holiday.

*Xinghē*-prominent language: It snowed hard, so the plane was canceled. Therefore I had to postpone my holiday.

Among translation scholars Chinese is considered to be a *yihē*-prominent language, while English and other Western languages are seen as *xinghē*-prominent

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languages (Li, 2011; Liu, 2006; Wang, J., 2007; Wang, T., 2010). Although *yihe* and *xinghe* prominence originally and predominantly apply to the sentence level, it is possible to apply them to the structuring of text as well (cf. Halliday, Matthiessen, & Matthiessen, 2014).

Several studies found evidence that *yihe* is the principle of organization in Chinese documents. Barnum and Li (2006), Y. Wang and D. Wang (2009), and Zhu and St.Amant (2009) all noticed that document structure is less explicitly defined in Chinese technical communication. Barnum and Li (2006), for instance, state that Chinese documents contain fewer structural elements such as headings and show a lack of topic sentences. They also show that elements such as an introduction and a conclusion have a less obvious structuring function than in Western documents. According to Y. Wang and D. Wang (2009), “[t]he German textbooks and service manuals were more finely and detailed structured than the Chinese ones” (p. 47). Zhu and St.Amant (2009) talk about an “indirect organization” and an “implied pattern,” largely without structural markers such as headings. They argue that even main points are often not clearly indicated as such, and that the lack of explicit structure can also be found on the paragraph-level, where “random bits of information seem to be combined in a paragraph, and it is left to the reader to intuit the overarching theme that holds this information together” (p. 178).

### Inductive, Chronological, and Gradual Order.

Fan (2000) states that the relationship to nature is one of the eight important Chinese cultural values and essential concepts. Tao, fatalism, and harmony all relate to this value. Therefore, Chinese people like to follow the natural process of how things happen. The preferred Chinese order of information in documents is inductive, chronological and gradual, which are assumed to reflect practical experience and cognition. In contrast, the Western order could be characterized as more businesslike and task-oriented.

Several studies found evidence for these assumptions. Barnum and Li (2006), Y. Wang and D. Wang (2009), and Zhu and St.Amant (2009) all observed that Chinese documents are often structured inductively, whereas Western documents often have a deductive organization. According to Barnum and Li (2006), this results “in a writing pattern that reflects a spiral, with the main idea developed in a roundabout or

spiral pattern that emerges through the paragraph as well as the document” (p. 152).

Q. Wang (2000) found that Chinese popular science articles and instruction manuals are often structured from basic to advanced, and from familiar to unfamiliar, while Western manuals are more focused on specific tasks. Similarly, Y. Wang and D. Wang (2009) found that Chinese textbooks about an engine fuel injection system start from general information, whereas German textbooks start from the specific system. They noticed a corresponding difference in user behavior. Chinese users searched information from general to concrete, whereas German users searched from concrete to general.

Finally, both Y. Wang and D. Wang (2009) and Barnum and Li (2006) noticed a stronger emphasis on chronology as organizational principle in Chinese documents.

### To Conclude

Our overview of earlier research shows that the insights about Sino-Western cultural differences are still limited and fragmented. In particular, user-based research is largely missing, and the content analytic research comparing document characteristics is somewhat informal and diverse. However, with regard to the structuring of documents some clear differences can be mentioned, which are all supported by more than one study. We summarized the differences using three (related) overall categories: (1) holistic versus analytic approach, (2) *yihe* versus *xinghe* dominance, and (3) inductive, chronological, and gradual order. These structural differences between Chinese and Western documents formed the starting point for our research.

### Method

To answer the research question, a 2x2 experiment was designed, in which participants had to use user instructions to perform a number of tasks with a translation software package. Document structure (Chinese versus Western) and participants' cultural background (Chinese versus Western) were the independent variables in our study, and task performance, knowledge, and appreciation of the software and the user instructions were the dependent variables. Table 2 gives an overview of the four conditions in the experiment.

**Table 2. Four Experimental Conditions**

Manual structure	Participants	
	Chinese	English
Chinese	CC	EC
Western	CE	EE

**Artifact: SDL Trados Studio 2014**

We selected SDL Trados Studio 2014 as the software package for the experiment. SDL Trados is a popular computer-aided translation tool, used by over 200,000 translation professionals worldwide. The software is well-designed and available as a free 30-day trial version. It has both an English and a Chinese interface. And most importantly, it is a tool that is unfamiliar to people outside the field of professional translation, which made it possible to eliminate the influence of differences in prior knowledge and experience.

SDL Trados increases productivity and translation quality using translation memory and terminology management. Translation memory can be seen as the core technology of SDL Trados. It involves a database that stores previously translated text segments for future use, so that translators do not need to translate the same sentences twice. Terminology management involves a customized dictionary in which translators can create new entries and their definitions. This is particularly useful to safeguard consistency and accuracy of terms, especially in collaborative translation projects. The mechanisms of translation memory and terminology management are similar; the main difference is that translation management stores sentences or even paragraphs, whereas terminology management stores words or phrases.

In addition, SDL Trados helps to manage translation projects. Word counts, analyses and reports are automatically generated to monitor a translation project. SDL Trados also allows assigning specific tasks, setting deadlines, and tracking the status of a project.

**User Tasks**

We designed seven related user tasks that had to be performed with the SDL Trados Studio 2014 package. Participants had to create a translation memory within 25 minutes. They were not allowed to use any resources except for the user instructions they were given. The seven tasks all had to do with the (for outsiders difficult) concept of translation memory. For instance,

two tasks were creating a new abbreviation, and creating an untranslatable element for the translation memory.

The principle of translation memory is as follows. Translation memory uses text alignment functions to split the original and translated texts into language pairs, and stores those pairs. When translators are working on a document, translation memory searches and compares what is being translated with previously translated segments, and provides suggestions. Translators may accept or reject the suggestions given by the translation memory. Even if there are no matches in a text, translators can save their work in the translation memory for future translation projects. As such, translation memory helps translators to avoid meaningless repetitive work and to focus on new texts. This is especially useful for large translation projects, in which the repetition rate is usually high. The translation memory is created by the translators, so it is empty at first. For an optimal use of its functionality, translation needs to be added in the translation memory. The larger the translation memory, the higher the reuse rate will be.

For our study, tasks centered on the translation memory were appropriate, as they involved both specific procedural instructions and a deeper understanding of the meaning of the concept translation memory.

**Manipulations of the User Instructions**

There are official manuals of Trados Studio 2014 available in various languages. The manual was designed in English by Western technical communicators, and then localized into other languages. The user instructions used in the experiment were designed based on the official manuals. They comprised three pages of information.

In total, we created four versions of the user instructions. For the specific user tasks selected, the relevant parts were redesigned in accordance with what prior research had found about Chinese and Western principles for structuring. Of both cultural versions, two language versions were made: a Chinese one and an English one. We did so to eliminate the influence of different language levels (for Chinese participants, an English manual is considerably further removed from their mother tongue than for Western participants), and also for reasons of ecological validity for the Chinese participants.

Table 3 provides an overview of the main structural differences between the two cultural versions. In

## Cultural Differences and User Instructions

the Appendix, specific examples (in English) of the materials are offered. During the design process of the user instructions, a certificated trainer of SDL Trados reviewed the manuals to make sure there were no mistakes related to the content about Trados. A professional translator reviewed and edited the re-designed (EE and CC) and translated versions (CE and EC) to make sure that they were completely equivalent.

### Participants

Forty students with a Western cultural background and 40 Chinese students at the University of Twente were recruited for the research. Western was geographically defined in our study, and comprised Europe and North America. Of the Western participants, the majority had a Dutch (18) or German (12) background; other nationalities included: France, Albania, Spain, U.S., Italy, and Slovakia. None of the Western participants had ever been in China. All Chinese participants were from mainland China (the People's Republic of China), and had come to the Netherlands to study. None of the participants had ever heard of the SDL Trados Studio 2014 software before. The male-female ratio was in perfect

balance. We recruited participants with an engineering and a social sciences background. The ratio between those study backgrounds was also in perfect balance.

Using gender and study background as primary allocation criteria, we randomly assigned the Western participants to the conditions of the Chinese and Western cultural instructions in English, and assigned the Chinese students to both cultural versions in Chinese. This resulted in four perfectly similar groups of participants. Afterwards, we checked for differences in participants' age. An analysis of variance showed that there were no significant differences between the conditions (the mean age was 22.7).

### Procedure

The data were collected in individual sessions, which were all held in a quiet room. All participants used the same laptop computer. At the start of the session, the facilitator briefly introduced the experiment. Then the participants were asked to switch off their communication devices and read and sign a consent form. The research was approved by the Institutional Review Board of the university.

**Table 3. Overview of Manipulations**

Characteristic	Chinese culture	Western culture
<b>Structures less specifically defined in Chinese documents</b>	Fewer conjunctions	More conjunctions
<b>Fewer structure elements in Chinese documents</b>	No table of contents Fewer lists No abbreviation list No glossary No headers and footers	Table of contents More lists An abbreviation list A glossary Header (company logo) and footer (page number)
<b>Headings less common in Chinese documents</b>	No subheadings	Subheadings
<b>Inductive versus deductive order</b>	Arguments → conclusion	Conclusion → arguments
<b>Lack of topic sentences in Chinese documents</b>	Placed at the end of the paragraph	Placed at the beginning of the paragraph
<b>General versus concrete order</b>	General → concrete	Concrete → general
<b>Implicit versus explicit instructions</b>	No step-by-step descriptions of all actions; briefer instructions.  No explanation of the document conventions.	Step-by-step descriptions of all actions; more elaborate instructions.  A special section explaining document conventions.

Each participant received a document with the task description. They had up to five minutes to read it. When they indicated that they knew what they should do, one of the user instructions versions was handed to them and the facilitator started recording time. During the process, the facilitator observed and did not communicate with the participant. The participant was not asked to think aloud, to avoid reactivity in the data collection (Van den Haak, De Jong, & Schellens, 2003, 2007). The facilitator stopped recording time when the participant finished the task or when the time exceeded 25 minutes. As soon as the participant finished the task, he or she was asked to fill out a questionnaire. If the participant wanted to be informed about the results of the experiment, he or she could leave an email address.

After each experiment, the translation memory the participant had created was stored in different folders. Besides, all the records in Trados were deleted to make sure that the user interface was in its original status for the next participant.

### Dependent Variables

Four dependent variables were included in the research: task performance, knowledge about the SDL Trados Studio 2014 package, appreciation of SDL Trados Studio 2014, and appreciation of the user instructions.

*Task performance* was measured using direct observation. The aggregated success score for the seven tasks was taken as an overall measure of effectiveness. These tasks formed a sufficiently reliable scale (Cronbach's  $\alpha = .75$ ). The time taken for the complete set of assignments was used as a measure of efficiency. A last performance measure was the number of attempts by the users to create a translation memory (this is indicated by the number of translation memories a participant had created).

The remaining dependent variables were measured using a questionnaire, which the participants filled out after the task execution. Just like the rest of the research materials, the questionnaire was designed in English and Chinese. A professional translator reviewed and edited the questions, to make sure that they were equivalent.

Participants' *knowledge about SDL Trados Studio 2014* was measured using a set of nine comprehension questions, in the form of statements. Participants had to indicate whether they thought a statement was true or false, and also had a "don't know" option. Examples of statements were "Translation memory

enables translators to never translate the same sentences again," and "Besides system elements, users can define customized fields in Trados." Two measures were derived from the nine comprehension questions: a success score (total number of correct items), and a doubt score (total number of items with "don't know" answer). The knowledge questions did not form a sufficiently reliable scale (Cronbach's  $\alpha = .53$ ), which indicates that there is probably not one underlying construct. Still it can be maintained that more correct answers indicated more successful participants.

Participants' *appreciation of the SDL Trados Studio 2014 software* involved both usability and usefulness. Usability was measured using items based on the Software Usability Scale (SUS). SUS is a reliable and robust scale for measuring the usability of a wide range of products and services (Bangor, Kortum, & Miller, 2008; Bangor, Staff, Kortum, & Miller, 2009; Lewis & Sauro, 2009). Examples of items are "I found Trados unnecessarily complex," and "I felt very confident using Trados." We complemented the usability questions with four items that focused more on satisfaction and experience (for example, "It is pleasant to use Trados"). Usefulness was measured using six items. Examples of items are "I think Trados is a useful tool for translators," and "I think Trados meets the needs of translators." All items were measured on five-point Likert scales. Factor analysis with Varimax rotation showed that there were three underlying constructs in this part of the questionnaire: usability-complexity (three items, Cronbach's  $\alpha = .62$ ), usability-ease of use (nine items, Cronbach's  $\alpha = .90$ ), and usefulness (six items, Cronbach's  $\alpha = .87$ ).

Participants' *appreciation of the user instructions* involved four aspects: usability (eight items; for example, "I am satisfied with this manual," and "the manual is user friendly"), language use (four items; for example, "The language of the manual is clear," and "Sentences in the manual are complicated"), organization (nine questions; for example, "The structure of the manual is confusing," and "I could easily find the information I need in the manual"), and layout (five items; for example, "The manual looks crowded and busy," and "The manual is professionally designed"). Factor analysis with Varimax rotation showed initially that there were six underlying constructs, but after removal of confounding questions we ended up with a three-factor solution: instructions usability (five items, Cronbach's



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alpha = .90), instructions structure (five items, Cronbach's alpha = .86), and instructions language use (three items, Cronbach's alpha = .73).

### Results

We report the results of the experiment in four sub sections: task performance, comprehension, appreciation of SDL Trados Studio 2014, and appreciation of the user instructions. The data were analyzed using analysis of variance, with participant background and user instructions version as independent variables. We looked for main effects, which would indicate that either cultural background of the participants had a significant effect on the scores irrespective of the version of the user instructions they used, or the version of the user instructions had a significant effect on all participants. Most importantly, however, we looked for interaction effects, which would indicate that Chinese and Western participants reacted differently to the two versions of user instructions. A significant interaction effect would support our expectations. At the end of the Results section, we describe observations during the sessions with participants.

#### Task Performance

Table 4 shows the results of the four conditions on task performance. For effectiveness (number of tasks correct), no main effects were found of participant background ( $F(1,76)=.644$ ,  $p=.425$ ) and user instructions version ( $F(1,76)=1.79$ ,  $p=.185$ ), and, most importantly, no interaction effects were found ( $F(1,76)=.161$ ,  $p=.689$ ).

**Table 4. Results Task Performance**

	Chinese participants		Western participants	
	Chinese structure	Western structure	Western structure	Chinese structure
<b>Effectiveness: Task correct (N=7)</b>	5.4 (1.5)	5.7 (1.9)	6.2 (1.2)	5.5 (2.0)
<b>Efficiency: Time taken</b>	11.2 (4.8)	13.0 (5.4)	13.2 (4.6)	12.8 (6.6)
<b>Efficiency: Number of attempts</b>	1.3 (.6)	1.5 (.8)	1.2 (.4)	1.1 (.2)

**Table 5. Results Knowledge about SDL Trados Studio 2014**

	Chinese participants		Western participants	
	Chinese structure	Western structure	Western structure	Chinese structure
<b>Knowledge: Success score (N=9)</b>	7.0 (1.5)	6.5 (2.0)	6.3 (1.6)	6.2 (1.7)
<b>Knowledge: Doubt score (N=9)</b>	1.1 (1.1)	1.9 (1.7)	2.2 (1.7)	2.3 (1.5)

Similar results were found for time taken. There was no significant main effect of participants' background ( $F(1,76)=.481$ ,  $p=.490$ ), no significant main effect of user instructions version ( $F(1,76)=.811$ ,  $p=.371$ ), and no interaction effect ( $F(1,76)=.324$ ,  $p=.571$ ). Regarding the number of attempts, we found a significant main effect of participant background: The Chinese participants made more attempts to finish the task ( $F(1,76)=5.677$ ,  $p<.05$ ). We did not find a main effect of user instructions version ( $F(1,76)=2.30$ ,  $p=.134$ ) or an interaction effect ( $F(1,76)=.422$ ,  $p=.518$ ). From these results, it must be concluded that the version of the user instructions did not have a main effect on task performance, and that Chinese and Western participants did not work better with their own culturally adapted version.

#### Knowledge about SDL Trados Studio 2014

The results regarding the knowledge questions can be found in Table 5. The tendency is the same as with task performance. Regarding participants' success score, no main effects were found for participant background ( $F(1,76)=1.71$ ,  $p=.195$ ) and for user instructions version ( $F(1,76)=.274$ ,  $p=.602$ ). Also no interaction effect was found ( $F(1,76)=.616$ ,  $p=.435$ ). Regarding participants' doubt score, there was a significant effect of participant background: Western participants gave more "don't know" answers ( $F(1,76)=4.627$ ,  $p<.05$ ). We found no main effect for user instructions version ( $F(1,76)=1.235$ ,  $p=.270$ ) and no interaction effect ( $F(1,76)=1.982$ ,  $p=.163$ ). These results corroborate the lack of significant effects regarding task performance.



### Appreciation of SDL Trados Studio 2014 Software

The scores regarding the participants' appreciation of the software package may be found in Table 6. Again, no significant effects involving user instructions version were found. For usability-complexity (how difficult the participants found the software), there was a significant effect of participant background: Western participants found it more difficult to use and learn Trados ( $F(1,76)=15.735$ ,  $p<.001$ ). However, we found no effect of the version of the user instructions ( $F(1,76)=.028$ ,  $p=.867$ ) and no interaction effect ( $F(1,76)=.253$ ,  $p=.617$ ). For usability-ease of use (how easy the participants found the software to work with), no significant main effects were found for participant background ( $F(1,76)=.091$ ,  $p=.763$ ) and user instructions version ( $F(1,76)=.031$ ,  $p=.862$ ), and no interaction effect was found ( $F(1,76)=2.412$ ,  $p=.125$ ). The results regarding usefulness followed the same pattern: no effect of participant background ( $F(1,76)=.381$ ,  $p=.530$ ), no effect of user instructions version ( $F(1,76)=.309$ ,  $p=.580$ ), and no interaction effect ( $F(1,76)=2.576$ ,  $p=.113$ ). Again, no evidence was found for main or differential effects of the version of user instructions.

### Participants' Appreciation of the User Instructions

To conclude, Table 7 presents the results regarding participants' appreciation of the user instructions. Regarding the usability of the manual, no significant

main effects were found for participant background ( $F(1,76)=.771$ ,  $p=.383$ ) and user instructions version ( $F(1,76)=2.575$ ,  $p=.113$ ). Also no interaction effects were found ( $F(1,76)=1.541$ ,  $p=.281$ ). Regarding structure, no significant main effects were found for participant background ( $F(1,76)=.221$ ,  $p=.640$ ) and user instructions version ( $F(1,76)=.997$ ,  $p=.321$ ), and no interaction effects ( $F(1,76)=.032$ ,  $p=.861$ ). Finally, for language use similar findings can be reported: no main effect of participant background ( $F(1,76)=1.781$ ,  $p=.186$ ), no main effect of user instructions version ( $F(1,76)=.049$ ,  $p=.825$ ), and no interaction effect ( $F(1,76)=1.002$ ,  $p=.320$ ). It must therefore be concluded that the cultural adaptation of the manual did not even affect participants' appreciation of the manual itself.

### Observations

During the sessions, the facilitator made several observations about the participants' behaviors. First, it was clear that the participants, both Western and Chinese, had a preference for exploring the software package themselves, using their prior general knowledge about software and their expectations of the translation tool. They only used the user instructions when they thought the task went beyond their previous knowledge, or when they had tried many times but failed. When in trouble, many participants first tried to use the embedded help in the software.

**Table 6. Results Appreciation of SDL Trados Studio 2014**

	Chinese participants		Western participants	
	Chinese structure	Western structure	Western structure	Chinese structure
<b>Usability: Complexity</b>	2.8 (.7)	2.7 (.7)	2.2 (.5)	2.1 (.8)
<b>Usability: Ease of use</b>	3.6 (.6)	3.3 (.7)	3.5 (.6)	3.3 (.9)
<b>Usefulness</b>	3.8 (.4)	3.5 (.6)	3.8 (.5)	3.7 (.8)

Note: Constructs were measured on a five-point scale (1 = negative, 5 = positive).

