

Audience Perceptions of Fonts in Projected PowerPoint Text Slides

Jo Mackiewicz
Illinois Institute of Technology
mackiewicz@iit.edu

Abstract

This study examined 10 common and popular fonts displayed in projected PowerPoint text slides. It investigated 37 participants' ratings of the fonts—5 serif and 5 sans serif—on four variables: 1) comfortable-to-read, 2) professional, 3) interesting, and 4) attractive. It also surveyed participants' opinions about the font displayed in the PP slides. A significant difference was found between sans serif and serif fonts on the professional variable, but not on the other three variables. Gill Sans, a popular sans serif font, was rated highly on each of the four variables, making it a safe choice for PowerPoint slides.

Keywords: PowerPoint, font, presentations, slides

Introduction

Technical communicators strive to pick fonts that are appropriate for the print and online documents that they create. Now, with the ubiquity of projected slide presentations, typically called PowerPoint presentations though they may be created with other software, technical communicators must employ fonts effectively in a relatively new medium. An example of a PowerPoint text slide, one that displays a bulleted list, is shown in Figure 1.

Choosing appropriate fonts for presentations is particularly important and interesting given the recent debates about the merits and pitfalls of conveying information via projected slides. Tufte, for example, argues that PowerPoint slides lead people to “conspicuous decoration” and “a preoccupation with format not content.”[1, p. 4] Other researchers, like Doumont, argue that Tufte’s criticism of PowerPoint slides lacks

nuance.[2] Indeed, several studies of instructors’ use of slides during lectures showed that presentations improved students’ performance.[3-5]. Interestingly, students stated that lectures accompanied by PowerPoint slides were more organized than those that were not [6, p. 212], a result Tufte certainly would not have anticipated.

This study examined people’s perceptions of 10 common and popular fonts that were displayed in projected PowerPoint slides. The fonts were used in bulleted lists and were displayed in black type and 24-point size on a white slide background (see Figure 1). The study investigated 37 participants’ ratings of the 10 fonts—5 serif and 5 sans serif—on four variables: 1) comfortable-to-read, 2) professional, 3) interesting, and 4) attractive. It also surveyed participants’ opinions about the font displayed in the PP slides.

The next section of this paper discusses one of the main components of this study: a comparison of serif and sans serif fonts on the four rated variables. The section following that briefly explains three anatomical features of fonts that likely contributed to participants’ ratings of the fonts. The sections after those relate the methods and results of the study.

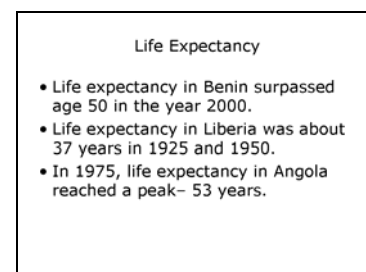


Figure 1. An example of a PowerPoint slide with bulleted text.

Serif versus Sans Serif Fonts

One of the main decisions that technical communicators make in designing any document, including PowerPoint slides that will be projected onto a screen, is whether to use a serif or a sans serif font (see Figure 2). This decision can determine the extent to which a typeface is comfortable-to-read. It may also have an effect on the extent to which a typeface is considered professional, interesting, or attractive.

Traditionally, serif typefaces have been used for the body text of print documents (as opposed to online documents) because they seem to be more readable across stretches of text. Some document designers have postulated that serifs lead a reader's gaze along the baseline, the invisible line on which the letters sit: for example, [7, p. 35]. Under this theory, serifs guide the reader's gaze from one letterform and one word to another. However, this idea that serifs guide readers' eyes across lines and, hence, facilitate reading, has not been supported by empirical research.

In contrast, another guideline is the prescription to use sans serif typefaces in the body of documents read on a computer screen, such as on a Web page. The traditional view is that body text in these formats is more readable when presented in a sans serif typeface. Some popular sans serif typefaces, like Verdana, were designed specifically to be read on a screen. In addition, research indicates that readers prefer sans serif typefaces for online reading.[8-9] Similarly, in regard to projected PowerPoint slides, Mackiewicz and Mastarone studied the perceived

clarity of 18-point serif (Times New Roman) and sans serif (Arial) fonts that were displayed in the axes labels and legends of graphs.[10] Sans serif type was rated as clearer than serif type.

The current study expanded research on font use in projected PowerPoint slides, analyzing the extent to which 10 common fonts—viewed from 15–20 feet on a 6 x 4.5 foot screen—were perceived to be comfortable-to-read, professional, interesting, and attractive. The 10 fonts are listed in Table 1.

