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The "wall of text" visual structure of academic conference posters

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Posters created for conferences are a type of visual communication that are used frequently by academics. There are rarely any formatting requirements beyond fitting on their provided boards. Because posters are usually created by researchers rather than experienced graphic designers, the visual structure of conference posters may be influenced by the common format for journal articles, where text is given primacy over graphics and structured as "introduction, methods, results, discussion." To test this, I examined award-winning posters from a large scientific society over 5 years of meetings. About three-quarters use the "Introduction, methods, results, discussion" format common to journal articles; about two-thirds use a columnar layout; most show multiple graphs and cite multiple references. Relatively few posters follow best graphic design practices, resulting in a "wall of text" on many posters.

KEYWORDS

conference, poster, graphic design, IMRAD format, best practices

Introduction

Posters presented at academic conferences may be the most common form of scientific communication (Rowe, 2017). It is difficult to estimate the global output of scientific work, but there may be several million conference posters given in a year (Rowe, 2017) compared to perhaps 3 million journal articles a year [Plume and van Weijen (2014) estimated 2.4 million articles were published in 2013, increasing a few percent annually]. Posters are a type of communication that is relatively distinct to academics (D'Angelo, 2016; Faulkes, 2021). For example, both businesspeople and academics create written reports and oral presentations, but businesspeople rarely prepare posters for business conferences.

Publishers and editors have standardized the format of journal articles (Wu, 2011), but conference organizers generally do not dictate the format of conference posters (except dimensions, so posters fit within allotted space). Authors are generally free to design and layout their posters as they see fit, with far fewer constraints than a journal article. Thus, posters could use a much larger set of graphic and visual tools than journal articles to communicate scientific results. But posters are typically made by early career researchers, not experienced graphic designers. Because journal articles are familiar to researchers, prestigious, and logically structured, I hypothesized that many conference posters would mimic typical journal articles. Journal articles give primacy to textual information over graphic displays, are organized into introduction, methods, results, and discussion (IMRAD) sections, and include references compiled at the end.

I further hypothesized that because of journal's emphasis on text plus a lack of graphic design experience, many posters would not follow best practices in graphic design. Best practices for posters (Block, 1996; Erren and Bourne, 2007; Barker and Phillips, 2021; Faulkes, 2021; Wang et al., 2022) generally include: large text; low word count (allowing larger text and more visuals); no abstract (because the poster is self-contained); a grid-based layout of columns or rows; no tables (graphs are more visual and easier to read at a distance); no logos in the same area as the title (competes for attention with title). Not following these practices can readily result in a "wall of text" poster that is ineffective as a graphic display.

Here, I characterize the visual structure of conference posters using award-winning posters from a large meeting (more than 20,000 attendees). These posters are ostensibly among the best from a very large pool, and might be more likely to showcase best practices in poster designs.

Methods

Posters were selected from the American Geophysical Union website (American Geophysical Union, 2022), which archives award-winning student posters from 2015 to 2019 ($n = 55$ unless otherwise indicated). This was used as a poster source for the following reasons. First, the American Geophysical Union hosts very large academic conferences. Attendance at the Fall meeting ranged from 22,632 to 27,934 from 2015 to 2019 (Guertin, 2015; Parr, 2017; American Geophysical Union, 2021). During these years, meetings were held in person. Second, the website shows award winning posters, which might be expected to use best practices in design from the meeting's large pool of presenters.

The posters were archived in portable document format (PDF), which generally preserves the look of the poster as intended by the creator. Some posters were accompanied by recorded video, which was not considered for this project.

Of the archived posters, 43.6% (24) won awards for graduate students; 50.1% (28) won awards for undergraduates, and 5.5% won awards for high school students (3).

For each poster, the number of words, images, graphs, tables, equations, and references on the poster was recorded. Whether the poster had an abstract, institutional logos in the title bar, and followed the standard journal format of introduction, methods, results, and discussion was recorded as a "yes" or "no." The layout of each poster was categorized as "columns," "rows," or "other." Finally, the number of visually distinct sections (excluding the title) was counted.