**Table 7. Results Appreciation of the User Instructions**

	Chinese participants		Western participants	
	Chinese structure	Western structure	Western structure	Chinese structure
<b>Usability</b>	3.6 (.7)	3.7 (.5)	4.0 (.7)	3.6 (1.0)
<b>Structure</b>	3.6 (.7)	3.8 (.7)	3.9 (.7)	3.7 (1.0)
<b>Language use</b>	4.0 (.6)	3.9 (.8)	3.9 (.6)	3.7 (.7)

Note: Constructs were measured on a five-point scale (1 = negative, 5 = positive).

## Cultural Differences and User Instructions

When using the user instructions, the participants, both Western and Chinese, appeared to be impatient: They tended to skip descriptions and “long” text parts, and seemed reluctant to turn pages (even though the user instructions only consisted of three pages). Some of the participants said that user instructions can only be helpful if they help solving problems. So they argued that the order of information (from most important to least important) should be troubleshooting information, procedural information, and conceptual information.

A final observation involved a remarkable difference between the Chinese and the Western participants. Many Chinese participants appeared to see the experiment as a test, and wanted to know how they performed compared to other participants. For instance, they asked how many participants had finished the tasks correctly, what their ranking was, or what the shortest completion time was. None of the Western participants asked such questions. This seems to reflect a stronger competitive orientation in Chinese culture.

### Discussion

#### Main Findings

The research described in this article is a first attempt to systematically and experimentally investigate the effects of an isolated aspect of cultural adaptation (namely the structure of user instructions) on Western and Chinese users. The main findings of our study can be summarized very briefly and straightforwardly. Our experiment did not yield any evidence for the superiority of the Western or the Chinese way of structuring user instructions, nor did it confirm that culturally adapted user instructions work better for either Western or Chinese users. As such, the results do not seem to support the assumed relevance to adapt the structure of user instructions to the cultural background of users (Barnum & Li, 2006; Ding, D. D., 2003; Dragga, 1999; Honold, 1999; Wang, J., 2007; Wang, Q., 2000; Wang, Y., & Wang, D., 2009; Yu, 2009; Zhu & St.Amant, 2007).

If our results are confirmed in future research on user instructions, this may be indicative that cultural differences based on national culture—as far as they involve the structuring of user instructions—are counteracted by the emergence of a worldwide

“community of practice” when it comes to using instructions (Eckert, 2006). A community of practice “identifies a social grouping not in virtue of shared abstract characteristics (for example, class, gender) or simple co-presence (for example, neighborhood, workplace), but in virtue of shared practice” (p. 683). It is imaginable that the situation of using user instructions in fact is highly similar for users from all cultures, and software and user instructions may create similar expectations, preferences and thought processes across cultures. This would relativize the relevance of cultural differences in a very small area, namely concerning the structuring of user instructions.

However, it should be kept in mind that this is only a first, single experiment into this phenomenon, and our research experiences give way to several methodological considerations that may have implications for future research. So it is not the time to draw firm conclusions about the irrelevance of cultural adaptations of the structure of user instructions. Instead, we see it as an opening to further discussion of this theme.

The results of our study may be considered far from spectacular. In general, researchers often feel reluctance to publish research that only yields nonsignificant results. There is value in our study, however, in avoiding significance bias in the academic literature (this refers to a tendency among researchers to mostly submit studies with significant results, and a tendency in editorial processes to mostly accept studies with significant results, which may lead to a biased overall picture), in setting the stage for more user-based intercultural or cross-cultural research in technical communication, and in sharing and discussing methodological issues with this type of research.

#### Methodological Considerations and Suggestions for Future Research

Several methodological considerations follow from our results and experiences. A first consideration involves the position of the user instructions in our study. From our observations, we noticed reluctance among the participants to actually use the user instructions during their task performance. Within the sessions, the user instructions may have played a less prominent role in the perspective of the users than we originally foresaw. This may have weakened

the sensitivity of the research design to find effects of the cultural adaptations. Solutions may be found in different directions. On the one hand, we could think of designing an experiment in which participants are obliged to use the manual (even though that may be hard to implement). On the other hand, we could think of using a different technical communication genre than user instructions (some of the content analytic studies focused more on technical reports and Web sites, for instance). It would be interesting to replicate our study in either direction.

Another consideration involving the user instructions might be that both versions of the user instructions were still relatively far removed from what would be an ideal type of user support in the eyes of the participants. In our research we based our materials on an existing manual, which could be considered to be positive for the ecological validity of the research. However, in the view of (at least some of) the participants, our variations in structuring may merely reflect marginal differences, when compared to the structure they would find more geared toward adequate user support: for instance, instructions supporting the exploratory behaviors of users, and offering help when they get stuck, comparable to the principle of “Minimalism” (cf. Van der Meij & Carroll, 1995). Indeed, our observations suggest that exploratory user behavior and reluctance to use the instructions were prominent among users of both cultural backgrounds. A problem here is that there is no content analytic research in this very specific area that can help us guide the design of experimental materials.

One could also question other choices that we made in our research. For instance, it is conceivable that the advantages of structure will become more apparent to users when the amount of text they are exposed to is larger and when navigating is a more prominent aspect of the task execution. It is also imaginable that a larger task, more tasks with the software package, or a higher task complexity would challenge the design of the user instructions more, and therefore would generate more sensitivity to pinpoint cultural differences. The mean scores on task performance and comprehension were relatively high in our study. A replication with longer documents of user instructions and larger, more, or more complex tasks would be an interesting follow-up to this study.

A last consideration involves the selection of participants. The Chinese participants in our study all lived and followed education in The Netherlands, and therefore may have been influenced by the Western way of structuring documents. It would be interesting to replicate our study with participants in China who never went abroad. It should be noted, though, that such a cultural influence assumption may only be an explanation for the lack of significant findings among Chinese participants: They may originally be used to the Chinese way of structuring, but in their acculturation process in the Netherlands have also gotten used to the Western way of structuring. We cannot explain the lack of significant findings among Western participants, who had never been to China before, but apparently had no clear preference for the Western way of structuring.

In sum, more research is needed in this fascinating area of investigation. The design and results of our study and our experiences and observations provide various interesting areas for future research. And let us not forget the other domains that we identified: style, visual design, and user behavior. Given the growing importance of intercultural and cross-cultural technical communication, more research attention for cultural differences between users is in our view essential.

### **Practical Implications**

Although it is too early for firm conclusions, our research shows that it may be ill-advised to simply adopt the suggestions given by content analytic studies about differences between Western and Chinese documents in the way information is structured. The practices of Western and Chinese technical communicators may indeed reflect cultural differences, but may not reflect the preferences of users. Neither of the two versions of the user instructions appeared to be superior for either of the two cultural backgrounds. As such, the results may relativize the importance of structuring in user instructions, or call for a more drastic, user-centered way of structuring that goes beyond either version of the instructions used. It should be noted that such a conclusion can only be preliminary at this stage, and that the research findings do not apply to cultural differences on other aspects (for example, style or visual design) and cultural differences in the structuring of other technical documents (for example, reports).

## Cultural Differences and User Instructions

### APPENDIX: Examples of the Manipulations

#### 1. Use of Subheadings

##### Western version: Subheadings

###### What is Translation Memory?

Translation Memory (TM) saves time and efforts for translators. Translators do not need to translate the same sentences twice, and the consistency of translated documents can be increased because TM is similar to a file or database, and it stores previously translated text segments for future use.

###### What is Local Translation Memory?

Local TM is the one you create on your own computer, and can be used off-line. You can also create an online TM, which is saved on a server, and can be used only when the internet is available.

###### Creating a Local Translation Memory

To create a local TM in your computer:

##### Chinese version: No subheadings

Translation Memory (TM) is similar to a file or database. It stores previously translated versions of the text segments for future use. Translators do not need to translate the same sentences twice. The consistency of translated documents can be increased. This saves time and efforts. Local TM is the one you create on your own computer. Local TM can be used off-line. You can also create an online TM. Online TM is saved on a server. It can only be used when the internet is available.

To create a local TM, steps are as follow:

#### 2. Deductive Versus Inductive Order

##### Western version: Deductive (conclusion → arguments)

Translation Memory (TM) saves time and efforts for translators. Translators do not need to translate the same sentences twice, and the consistency of translated documents can be increased because TM is similar to a file or database, and it stores previously translated text segments for future use.

##### Chinese version: Inductive (arguments → conclusion)

Translation Memory (TM) is similar to a file or database. It stores previously translated versions of the text segments for future use. Translators do not need to translate the same sentences twice. The consistency of translated documents can be increased. This saves time and efforts...



### 3. Explicit Versus Implicit Instructions

#### Western version: Explicit instructions (with lists)

- 1) To add a customized untranslatable element to the **Variable List**:
  - a) In the **Resources** section, double-click on **Variable List**. The **Variables** dialog box displays.
  - b) Double-click on the first line and type in the variable name, for example, "Google".
  - c) Click **OK** to close the dialog box.

#### Chinese version: Implicit instructions (without lists)

identifies it as untranslatable element. The operation is: In the **Resource** section, double click **Variable List**; then in **Variables** dialog popped up, type in the variable name, for example "Google"; finally click **OK**.

### 4. Concrete-to-General Versus General-to-Concrete Order

#### Western version: Concrete-to-general order

SDL Trados Studio is one of the most popular computer-aided translation (CAT) tools in the world, which is used by over 200,000 translation professionals worldwide. Besides translation function, you can use SDL Trados Studio to manage translation projects and terminologies.

CAT tools reduce the workload for translators because translators do not need to translate what they have translated based on two functions of CAT tools: memory and search. CAT tools compare what is being translated with previously translated texts, and give suggestions according to different match ratios. CAT tools are different from Machine Translation (MT) tools. MT tools (e.g. Google Translation) do the translation for people. However, CAT tools are semiautomatic. CAT tools do not replace translators, and just assist the translation process.

CAT tools came into existence because globalization has increased the demand for multilingual documentation, and the translation companies need to copy with larger volumes of translation with shorter time.

#### Chinese version: General-to-concrete order

##### SDL Trados Studio Introduction

Recently, globalization has increased the demand for multilingual documentation. Translation companies need to copy with larger volumes of translation with shorter time. Therefore, Computer-aided Translation (CAT) tools came into existence.

The well-known Machine Translation (MT) tools (for example, Google Translation) do the translation without the intervention of translators. However, CAT tools do not replace translators, but just assist the translation process, and are semiautomatic. They are different from Machine Translation (MT) tools. CAT tools have memory and search functions. CAT tools compare what is being translated with previously translated texts, and give suggestions according to different match ratios, thus greatly reducing the translators' workload.

All around the world, there are over 200,000 translation professionals using SDL Trados Studio. It is one of the most popular CAT tools. Besides translation function, it can be used to manage translation projects and terminologies.

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# Key Elements of an Effective Style Guide in the New Age

Esha Adhya

## Abstract

**Purpose:** Is the current style guide helping our business? Does it give us an edge over our competitors in reaching out to people? Company executives ask these questions before allocating budgets and resources for the documentation team. A style guide is a rule-driven document that sets the parameters for consistency and acceptability of all written materials produced by an organization. But, is that the sole function of a style guide? This paper lays out key fundamentals of how to make an *effective* style guide and explores its benefits. The article also illustrates the process of developing a style guide in detail while satisfying the needs of the organization.

**Method:** To understand the best practices in the industry, a comparative analysis of five style guides of global software companies was done. Further, an online survey was administered to the technical writing community to collect more information. To get first-hand feedback from professionals, seven technical writers were interviewed and discussions in online technical writing forums were facilitated.

**Result:** In addition to generating document consistency, 82% of the survey participants concurred that an effective style guide helps in creating a distinct brand image. Word usage, new terminology, document formatting and meeting needs of global audience are important topics that need constant attention during designing a style guide.

**Conclusion:** A style guide will have a successful impact when it is supported by management, incorporates broader inputs from all its beneficiaries, is integrated into the day-to-day operations, and is updated periodically.

**Keywords:** style guide, document consistency, revision, updates, translation

## Practitioner's Takeaway

- This article establishes an argument that an effective style guide creates a distinct and unified presence for a company's brand.
- It is important to make sure that style guides are updated to meet the changing demands of the market. The most common topics changed frequently in a style guide are word usage and new terminologies.
- The survey also revealed that many people other than the technical writers are responsible for the design and development of a style guide.
- The inputs from survey and interviews put forward reasons for frequent revisions and changes to a style guide.

## Elements of an Effective Style Guide

### Introduction

We, technical writers, are constantly asking various questions about style guides. Does every organization have a style guide? Is the style guide being regularly followed for documentation needs? Does the style guide contain all the necessary guidelines for developing any document or deliverable? Is the style guide worth all effort put in its creation and maintenance? Answers to these questions can help us understand how, in today's peer-to-peer social media environment, organizations are increasingly publishing documents that are concise, informal, and simple in language. Customers do not want documents written in pompous language and stilted styles that take time to decipher. Instead, they want instructions in simple and easy-to-understand language.

A style guide is a rule-driven document that sets the parameters for consistency and acceptability of all written materials produced by an individual or group. Style guides are not direct revenue generators, yet their benefits do affect the business's bottom line. Corporate style guides save money by enabling document consistency, promoting an ethos of professionalism in communication, serving as an effective training tool for new hires, and setting policy for document creation within an organization (Allen, 1995). The purpose of having a style guide is not to restrict the creativity of technical writers. Instead a well-rounded style guide provides them a structure within which they can work. As suggested by Bright (2005), a style guide improves the quality of communication by establishing specific style guidelines that promote consistency in tone, design, and format of any document.

Advances in information technology are forcing technical writers to continuously adapt and adjust to a world of new word usage and terminologies. Nowadays, technical writers are dealing with changes such as the transition of software programs to applications on mobile devices. New terms such as "touch" or "tap" and "slide" are developed frequently since terms such as "click," "double-click," "drag and drop," "hover the mouse," and "cursor" are no longer relevant for all platforms. Documentation teams are increasingly restructured to address the needs of a diverse audience. Jennifer O'Neil, in her article "Changing Times, Changing Style Guides" (2012), focuses on challenges faced by a documentation team trying to produce with

tight budgets, documents for a market that operates in numerous languages. This demonstrates how the necessity of change challenges the documentation team to adjust to the emerging issues of language translation and globalization.

My interviews with documentation team personnel in software firms reaffirmed the above mentioned challenges faced by several global organizations today. Like other corporate employees, technical communicators are always hard-pressed for time. So, a tool like a style guide that helps the technical communicators maximize their efficiency is very valuable.

### Problem Statement

In order to gain more insight into the problem, I relied on both a comparative style guide analysis and field research. This research aims to find answers to the following questions:

- What are the commonalities in style guides among the companies having a global footprint?
- How can an effective style guide create a distinct and unified presence for a company's brand?
- Who are the key contributors involved in the process of reviewing an existing style guide in an organization?
- What are the reasons that trigger a call for revision of an existing style guide?
- What are the most common topics revised in an existing style guide? And more importantly, how often?
- What are the methods incorporated for updating a style guide?

With the advent of globalization, big corporate houses rely on fast information processing for their businesses. This study emphasizes organizations that use style guides on a day-to-day basis. Nowadays every organization, small or big, profit making or non-profit, academic or government relies on a style guide for reaching out to the end users and improving consistency. The questions raised above are complex in nature and are intertwined with the role the style guide plays in any given organization and the way the changes are perceived. In the end, this research study enhances the understanding of *how to make better style guides?*

## Methodology

### Comparative Analysis of Style Guides – A Case Study

First, to understand the best practices followed in today's organizations, I did a comparative analysis of five style guides. I chose style guides of globally based software companies such as IBM, Cisco, SAS, Red Hat, and Progress Software. My analysis was targeted to find the commonalities and ease of accessibility to the style guides in these respective companies. The case study revealed that there were certain key topics that were common in all of these style guides. The next step was to figure out the process of how these style guides came into existence in their present form.

### Field Survey

To gather more information from the people involved in the creation and use of style guides and usage, I created a survey. The survey was posted on the Qualtrics survey platform, qualtrics.com. The questionnaire was designed in consultation with my fellow technical writers and with helpful insights from my faculty. The numbers of questions were limited to twelve multiple-choice questions and one open-ended question to make the survey less tedious. The survey questionnaire was approved by the Institutional Review Board (IRB) at North Carolina State University before it was posted online. The participants of the survey were primarily in technical writing careers in the software industry.

Questions 1 and 2 of the survey were generic and covered basic information. The questions asked whether the respondents were using a corporate style guide at their workplace and how often did they refer to it for documentation purposes. This helped in filtering out random responses in my study. I gathered 51 responses within a span of seventeen days, of which 45 participants completed the survey in full. Questions 3-5 were directed toward collecting more information about the style guide functionality, such as

- Does the style guide contain all the necessary guidelines for designing and developing any document?
- How do different teams access the company style guide?

Questions 6-9 focus on the key reasons that triggers revision of the style guide. The main objective of these questions was to determine the importance of the style guide in an organization and the urgency to allocate resources to keep the style guide functional. Question 9 was a direct question about finding the reasons that trigger a call for a change in the style guide. Questions 10-12 asked about the common topics usually revised, methods incorporated to install those changes and the contribution of a style guide to an organization's brand. There was an open-ended question at the end of the survey to provide suggestions for improving a style guide.

### Interview

To further foster first-hand response and provide validity on the survey results, I interviewed and interacted with seven experienced technical writers working in the software companies mentioned above. A couple of my interviewees had more than 25 years of experience in technical writing and were very candid in describing the entire development process. They added valuable inputs on how style guides have evolved from past to present. They shared their experience and opinions about the benefits of having a corporate style guide, how changes are made in those guides, and its benefits for the users. We also discussed the current challenges faced by technical communicators and the effects of emerging technologies in the field of technical writing.

### Online Discussion Forum

During my research, I also took advantage of online discussion forums to get input from a wide range of audience. I facilitated discussion in two of the LinkedIn forums,

- Documentation and technical writing management and
- Software user assistance groups

In these forums, I asked for opinions on some of the survey questions and was excited to see inputs from a lot of experienced writers who are familiar with the issues mentioned in the problem statement section.

Collecting information through all these above-mentioned sources evoked thoughtful responses and varied opinions from people working in the field of technical communication spread across the world.



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### Results

There are many reasons why every organization should have a style guide. Participants of my study have advocated that style guides are indeed an essential component of meeting effective documentation needs. Whether it is a small company, such as any start-up, or a bigger company with a global presence, a style guide serves as an indispensable guideline for meeting the documentation needs and maximizing the time of any organization. I report my findings below, which revealed

- The impact a style guide has on an organization's image
- The process of creating and developing a style guide
- Primary contributors in its making
- Reasons for frequent revisions
- Most important topics updated in a style guide
- Benefits of revisions and updates
- Challenges and limitations of a style guide

### Style Guide and Its Effect on Company's Brand

An organization's content, including its Web site, blogs, manuals and press releases create and nurture a strong brand if it is refreshing and consistent. On the flip side, if the content is not organized, it can quickly undermine the brand. Brands are unique and set you apart from the competition. Allen (1995) noted some common expressions from his survey participants, such as, "All the documentation looks so different and it's very unprofessional" and "It's so frustrating to see communicators' materials produced by large corporations appear in such non-professional, archaic, non-friendly format and usage." These responses show the need for a style guide and the potential impact it can have on a company's image. Chapman (2014) suggests that brand updates should be done in a way that's seamless and less likely to alienate your users. It should seem like a natural evolution, rather than a stark contrast. Table 1 shows below that 82% of my survey participants support the view that a style guide creates a distinct and unified presence for the company's brand.

During my case study, I found that organizations have style guidelines specifying the use of their brand logo, graphics, and slogan in great detail. The Cisco Technical Documentation Style Guide has "Corporate Style Guidelines" as one of their topics addressing and specifying the use of the Cisco name, corporate address,

**Table 1. Does the Style Guide Help Create a Distinct Presence for the Company's Brand?**

Answer	Response	Percentage
Strongly agree	16	36%
Agree	21	47%
Neither agree nor disagree	6	13%
Disagree	1	2%
Strongly disagree	1	2%
Total	45	100%

OEM guidelines (industry terminology for partners or Original Equipment Manufacturer), format for writing telephone numbers, and ensuring proper usage of trademarks. Progress Software Corporation created a brand style guide in addition to their technical writing style guide explaining how to use their brand logo, graphics, language, tone of voice, and style of writing.