These 10 fonts were chosen because they are widely available and commonly used. This study, then, aimed to help technical communicators select fonts that will help them to make better choices when designing PowerPoint presentation that rely heavily on text slides, as opposed to image, graph, or table slides.

Three Anatomical Characteristics of Fonts

Fonts can be described in terms of a variety of anatomical characteristics.[11] Three characteristics that are relate to the significant findings of this study were the following: 1) the THICK-TO-THIN TRANSITION within the letters of the font; 2) the ratio of the font's X-HEIGHT to its CAP-HEIGHT, and 3) the ratio of a font's x-height to its width, a ratio as known as the font's ASPECT RATIO. These three characteristics are explained and illustrated below.

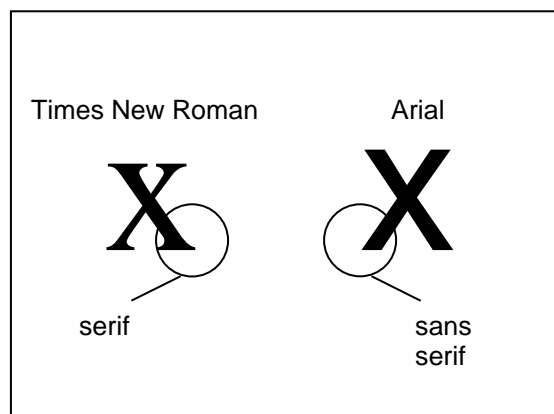


Figure 2. Serif versus sans serif x letterform.

Table 1. The serif and sans serif fonts in this study.

Serif	Example	Sans serif	Example
Bookman Old Style	The quick brown fox jumps over the lazy dog.	Arial	The quick brown fox jumps over the lazy dog.
Garamond	The quick brown fox jumps over the lazy dog.	Gill Sans	The quick brown fox jumps over the lazy dog.
Lubalin Graph Bk	The quick brown fox jumps over the lazy dog.	Futura Bk	The quick brown fox jumps over the lazy dog.
Souvenir Lt	The quick brown fox jumps over the lazy dog.	Tahoma	The quick brown fox jumps over the lazy dog.
Times New Roman	The quick brown fox jumps over the lazy dog.	Verdana	The quick brown fox jumps over the lazy dog.

Thick-to-thin Transition

One important anatomical characteristic is the extent to which the letters of a font vary in thickness. Most serif fonts contain strokes that vary in thickness, as Figure 3 shows. Souvenir Lt, a serif font, displays such strokes. On the other hand, some fonts do not vary at all; the lines (i.e., STROKES) that compose them do not vary in width. Such fonts are called MONOWEIGHT. Many sans serif fonts, like Arial in Figure 3, are monoweight.

***x*-height to Cap-height Ratio**

Another important anatomical characteristic is the ratio of a font’s *x*-height (the height of its *x* letterform) to it cap height (the height of its uppercase letterforms). A moderate ratio of *x*-

height to cap height is about a 2:3 ratio for serif fonts and about a 3:4 ratio for sans serif fonts.

Figure 4 shows that the *x* letterforms of some fonts, like Garamond, are much shorter than their capital counterparts. In the case of Garamond, the lowercase letters, represented by the *x* letterform, are just more than half the height of the uppercase letterforms (even excluding capitals that descend past the baseline, as in Garamond’s capital *J* letterform.

Previous research suggests that the *x*-height to cap-height ratio affects the extent to which a font is considered comfortable to read and professional.[11-12] It may also be related to which a font is considered interesting and attractive.

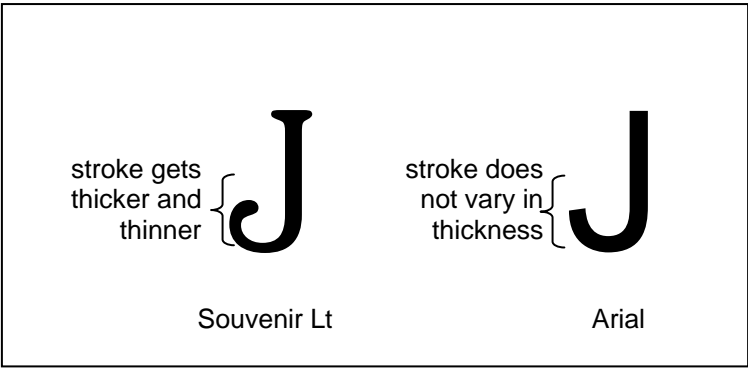


Figure 3. Thin-to-thick transition in letterforms.