The number of words on posters was counted by using the "Select all" command in Adobe Acrobat Pro 2020, pasting the content of the clipboard into Microsoft Word (Word for Microsoft 365 MSO, v. 2209), then using the "Word count" function. Because of variation in PDF creation, the number of words on some posters could not be counted.

Percentages may not add to 100% due to rounding.

Data are archived on Figshare (https://doi.org/10.6084/m9.figshare.21280062).

Results

Most posters (74.5%) structured the main text (mean = 787.25 words per poster, SD = 370.4, $n = 24$) using some variation of the IMRAD format. These usually consisted of using headings that were similar to introduction, methods, results, and discussion, although there were sometimes alternative names for these headings. For example, some posters called the last text section "conclusions" rather than "discussion."

Most posters (80.0%) included one or more references (mean = 3.7 references per posters, SD = 3.2). Few posters (10.9%) included an abstract on the poster itself, however.

Column layout (65.5%) was used more often than rows (5.5%). The remaining posters (29.1%) often used some combination of columns and rows. For example, a single leftmost column with multiple rows to the right. Some posters showed no clear relationship to a grid. Single columns or rows were often broken into smaller sections (mean = 6.6 sections per poster, SD = 2.4).

Graphs were the most common form of data display (mean = 6.3 graphs per poster, SD = 4.8), followed by images such as photographs and illustrations (mean = 4.7 images per poster, SD = 3.6). There were few tables (mean = 0.47 tables per poster, SD = 0.79), with similar numbers of equations (mean = 0.44 equations per poster, SD = 1.2).

Most (89.1%) posters included logos at the top of the poster alongside the poster title (mean = 1.8 logos per poster, SD = 1.3).

If low word count is considered a best practice, only 25% of posters ($n = 24$) used 500 words or less. If "regular column or row layout" and "no tables or equations" are considered best practices, less than half (43.6%) of posters followed these two best practices in combination.

Discussion

The conference posters examined here reveal two trends. First, the visual structure of most conference posters is influenced by the "introduction, method, and results" (IMRAD) structure of journal articles. Second, even award-winning posters rarely follow commonly recommended best practices in graphic design. These result in posters that are relatively dense with text and information. This style has sometimes been dubbed the "wall of text" approach (a poster equivalent of "death by PowerPoint"). That these trends were apparent in award winning posters suggests that most posters are even less well designed.

Writing about conference posters is often focused on recommending best practices (Block, 1996; Erren and Bourne, 2007; Barker and Phillips, 2021; Faulkes, 2021; Wang et al., 2022) rather than documenting the common practices used in conference posters "on the ground." This may be because posters are considered ephemeral "first drafts" of research that people expect will be published in journals later. Having high proportions of presentations that are later published in journals is sometimes seen as indicating a high-quality conference (Gorman and Oderda, 1990; Jackson et al., 2000; de Meijer et al., 2016), and low proportions of presentations that are later published in journals are viewed as concerning (Carey et al., 2016). Many studies have shown that posters are less likely to be published than oral presentations (Scherer et al., 2018).

Given the large amount of scientific research that is presented in poster format, the prevalence of ineffective "wall of text" posters could impede scientific communication at conferences (Morrison, 2019; Morrison et al., 2020). Expectations and designs for conference posters away from the common practices described here. First, "billboard" poster formats have received substantial attention (Morrison, 2019; Oronje et al., 2022) since 2019 (the last year of this study). Second, academic conferences may move to include a much wider set of online activities, including virtual poster sessions, due to crises like the global COVID-19 pandemic and the climate crisis (Skiles et al., 2021; Tao et al., 2021). New designs or formats may arise when posters need not be constrained by physical pieces of paper. Archiving conference posters will be needed to see if there are changes in poster design and effectiveness over time.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found in the article/Supplementary material.

Author contributions

ZF conceived the project, collected the data, analyzed the data, and wrote the manuscript.

Conflict of interest

ZF has written a book on conference posters and receives royalties from its sales.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fcomm.2023.1063345/full#supplementary-material

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