### Creation and Development of a Style Guide

More than 80% of my survey participants supported the fact that a style guide is an essential document and should be followed to meet the documentation needs of any organization, irrespective of its size. However, for many firms, building an in-house style guide from scratch may seem like an arduous task. Online forum participants and interviewees suggested that in such scenario, companies can opt to follow any one or a combination of the available comprehensive style guides. For example, the *Chicago Manual of Style*, which is a well-known resource for copyright guidelines, grammar, and punctuation style, or a more discipline specific guide like the *Microsoft Manual of Style* for software documentation or the *IBM Style Guide* for its support for structured writing and DITA (Darwin Information Typing Infrastructure). One of my interviewees stated that in his organization, they have an internal style guide that was based on a combination of the *Microsoft Manual of Style*, *Chicago Manual of Style*, and *Associated Press Style Guide*. They also use several terminology and word usage databases, all set based on organizational requirements. He went on to mention the fact that if, occasionally, there is a discrepancy between a department's specific audience requirement and the company's preferred standard, they follow the guidelines determined by the editing team. He added, "But, those cases are rare."

In the Documentation and Technical Writing discussion forum on LinkedIn, a large number of participants agreed that they usually refer to popular, well known style guidelines for resolving their regular writing issues, but also follow their own internal style guide or style sheet for meeting department-specific audience needs. As rightly put forward by a forum contributor, “At some point you need to create your own style guide as, more than likely, there’ll be unique phrasings, exceptions, and guidelines that aren’t found in the *Microsoft Manual of Style*, *The IBM Style Guide*, etc. It doesn’t need to be long, but should be there, especially to help new recruits.”

Technology has vastly influenced the accessibility, role, and content of style guides. Ease of maintenance, availability, and accessibility have led to the migration from traditional paper bound guides to online media such as intranets, compiled HTML files, XML files (such as DITA), and Web sites. Table 2 below shows the different formats in which the survey respondents accessed the company style guide. Having the style guide integrated into the online system is a great way to keep it accessible and in use throughout the content development process.

**Table 2. Different Ways of Accessing the Company’s Style Guide**

Answer	Response	Percentage
Hard copy	8	18%
PDF files via intranet	24	53%
Compiled HTML files	21	47%
XML files	5	11%
Any other (specify)*	12	27%

\* Other responses include: Database, DITA files in Eclipse help, Internal Wiki

One of my interviewees, a senior technical author at BAE Systems Applied Intelligence said the shift to the online presentation of user documentation and away from print (hardcopy) is making certain older style conventions less relevant. Online documentation forces technical writers to produce short topics that can be skimmed and digested easily. Conciseness is very important, especially for instructions. Minimalism is highly encouraged, making authoring tools such as DITA popular in every organization.

### Primary Contributors of Designing and Developing a Style Guide

It might be well assumed that technical writers and editors are solely responsible for the development of a style guide. That is mostly true, and from my survey results, technical writers (70%) and content editors (57%) are the main contributors of a style guide. However, it also revealed that there are some other people who contribute to the style guide development process, such as legal consultants (18%), product managers (16%), and usability testers (7%). Survey participants also mentioned having a layered team structure with defined roles, such as, corporate information development team, the core team of copy editors and technical writers, and a documentation manager. One of the participants specified that his company has a ‘Word Nerd’ team, which anyone who is interested in style issues can join and have a voice. Since a style guide serves as a company-wide tool serving all documentation needs, its contributors are also not restricted to a particular team or department. Table 3 below shows the survey results and proves how diverse the style guide committee is and how different people are involved in its creation.

**Table 3. Primary Contributors for Style Guide Development and Revision**

Answer	Response	Percentage
Technical writers / Information developers	32	71%
Content editors	26	58%
Usability testers	3	7%
Product managers	7	16%
Marketing managers	7	16%
Customer service managers	2	4%
Legal consultants	9	20%
Any other (specify)	14	31%

### Reasons That Trigger a Call for Revising a Style Guide

One of the key benefits of the style guide is to save company resources, both time and money. Apart from that, the survey explored several other reasons why changes are needed for organizations that have an existing style guide. The topmost reason chosen by

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survey participants is for maintaining consistency across different design teams (see Figure 1).

One of my interviewees suggested that, to maintain document consistency and professional image, it is important that all the documents from the same company have the same voice and style. When changes are made to topics, organizations need to ensure that all the teams or departments are well informed about the changes so that each product team doesn't make their own (different) decisions. In order to prevent documentation inconsistencies, many organizations use automated word-processing templates, cascading style sheets, and code-tagging guidelines such as XML to enforce design criteria. In recent times, advanced style verification software such as Acrolinx is embedded in the authoring platform to assure information consistency for global documentation. Templates are designed based on predetermined organizational settings, and software tools such as Acrolinx help writers to self-edit their documents, thus reducing the time and effort of editors.

Another reason that many respondents chose was to meet the demands of a global audience in the field of technical writing. In my discussions with several technical writers, they unanimously agreed on the importance of translation and internationalization and how that is shaping the world of technical writing. Since most of the companies are competing internationally and products are delivered across the globe, companies are generating documents such as manuals and online instructions in various languages. Therefore, technical writers should be able to write and reuse content so that translation costs could be minimized. One of the technical writers

working for a product based company explained that a style guide is a very territorial document because it has to be designed to suit its *locale* (target market) and from there comes the need for localization.

### The Most Common Topics Updated in Style Guides

My survey confirmed that it is important to make sure that style guides are revised and updated to meet the changing demands of the market. I was curious to know what are the most common topics changed or updated in a style guide. Of the survey respondents, an overwhelming 91% responded that new terminology and word usage are updated most frequently. As new technology, products, and their acronyms are constantly creeping into the industry, organizations are always adding new terms to corporate glossaries and changing how words are used. Every style guide I reviewed in my case study has a section devoted to word usage that listed terms, abbreviations and acronyms that are frequently used in the company's communications. In addition, there are also topics that are unique and tailor-made depending upon the company and its services. There are detailed sections on *corporate guidelines* that helps maintain its corporate identity, such as proper logo, trademark use, and legal issues.

A technical writer from SAS reported that new buzzwords related to cloud computing, such as Chaos Monkey, Latency Monkey, Doctor Monkey, and Janitor Monkey, are making them contemplate how to use these words and explain their function. In addition, a lead technical writer from Cisco suggested that common word usage does not change very frequently, but new technologies are added all the time. In their

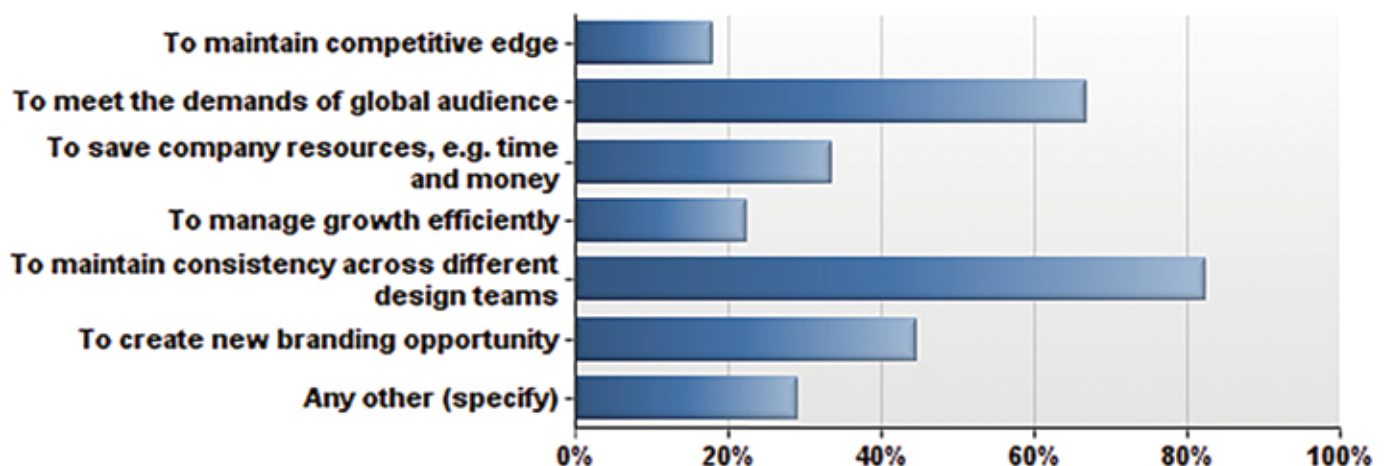


Figure 1. Reasons that Trigger a Call for Revision of an Existing Style Guide

group, they add new product acronyms and definitions for new routing protocols whenever necessary (for example, IPv4, IPv6, and so on).

Further, a technical communication professional from a global software firm shared her unique experience of changing word usage. She had a very interesting story about developers who often use the terms “*master*” and “*slave*” when describing technical configurations. A well-dressed, African-American man went into the company headquarters and told the legal department that he was deeply offended by the wording. He strongly implied that a lawsuit might follow if they continued using the terminology. The corporate style guide was promptly updated. All the departments throughout the company and the developers had to change all of the messages that used the wording. About six months ago, she was reviewing a draft and once again found a description of a “*slave*” computer. She promptly raised the issue, and the document and software were changed to say “*client machine*.” These incidents emphasize the need to identify various definitions and terms and decide on correct usage. With changing industry trends and evolving word usage, adapting to new terminology is inevitable and all corporate style guides should have an elaborate section on appropriate word usage.

As more companies are delivering their products in foreign lands, the need for producing technical documents such as product manuals or online help for a global audience has become a necessity. Forty-one percent of my survey participants felt that language and proper usage of grammar is another important topic revised in a style guide. Online forum participants suggested that eliminating unusual grammatical constructions and building simple sentence structure can also ease the process of translation. Applying global English guidelines enables writers and editors to take the clarity and consistency of technical documents to a higher level, leading to faster, clearer, and more accurate translations (Kohl, 2008).

In a conversation with a Red Hat veteran, I learned that “the biggest challenge that comes to mind about writing for global audiences is that we want to avoid business jargon, idioms, slang, and metaphors, because they often do not translate correctly the first time and need human intervention, which adds to the translation costs.” Thus, writing in simple language eliminates ambiguities and complexities, which can lead to misrepresentation.

A similar percentage of survey participants (41%) also reported the need for changes in document format

and structure as another topic commonly updated in a style guide. A documentation manager in a software company supported the fact, saying that, “Changes in document format or structure might be a decision for a company to move to minimalist writing in which content topics are more task-based and less conceptual. There might be a document model that prescribes an overview topic, but the company moves toward a simpler model that doesn’t include extra overview topics. This cuts down on translation costs and promotes minimalist writing.”

Legal issues such as use of trademark, copyright, URLs, and IP addresses are matters that also need to be addressed with care while writing technical documents. Style guides of corporations like Cisco and SAS have separate sections explaining various legal issues of trademarks, company address, and so on. Forty-one percent of survey participants chose legal issues as one of the topics that is frequently updated to avoid any legal liability, which can cost or damage a company’s image.

### Revisions and Changes in a Style Guide

The need for routine updates has become critical to the successful usage of style guides. From the survey results, shown below in Table 4, we can see that most of the organizations revise their style guide periodically, mostly in the range of every 6 to 12 months. One of my survey participants mentioned that in his organization, revisions are a continuous ongoing process. Whenever changes appear necessary, such as acronyms for new products or technologies, updates are immediately made in the style guide. Another participant specified that her company has multiple style guides. The main style guide is rarely updated (+2 years), but their tool-specific style guides are updated every few months (3 to 6 months).

**Table 4. How Often Is the Style Guide Revised or Updated in Your Department or Company?**

Answer	Response	Percentage
1 - 6 months	9	20%
6 - 12 months	16	36%
1 - 2 years	9	20%
> 2 years	3	7%
Any other (specify)	8	18%
Total	45	100%



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A senior technical writer working at a software multinational shared her experience of how she had seen the transition of the style guide from a monolithic hard copy to a searchable online document. Also, as a representative of the Style Committee, she illustrated how revisions or updates were made in the style guide. She explained that the style committee would meet monthly and discuss questions that the various technical writers and illustrators would bring to the meeting. The committee would brainstorm ideas, refer to older references, and eventually reach a consensus. She summarizes by saying, “It’s great to have a style guide for the sake of documentation consistency; however, it must be a living document that can evolve and adapt to the needs of its users.” This is well supported by my survey response, in which 83% of the participants believe that changes and revisions in the style guide are needed and beneficial.

### Challenges and Limitations of a Style Guide

One of the biggest challenges in its maintenance as described by one of my survey participants is, “communicating the style guide standards, and where they can be found, to all writers. Experienced employees forget to review it; new writers don’t know where to find it. So, regular communications about it is crucial.” A limitation as stated by one of my interviewees is that “the style guide used for creating an online help may not be the same as for creating a requirements specification. The style guide cannot cover everything.” Style guides are a component of the whole that typically focuses on language and grammar in writing. Nowadays, companies are competing worldwide, mergers and acquisitions are becoming common and are often heard about. In such a scenario, style guides should also try to specify what steps to take for standardizing documentation that comes with following a merger and acquisition. A lead technical writer annoyed with the issue commented, “I currently work with a team that was acquired, but there are no guidelines as to how to make the documentation come up to the standard followed by the parent company.” Such inconsistencies and bad planning can cause frustration and loss of resources for the company.

### Discussion

The findings of my study clearly indicated that a style guide is successful in generating effective documents if:

- Management promotes it,
- Broader inputs are taken from its users, and
- Guide is easily accessible for reference

If style guides are not readily accessible, employees often end up not following them. Instead, they refer to their coworkers or rely on their interpretation and judgment of the style in the documents. To overcome such obstacles, companies can organize routine training sessions to orient employees with correct writing guidelines. An effective method could be to use the company’s weekly communication to share some tips and tidbits from the guide. This will help people to stay involved and connected to the guide.

To ensure that employees are following style guidelines, software tools are run on the content they generate. The software checks for styles and word usage issues. This automated check reinforces the style guidelines by flagging certain items and giving an explanation about how to make a decision on whether to change and even what to change in the text. In addition, it is always beneficial for companies to create an internal style guide, which is largely driven by information mapping principles and customized to particular structured authoring and content re-use needs. Most companies create their own in-house style guide for the organization’s internal use and specifically tailored for its needs and contexts (MacKay, 1997). Such means and methods are incorporated to get the writers to conform to the company’s style guide. But there are challenges when one style guide may not be applicable for all types of information and all types of audience. For a company to create a unique corporate voice, many other elements are needed, for example, branding guide, document templates, and technical formats. Style guides are a component of the whole that typically focuses on language and grammar in writing.

A corporate style guide is only as good as its latest revision. Periodic reviews should be held to evaluate content and incorporate additions based on end-users suggestions and organizational changes. Collecting data using user-tracking reports, surveys, or interviews will help to distinguish useful content from the information that can be discarded from the guide. Changes such as document format and structure are often updated because companies are adopting more of a minimalistic approach, that is, defining information by concept



or task, which is often combined with a move from traditional tools like Frame Maker to modern tools like DITA. There are also different formats that evolve for margins, fonts, and titles based on moving documentation from a PDF-centric model to a delivery format that is HTML-based or more conducive to online or mobile apps. New technologies and tools are forcing companies to adopt those for making the job of documenting more streamlined and also save resources, and such adaptations need to be updated in style guides so that every writer is aware of the new changes.

Even though a style guide is revised and updated with time, it is also important to keep the old style guide to refer back to. Dating by version numbers is a common strategy to keep track of the number of revisions or updates done and with a guide. As an example, Cisco's technical documentation style guide describes all the significant new and changed information in a concise tabular form to let the users know at a glance the latest updates in the guide. It helps to get the new updates in a condensed and easily searchable form.

Further, organizations are expanding globally and becoming more aware and understand the need for identifying culture-specific elements to make their documents accessible to many cultures. Factors such as translation, localization, and internalization were significantly stressed by a few study participants working in global firms and how these factors contribute to meet the demands of a global audience. *Localization* and *Translation* are terms that are often used interchangeably, but there are distinct and important differences.

*Localization* is an adaptation process in which a product, application, or document content is designed to meet the language, culture, and other requirements of a specific target market (a 'locale'). *Translation* is the process of changing a source version (usually English) of a product, application, or document content into a target-language version (any language) by simply changing the words from one language to another. Unfortunately, a word-to-word translation may often yield strange or sometimes even offensive literal translations. Localization is a combination of translation and adaptation of material in the foreign language market. It takes into account not only literal translation, but also adaptation of the target language by creating a linguistic equivalent. The most common topics addressed in localization are:

- Numeric: date and time format
- Use of currency
- Keyboard usage
- Collation and sorting
- Symbols, icons, and colors
- Text and graphics containing references to objects, actions, or ideas which, in a given culture, may be subject to misinterpretation or viewed as offensive
- Varying legal requirements

I also learned from a senior technical writer that before one can localize a product, one has to internationalize it. *Internationalization* is the design and development of a product, application, or document content that enables easy localization for target audiences that vary in culture, region, or language. It is a way of planning ahead and involves designing and developing in such a way as to remove barriers to localization or international deployment. In a specific example from the software product development perspective, the process includes steps:

- Using Unicode to support all manner of scripts, languages, and characters, such as non-Latin scripts like Chinese, Japanese, or Hindi
- Using markup in the DTD (Document Type Definition) to support bi-directional text like Hebrew or Farsi.
- Adding to CSS (Cascading Style Sheet) support for vertical text or other non-Latin typographic features.
- Enabling code to support local, regional, language, or culture related preferences mentioned earlier
- Separating specific elements of source code or content that could be localized, so that when localization changes are made the rest of the code will remain unchanged.

As translators are not likely to write the document in the first place, technical writers and project managers working in global firms need to assist in the localization process by preparing for it. Technical writers can confer with translators, include them in review and evaluation, provide definitions and other information, indicate core information and internationalize the document (Major & Yoshida, 2007). The findings of this study suggested that if documents from a global company come across to the end-user as if they were from different organizations, it will surely have a negative impact on the company's image and brand.

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### Conclusion

In a highly competitive market with emerging technologies, style guides are also evolving to suit the needs of various products and audiences. Data from my survey and interviews have shown that style guides are definitely an indispensable tool for all writers for maintaining conformity and the professional image of a company. Companies are upgrading to new tools and platforms to incorporate their style guides into their systems, which is generating more accurate and effective documents. A change in a style guide should be a well thought action to help create meaningful and consistent content. As organizations discover new opportunities and ways to communicate with their audiences, they also need to expand the scope of their style guides to circumvent the restrictions and potentialities of different media outlets, channels, and messages. Thus, creating and maintaining a style guide is a challenging and ongoing task. Also, its development process is not just limited to technical writers and editors. This article also stresses the fact that an effective style guide can create a distinct and unified presence for a company's brand in addition to generating quality documents. Style guides will have a successful impact when they reflect consensus in the organization, are integrated in day-to-day operations, and are revised periodically.

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# Implications of Desnoyers' Taxonomy for Standardization of Data Visualization: A Study of Students' Choice and Knowledge

Rachel Rayl

## Abstract

**Purpose:** Current research on data visuals focuses on their creation and use; however, there are few attempts at standardizing data visuals to help facilitate better interdisciplinary communication. Can Desnoyers' taxonomy facilitate better interdisciplinary communication in STEM (Science, Technology, Engineering, and Mathematics) fields by helping practitioners choose more efficient data visuals? In addition, would adopting Desnoyers' taxonomy bypass the current discrepancies between academic and journal data visuals?

**Methods:** To test Desnoyers' taxonomy's impact on efficient use of data visuals, I did an exploratory, pretest/posttest survey of 101 STEM students and their choices of data visuals before and after exposure to Desnoyers' taxonomy.

**Results:** Students chose more complex and more efficient data visuals on the posttest, after exposure to Desnoyers' taxonomy. However, level in school did not change the effect of exposure.

**Conclusion:** Students' reported use of data visuals supports prior research about discrepancies between academic and journal data visuals. Additionally, students might benefit from having more exposure and training in efficient data visuals. Further control group studies are needed to show if Desnoyers' taxonomy itself can increase students' comprehension and use of efficient data visuals as compared to pure explanation of data visuals. If the further studies demonstrate that, then researchers and creators in the field of data visualization could confidently adopt Desnoyers' taxonomy as a way to teach and reference data visuals consistently.