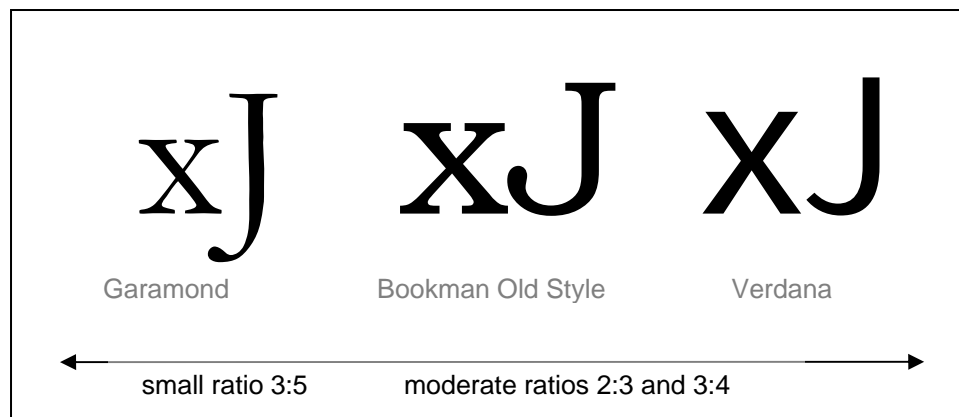


Figure 4. Small and moderate x -height to cap-height ratios.

Aspect Ratio

Related to the x -height to cap-height ratio is a typeface's aspect ratio: the ratio of the x letterform height to width. This ratio, then, determines the "squatness" of a font. Letterforms that are wider relative to their height may be easier to read on a screen.[13]

Related to aspect ratio is the size of a font's counters, the enclosed spaces within letterforms like *o* and *d*. Fonts with wide letterforms for their x -heights tend to have large counters, and large counters increase reading comfort.

Methods

Participants

The 37 participants were graduate and undergraduate students at a mid-size, private university in the Midwest of the United States. They were tested and found to have 20/20 corrected and normal color vision. Of the 37 participants, 23 were males and 12 were females. Their ages ranged from 18–42, with an average age of 24. Sixteen spoke English as a first language; the others spoke English as a second language, and their first languages comprised Korean (4), Chinese (4), Thai (4), Gujarati (3), German (1), Kannada (1), Oriya (1), Tamil (1), Telgu (1), and Vietnamese (1). Participants' experience in viewing and creating PP presentations was gauged through a survey of demographic information. Their responses regarding their experience with PP are shown in Table 2.

Procedure and Instruments

In groups of 2–6, the 37 participants viewed slides that were unaccompanied by oral presentation. Although gauging people's perceptions of the visual component of a presentation (slide design) divorced from a verbal component (a presenter's words) created an unnatural situation, isolating the visual component allowed valid measures of the four variables.

Participants received a paper-clipped packet containing the following: a consent form to participate in the study, a demographics sheet, stapled booklets for rating the slides, and a follow-up survey. Before viewing the slides, participants viewed an example slide that was labeled with terms that they would encounter in scales of the rating booklet.

The participants were told that the slides conveyed information about three countries in western Africa: Angola, Benin, and Liberia. They were told that the study was intended to get their feedback about the slides, not to test their knowledge of the three countries.

Participants used 1–7 Likert scales to rate the slides on several rating scales. When viewing the slides, they rated how 1) comfortable-to-read, 2) professional, 3) interesting, and 4) attractive the text/font was. Figure 5 shows the scale they used to rate "comfortable-to-read." The other scales for "professional," "interesting," and "attractive" were similar.

Table 2. Participants' experience with PowerPoint.

	How many PowerPoint presentations have you viewed in the last month? (Include instructors' presentations in class.)	How many PowerPoint presentations have you created yourself in the last year?
0-5	11	21
6-10	9	8
11-15	8	1
16-20	5	4
21-25	2	2
> 25	2	1
Total	37	37

As Figure 5 shows, a rating of 7 meant that participant judged the font to convey an attribute, like “comfortable-to-read,” very strongly, and a rating of 1 meant that the font conveyed the attribute very weakly.

The entire study session lasted about one hour. Participants were either paid \$10 or were given extra credit in a university course.