**Keywords:** data visuals, graphs and charts, interdisciplinary communication, taxonomy, visualization

## Practitioner's Takeaway:

- Interdisciplinary visual communication, especially in the STEM fields, is hindered by a lack of standardization.
- Desnoyers' taxonomy of data visualization may help teach students how to use data visuals in an efficient manner.
- This study shows that Desnoyers' taxonomy of data visualization offers a potential way to standardize the usage of data visuals, independent of language specific sorting schemes.

## Desnoyers' Taxonomy's Implications for Data Visualization

### Introduction

Data visuals influence how we view explanations of data; but so far, we have yet to consistently sort the many different kinds of visuals into a cohesive whole. We live in an increasingly visual and digital culture, and as such, researchers have been studying the field of data visualization for several decades. Edward Tufte wrote a seminal book on data visuals, *The Visual Display of Quantitative Information* (1983), and consequently defined how to create data visuals. However, even with the extensive defining of data visuals and subsequent research on their usage, researchers cannot agree upon one way to sort them. Current proposed sorting schemes (Keim, 2002; Ménard & Dorey, 2014; Shedroff, 2000) depend on words that require translation, making it difficult to create a globally consistent sorting scheme. Luc Desnoyers argued, "A consensual glossary of visuals would facilitate the development of harmonized guidelines and therefore help students, scientists, and writers in the selection of appropriate graphs" (Desnoyers, 2011, p. 121). This would solve the problem that Richard Emanuel and Siu Challons-Lipton noted, specifically that most undergraduate curricula do not teach students to be visually literate (Emanuel & Challons-Lipton, 2013, p. 12). This causes problems in data heavy fields, such as STEM (Science, Technology, Engineering, and Mathematics), where students and professionals are expected to communicate highly technical data to an increasingly visual culture. In 2011, Desnoyers proposed building a taxonomy of data visuals sorted in a manner similar to the scientific biological taxonomies, that is, "categories going from the more general to the more specific level, according to precise rules" (Desnoyers, 2011, p. 123), with the denominations of the taxonomy being based on Greek and Latin terms.

Because of the lack of a unified data visual lexicon, academics and practitioners can and do miscommunicate when using visuals (Rybarczyk, 2011). As such, I explore how using Desnoyers' taxonomy of data visuals might help unify visuals by sorting them into a cohesive whole based on efficiency. The question of "would exposing students to this taxonomy and its denominations change which data visuals they prefer to present information?" laid the foundation for this exploratory research project. Because of the lack of published, follow up research to Desnoyers' original article, I chose to do an exploratory study to test if exposing STEM students to Desnoyers'

taxonomy and proposed denominations along with data visuals definitions changed what data visuals students prefer to present information. My research question weaves in both the idea of training future STEM professionals, that is, STEM students, and the idea that certain visuals correlate with specific data sets. Because Desnoyers designed his taxonomy with STEM data visuals in mind, I chose to focus on the STEM application and use students from relevant STEM fields as my participant group. However, because the subject of data visualization is a universal one, technical communicators with all specialties (inside and outside of STEM) can benefit from this research.

### Literature Review

Throughout the past decades, there has been much discussion about what constitutes an "efficient" data visual, but researchers generally agree that efficient visuals allow for accurate identification of data as well as drawing attention to the data (Desnoyers, 2011; Dragga & Voss, 2001; Kostelnick, 2008). Additionally, they agree that the principles of efficient visuals affect all professionals who create data visuals, including STEM professionals. To make efficient visuals, professionals should follow all principles of aesthetic design while emphasizing ethics, proportionality, clear labeling, and context, all with the purpose of improving comprehension of the data (Dragga & Voss, 2001, p. 266; Heer, Bostock, & Ogievetsky, 2010, p. 59; Tufte, 1983, p. 56, 74). Technical communicators typically have many resources at their disposal to figure how to apply these principles when making their data visuals. However, STEM professionals typically have inadequate resources of efficient ways to present data. STEM fields mostly emphasize presenting data in its raw form, mainly ungainly chunks of data in spreadsheets, or processing data (Finson & Pederson, 2011; Gorodov & Gubarev, 2013; Rybarczyk, 2011). STEM fields place little emphasis on differentiating efficient and non-efficient ways of presenting data in a polished manner. Helping STEM professionals to adopt principles of efficient visuals would allow for better presentation of STEM ideas in a highly technical world.

### Efficiency Defined for STEM Data Visuals

STEM professionals can include data visuals to support the logical appeals of any given science, and efficient

visuals present information in ways that improve logical comprehension of the data. However, Frankle and DePace (2011) pointed out that “a visual representation of a scientific concept is a re-presentation, and not the thing itself” (p. 3). Technically, one could take any data set and represent it using most data visuals; however, only a select few would represent the data in a logical manner consistent with its intended use. For example, people could decide that they want to compare the number of endangered iguanas to the total number of endangered animals in the world. To represent that comparison, they could use any number of data visuals, and Figures 1a-d show a small sample of the possibilities.

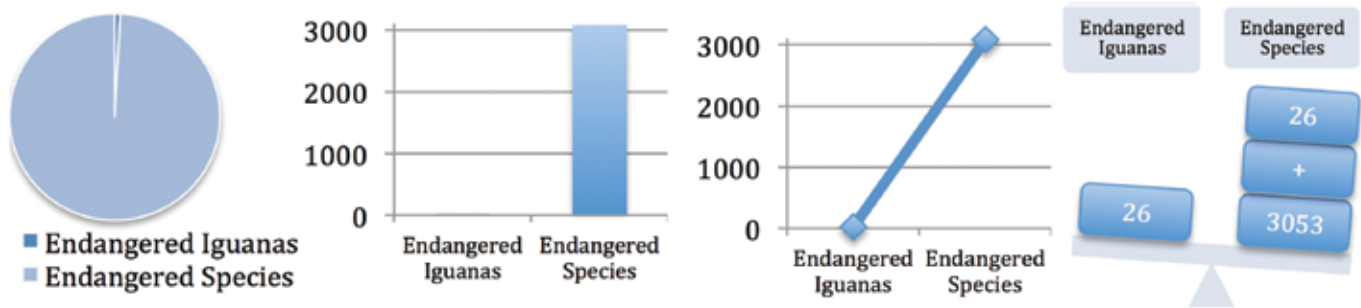
The sheer magnitude of difference makes it almost impossible to see the data points for endangered iguanas on Figures 1a, 1b, and 1c. Those figures are only proportional and clearly labeled while not showing the actual numbers, which limits comprehension of the data, thereby creating unethical visuals (Dragga & Voss, 2001). On the other hand, Figure 1d is ethical, clear, improves comprehension, and allows people to accurately identify the information; therefore, it more efficiently represents the given data. As shown, STEM data visuals need to follow both general efficiency rules as well as present data comparisons to logically support scientific arguments. However, which data visual people chose changes how much it supports their arguments, thereby showing that not all STEM data visuals are equally efficient.

### What STEM Professionals and Students Are Taught

To properly choose the efficient visuals, STEM professionals must learn how to visualize data. Dan Lipsa *et al.*, a collaboration visualization group, recommended that data visual creators should work

closely with the physical scientists by “reviewing recent visualization papers [in those fields]” (2012, p. 2338). By doing so, data visual creators can keep up with the needs of the STEM community. Given that STEM students are professionals in training, having something to connect both academia and the “real-world” type visuals would help students develop visualization skills now that they will use in the future.

To get students to focus more on what visual communication can offer them, professors can pull in real-world examples of visual communication to interest students, but that approach has its own drawbacks. In 2011, Brian Rybarczyk compared the differences between scientific visuals in textbooks and scientific visuals in journals. His results suggested, “there is a mismatch between the types of scientific visualization in textbooks compared with how science is documented in [journals]” (Rybarczyk, 2011, p. 111). Specifically, textbook visuals used in academia are oversimplified and lacking in variety; whereas journal visuals present more of the complexities involved in interpreting real data. These mismatches between textbooks and journals are the result of a disconnection between academia and professions. Practitioners working in the field have data that does not fit nicely into any one given data visual, as demonstrated by the wider variety of data visuals used to try to convey very singular results. However, as academics continue to use textbooks, with their oversimplified and lacking visuals, as their standard for exposing and teaching students about data visuals, it hinders the development of visualization skills. STEM students need to learn visualization skills that will serve them well in future work. Standardizing visuals to understand their efficiency in particular situations can overcome this. If both academia and practitioners



**Figure 1a, 1b, 1c, and 1d. Example Visuals for a Single Data Set**

Note: Figures 1a, 1b, 1c, and 1d listed from the left are pie chart, bar chart, line chart, and scale data visual.



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referred to the same definitions of data visuals, then they would create and use consistent data visuals, as they could capture both the complexities of real data and the simplicities of “textbook example” visuals.

### How to Sort (and Standardize) Data Visuals

Consistency within use of data visuals would require consistency in description and sorting of the data visuals. In 1977, Michael MacDonald-Ross reviewed empirical studies of ways to display quantitative data. He began by establishing a consistent lexicon of terms, vital when comparing papers written at different times by people in different fields. For example:

- Bar chart: bars of constant width and variable length that may have more than one dependent variable (p. 364)
- Cartesian grid: a coordinate grid bearing arithmetic scales (p. 364)
- Cartogram: a map displaying quantitative data (p. 364)

However, his need to create this lexicon demonstrates a problem: while people have a general idea of what certain data visuals look like, they do not always speak of them in the same terms. As Desnoyers (2011) points out, “the terminology used by different authors varies” (p. 121). A simple example of this would be the difference in definition of “cartogram”: MacDonald-Ross (1977) defines it as “a map displaying quantitative data” (p. 364) whereas Heer *et al.* (2010) define it as a map that “distorts the shape of geographic regions” based on data (p. 63). Different terminology leads to a lack of consistency and thereby creates barriers to understanding which type of data visual efficiently presents which kinds of data.

Making a consistent lexicon for data visuals requires figuring out the correlation between efficient data visuals and different kinds of data sets. This goes back to the heart of defining data visuals. As Daniel Keim, an influential author in the field of data visualization, summarized: “The basic idea of visual data exploration is to present the data in some visual form, allowing the human to get insight into the data, draw conclusions, and directly interact with the data” (Keim, 2002, p. 1). Commonly, researchers standardize data visuals’ terminology by sorting them (Cairo, 2012; Meirelles, 2013). Sorting by terminology allows for consistent reference both when creating data

visuals and when dissecting them to understand their use and creation. However, the “what,” “how,” and “why” of sorting still depends on the person proposing the given sorting scheme.

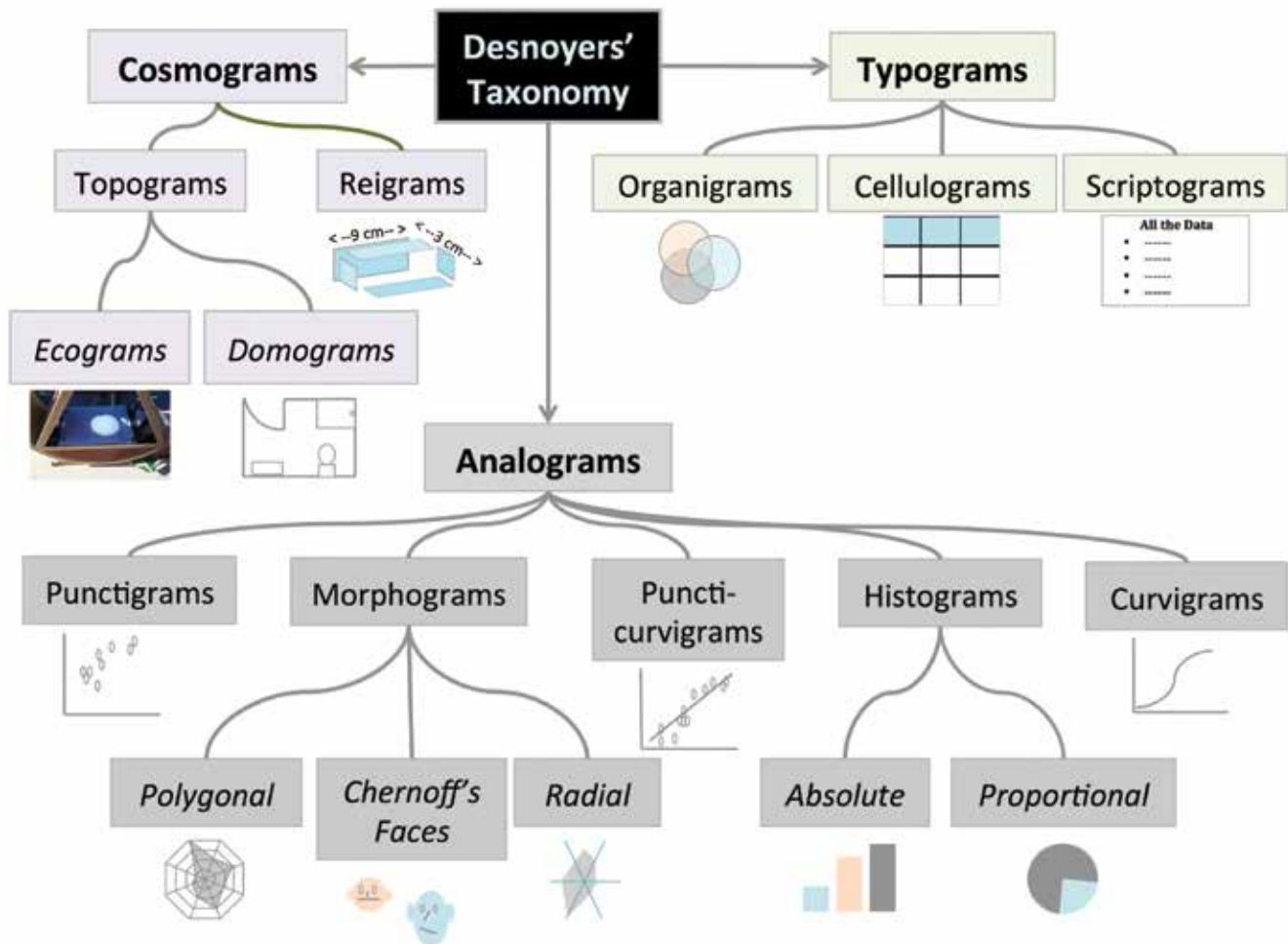
**General Sorting Schemes.** The language dependence of most sorting schemes causes a key, language dependent, problem. As Edward Tufte (1983) says, “the design of statistical graphics is a universal matter—like mathematics—and is not tied to the unique feature of a particular language” (p. 12). Yet, some proposed sorting schemes heavily depend on language specific factors.

In *Information Design*, Nathan Shedroff (2000) differentiates seven ways to possibly sort data: by alphabet, location, time, continuum, number, category, or randomly organized. Additionally, Daniel Keim (2002) proposes three different ways to sort data: type of data (numerical vs. textual), actual output design, and how humans will interact with the data visual to extract meaning from it. However, sorting data based on type, output, or interactivity can lead to vastly different sorting schemes depending on the criteria used for sorting, which can lead back to our problem of inconsistent lexicons or inconsistent sorting overall. In 2014, a paper was published that focused on using a taxonomy to sort the visuals because “[the purpose of taxonomies] includes domain simplification, description and charting for reliable and speedy navigation” (Ménard & Dorey, 2014, p. 114). But the taxonomy relies on consistent translation between the two languages and does not incorporate other languages. However, Desnoyers’ taxonomy, proposed in 2011, bypasses the language translation problems by using Greek and Latin (scientific standards that require no translation).

### Desnoyers' Taxonomy

Luc Desnoyers proposed his taxonomy in 2011 as a way to simplify the language barrier facing other proposed sorting schemes. As he states, “A consensual glossary of visuals would facilitate the development of harmonized guidelines...” (Desnoyers, 2011, p. 121). To develop a standardized (or consensual) glossary, Desnoyers abandoned the idea of using Standard English or another living language, and instead resorted to a taxonomy with denominations based on Latin and Greek vocabulary (Figure 2).

By resorting to “dead” languages, he bypassed conventional problems with language dependency,



**Figure 2. Desnoyers' Taxonomy with Example Data Visuals**

*Note: The denominations are as follows: Classes in bold, orders in normal font, and families in italics.*

and he added a level of familiarity for STEM professionals, as most STEM fields use Greek or Latin words to describe ideas or things. Using three major classes (Cosmograms, Typograms, and Analograms), Desnoyers' taxonomy covers all static STEM data visuals, including photographs. He chose to leave out interactive visuals and compound visuals. However, he leaves open the idea that those types of data visuals could themselves form other branches of his proposed taxonomy. Desnoyers' taxonomy sorts data visuals by component similarities into three branching denominations: classes, orders, and families. By doing this, he follows the same developmental process that Carolus Linnaeus followed to form the biological taxonomy used for plants and animals. Desnoyers developed this sorting scheme based on over 30 years of training graduate

students in science communication. However, Desnoyers admits that he has yet to complete the taxonomy and the proposed denominations remain untested for how well they help people utilize data visuals (Desnoyers, 2011, p. 131).

As Desnoyers said, "students frequently rely on their self-acquired mastery of software like Microsoft Excel, which offers indiscriminate use of different types of awkwardly named visuals for any type of data" (2011, p. 121).

As such, my first sub-question inquired if students originally gravitate toward reigrams, cellulograms, puncti-curvigrams, and absolute histograms, which they can generate from simple software programs, or if they used a wider variety of data visuals (Figure 3). Second, I wanted to see if students gravitate toward more efficient type visuals after exposure to Desnoyers' taxonomy.

## Desnoyers' Taxonomy's Implications for Data Visualization

### Methods

I used a standard exploratory, pretest-posttest design, anonymized according to the IRB approval that I received, using exposure to Desnoyers' taxonomy as the treatment between the pretest and posttest. The overall structure follows the standard format for exploratory, pretest-posttest designs (Creswell, 2009, p. 160; Greeno, 2002, p. 73). By using a quantitative study, as opposed to qualitative, I could compare the statistical differences in efficient answers before and after exposure to the Desnoyers' taxonomy and the denominations to see if students increased their understanding of data visuals after exposure. I structured the test itself as follows:

- Pretest: which I used to evaluate students' initial choice of data visuals (see Appendix A for the full pretest). This included demographic questions along with asking students to list the data visuals they used most often in the past twelve months, and how many they have used.
- Educational treatment (exposure): where I used a five-minute presentation to expose students to Desnoyers' taxonomy along with definitions of different data visuals within the denominations.
- Posttest: which I used (in conjunction with the pretest) to evaluate how students' choices of data visuals changed after exposure.

### Exposure to Desnoyers' Taxonomy

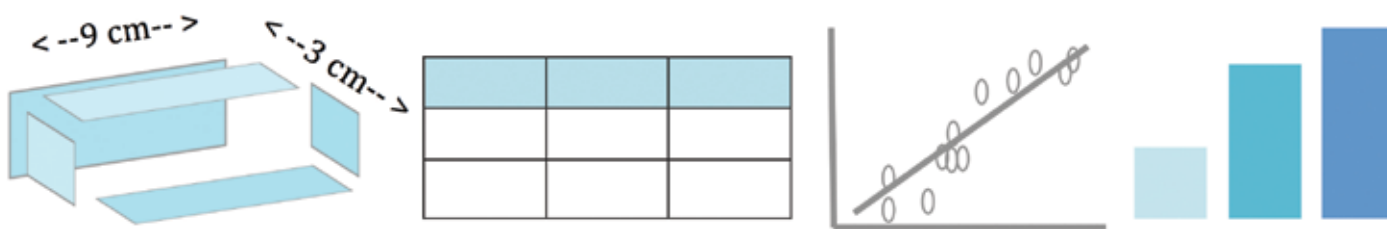
Once the students all finished their pretest surveys, I gave a five-minute presentation about Desnoyers' taxonomy and its denomination. There were various reasons for the relatively short duration of the exposure: the exactness and consistency of the wording across classes, the attention span of students (for an extra-class

activity), and the class time that the professors of the classes designated for the entire research session. The presentation itself was simplistic with first a general overview of the taxonomy classes (refer back to Figure 2), followed by an explanation of each denomination within them. Each class and respective branching denominations within the taxonomy were on their own slide, and was accompanied by oral explanation based on a prewritten script, to keep the explanation consistent for all participants. I did not permit participants to ask questions about the taxonomy until after the posttest, again for purposes of consistency. Finally, I pulled the explanations and types of example data visuals from Desnoyers' article so that the information would remain true to its source material.