Equipment and Room

Participants were seated in desks that were 15–20 feet (4.5–6.1 meters) from the screen, like students in a class or audience members in a breakout conference session. The projected image was 6 x 4.5 feet (1.8 x 1.4 meters). The projected image was focused prior to each session of the study. An Epson PowerLite S1 Plus projector was used to project the slides. Light in the room was measured prior to each session and light was modulated for glare. In each session, light was

measured between 125–150 lux. This amount of light equates to most classrooms and conference rooms when the lights have been dimmed somewhat but there is still light enough to take notes and see the speaker easily and clearly. This lighting situation was used so that the findings could be applied to academic and business settings.

Results

This section details the main findings of the study. Specifically, it covers findings from comparing all of the sans serif fonts against all of the serif fonts. Then, it covers findings from analyzing the sans serif fonts individually and the serif fonts individually.

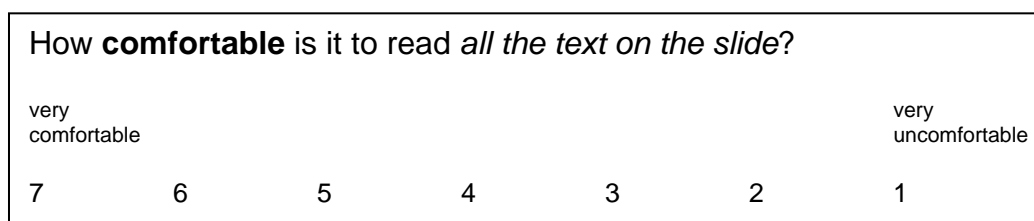


Figure 5. An example of a Likert scale used in the study.

Table 3. Mean ratings and SDs of sans serif and serif fonts.

sans serif / serif	comfortable to read		professional		interesting		attractive	
	mean	SD	mean	SD	mean	SD	mean	SD
sans serif	5.2	1.0	4.9	1.0	4.4	1.1	4.8	1.0
serif	5.0	1.1	4.6	0.8	4.3	0.9	4.7	0.9

Sans serif versus Serif Fonts

Table 3 shows the mean ratings and standard deviations for sans serif fonts grouped together and serif fonts grouped together on each of the four variables. As Table 3 shows, the overall means of sans serif and serif fonts were similar, particularly for the interesting and attractive variables. Indeed, one-way ANOVA tests for three of the four variables—comfortable-to-read, interesting, and attractive—revealed that there were no significant differences between participants’ ratings of sans serif and serif fonts on these three variables.

However, there was a significant difference between participants’ ratings of the sans serif and serif fonts on the professional variable $F(1, 36) = 5.50, p < .05$. The ratings of the sans serif fonts were significantly higher than the ratings of the serif fonts. This significant difference can be explained at least in part by the low ratings on this variable of two serif fonts: Garamond and Lubalin Graph Bk. These low ratings are discussed in more detail below in section on individual fonts.

The lack of significant difference in participants’ ratings of the comfortable-to-read, interesting, and attractive variables counters expectations, particularly concerning the comfortable-to-read variable. Prior research suggests that people perceive sans serif fonts as more comfortable to read on a screen, as opposed to a printed page. It seems that this finding did not translate directly to sans serif and serif fonts projected onto a screen, at least not ones set in 24-point type and viewed on an area of 6 x 4.5 feet.

However, it is worthwhile to note that the mean ratings of the sans serif fonts were higher for all four variables than the mean ratings of the serif fonts. This finding is in keeping with prior

research and its consequent guideline to use sans serif fonts in electronic documents.

Individual fonts

As Table 4 shows, *Gill Sans*, a sans serif font, and *Souvenir Lt*, a serif font, were both rated highly on each of the four variables. The two fonts were rated the highest on three of four variables (comfortable-to-read, interesting, and attractive). *Gill Sans* received the highest mean rating in any category: 5.5 on comfortable-to-read. This high mean rating corresponds to the status of *Gill Sans* as a best selling font on websites like www.fonts.com, www.fonthaus.com, www.linotype.com, and www.myfonts.com.

Gill Sans and *Souvenir Lt* were also rated third and fourth highest, respectively, on the variable professional, behind *Times New Roman* (serif) and *Tahoma* (sans serif). All four of these fonts display moderate *x*-height to cap-height ratios and moderate aspect ratios. *Times New Roman* and *Souvenir Lt* display moderate thick-to-thin transition as well. *Tahoma* and *Gill Sans*, like most other sans serif fonts, are monoweight, so this anatomical characteristic is not as relevant to them.

Participants’ survey comments reflected their association of *Times New Roman* with a professional tone. One person wrote, “I like the *Times Roman*. It looks professional . . .” *Times New Roman*’s professional tone likely stems from its status as the default font in Word and other software. Other participants noted this. One person called *Times New Roman* a “standard font,” and one noted that it is the “default.”

Table 4 also shows that *Lubalin Graph Bk*, a serif font, received the second-lowest mean rating in each category. *Verdana*, a widely used sans serif font, received the lowest mean rating in three of the four variables (except professional).

Table 4. Mean ratings and SDs of individual fonts. Dark gray = highest means for sans serif and serif; light gray = lowest means for sans serif and serif

font	comfortable to read		professional		interesting		attractive	
	mean	SD	mean	SD	mean	SD	mean	SD
Gill Sans	5.5	1.3	5.2	1.3	4.8	1.5	5.2	1.3
Souvenir Lt	5.0	1.2	5.0	1.3	4.8	1.3	5.0	1.2
Tahoma	4.9	1.4	5.3	1.6	4.2	1.4	4.9	1.4
Times New Roman	4.8	1.2	5.4	1.1	4.2	1.4	4.8	1.2
Arial	4.8	1.3	4.9	1.5	4.4	1.6	4.8	1.3
Futura Bk	4.7	1.5	4.4	1.4	4.6	1.4	4.7	1.5
Bookman Old Style	4.6	1.4	4.5	1.4	4.2	1.7	4.6	1.4
Garamond	4.6	1.8	4.0	1.5	4.3	1.9	4.6	1.8
Lubalin Graph Bk	4.3	1.5	4.2	1.9	4.1	1.4	4.3	1.5
Verdana	4.1	1.6	4.8	1.3	3.9	1.4	4.1	1.6

Lubalin Graph Bk and Verdana display large x -height to cap height ratios and large aspect ratios as well. In addition, unlike most serif fonts, Lubalin Graph Bk is a SLAB SERIF font, meaning it is a serif font with strokes and serifs that do not vary in thickness, making it like a typical sans serif font. These anatomical characteristics differentiate these two fonts from the others and may explain the results.

One-way ANOVAs were run on the sans serif fonts and the serif fonts separately. These tests helped to determine whether there were significant differences in how participants rated fonts within both types. Several significant differences were found, two within the sans serif fonts and two within the serif fonts.

Among the sans serif fonts, two significant differences were found: one on the professional variable $F(4, 180) = 2.47, p < .05$ and the other on the attractive variable $F(4, 180) = 2.77, p < .05$. Futura Bk was rated low for professional among the sans serif fonts ($M = 4.4, SD = 2.1$). It may be that the smaller x -height to cap height ratio decreased this font's ratings on this variable and generated the significant difference. In relation to attractiveness, Verdana was rated particularly low ($M = 4.1, SD = 1.6$); in fact, of the sans serif fonts, only Verdana received a mean rating lower than 4.7. It may be that its large aspect ratio (relatively large width) is considered

an unattractive anatomical characteristic. Indeed, the serif font Lubalin Graph Bk was rated low on this variable as well ($M = 4.3, SD = 1.5$), and it too displays a large aspect ratio.

Among the serif fonts, a weak but significant difference was found in participants' ratings of comfort of reading $F(4, 180) = 2.62, p < .05$. Lubalin Graph Bk was rated low on this variable ($M = 4.3, SD = 1.5$). This finding is somewhat surprising, given that large aspect ratios like Lubalin Graph Bk's generate large counters, the spaces inside letters such as *o* and *B*. Large, open counters are thought to facilitate reading. However, it may be that counters can be *too* large, create too much white space in a line of text, and make text uncomfortable to read.

A stronger significant difference was found among serif fonts on the professional variable $F(4, 180) = 5.11, p < .05$. Garamond was rated lowest on this measure ($M = 4.0, SD = 1.5$). It is likely that Garamond's comparatively small x -height to cap-height ratio led it to be perceived as less professional than the other serif fonts. This finding is somewhat surprising, given Garamond's common use, particularly in printed books, and the finding is worthy of further study. As noted before, Lubalin Graph Bk was also rated low on the professional variable, which along with Garamond's low rating, contributed to a

significant difference between the overall ratings of serif and sans serif fonts on this variable.