### Procedure

For this study, I avoided using a structured "test" setting, so that the students could relax and perform for the study how they normally would. Additionally, all of the classrooms had projectors built in so that I could present the educational treatment part of the study without bringing additional equipment. According to required IRB regulations, students could stop participating at any time, and I explained to them that this test would not affect their grades. I piloted the study with three NMT recently graduated alumni because I expected that they would represent current students' understanding at NMT.

I began with a 16-question pretest, and after all students had indicated that they finished the pretest, I began the five-minute presentation about Desnoyers' taxonomy. Finally, I handed out a posttest that contained the ten data sets from the pretest but in different order, which the students had about five minutes to finish. As students finished their posttest, I had them then staple their pre- and posttest together



**Figure 3. Possible Selection of Students' Commonly Used Data Visuals**

*Note: Data visuals listed from the left are reigram, cellulogram, puncti-curvigram, and absolute histogram.*

and place the packet in a box, to keep the appropriate surveys together while retaining anonymity. After all students had deposited their packets into the box, I opened the floor to questions about Desnoyers' taxonomy or data visuals in general, that way I could generally see if the students learned anything from the exposure or if they merely participated because everyone else did. However, evaluating the post-survey students' questions was outside of the scope of this study, and as such I did not formally gather that data.

### Participants

I recruited 101 participants from writing classes at NMT and from one student club because they belong to the target demographic, that is, STEM students, and because they were a convenient sample. I used volunteer student participants from the New Mexico Institute of Mining and Technology (NMT), with the goal of having 100-120 participants so that I could generalize to a larger audience (Creswell, 2009). Working with core-requirements writing classes and a club with members from different degrees and levels in school allowed me to get a cross-sampling of degrees that I would not have gotten with, for example, a chemistry class (see Table 1).

**Table 1. Overall Breakdown of Participating Students**

	Upperclassmen	Underclassmen
<b>Mechanical Engineering</b>	17	2
<b>Natural Science</b>	3	3
<b>Applied Science</b>	14	10
<b>Other/None Entered</b>	42	10
<b>Overall</b>	76	25

I visited each class and club only once, and only students who showed up to class that day could participate. This allowed me to avoid having people participate more than once, which would skew my data. For this study, I collected demographic data about degree and year in school. I limited the scope of demographic data to only those two questions because I only wanted to see the overall effects of exposure to Desnoyers' taxonomy. Bartell, Schultz, and Spyridakis (2006) used a similar limitation of demographics when they tested how difference in text signals changed comprehension between online and print documents. I got a range of

data that reflects mostly normal distributions of degrees and year in school at NMT, specifically more engineering type degrees, as well as undergraduate level in school. However, because two of the classes were limited to only mechanical engineers and one of the classes had mostly technical communication students, I have a slightly higher than normal percentage of those two populations. Unfortunately, my data does not fully reflect those higher percentages because roughly one third of the total participants did not write their degree (called Major(s) on the pretest, see Appendix A) on their copy of the survey.

### Pretest and Posttest Measures

The first six questions on the pretest (see Appendix A) were general demographic questions, including ones about majors and level in school, whereas the final ten questions were data sets that the students had to pair with data visuals. The posttest had identical data sets as the pretest, but in different orders, to make the comparisons valid while preventing students from answering the posttest questions in "autopilot mode."

My dependent variable was the students' answers for the data sets on the pretest and posttest, which I then evaluated in light of overall change and change within each major and level in school. To capture these changes, students only had to fill out the pretest and posttest surveys, and listen to the presentation: no other tasks were required. For purposes of calculations, because I could not account for people putting both efficient and non-efficient answers on a single data set (see Appendix A for the list of which answers were considered efficient for each data set), I coded their answer as efficient so long as one of their options was efficient for the given data set.

For example, data set 4 of the pretest read, "As part of your senior project, you need to compare the durability of five types of wood resin composites" (see Appendix A). The data set included three specifics that the students had to notice: specifically the words "compare," "durability," and "five." "Compare" told the students the objective of what they needed to do with the data. "Durability" told the students what quantitative quality they would need to focus on, and "five" told the students that they had to present only a small set of data. Given these three specifics, the efficient answers were: F, I, and L. Choice F (a cellulogram) would allow the students to compare exact numbers for multiple measures of durability. Choice I (a punctigram) would allow the students to compare two measures of

## Desnoyers' Taxonomy's Implications for Data Visualization

durability by using a point to represent each of the five wood resin composites. Finally, choice L (an absolute histogram) would allow the students to compare the composites based on a single measure of durability.

### Data Analysis

Of the 16 questions on the pre-test, 10 were data sets, and I used paired Student's *t*-tests to analyze the primary results by calculating an aggregate score for the pretest and a second aggregate score for the posttest. I then used a one-way ANOVA test to compare performance of upperclassmen to underclassmen because of the large difference in group sizes (76 compared to 25). However, I could use neither a *t*-test nor an ANOVA test to compare performance of degrees because 1/3 of the students chose not to put down any information for this demographic factor.

If the *t*-test results showed a statistically significant increase in the number of efficient chosen data visuals after exposure to the Desnoyers' taxonomy, then I would need to calculate the Cohen's *d* value based on means and standard deviations (Ravid, 2011, p. 150). The Cohen's *d* value indicates the effect size of the difference found. If Cohen's *d* is 0.8 or larger, then it would indicate that the results have a large effect, and that exposure to Desnoyers' taxonomy could significantly help students use more efficient data visuals. A Cohen's *d* value of 0.5 would indicate a medium effect. A Cohen's *d* of 0.2 or smaller would indicate that the difference, although statistically significant, is only small.

## Results

In this section, I first present the overall change in efficient answers after exposure to Desnoyers' taxonomy. Next, I present the results of the sub-questions, specifically the results of their reported use of data visuals and how the demographics of the participants affected their choice of efficient data visuals. Finally, I report how the exposure to Desnoyers' taxonomy changed students' willingness to use more complex visuals for the data sets.

### Change in Efficient Answers after Exposure

Comparing overall pretest results ( $M = 7.02$ ,  $SD = 1.59$ ) to posttest results ( $M = 7.38$ ,  $SD = 1.66$ ) I found a statistically significant difference,  $t(100) = 2.11$  ( $p < 0.025$ ) between the two, as shown in Table 2.

**Table 2. Means and Standard Deviations for the Pretest and Posttest**

	Mean	Standard Deviation	<i>t</i> value	<i>p</i> -value	Cohen's <i>d</i>
Pretest	7.02	1.59	2.11	$p < .05$	0.21
Posttest	7.38	1.66			

*Note:* The scores represent numbers of efficient visuals used (out of 10).

As noted, the mean of the overall answers only increased by 0.36 points out of 10 possible points, a mere 5% increase. The positive *t* value (2.11) shows that the students chose more efficient answers on the posttest, showing that students would choose more efficient data visuals after exposure to discussion of the taxonomy and the data visuals' purpose. However, the small Cohen's effect size value ( $d = 0.21$ ) limits how much of an impact this increase is on students' reported usage of efficient data visuals. I will explore a few possible reasons for this limited increase along with the associated implications for education in my Discussion section.

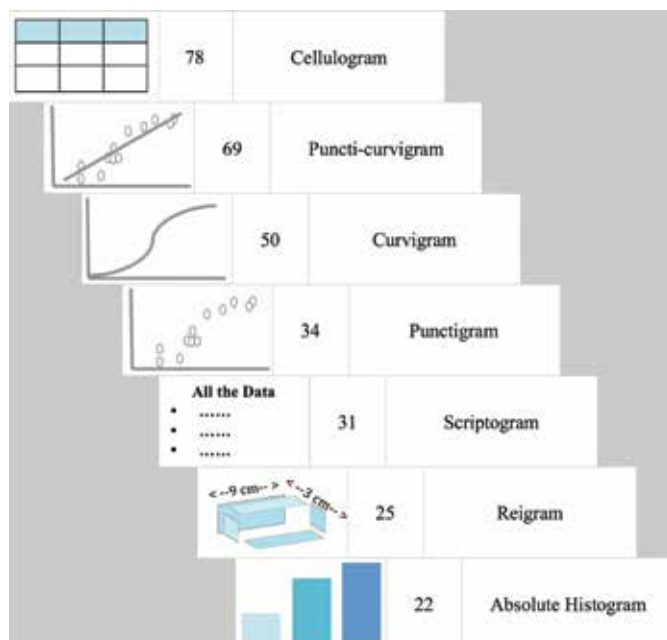
### Students' Reported Use of Data Visuals

In question 5 of the pretest, I asked the participants to list the data visuals they used the most often in the past 12 months (see last page of Appendix A for potential data visuals). I hypothesized that students would use cellulograms, reigrams, puncti-curvigrams, and absolute histograms. In Figure 4, I list the top 7 most used data visuals as reported by the participants. In my results, I discovered that many students could not decide on just three data visuals (question 5 of the pretest, see Appendix A). Figure 4 shows that students reported using cellulograms and puncti-curvigrams as the top four most used, whereas they reported reigrams and absolute histograms as the sixth and seventh most used.

The data visuals that students selected reflected the STEM nature of the university because those are the types of data visuals required by field conventions in the NMT student lab reports, but the visuals also show that there is not much variation in how students present data.

In question 3 of the pretest, I asked students to mark how many data visuals they had used in the previous twelve months. Table 3 summarizes my results, which show that roughly 75% of my participants created over 21 data visuals for classes and projects in the past twelve months.





**Figure 4. Top Seven Most Used Data Visuals by Students**

*Note: These answers were self-reported by students, and only cover 12 months of their time in school (during the year 2014).*

**Table 3. Participants' Reported Amounts of Data Visual Creation**

0-10 data visuals	13
11-20 data visuals	11
21-30 data visuals	20
31-40 data visuals	13
41+ data visuals	34

*Note: These numbers were self-reported by students, and only cover 12 months of their time in school (during the year 2014).*

In the Discussion section, I explore the implications of students' creating that many data visuals and a possible ramification on the types of data visuals created.

### Differences between Degrees and Levels of Participants

As seen in Tables 4 and 5, the degrees and different levels in school show a slight difference in how many efficient data visuals students chose before and after exposure to the taxonomy. These two tables taken together show the spread of participants over my target demographics, that is, STEM university students.

Overall, students increased the mean of their efficient answers by only 0.36 points out of ten, and the standard deviation increased. When I compared

**Table 4. Degree Comparisons Based on Mean of Efficient Answers**

	Number of participants	Pretest mean (SD)	Posttest mean (SD)
<b>Overall</b>	101	7.02 (1.59)	7.38 (1.66)
<b>Mechanical Engineering</b>	19	7.47 (1.19)	7.58 (1.43)
<b>Natural Science</b>	6	6.17 (1.95)	8.33 (0.94)
<b>Applied Science</b>	24	6.75 (1.83)	6.88 (2.01)

*Note: The scores represent numbers of efficient visuals used (out of 10).*

mechanical engineers and other applied sciences to that, their means increased by less than that amount, but their standard deviations also increased. However, natural sciences increased by 2.16 points out of ten, while also decreasing their standard deviation. I did not gather enough data on the split of degrees to do more than surface comparisons because, as noted, 1/3 of my participants chose to not write in their degrees (question 1 on the pretest, see Appendix A).

**Table 5. Comparison of Levels in School Based on Gain Scores**

	Number of participants	Pretest mean (SD)	Posttest mean (SD)
<b>Overall</b>	101	7.02 (1.59)	7.38 (1.66)
<b>Upperclassmen</b>	76	7.08 (1.52)	7.43 (1.72)
<b>Underclassmen</b>	25	6.84 (1.76)	7.20 (1.41)

*Note:  $F(1,99) = .000, n.s.$*

Comparing the different levels in school to the overall, I ended up with an interesting result: the underclassmen and upperclassmen had virtually no difference in performance on the test. In the discussion, I explore one possible reason for why this is.

### Effects of Desnoyers' Taxonomy on posttest data visuals

I saw an increase in more complex data visuals (A, B, C, D, H, N, O, P as listed in the Appendix) on the posttest. These data visuals I consider "complex" because basic spreadsheet software does not include them, requiring students to make them by hand, and therefore students might not normally take the time

## Desnoyers' Taxonomy's Implications for Data Visualization

to make them. Ten percent or less of the participants reported using these complex visuals within the past twelve months, with exception of C. This trend caught my attention because participants were willing to use more complex data visuals after exposure to Desnoyers' taxonomy even without formalized training.

### Discussion

The results from this exploratory study seemed very promising, as they indicate that Desnoyers' taxonomy may help students choose more efficient data visuals; however, the results highlighted more problems than solutions. First, students' reported use of data visuals supports the idea of discrepancies between academia and journals. Second, while students create many data visuals per year, they are lacking quality instruction on how to create efficient visuals. Third, instruction needs to include complex visuals and not just simple ones generated by software.

### Discrepancies in Visual Communication

For my first research question, I proposed that students would only use four specific types of data visuals before exposure to Desnoyers' taxonomy. I accurately predicted students reporting that they often use cellulograms and puncti-curvigrams. However, the next most used data visuals fall under curvigrams or puncti-curvigrams, which I did not anticipate. This usage makes sense because I conducted the study at a STEM university that requires all students to take laboratory sciences. For example: students have to write weekly lab reports for Physics I & II (required for all students to take). In these lab reports, they must use line graphs to show trends and raw data. I did not anticipate students using punctigrams or curvigrams (the third and fourth most used data visuals) because students normally have to report trends and raw data on the same data visual, which is what puncti-curvigrams efficiently do. However, students' use of these other two forms of line graphs shows that they do not always have to report trends and raw data simultaneously. This lack of variation in visuals indicates that students either present very similar data sets or simply do not use a variety of efficient data visuals or chose to follow field conventions regardless of efficiency.

Additionally, students' reported use of data visuals supports prior research about discrepancies between

academia textbooks and journal data visuals: in STEM journals, professionals typically do not use cellulograms or cosmograms (Rybarczyk, 106, p.110). As such, students are learning and using textbook data visuals that they might use for laboratory research, but perhaps not for publication. If students in the STEM fields were maintaining the discrepancy, then it would stand to reason that we would need to ask if the field of technical communication has similar discrepancies and if our students are being trained to maintain them.

### Teaching Students Efficient Data Visualization

NMT students have experience creating data visuals even without much formal training. The majority of STEM students participating in this study create over 20 data visuals yearly, which means they can create either many effective data visuals or many ineffective ones. I anticipated that the majority of students would create this amount of visuals specifically because of the required 26 credit hours (minimum) of laboratory sciences that all students at NMT have to take. Professors routinely give students instruction on how to create line graphs, as each degree field has different requirements for what variables go on which axes. However, instruction in how to create other efficient data visuals is absent.

I noticed that students gravitated toward both more efficient answers and more complex data visuals after exposure. Again, as defined in my results, I consider complex data visuals A, B, C, D, H, N, O, P as complex data visuals (page three of Appendix A), and I consider them "complex" because basic spreadsheet software does not include them and therefore students must make them by hand. Possibly, students chose more complex visuals because of the exposure. As such, students might have chosen the complex visuals because they finally knew what to use them for, whereas before they might not have known how to use them. The fact that 10% (or less) of the participating students reported using those data visuals and the increases in standard deviations for most of the participant groups after exposure supports this idea. Understanding complexity and efficiency of data visuals might not directly tie to Desnoyers' taxonomy, but it could help students understand the kind of visuals used in journals and other STEM fields.

Perhaps STEM students are unusual in the number of data visuals that they create, thereby marking them as a different subset of students that technical communicators should study as part of data

visualization research. This supports the research done by David Hutto (2007) that found that working STEM professionals “record information in graphic form and [use] graphics during design work” (p. 88), except in this case students and not STEM professionals record information in visual form. Without proper instruction on how to create data visuals, though, students waste time and possibly miss data while recording data in improper formats while they attempt to figure out how to create visuals on their own. This idea generalizes to all users of data visuals; even technical communication professionals could waste time and miss data if they lack proper instruction on how to create and how to choose data visuals in accordance with the data and the purpose of the intended visual.

### **Desnoyers’ Taxonomy’s Potential Use**

We can see from the results that upperclassmen and underclassmen had almost identical results during this experimental study. Admittedly, the exposure to Desnoyers’ taxonomy was brief (only five minutes), so perhaps a more substantial and interactive exposure would reveal how prior knowledge might create differences between the two groups.

So how does this result influence our choice of whether or not to continue pursuing Desnoyers’ taxonomy as a useful way of sorting data visuals? First, Desnoyers’ taxonomy requires knowledge of how to differentiate between different kinds of data (that is, spatial, temporal, intrinsic properties, for example). Second, Desnoyers’ taxonomy requires knowledge of what features in a given data set one wants to highlight, if at all. The lack of a difference between underclassmen and upperclassmen means that their knowledge (or lack thereof) of these two factors is very similar. This then implies that upperclassmen do not receive further knowledge in their upper level courses about how to create data visuals or why/when to use them. With this, perhaps students would benefit from having more exposure and training in efficient data visuals starting their freshman year and increasing in complexity by senior year. By starting simply, we can help students grasp the core concepts of data visual creation (Dragga & Voss, 2001; Heer, Bostock, & Ogievetsky, 2010; Tufte, 1983). Core concepts allow students to better differentiate between different kinds of data while helping them understand what information they can highlight from the data. Then, by increasing the

complexity of data visuals as students advance through college, we can steer students toward efficient visuals regardless of the methods needed to create the visual. Desnoyers’ taxonomy, due to its inherent organization, offers a logical framework to present visuals, and could easily be manipulated by educators to focus on either simple or complex visuals and how they relate to other visuals.

### **Limitations to the Study**

I proposed and confirmed that students would gravitate toward more efficient data visuals after exposure to Desnoyers’ taxonomy. However, for several reasons, we cannot be sure that the exposure to the Desnoyers’ taxonomy was the only factor of influence in this study.

Possibly, descriptions of different types of data visuals during the exposure introduced students to new data visuals. For example, after the survey students asked me many questions about morphograms (i.e. spider charts). The descriptions of how to properly use the different kinds of data visuals might have helped the students understand how to properly use data visuals more so than the exposure to the taxonomy itself.

Secondly, the increase in efficient data visuals may also be attributed to learning because of thinking about the visualization twice. Remember, the data sets on both the pretest and posttest were identical, just in different orders, so the students had to think about how to present the data twice. This leads to a takeaway specifically for university and college level faculty, in that perhaps students need more exposure to a wide variety of data visuals and explanations of how to properly create and use them, regardless of whether that exposure comes from Desnoyers’ taxonomy. Every faculty member has a different understanding of data visuals, so by having multiple explanations from different perspectives, students can think about visualization in different ways resulting in the creation and use of more efficient data visuals.

Perhaps the largest limitation to this study is the lack of a control group with alternative instruction. While I chose an exploratory study where control groups are not required, the results highlight the need for such a comprehensive study, leaving open the door for future research.

### **Future Research**

This study supports other calls to research about data visual sorting schemes and opens the doors for several

## Desnoyers' Taxonomy's Implications for Data Visualization

specific studies. First, technical communicators should see if STEM students are unusual in the number of data visuals they create. If STEM students are unusual, then that difference as compared to humanities students can open an entirely new area of data visualization research. Second, a comprehensive study that compares Desnoyers' taxonomy to "just" explanations of data visuals will answer the question of whether or not it can fill that void of a consistent lexicon. Third, additional testing should be on the differences in data visual efficiency between degree fields, so as to highlight where we can focus further efforts of data visualization standardization.

Finally, the results of this study suggest both that students need more exposure to data visuals and that Desnoyers' taxonomy can help prompt students to ask the needed questions when trying to match data sets to data visuals. As such, it might be worthwhile to do a study about how we could adopt this taxonomy as a teaching tool. For example, drawing teaching methods from life science fields and how they use the biological taxonomy developed by Carolus Linnaeus as a framework to teach classification of living things.

### Conclusion

My study does not confirm that Desnoyers' taxonomy is the perfect way to sort data visuals, but it does show that the taxonomy has potential. It supports the idea

that a consistent sorting scheme will help scientists and STEM academia choose efficient data visuals to present their data. Again, aesthetic efficiency for data visuals has been defined, but efficiency for their usage has not. Such a sorting scheme will help everyone to focus on the creation of efficient data visuals themselves rather than focusing on defining efficiency for scattered types of visuals. Efficient data visuals will support the recent advances in science, and will make those advances more easily understood by those not in the respective scientific field of development. Additionally, technical communication research in data visualization would benefit from a consistent way of referring to data visuals. Consistent lexicons will allow researchers to focus on the visuals themselves and not the terminology itself. Ultimately, if further studies show that it can increase awareness of data visuals' efficiency, then researchers could confidently adopt Desnoyers' taxonomy as a way to teach and reference data visuals consistently.

### Acknowledgments

Thanks be to God who gave me the idea for this research topic. Many thanks to the assistance of three professors at NMT who let me conduct the study in their classes. Additionally, thank you to Elisabeth Kramer-Simpson, who assisted me with setting up the initial research, and Mark Samuels, who reviewed my calculations for accuracy.

## Appendix: Visualizing STEM Data Pretest

[Note: Question numbers added during data analysis to make it easier to reference in the write up. Also, the letters in italics are the efficient answers for the given data sets.]

1) What is/are your major(s)?

2) Check which applies

\_\_\_ Freshman/Sophomore

\_\_\_ Graduate

\_\_\_ Junior/Senior

\_\_\_ Other

3) How many Data Visuals (such as tables, charts, graphs, figures, maps, diagrams, etc.) did you create for school in the last 12 months? (See page 3 for examples)

\_\_\_ 0-10

\_\_\_ 11-20

\_\_\_ 21-31

\_\_\_ 31-40

\_\_\_ 41+

4) How many research projects and/or papers have you participated in/completed in the past 12 months?

5). Which 3 Data Visuals from the list on page 3 did you use the most often in the past 12 months? (List the letters in the space below.)

6) How much do you care about presenting data in the most effective manner possible?

1-----2-----3-----4-----5-----6-----7

For the next 10 data sets, mark the letter of the Data Visuals listed on page 3 that you would most likely use to present the data (you can re-use letters)

7) *Data Set 1:* You are writing a memo about a new widget in the lab and you need to include all of the widget's functions.

Letter of the Data Visual \_\_\_\_\_ (*E, F*)

8) *Data Set 2:* Your team discovered a new species of iguana and want to show in a report how many iguanas in the world are part of that species.

Letter of the Data Visual \_\_\_\_\_ (*L, M*)

9) *Data Set 3:* In a lab report, you want to show the change in the angular momentum of a wheel over time.

Letter of the Data Visual \_\_\_\_\_ (*J, K*)

10) *Data Set 4:* As part of your senior project, you need to compare the durability of five types of wood resin composites.

Letter of the Data Visual \_\_\_\_\_ (*F, I, L*)

11) *Data Set 5:* Over the course of a year, you measured trees on campus and noticed that some are growing faster than others are. You want to figure out where trees grow faster based on location.

Letter of the Data Visual \_\_\_\_\_ (*A, L*)



## Desnoyers' Taxonomy's Implications for Data Visualization

12) *Data Set 6*: You need to compare the parts of widget green to widget blue. You decide to compare them based on materials used to build the parts.

Letter of the Data Visual \_\_\_\_\_ (*E, N, O*)

13) *Data Set 7*: You noticed a patch of lichen growing outside the Chemistry building and decided to measure the lichen's diameter over the course of year, with bi-monthly measurements. After gathering the data, you decided to show the relative change in diameter as it grew.

Letter of the Data Visual \_\_\_\_\_ (*D, J, L*)

14) *Data Set 8*: You need to illustrate the difference in assembly between a concrete bridge and a metal bridge.

Letter of the Data Visual \_\_\_\_\_ (*C*)

15) *Data Set 9*: After cleaning up your dorm room, you decide to do the very techie thing and compare three different cleaning compounds to see which chemicals are similar and which ones are different.

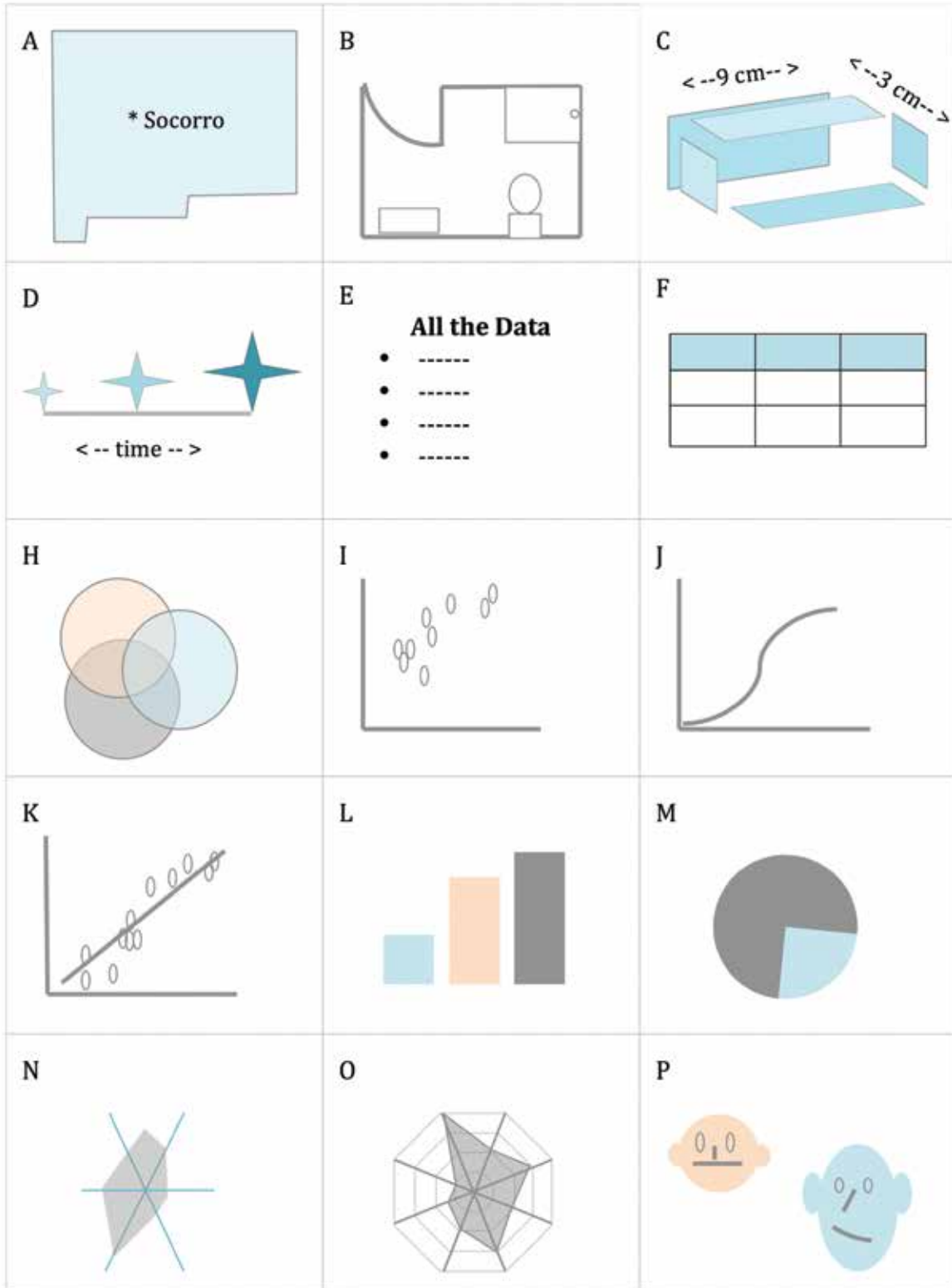
Letter of the Data Visual \_\_\_\_\_ (*E, H*)

16) *Data Set 10*: For your junior project, your team decides to compare the horsepower, torque, and price of three engines to see which one would be the best for your purple widget.

Letter of the Data Visual \_\_\_\_\_ (*E, N, O*)

## Visualizing STEM Data

### Data Visuals



## Desnoyers' Taxonomy's Implications for Data Visualization

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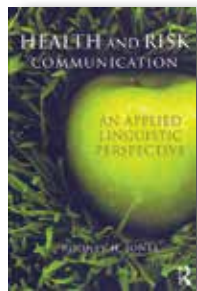
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## Health and Risk Communication: An Applied Linguistic Perspective

Rodney H. Jones. 2013. New York, NY: Routledge. [ISBN 978-0-415-67260-3. 212 pages, including index. US\$39.95 (softcover).]



*Health and Risk Communication: An Applied Linguistic Perspective* is a thoughtful analysis of health and risk as seen through the lens of applied linguistics. Rodney Jones addresses several questions in this book that include how health discourse shapes a patient's understanding of their condition as well as how it influences

their decisions regarding their health. Jones also addresses the role of technology, such as genetic screening, and how health communication can help create communities centered on specific health issues.

The rhetorical analysis in the book builds on the work of many well-known works in health rhetoric, like Foucault's *The Birth of the Clinic*. Jones adds to the existing conversation in the rhetoric of health communication by examining current issues in healthcare, such as how medical research, or "the voice of medicine" and a patient's personal experiences, or "the voice of the lifeworld" clash. According to Jones, an example of this conflict occurs when parents decide whether to vaccinate their children. On one hand, disease outbreaks among unvaccinated children have made it evident that not vaccinating children can lead to contracting serious illnesses. However, on the other hand, parents who identify as "anti-vaxxers" feel that the risk of contracting these illnesses is minor when compared to the potential negative effects of receiving the vaccinations, such as the perceived risk of the child developing autism from the vaccine.

The medical issues analyzed in *Health and Risk Communication* are timely and understandable. Jones uses medical situations that most readers will immediately recognize either from personal experience or from the news, such as the 2012 Texas mandate that any woman who seeks an abortion must first undergo an ultrasound. These concrete examples are a major strength of the text because they allow a reader with less experience in applied linguistics to follow his analysis of the medical text or communication.

Despite the clarity and timeliness of the examples, the analysis in *Health and Risk Communication* makes for a slow and careful reading experience. This is not a text to which the reader can devote anything less than their full attention. Although Jones covers the basics of applied linguistics in chapter 2, *Health and Risk Communication* is a much easier read for those who have a background in this method of analysis. However, for those who take time to follow Jones's detailed analysis, the rewards are worth the effort.

The main audience for *Health and Risk Communication: An Applied Linguistic Perspective* is academics interested in the rhetoric of health communication. Health practitioners and technical writers working in the health fields may also benefit from this book's examination of communication and power. This text may also benefit graduate students in technical writing as well as medical students who are interested in issues of communication in healthcare settings.

### Nicole St. Germaine-Dilts

Nicole St. Germaine-Dilts is an associate professor in the Technical and Business Writing Program at Angelo State University. Her research interests include technical communication for a Mexican-American audience and technical communication in the health fields.

## Brand Journalism

Andy Bull. 2013. New York, NY: Routledge. [ISBN 978-0-415-63810-4. 288 pages, including index. US\$43.95 (softcover).]



In *Brand Journalism*, Andy Bull bundles communication, marketing, and journalism principles into one neat how-to package. On the Routledge Web site, the book is described as a response to "the newly-emerging trend of organisations hiring journalists to create content on their behalf"

(<http://www.routledge.com/books/details/9780415638104/>). From my perspective the concept of brand journalism, as Andy Bull presents it, is



a fascinating outcome of the decline of traditional journalism and the increased pressure in the market for brands to differentiate themselves amidst a tidal wave of ever-evolving media options.

As I began reading, I found that there was nothing groundbreaking or new about the approach. In Section One, Bull describes how to build a brand journalism strategy. A sound yet generic approach, giving readers nothing that they couldn't find in any good marketing or communications textbook.

Each chapter ends with recommended exercises that cause an awkward juxtaposition. These exercises are presumably for students or those new to the field, yet the content is more for experienced professionals. As an example, Bull provides advice on how to establish a brand journalism department staffed with multiple employees, equipped with expensive technology, and occupying office space. This is not student or entry level material. Most communication professionals would need to be well along in their careers before they attained a level high enough to open a new department.

*Brand Journalism* becomes interesting when Bull begins presenting case studies in Section Two. He interrogates case studies of well-known brands from Ford to Red Bull to McDonald's to uncover how they succeeded, and sometimes failed, in their attempts to bolster their brands. Where Bull falls down is his inconsistent depth of analysis. In Section Two, we are treated to seven chapters of thorough examinations of brand journalism platforms. By the time we get to Section Three, which provides a review of storytelling paths, the depth of coverage becomes increasingly shallow. On the other hand, the number of case studies increases, so what is lacking in depth Bull makes up for in breadth . . . yet I personally prefer both.

Section Four covers metrics—the philosopher's stone of communications. This is typically the topic writers can't stop gushing about. I was surprised, then, to find only three chapters in this sparse section. I am tempted to excuse the author on grounds that solid measurement for communications is, as I noted, elusive. It's elusive because it's hard. Because it's hard, most organizations find a way to avoid it. But then again, I have been around enough to know there are companies that absolutely nail measurement, showing strict line of sight from strategy to execution to business impact. I

was disappointed that *Brand Journalism* didn't cover this topic more exhaustively.

What I liked about *Brand Journalism* was the case studies. I enjoyed stealing a view into how other companies market their brands through innovative means. What I wanted more of was consistent depth.

### Gary Hernandez

Gary Hernandez is a communications director for an international oil company. He received his English literature MA from George Mason University and received his technical writing MS from Utah State University. Gary belongs to STC and IABC.

## Design for Kids: Digital Products for Playing and Learning

Debra Levin Gelman. 2014. Brooklyn, NY: Rosenfeld Media. [ISBN 978-19-338-2030-9. 232 pages, including index. US\$39.00 (softcover).]



If you have kids who are digitally literate, you know the joys and sorrows they experience when trying to play games on the Web or a smartphone. Why those swings in emotion? Kids with short attention spans quit games after a few minutes of frustration. Often the source lies in the game design. Debra Gelman addresses why games go wrong for kids in her *Design for Kids: Digital Products for Playing and Learning*.

The problem she addresses, as Brenda Laurel points out in the Foreword, is that kids are often thought of as not demanding careful design of their games. Most early Web designs assumed that kids were little adults and the designs that worked for adults should work for kids if they were dumbed down. Another important problem leading to frustration is an educational assumption: play and learning are two separate activities. In elementary school, recess was the time for play and classroom the time for learning. As the child progresses, the schools allocate less time to play until a point where there is no play at all during school hours.

Gelman argues that play can be a part of learning, and her book presents a guide on how to design to incorporate both.

The key to *Design for Kids* is a comment Gelman makes that summarizes her advice: “. . . you should design [for kids] as you would for adults, *by understanding your target users’ needs, behaviors, and attitudes*” (p. 134; emphasis added). But, this has long been rule number 1 for technical communicators. So, why have these designers been ignoring it? Her answer is poor user analysis.

Gelman divides her book into three parts: In Part one, she surveys past design approaches, analyzing those designs showing strengths and weaknesses. She follows up on this conclusion by discussing how learning should be part of play just as in a classroom. In the final chapter of this Part, she discusses kids’ development based on Piaget’s Theory of Cognitive Development.

Part two takes us into the kids’ world. She divides kids into two-year groups starting with 2–4 year olds, and ending with kids 10–12. For each grouping, Gelman presents some theory, but more importantly, specific design advice. Screen shots, lists of various kinds, interviews, case studies, and chapter checklists are among the features that make her work accessible.

Finally, Part three offers suggestions for doing research on kids. She provides an example of embedding a video in the site or app, and how the design handles that for the age groups. The last chapter is a checklist based on what has come before and questions designers need to ask, some design particulars, and suggestions on getting the final product published.

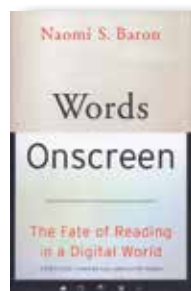
All in all, *Design for Kids* provides the information designers need when they design Web sites and apps for kids.

### Tom Warren

Tom Warren is an STC Fellow, Jay R. Gould Award for Excellence recipient, and professor emeritus of English (technical writing) at Oklahoma State University, where he established the BA, MA, and PhD technical writing programs. Past president of INTECOM, he serves as guest professor at the University of Paderborn, Germany.

## Words Onscreen: The Fate of Reading in a Digital World

Naomi S. Baron. 2015. New York, NY: Oxford University Press. [ISBN 978-0-19-931576-5. 304 pages, including index. US\$24.95.]



Naomi Baron has written a prophetic call to look at what digital reading is doing to us, and whether it should be challenged. She does her own research, formal and informal, and examines the scholarship. Her conclusion: Yes, we should challenge it. Why?

Reading onscreen is changing the way we read and what it means to read. Digital reading encourages the kind of fast reading that most of us create as technical communicators, which focuses on searching for solutions to problems. It does not encourage slow reading, the type that allows us to contemplate, absorb, and reread. Not everything is meant for slow reading, but digital reading does not encourage the type of reading required for literature, philosophy, and sacred texts.

Two of Baron’s chapters alone are worth the price of the book: Chapter 5 “The Web Ate My Print Option” and Chapter 8 “Your Brain and Hyper Reading.” The former chapter explores the phenomenon of the loss of the print option for Internet reading. I, for one, am so tired of printing badly formatted documents. It’s another case of the developers not knowing what the users want. Technical communicators as user advocates need to stand up for readers who want to annotate, reread, and save what they read for future use.

Chapter 8 “Your Brain on Hyper Reading” gathers all writers who are challenging what reading online is doing to us, plus the scientific research that shows how the brain is changing or not changing with regard to reading technology.

Baron challenges the notion that online reading is environmentally better than print, citing the heavy use of servers and the huge amounts of energy they require.

At the heart of the issue is a challenge to businesses and organizations that stand to benefit from digital reading: “Businesses (such as Amazon and Kobo) and educational establishments (whether CourseSmart or state boards of education) are working to change the culture of reading by replacing print with screens” (p.

205). Or as she puts it more succinctly—where you stand on this issue depends on where you sit.

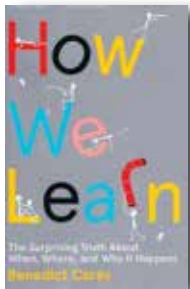
Baron invites us to stand and challenge those whose economic interests may be at odds with those of us for whom the printed book is a sacred object, which perhaps cannot be improved upon.

### Charles R. Crawley

Charles R. Crawley is a lead technical writer at Rockwell Collins in Cedar Rapids, Iowa. He also teaches as an adjunct at Mount Mercy University in Cedar Rapids. He just finished his third term (not consecutive) as the president of the Eastern Iowa Chapter of the STC.

## How We Learn: The Surprising Truth About When, Where, and Why It Happens

Benedict Carey. 2014. 1st ed. New York, NY: Random House. [ISBN: 978-0-8129-9388-2. 254 pages, including index. US\$27.00.]



There is an invisible line that some practitioners draw between the development of technical content for product documentation and learning modules. For example, when organizations establish different departments for technical writing and education. This line seems arbitrarily drawn because, as technical

communicators, we are educating. I heartily recommend Benedict Carey's *How We Learn: The Surprising Truth About When, Where, and Why It Happens* regardless of how you define your role.

Carey, an esteemed *New York Times* science reporter, wrote this book for a general audience. He divides the material into four easy-to-read parts. The first part, Basic Theory, is my least favorite part. Yet, this part was valuable enough that I re-read it to make sure I had the theory of memory and the biology of the brain stored for easy retrieval.

The theory section is not all science; the history of memory and learning is what kept me tuned to the material. The Forgetting Curve (p. 25) explains memory loss over time then takes what we think we know about

learning and challenges it. This theory sets us up for part 2, Retention, where things get interesting because the conventional wisdom regarding learning is redressed.

For example, studying in a quiet room for several hours is not the best way to learn (p. xiv). Long periods of concentration are not the only way to learn; interruptions are OK (p. 217). While scientists continue to debate about the best situations for learning and instruction (p. 63), research proves that if you struggled to learn in these situations, there is a good reason for your struggle.