Conclusion

This study examined people's perceptions of 10 popular typefaces when those typefaces were projected on PowerPoint slides. The study investigated 37 participants' ratings of the fonts on four variables: comfortable-to-read, professional, interesting, and attractive. A main finding was that no significant difference was found between sans serif and serif fonts on three variables: comfortable-to-read, attractive, and interesting. This finding means that technical communicators can be reasonably sure that their audiences will be able to read serif font text comfortably, at least when the text is set in 24-point or larger and when the slides are viewed from a distance of about 15–20 feet and projected onto a 6 x 4.5 foot area. In addition, technical communicators who want attractive or interesting fonts can look to both sans serif and serif fonts. In short, in relation to these three variables, technical communicators designing presentations for classrooms or conferences rooms can vary the fonts that they use and move away from using sans serif fonts exclusively. Souvenir Lt, a serif font, seems to be a good option. It was rated highly on all of the variables.

That said, sans serif fonts received significantly higher ratings than serif fonts on the professional variable. This difference may have been generated by the small *x*-height to cap-height ratio of the low-rated Garamond. It was also generated by the low-rated Lubalin Graph Bk, which displays very large counters and no thick-to-thin transition in its strokes. This finding suggests that technical communicators who want to use serif fonts that will be perceived as professional should look for ones that are moderate in their anatomical characteristics: *x*-height to cap-height ratios, aspect ratios (which contribute to moderately-sized counters), and thick-to-thin transition.

Technical communicators may want to avoid Verdana and Lubalin Graph Bk when designing bullet text slides. Verdana was rated lowest of the sans serif fonts on three of four variables, and Lubalin Graph Bk was rated lowest of the serif fonts on all four variables.

In their survey comments, many participants stated that they liked fonts that are easy-to-read yet interesting. Technical communicators may want to turn to Gill Sans as a safe choice for PowerPoint slides. It is comfortable-to-read, interesting, and attractive to boot.

References

- [1] E. R. Tufte, *The Cognitive Style of PowerPoint*. Cheshire, CT: Graphics Press, 2003.
- [2] J. Doumont, "The cognitive style of PowerPoint: Slides are not all evil," *Technical Communication*, vol. 52, no. 1, pp. 64-70, 2005.
- [3] R. B. Lowry, "Electronic presentation of lectures-Effect upon student performance," *University Chemistry Education*, vol. 3, no. 1, pp. 18-21, 1999.
- [4] E. J. Mantei, "Using internet class notes and PowerPoint in the physical geology lecture," *Journal of College Science Teaching*, vol. 29, no. 5, pp. 301-305, 2000.
- [5] A. Szabo, and N. Hastings, "Using IT in the undergraduate classroom: Should we replace the blackboard with PowerPoint?" *Computers & Education*, vol. 35, no. 3, pp. 175-187, 2000.
- [6] J. E. Susskind, "PowerPoint's power in the classroom: Enhancing students' self-efficacy and attitudes," *Computers & Education*, vol. 45, no. 2, pp. 203-215, 2005.
- [7] R. Williams, *The Non-Designer's Type Book*. Berkeley, CA: Peachpit Press, 1998.
- [8] M. Bernard, and M. Mills. (2000). So, what size and type of font should I use on my Website? *Usability News*. [Online]. 2(2). Available: <http://psychology.wichita.edu/surl/usabilitynews/2S/font.htm>.
- [9] M. Bernard, M. Mills, M. Peterson, and K. Storrer. (2001). A comparison of popular online fonts: Which is best and when? *Usability News* [Online]. 3(3). Available: <http://psychology.wichita.edu/surl/usabilitynews/3S/font.htm>.
- [10] J. Mackiewicz, and G. L. Mastarone, "Audience perceptions of the readability, clarity, and attractiveness of PowerPoint slides."

presented at the Conf. of the Association of Teachers of Technical Writing. Chicago, IL, October 28, 2006.

[11] J. Mackiewicz, "How to use five letterforms to gauge a typeface's personality: A research-driven method," *Journal of Technical Writing and Communication*, vol. 35, no. 3, pp. 291-315, 2005.

[12] J. Mackiewicz, "What technical writing students should know about typeface personality," *Journal of Technical Writing and Communication*, vol. 34, no. 1-2, pp. 113-131, 2004.

[13] R. F. Wilson, "HTML email: Text font readability study," *Web Marketing Today*, 1 March, 2001.

About the Author

Jo Mackiewicz is an assistant professor at Illinois Institute of Technology. She has published in *Journal of Technical Writing and Communication* and *Technical Communication*. She is the book review editor of *Business Communication Quarterly*. With Kathryn Riley, she is co-authoring a book called *Visual Composing*.