The remaining sections lay out the science behind struggles with traditional instructional models. Learning and retention rates improve when we are pretested on material (p.100). Engaging in periods of not learning is helpful because the effort that goes into remembering what you learned increases long-term retention (p. 158). Sleep is essential for long-term learning (p. 211). Yes, you can cram for a test and pass, but don't count on retaining that information (p. 225). These pieces of information make logical sense, and it's great to see that research confirms it.

What is most reassuring about *How We Learn* is that the research presented seems to be entering into the educational systems. When I work on educational materials, I can cite the research to explain why pretesting is crucial (p. 95). When I guide my kids to prepare for classroom assignments, I push for distributed learning instead of waiting until the night before a test or major assignment to finish preparations (p. 65).

Learning does not have to be an anxiety-filled drill; it can be a process that is, at times, stressful, but ultimately rewarding. Learning is fun if we take fear of failure for not having complete mastery after a predetermined period of time out of the equation.

### Angela Robertson

Angela Robertson works for IBM in Research Triangle Park, NC. Angela has an MS degree in communication from North Carolina State University.

## You Can Say That Again: 750 Redundant Phrases to Think Twice About

Marcia Riefer Johnston. 2015. Portland, OR: Northwest Brainstorms Publishing. [ISBN 978-0-9858203-3-6. 46 pages. US\$7.00 (softcover).]



“See inside for details.” One visual-verbal redundancy you will find in *You Can Say That Again: 750 Redundant Phrases to Think Twice About*. According to Johnston, “Envelopes, in their very envelopeness, say, *I envelop something*. *Guess where you can find it!* *Hint: It’s not here on the outside*”

(p. 2). The opening dialog starts the book with its first redundancy where Johnston points solidly to the problems she has found when writing prose. One thought I have is how many of these redundancies occurred from an advertising-style of writing to gain immediate attention. Johnston gives us a few forms of redundancies. Other forms include literal, conceptual, and figurative repetition; colloquial speech; morphology; phonemes in phonology; and rhetoric. I believe that Johnston has a great start with her book.

The book’s organizational schema is by “alphabetical order within parts-of-speech groupings dotted with blatantly alphabetical thematic or aurally pleasing subgroupings” and interestingly illustrated by Brian Poulsen to match 17 of Johnston’s key redundant phrases (p. 5). The parts-of-speech groupings include adjective phrases (“bald-headed,” “whole entire”); noun phrases (“armed gunman,” “free gift,” “pair of twins”); verb phrases (“breathe in and out,” “Enter, Superman, to the rescue.”); and adverb phrases, odds, and ends (“copyright © 2015,” “equal halves.” Johnston’s sources are recent blog articles from the *Grammar Girl* and *Daily Writing Tips* to Bryan Garner’s *Garner’s Modern American Usage*.

*You Can Say That Again* is a simple, yet short, inexpensive book that gives you time to reflect on any writing mistakes you are making or have made. This book is a great desk reference resource worth keeping to make sure your writing doesn’t add to the redundant phrase count. And, if you find other redundant phrases, I’m sure that Johnston will gladly add them to her ever-growing list.

### Jackie Damrau

Jackie Damrau has more than 20 years of technical communication experience. She is a Fellow and member of the STC North Texas Lone Star chapter and the Instructional Design & Learning SIG. She serves as the book review editor for *Technical Communication*.

## Blogging for Writers: How Authors & Writers Build Successful Blogs

Robin Houghton. 2014. Cincinnati, OH: Writer’s Digest Books. [ISBN 978-1-59963-896-6. 176 pages, including index. US\$19.99 (softcover).]



What thoughts does the word “blog” invoke within you? Pleasant reading experience, opportunity for creative writing before an audience, marketing strategy, keeping in touch with followers or customers, one more social media to maintain.

Houghton considers all these responses, and more, in *Blogging for Writers: How Authors & Writers Build Successful Blogs*. So feel free to jump into the book anywhere you want to learn more.

If you haven’t already done so, Chapters 1 through 3 provide help to think through a blogging persona; understand blog basics, such as pages versus posts; and perform step-by-step procedures to set up a blog using WordPress or Blogger hosting services. Blogs featured in the book are to inspire. Smiling writers, each with a list of credentials, tell of their blog successes. You will be motivated to have a blog up and running in no time.

The next eight chapters contain the information a majority of writers hope to find when opening the book. Suggestions and guidelines for best use of blog features to help capture your desired audience and inspire reader loyalty. At the very least, your blog will look as professional as the writer it represents.

Having recently self-published a book, my agenda while reading *Blogging for Writers* was to learn how to advertise and sell copies. I already had created two blogs with supportive content, one for the published book and another for the upcoming one. Unfortunately,



my choice of Wordpress.com would not let me collect email lists—of utmost importance for writers to contact customers about future releases. It was least expensive to create a third blog on Wordpress.org to serve as my writer Web site and link to the others. I should have read the first chapters of Houghton's book a year or more ago!

Next, I made a "shopping" list: plug-ins such as About page (Chapter 3); customized theme and menus (Chapter 4); featured images and video (Chapter 5); promoting the blog (Chapter 6); adding social media links to avoid posts in multiple locations (Chapter 7); selling from the blog (Chapter 9); and collecting statistics (Chapter 10). More smiling writers promised me I could do all this. Fortunately, the instructions were clear and easy to follow.

What seemed to get lost is the fact that a blogger *must* be a social creature. Most of the writers I know are introverts, like myself. We can write instructions fifteen steps long, but be social? Chapters 6 and 7 ("How to Get Noticed" and "Let's Get Social") give ways to grow a blog community. However, no chapter in *Blogging for Writers* persuaded me to reply to spam comments or follow other blogs simply because their writers have a large audience.

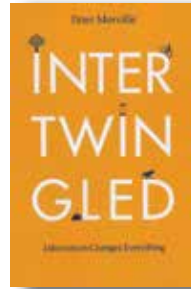
My blog is seldom visited, though now looks professional. And my business cards boast a QR code (not discussed in the book) that launches the blog from a cell phone. But the fact remains—Content is King (Chapter 5).

### Donna Ford

Donna Ford has been an STC member, joining in 1990 and serving on her local chapter's board for many years. She has been a technical writer since 1987 in the hardware, software, and government healthcare industries. Donna holds a certificate in Information Design from Bentley College.

## Intertwined: Information Changes Everything

Peter Morville. 2014. Ann Arbor, MI: Semantic Studios. [ISBN: 978-0-692-22558-5. 188 pages, including index. \$22.50 (softcover).]



Once in a while, in the midst of all our work reading and creating "how-to" information, we should stop and read a book that makes us think. *Intertwined: Information Changes Everything* is such a book.

The book takes its title from a 1974 work by Ted Nelson in which he commented that "everything is deeply intertwined"—connected in myriad, intricate ways. Peter Morville's new book shows us and exhorts us to think about how "it's vital to see our organizations as ecosystems" and how "all ecosystems are linked" (p. 3).

Morville, one of the information architecture founders and a noted consultant, is really a Renaissance man. Here he draws on many fields and examples from preparing for a solo backpacking trip to Buddhism to basketball coaches, as well as Web sites and other artifacts that resonate with technical communicators.

*Intertwined* is full of insights like these:

"Information systems aren't just code. They are also about content and culture. We must select our frame of reference very carefully, because the solution is shaped by how we define the problem" (p. 26).

"Clients often don't know what's wrong. Instead of solving the symptom, I dig for a diagnosis. Design is an intervention" (p. 27).

The book's tone is conversational. When Morville uses "we," he is talking most directly to his information architecture colleagues. However, what he says is really for all of us. Not only are technical communicators also often information architects, *Intertwined* is about information, content, organization, and life.

Morville's book is also a treatise on thinking outside the box. As an information architect, he has often had to make clients see new ways of organizing their content. If you've ever been in a similar situation trying to help



clients or colleagues change, you will find much to like in *Intertwined*. As he says, the information age is “a time when learning how to learn (and unlearn) is central to success” (p. 6) and “we must have the courage to dwell in discomfort. Time spent wisely at the start of a project or journey may return dividends for years” (p. 46).

But *Intertwined* is not only a meditation. Along the way, Morville gives useful practical advice on organizing information, such as this: “Since every classification is flawed, we should usually use more than one. . . . we are getting better at providing multiple maps and paths, and it’s helping our users enormously” (p. 59).

*Intertwined* is a great read and an important contribution, not only to information architecture, but to technical communication. Reward yourself. Get the book.

### Janice (Ginny) Redish

Janice (Ginny) Redish is president of Redish & Associates in Bethesda, Maryland, USA. Ginny’s “how-to” book, *Letting Go of the Words – Writing Web Content that Works*, (Morgan Kaufmann / Elsevier, 2nd edition, 2012) will help you and your colleagues communicate successfully through your Web sites and social media. Ginny is an STC Fellow and a former member of the STC Board of Directors.

## Type. A Visual History of Typefaces & Graphic Styles

Cees W. de Jong, Alston W. Purvis, and Jan Tholenaar, eds. 2013. Cologne, Germany: Taschen. [ISBN 978-3-8365-4480-1. 2 vols., 720 pages, including index. US\$59.99 (softcover).]



*Type: A Visual History of Typefaces & Graphic Styles* is a two-volume set presenting a selection of type specimens from the collection of Jan Tholenaar, a Dutch collector who focused on letterpress specimens produced primarily between 1830 and 1930, although this set provides examples from as early as 1628 and

as late as 1938. Originally published in a hardcover edition in 2009 and reissued in 2013, this set is best thought of as a personally curated catalog of selections

from Tholenaar’s collection rather than a “visual history” as the title suggests. There are some large chronological gaps (for example, the period of 1629 to 1741 is not represented), a heavy weighting of 19<sup>th</sup> century specimens, and an emphasis on display faces and ornaments.

The bulk of the set is comprised of type specimen images presented in chronological order printed on high quality paper. Volume 1 covers the years, 1628–1900, while Volume 2 features the years, 1901–1938. Owners of the set gain free access to high-resolution JPEG files of the featured images.

As is typical of Taschen-published volumes, the text is presented in multiple languages (English, German, and French). Essays include an introduction by Cees W. de Jong (designer and publisher based in the Netherlands), an explanation of the collection by Tholenaar, and an essay by Alston W. Purvis (professor at Boston University) titled “Type Foundries: The Golden Age.” Purvis’ entry is by far the most coherent and useful of the essays; the others are poorly written and read as a set of unconnected paragraphs haphazardly strung together. Even the image captions would have benefited from thoughtful editing. For an 1878 specimen, the caption simply reads, “These samples show unprecedented possibilities. Letterpress technology now knows no bounds.” (Vol. 1, p. 176).

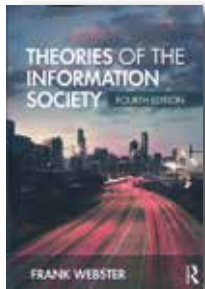
If the reader is in need of general “inspiration” for font selection, of historical examples to use in the classroom or visually interesting volumes to adorn his coffee table, then this set might be useful. Otherwise, the typical technical communicator will find little value in *Type: A Visual History of Typefaces & Graphic Styles*.

### Lee Andrew Hilyer

Lee Andrew Hilyer is the head of Information & Access Services at the University of Houston Libraries. He received his M.Ed. in instructional technology from the University of Houston and is the author of *Presentations for Librarians: A Complete Guide to Creating Effective, Learner-Centered Presentations* (Chandos, 2008).

## Theories of the Information Society

Frank Webster. 2014. 4th ed. New York, NY: Routledge. [ISBN 978-0-415-71879-0. 404 pages, including index. US\$55.95 (softcover).]



Webster's *Theories of the Information Society* is a sociological study of the society, variously named, but essentially a society involving information. This scholarly book, now in its fourth edition, will have limited appeal for technical communicators; it is best suited for a graduate course focusing on

information's role in society.

The book's structure falls into three sections: An overview of the field (Chapters 1–3); addressing specific theories and theorists (Chapters 4–12); and Webster's own views on why *Information Society* as a label is flawed and ultimately misleading (Chapter 13). The theorists he addresses include Daniel Bell; Manuel Castells; Herbert Schiller; Jürgen Habermas; Frederick von Hayek; and Anthony Giddens.

Webster's argument is that there is not enough evidence to label the current age as the Information Society as the various theorists want to do; therefore, each of the theories are inadequate when naming the current age. One interesting point he makes is that, while the theorists and groups he discusses focus on information and information products, one theorist suggests that the better view is obtained when you examine the sources and controllers of that information rather than the information itself.

While several chapters focus on a single theorist, others discuss several theorists—no principle scholar is identified with the topic. These chapters address a broader range of theories; for example, Chapter 5 discusses capitalism and Chapter 7 mobilities (such as Apple products). The various theorists address directly or indirectly how information influences and shapes society. Another issue is whether the political entities should be involved in information; for example, surveillance.

For Webster, the key is his skepticism about information becoming “the major distinguishing feature of our times” (p. 24). The problem is that the theorists label society the information society based on the quantity of information available when compared with past years.

The focus of the book's title is society and information, so, we have a society, but what kind of society is it? Webster does not challenge *information society*, but rather challenges the basis for the term. To help his readers understand his approach, Webster claims to be an advocate for capitalistic democracy, and that is the lens through which he views the theories. He seems to lean toward “theoretical knowledge” that involved capitalism as the basis for the designation. By theoretical knowledge, he refers to the theories behind information products. He concludes that “we may best appreciate information trends by situating them within the context of capitalist development” (p. 347).

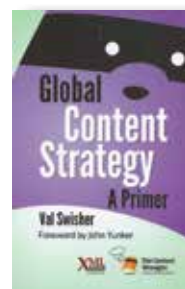
Be aware, though, that *Theories of the Information Society* is not easily read because it is meant to be a textbook used in advanced sociology classes. Also, the critiques require at least some familiarity with the theorists' views. Yet, for those who spend the time, the wealth of material can help them understand how information is shaping, in his view, capitalistic democracy. Fortunately, his style is easily accessible and the myriad references do not get in the way.

### Tom Warren

Tom Warren is an STC Fellow, Jay R. Gould Award for Excellence recipient, and professor emeritus of English (technical writing) at Oklahoma State University, where he established the BA, MA, and PhD technical writing programs. Past president of INTECOM, he serves as guest professor at the University of Paderborn, Germany.

## Global Content Strategy: A Primer

Val Swisher. 2014. Laguna Hills, CA: XML Press. [ISBN 978-1-937434-40-3. 86 pages, including index. US\$19.95 (softcover).]



*Global Content Strategy: A Primer* is an excellent book for someone new to the global content strategy field. Swisher defines global content strategy, gives you tips on finding your content, and shares brief insights into how certain word phrases or gestures can get you in trouble when translating content. She then briefly

talks about transcreation and the Translation Memory dance, and concludes by discussing the global content strategy revolution.

A global content strategy plan manages content “intended for people whose main language is something other than the source language” (p. 2). A global content strategy involves knowing where you are and where you want to be, doing a gap analysis, and moving toward a global content strategy solution. When developing your global content strategy, you should “cover global considerations implicitly,” which is why “we need books like this to show how it’s done” (pp. 5-6).

Finding your content helps minimize your translation costs. Knowing where your content is “created, stored, used, reused, and consumed” (p. 7) helps during the content audit. Swisher recommends using a content matrix that details where the content is, if it is localized, translated, or transcreated; number of languages; if translation memory is being; the translation vendors being used for each content source; and the translation reviewers both domestic and global.

Content translation can pose problems when you use the wrong words, pictures, symbols, icons, maps, flags, or gestures. Always make sure that these items are culturally appropriate for the audience. Analyze your images for universality and appropriateness before putting them in your documents to make sure you don’t offend your readers.

Transcreation creates content—words and images—for every culture using that country’s vernacular. With

transcreation, you may need to change the message or expression of sentiment to be culturally appropriate and understood. Swisher shows several transcreated Web sites from Coca-Cola with examples of how well they effectively targeted every culture and country, making these sites pleasing to look at, yet maintaining the corporate branding and marketing standards.

Delving further into global content strategy involves considering the translation memory and its effect on your content as well as doing the Translation Memory Exchange (TMX) dance. In that dance, you synchronize all the translation memories that reside individually at each language service provider by requesting each one to export their (really your) translation memory database into a standard file type, known as TMX.

*Global Content Strategy* is a short, easy read. The largest problems you will find are the size of the graphics and the grammatical mistakes in the book. The graphics are too small for you to focus on the details that Swisher wants you to view. The minor annoyances with the grammatical mistakes do not detract too much, yet in such a small book, I wouldn’t expect them to be there.

### **Jackie Damrau**

Jackie Damrau has more than 20 years of technical communication experience. She is a Fellow and member of the STC North Texas Lone Star chapter and the Instructional Design & Learning SIG. She serves as the *Technical Communication* book review editor.

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— **Willam van Weelden**, Technical Writer, WvanWeelden Consultancy



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Lyn Gattis, Editor

The following articles on technical communication have appeared recently in other journals. The abstracts are prepared by volunteer journal monitors. If you would like to contribute, contact Lyn Gattis at [LynGattis@MissouriState.edu](mailto:LynGattis@MissouriState.edu).

“Recent & Relevant” does not supply copies of cited articles. However, most publishers supply reprints, tear sheets, or copies at nominal cost. Lists of publishers’ addresses, covering nearly all the articles we have cited, appear in *Ulrich’s international periodicals directory*.

## Collaboration

### **Building relationships through integrated online media: Global organizations’ use of brand Web sites, Facebook, and Twitter**

Shin, W., Pang, A., & Hyo Jung, K. (2015). *Journal of Business and Technical Communication*, 29, 184–220. doi: 10.1177/1050651914560569

This article contains collaborative approaches in using social media that may be useful when teaching technical communication courses. “Many studies have examined organizations’ use of specific types of online media, but few studies have examined how organizations generate dialogues and develop relationships by using multiple online communication platforms. This study takes an integrated approach by examining how top global organizations incorporate brand Web sites, Facebook, and Twitter to cultivate relationships with stakeholders. Its findings suggest that those particular online media are used similarly, that is, more for information dissemination than user engagement and more for one-way than two-way communication. The findings also suggest that the types of products promoted can affect the way that organizations use different online media to develop relationships.”

**Sean C. Herring**

### **The hype and reality of social media use for work collaboration and team communication**

Cardon, P., & Marshall, B. (2015). *International Journal of Business Communication*, 52, 273–293. doi: 10.1177/2329488414525446

“This article describes the growing adoption of enterprise social networking platforms by organizations in an attempt to foster better team communication and collaboration. To examine current views of these social networking tools, survey results from 227 business professionals are presented that address three areas: frequency of use of social networking for team communication compared to other communication channels, perceived effectiveness of social networking tools for team communication compared to other communication channels, and attitudes toward social networking for team communication. Generally, the results show that traditional communication channels are used more frequently and considered more effective for team communication. However, the results also indicate that Gen X and Gen Y business professionals are quite likely to consider that social networking tools will be the primary tools for team communication in the future. The article concludes with recommendations for how business communication scholars can advance, define, and set apart the field by focusing on business communication via enterprise social networking platforms.”

**Katherine Wertz**

### **A preliminary examination of perceptions of social influence in group decision making in the workplace**

Henningsen, D., & Henningsen, M. (2015). *International Journal of Business Communication*, 52, 188–204. doi: 10.1177/2329488414525448

“Theory and research on social influence in groups indicate that normative influence can be detrimental to important group outcomes, whereas informational influence tends to have positive effects. However, much of the research providing these results consists of experimental studies conducted in laboratory settings. [The authors] examine how normative and informational influences are perceived in decision-making groups in the workplace. [The authors] find, in a survey of 197 individuals involved in group decision making in their workplaces, that the use of informational influence is viewed as enhancing group decision-making effectiveness and group cohesiveness. In contrast, normative influence has a negative effect on perceptions of decision-making effectiveness. Flirting as a form of idiosyncratic influence in the workplace is also considered and is found to have negative effects on perceptions of decision-making effectiveness and cohesiveness.”

Katherine Wertz

### **Professional writing pedagogy and university-workplace partnerships can shape the mentoring of workplace writing**

Kohn, L. (2015). *Journal of Technical Writing and Communication*, 45, 166–188. doi: 10.1177/0047281615569484

“This article analyzes literature on university-workplace partnerships and professional writing pedagogy to suggest best practices for workplace mentors to mentor new employees and their writing. The article suggests that new employees often experience cultural confusion due to (a) the transfer of education-based writing strategies and (b) the employees’ lack of cultural knowledge of the new workplace. The article then outlines implied mentoring strategies based upon this transfer and lack of cultural knowledge. The article also analyzes the literature on discourse community theory, activity theory, service learning, and internships, each of which also imply potential mentoring practices. These comprehensive best

practices are also contextualized through social cognitive, community-cultural, and motivational-attitudinal components that writing mentors should consider when mentoring writing in the workplace.”

Anita Ford

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## Communication

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### **An application of motivating language theory in Mexican organizations**

Madlock, P., & Sexton, S. (2015). *International Journal of Business Communication*, 52, 255–272. doi: 10.1177/2329488415572783

“The purpose of the current study was to extend organizational communication scholarship by examining the influence of culture on the use of motivating language by supervisors in Mexican organizations. Furthermore, the influence of motivating language on employees’ perceptions of their supervisors’ communication competence and their own job satisfaction and organizational commitment was examined. Participants included 158 full-time employees from a number of organizations located in Mexico. The current findings indicate that supervisors in organizations located in Mexico tend to use direction-giving language most frequently followed by meaning-making language and empathetic language. Direction-giving language was also indicated as the greatest predictor of communication and organizational outcomes. A discussion of the current findings highlighting expectancy violations theory was also offered.”

Katherine Wertz

### **Internal crisis communication strategies to protect trust relationships: A study of Italian companies**

Mazzei, A., & Ravazzani, S. (2015). *International Journal of Business Communication*, 52, 319–337. doi: 10.1177/2329488414525447

“Crisis communication has emerged as a hot topic after the global financial crisis that started in the

second half of 2008. A survey of 61 Italian companies examined internal crisis communication strategies and the characteristics of that communication in order to understand the role of communication in safeguarding relationships of trust with employees. The main results show that companies have used poorly internal communication as a strategic lever to develop employee commitment and have adopted a broadly defensive approach that may undermine their intangible assets. The study offers implications for practice and suggestions for future research.”

Katherine Wertz

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## Design

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### **Brainy type: A look at how the brain processes typographic information**

Thiessen, M., Kohler, M., Churches, O., Coussens, S., & Keage, H. (2015). *Visible Language*, 49, 174-189. [doi: none]

“Despite a growing body of knowledge around how readers interact with texts, our understanding of how the brain processes that information is relatively limited. This multidisciplinary (typography and cognitive neuroscience) study examines how the brain processes typographic information using EEG technology and shows the value of neuroscience methodologies to legibility research. By measuring the brain’s response to a range of typographic stimuli, [the authors] have shown that it is more difficult for the brain to process single letter information presented in harder to read compared to easier to read typefaces. This effect was evident at both the most basic levels of letter identification (0–300 milliseconds from stimuli onset) and also during sustained activity involving the working memory (after 300 ms). This has implications for our understanding of legibility and how legibility research is further explored with the aim of developing a body of knowledge that has a wider application to how typographic design is practiced.”

Lyn Gattis

### **The use of visualization in the communication of business strategies: An experimental evaluation**

Kernbach, S., Eppler, M., & Bresciani, S. (2015). *International Journal of Business Communication*, 52, 164–187. doi: 10.1177/2329488414525444

“An experiment was conducted to gather empirical evidence regarding whether the use of visualization is better than text in the communication of a business strategy. A total of 76 managers saw a presentation of the strategy of the financial services branch of an international car manufacturer. The visual representation of the strategy was chosen as the independent variable, and the effects on the audience were measured. Three types of visual support were chosen as conditions: bulleted list, visual metaphor, and temporal diagram. Each subject saw one representation format only. Subjects who were exposed to a graphic representation of the strategy paid significantly more attention to, agreed more with, and better recalled the strategy than did subjects who saw a (textually identical) bulleted list version. However, no significant difference was found regarding the understanding of the strategy. Subjects who were exposed to a graphic representation of the strategy perceived the presentation and the presenter significantly more positively than did those who received the presentation through a bulleted list.”

Katherine Wertz

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## Education

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### **Learning beyond the classroom and textbook: Client projects’ role in helping students transition from school to work**

Kramer-Simpson, E., Newmark, J., & Dyke Ford, J. (2015). *IEEE Transactions in Professional Communication*, 58, 106–122. doi: 10.1109/TPC.2015.2423352

“To prepare students for careers postgraduation, many academic programs have added components, such as service-learning projects (civic oriented, real-audience tasks) and client projects (real-audience corporate or nonprofit tasks), which aim to acclimate



students to the expectations of ‘real world’ clients while they are still in the relatively ‘safe’ domain of the classroom. The two studies reported in this paper examine whether participating in client projects as part of regular technical communication classes aids students in internships and later on the job. . . . To evaluate experiences on a particular client project, study one surveyed six students with open-ended questions about their experiences on it. To explore how the client project prepared them for internships, study two used semistructured interviews with interns and supervisors, observations of interns at work, and documents that interns created. Through recursive analysis, client projects emerged as being important in students’ internship experiences. Students participate in client projects in ways that support their learning and development as members of a community of practice in internships and on the job. This learning is gradual and varied. One particular finding for teachers is that rather than shield students from client interactions, it may be helpful to promote frequent, structured interactions with clients to better prepare students for the workplace.”

Lyn Gattis

### **Teaching students to focus on the data in data visualization**

Wolfe, J. (2015). *Journal of Business and Technical Communication*, 29, 344–359. doi:10.1177/1050651915573944

“Although most technical communication pedagogy provides students with solid advice on how to visualize particular numerical representations, it underproblematizes the rhetorical decisions we make in choosing which numbers to display in the first place. This pedagogical reflection uses Perelman and Olbrechts-Tyteca’s concept of interpretative level to foreground the rhetorical choices that underlie our decisions on how to summarize, aggregate, and synthesize the data we visualize. It then describes two informal classroom activities that emphasize the importance of interpretative level and help students see the recursive nature of data visualization and invention.”

Sean C. Herring

## Ethics

### **Corporate social responsibility communication through corporate websites: A comparison of leading corporations in the United States and China**

Tang, L., Gallagher, C., & Bie, B. (2015). *International Journal of Business Communication*, 52, 205–227. doi: 10.1177/2329488414525443

“Corporate social responsibility (CSR) is a discourse constructed through the constant dialogue and negotiation between corporations and their different stakeholders. This article examines how leading corporations in the United States and China discuss the rationales, themes, and practices of CSR on their corporate websites through a quantitative content analysis. The results, based on data collected in 2008, indicate that leading U.S. companies demonstrate a higher level of comprehensiveness and standardization in their CSR communication, while Chinese companies in different industries take distinctive approaches to CSR. However, the differences between the CSR discourses of leading Chinese and U.S. companies have greatly diminished since 2008. Updated data collected in 2012 show that the Chinese companies have adopted an all-inclusive and homogeneous approach in CSR communication, which is very similar to the approach taken by their U.S. counterparts. Such convergence is attributed to the process of institutionalization, especially to the forces of coercive and mimetic isomorphism.”

Katherine Wertz

### **Monkeywrenching plain language: Ecodefense, ethics, and the technical communication of ecotage**

Ross, D. G. (2015). *IEEE Transactions in Professional Communication*, 58, 154–175. doi: 10.1109/TPC.2015.2425135

“Subversive environmental texts, those that strive against hegemonic discourse, such as the book *Ecodefense*, have a long history of use by radical environmentalists as a means for recruitment and distribution of best



practices. This study aims to investigate the role of plain language in the subversive text *Ecodefense*, and consider some ethical implications of plain language by conducting a close textual analysis . . . using the Center for Plain Language’s (CPL) Plain Language checklist and Writemark’s criteria for documents, which includes consideration of the audience, structure, language content, and design of a text, as well as usability testing. Analysis shows that *Ecodefense* is partially representative of plain language use and practice under the CPL’s standards, and appears somewhat more fully representative under Writemark’s standards, which are designed for use by a trained assessor. Analysis further suggests that adherence to checklist-driven language practices may unwittingly enable an ethic of exigence; thus, research is needed into the ethical implications for list-driven, or standards-based, rhetoric in order to ensure that plain language practices consider long-term implications for users and for organizations that employ these practices.”

Lyn Gattis

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## Health communication

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### **Co-designing for healthcare: Visual designers as researchers and facilitators**

Napier, P., & Wada, T. (2015). *Visible Language*, 49, 128–143. [doi: none]

“This article describes the process, methods, and outcomes of a project that included multiple stakeholders in a participatory design process to re-design an indispensable service in the healthcare sector. The project explores how visual designers are taking on new roles as design researchers and design facilitators and what a human-centered design approach might look like within the healthcare sector of emergency management. Design methods included collaboratively visualizing the complexity of an existing context, including content development, production processes, distribution processes, issues, and perceptions; using generative tools to examine and discuss content, use, form, and function; prototyping toolkits to visually model processes, themes, devices, and technological

capabilities; and evaluative surveying to collect and assess user feedback. The outcome of this project includes a completely redesigned product and service that has increased user subscription and satisfaction, as well as suggestions for future implications and improvements.”

Lyn Gattis

### **Design to improve the health education experience: Using participatory design methods in hospitals with clinicians and patients**

Paulovich, B. (2015). *Visible Language*, 49, 144–159. [doi: none]

“Poor communication in health is a persistent problem. Transient conversations, extreme time constraints, stress, trauma, clinical factors and the restrictive environment make effective communication between health professionals and patients difficult to achieve. Children, especially, are often positioned as passive participants in the healthcare paradigm. It is hypothesized that providing children with visual health information (well-designed, accurate, age appropriate, and presented in a way that they can understand) can empower them to take charge of their health and well-being. For visual health education materials to be effective, accurate, and engaging, they need to be designed with input from design practitioners, health experts, and the target audience. However, constraints within the health field, such as restricted access to patients, make this difficult. Furthermore, when children are involved, ethical and practical obstacles can hinder the process. The research presented in this paper navigates the complexities of the health field and presents a realistic participatory design model that responds to the specific challenges associated with designing in a health-care environment. The efficacy of the approach is demonstrated through successful designs and positive health professional feedback.”

Lyn Gattis

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## Information management

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### **Title guidelines for technical documentation: Legacy vs. topic-based multi-channel delivery**

Devere, M. (2015). *Best Practices*, 17, 44–50. [Center for Information-Development Management] [doi: none]

Topic-based documentation is strengthened by effective titles, which “can convey not only content, but also structure and relationship. Consistency in titles improves the user’s experience, and, from the point of view of the information developer, consistent, well-drafted titles support content reuse.” This article offers nine guidelines for developing topic titles, such as beginning titles with key words, supporting the user’s mental models, and relating titles to user goals. The guidelines for titles can be applied to figure and table captions as well. The author illustrates the guidelines with several legacy and rewritten titles and also offers ideas for spreadsheets to organize and document decisions about title styles.

Lyn Gattis

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## Intercultural issues

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### **Connotative localization of an HIV prevention image to promote safer sex practices in Ghana**

Bennet, A. (2015). *Visible Language*, 49, 24–39. [doi: none]

“When designers localize an image’s denotative elements according to the users’ cultural preferences, research shows that it improves user experience and cross-cultural usability. However, this paper reports that, even when localized denotatively, culturally-based disparities—dissonance between how the designer communicates and how the user interprets from a cultural perspective—can still impede or entirely obstruct the image’s connotative performance. Localization needs to facilitate adaptation of the image on a connotative level particularly when the goal is to bring about behavioral change

hyper-locally, on a transnational and transcultural scale, with a community of users.” Based on data collected over a period of two years during which the author “interviewed lay people in Kumasi [Ghana] about the denotative and connotative performance of an HIV prevention image called the Red Card,” this paper describes “the existence of cultural dissonance between [the researcher’s] Westernized esthetic sensibilities and Ghanaian interpretive capacities. [The] data also corroborates that the use of connotative localization through an interactive communication design process (CLIC) can reveal semiotic noise hindering the image’s connotative performance prior to its final production.”

Lyn Gattis

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## Management

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### **Online employment screening and digital career capital: Exploring employers’ use of online information for personnel selection**

Berkelaar, B. L., & Buzzanell, P. M. (2015). *Management Communication Quarterly*, 29, 84–113. doi: 10.1177/0893318914554657

“This study explores how employers report using online information to evaluate job candidates during personnel selection. Qualitative analysis of 45 in-depth employer interviews emphasizes how new and different information visibility afforded by the Internet simultaneously replicates and shifts how employers evaluate reconstructed information about candidates during personnel selection. Data revealed that employers evaluate the relative presence or absence of certain types of visual, textual, relational, and technological information in patterned and idiosyncratic ways. [The authors] discuss the likely consequences for theory and practices of personnel selection and careers, emphasizing the increasing expectations for workers to curate ‘digital career capital’ to manage the expanding contexts within which employers construct and evaluate professional and/or workplace identities. “

Lyn Gattis

**Work-related communication technology use outside of regular work hours and work life conflict: The influence of communication technologies on perceived work life conflict, burnout, job satisfaction, and turnover intentions**

Wright, K. B., Abendschein, B., Wombacher, K., O'Connor, M., Hoffman, M., Dempsey, M., Krull, C., Dewes, A., & Shelton, A. (2015). *Management Communication Quarterly*, 28, 507-530. doi: 10.1177/0893318914533332

“The purpose of this study was to investigate employee perceptions of the influence of communication technology use outside of regular work hours on perceptions of work life conflict, burnout, turnover intentions, and job satisfaction. An online survey of 168 employees from more than 30 companies in a Midwestern city was conducted to assess relationships among these variables. The results indicated that hours of work-related communication technology use outside of regular work hours contributed to perceptions of work life conflict. However, positive attitudes toward communication technologies predicted decreased work life conflict. Controlling for worker age, perceived life stress, and attitudes toward communication technologies, work life conflict was found to predict job burnout and job satisfaction, but not turnover intentions. The authors discuss implications of the study findings for management practices, limitations of the study, and directions for future research.”

Lyn Gattis

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## Professional issues

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**Medical writing up close and professional: Establishing our identity**

Lang, T. (2015) *AMWA Journal*, 30, 10–17. [doi: none]

“Medical writing is not easily defined, not widely known, not well understood, and thus not always appreciated. Each of these issues is a challenge we need to overcome if we are to advance the profession. Here, [the author] suggest[s] some reasons for our low

profile. [The author] propose[s] a definition of medical writing that identifies some key skills and suggest[s] that these skills are not necessarily learned in school but require additional training. [The author] describe[s] some common misconceptions acquired about writing in school and assert[s] that they need to be dispelled before medical writing can be fully appreciated. That is, if we are to develop the profession, we need to educate employers and clients about the nature and potential of medical writing. In fact, changing the way people think about medical writing is essential, not only to defining the profession but to having one. People need to know that we are not just professionals who like to write but that our knowledge, skills, and experience make us expert writers and allow us to communicate more effectively than can writers without advanced training. They need to know that scientific-technical-medical writing is distinct from literary or creative writing and from journalistic or popular writing. Finally, [the author] identif[ies] areas we can develop to make medical writing more professional—more visible, more distinct, more credible, and more valued.”

Magdalena Berry

**Topoi and the reconciliation of expertise: A model for the development of rhetorical commonplaces in public policy**

Harlow, R. M. (2015). *Journal of Technical Writing and Communication*, 45, 57–75. doi: 10.2190/TW.45.1.d

“In a society in which expertise becomes increasingly specialized, [the author seeks to] understand how to manage gaps in knowledge between experts in various fields and between experts and the public in general. That need is especially great in the public sphere, where technical understanding and lived experience do not always align. This study attempts to model the process by which discipline-specific *topoi* filter into common knowledge and general *topoi* are acknowledged by experts. . . .”

Anita Ford

## Research

### **Design and language impact on study volunteerism in medical research: Learnings from a controlled study of recruitment letters**

Sanematsu, H., Hudson, B., Nyhuis, A., Hui, S., & Dexter, P. (2015). *Visible Language*, 49, 160–171. [doi: none]

“Research on human subjects in health and medicine is a necessary part of studies ranging from taking online surveys (less invasive) to taking blood draws (more invasive). Without them, our ability to learn about and improve health is limited. However, recruitment for such studies is difficult. Patient registries aim to speed up scientific advancement by reducing the time and effort spent to recruit participants by maintaining a cadre of ready volunteers. Invitation by mail is an effective route to approach a large number of potential registry volunteers at relatively low cost. [The authors’] research question was whether the letter recipients’ response (by signing up on the patient registry) to the invitation could be increased by ‘perking up’ the letter content using 1) more motivational language, and 2) enhancing the graphic design of the invitation. [The researchers] tested four models and sent them out to 10,000 recipients. [Their] results showed that in this application, a conventionally worded and typeset letter is more effective in recruiting altruistic volunteers than one that uses motivational language or modernist design principles. This has implications for how designers apply their skills in this context.”

Lyn Gattis

## Usability studies

### **Complex systems, cooperative work, and usability**

Pan, Y., Komandur, S., & Finken, S. (2015). *Journal of Usability Studies*, 10, 100–112. [doi: none]

“Modern operating systems are increasingly complex and require a large number of individual subsystems and procedures; operators also must cooperate to make them function. In this paper the authors consider usability from a broad perspective based on this understanding, recognizing the challenges a team of operators, complex subsystems, and other technical aspects pose as they work together. It seeks to expand usability by adding insights from Computer-Supported Cooperative Work (CSCW)-based fieldwork in offshore operations. To contribute to the current usability literature, [the authors] investigated and analyzed through a network-based approach how operators, ship bridge hardware and software, and other physical environments work together. [The authors] propose a process for evaluating the usability of complex systems: field observation and interviews to determine how work is organized and executed by human and nonhuman actors and to identify whether additional artifacts are being used to supplement the nonhuman components. The use of those artifacts often identifies usability issues in complex systems.”

Ginnifer Mastarone

### **Evaluating the utility and communicative effectiveness of an interactive sea-level rise viewer through stakeholder engagement**

Stephens, S. H., DeLorme, D. E., & Hagen, S. C. (2015). *Journal of Business and Technical Communication*, 29, 314–343. doi: 10.1177/1050651915573963

“The design of interactive applications for online communication is an ongoing area of research within technical communication. This study reports on the development of an interactive sea-level rise (SLR) viewer, a data visualization tool that communicates about the

potential effects of SLR along coastlines. It describes the formative evaluation of a location-specific SLR viewer created via integral stakeholder engagement. Participants performed a series of tasks, answered questions about the tool's usability and communicative effectiveness, and made suggestions for ways to improve its application to desired tasks. The authors discuss the implications of this study for visual risk communication and make recommendations for others developing similar interactive data visualization tools with audience input.”

**Sean C. Herring**

***Personas in heuristic evaluation:  
An exploratory study***

Friess, E. (2015). *IEEE Transactions in Professional Communication*, 58, 176–191. doi: 10.1109/TPC.2015.2429971

“No study has explored how incorporating personas into heuristic evaluation of products, namely websites, affects the kinds of findings reported and the recommendations presented by usability evaluators. . . . In this exploratory study involving three sections of an advanced technical writing course, groups of evaluators conducted a heuristic

evaluation of a website. Each section was randomly assigned a different condition with which they would conduct the heuristic evaluation: (a) a traditional heuristic evaluation, (b) a persona-led heuristic evaluation in which the personas were given to the evaluators, or (c) a persona-led heuristic evaluation in which the evaluators themselves created their own personas. Each group wrote a report identifying the major problems with the website and provided recommendations to solve the identified problems. The evaluators completed pretesting demographic surveys and posttesting confidence surveys. This exploratory study found few detectable differences in the findings reported by groups that used personas in heuristic evaluation and groups that did not use personas. The groups that used personas were more likely to report findings related to navigation than the groups that did not use personas, while the groups that did not use personas were more likely to report findings related to design than the groups that used personas. The groups that created their own personas were more likely than the other groups to include complex issues in their reports and include language that directly references users and user needs. All groups were confident in their findings.”

**Lyn Gattis**