ARTICLES

Poster presentations for scientific meetings
Leon H. Liegel* and Delbert Thompson

ABSTRACT
As the number of poster sessions increases at professional meetings each year, students, scientists, and managers face new challenges to develop effective poster production skills. We review the advantages and disadvantages of poster presentations vs. oral talks. We outline front-end and secondary planning, materials, and follow-up needed to create visually attractive and technically accurate posters. An example of an actual poster display, with several spot-art symbols, is used to help document conceptualization and technical production aspects. These techniques can be used to make posters either for classroom projects or for formal presentations at national professional meetings. Convenient check lists are provided to help first-time or experienced enthusiasts determine their progress in completing specific phases of a poster presentation.

Up to 50% or more of presentations at some national scientific meetings are now in poster rather than oral format. If writing assignments are valued for promoting discovery, enhancing comprehension, and fostering communication skills (4, 6, 12), shouldn't the design and execution of a poster presentation be considered a valid learning tool, equal in importance to lectures, films, laboratory exercises, field trips, and discussion groups? Indeed, some universities have already recognized the merit of poster displays as both learning and instructional media. For example, in Spring 1988 the local chapter of Sigma Xi at Oregon State University, Corvallis, OR, offered cash awards of $800, $500, and $300 to winners of a poster competition for graduate students.

What are the advantages and disadvantages of poster presentations vs. oral talks? Are poster presentations suitable for all audiences and subject matter? What kind of planning, materials, and follow-up are needed to create effective posters? We answer these questions and others by explaining the complete process we used to create an actual poster. We provide convenient check lists to determine progress in completing various phases of a poster presentation. And, we have condensed pertinent procedures and techniques from published information currently scattered in professional journals (2, 7, 10, 11) and pamphlets (1, 9).

SELECTING PRESENTATION FORMATS

Oral, poster, and exhibit presentations have distinct time constraints (14). Each format includes a unique interaction between the presenter and the intended audience (Table 1). For national meetings, oral talks generally do not exceed 15 min. During this restricted time, the presenter must keep the audience's full attention in a darkened, sometimes stuffy room, often competing against noise from late-arriving or early departing people. At poster sessions, on the other hand, viewers proceed at their own pace in fully lighted rooms where note taking is easy. At posters, viewers can talk directly to the presenter(s) during specified time periods to resolve any questions that they might have; presenters also develop public speaking skills while discussing their work with viewers who have questions.

Poster displays have some disadvantages. For example, information about complex laboratory procedures and multifactorial field trials may best be presented via oral talks. Preparations for a poster presentation can be

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### Table 1. Communication terminology.

<table>
<thead>
<tr>
<th>Media</th>
<th>Characteristics</th>
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<tbody>
<tr>
<td>Visuals</td>
<td>Different communication media that provide specific and definite effects on the reader/viewer. Examples are slides, photos, figures, tables, posters, and overheads. Common attributes to a good visual are:</td>
</tr>
<tr>
<td>Oral talk</td>
<td>Relaxing to audience Commands attention Incorporates balanced use of color, complexity, shape, and simplicity</td>
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<tr>
<td>Poster presenta-</td>
<td>tion</td>
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<tr>
<td>Exhibit</td>
<td>Large display using several visuals that is designed to be unattended. Text is short but needs to be more self-explanatory than for poster presentations.</td>
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<tr>
<td>Poster/exhibit</td>
<td>Large display that has a presenter for a short period (2-4 h) but is generally left unattended for longer periods, up to an entire day. Developing suitable text is difficult because of the dual format presentation.</td>
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</table>

### Table 2. Front-end planning: questions before beginning posters.

1. Who is the target audience?
2. How far will viewers be away from the display?
3. What size limitations exist for the entire display?
4. Is the format presented, exhibit style, or both?
5. Is the context formal or informal?
6. What major points need to be incorporated?
7. What visuals are available for presentation?
8. Have poster do's and don'ts been reviewed?
9. What timelines are needed to complete the entire project?
10. Who does the actual poster assembly?
11. How will poster panels be transported?

### Table 3. General hints in preparing poster displays.

**Do's**

1. Elect tacked or free-standing design
2. Develop a scaled sketch on 28 by 36 or 28 by 43 cm (11 by 14 or 11 by 17 inch) paper
3. Use a simple title; seven words or less
4. Place title across the entire poster rather than on one side
5. Place large attention getter on first panel
6. Keep information flow from left to right
7. Keep text type large
8. Keep text; blocks short: 50 words or less
9. Restrict ideas on individual panels
10. Use spot-art if possible
11. Use color when possible
12. Mix photos, figures, and other visuals

**Don'ts**

1. Use small type for title
2. Forget attention getters on all panels
3. Clutter with yarn or arrows to show information flow
4. Use regular typewriter-sized text
5. Crowd information on any panel
6. Use too bright colors
7. Follow published paper format (e.g., methods, results, etc.) unless specified in poster instructions
8. Cite references unless asked
9. Use plain 22 by 28 cm (81/2 by 11 inch) paper for mounting text or visuals

More expensive and time consuming than those for an oral talk on the same topic. Slides, photos, and graphs made for posters are easily adapted, however, to oral talks and publications that are developed later.

**UNDERTAKING POSTER PRESENTATIONS**

We made our poster using experience of the Graphics Service staff at the USDA Pacific Northwest Research Station, Portland, OR. For over a decade, the Graphics Service staff have helped foresters, entomologists, and other scientists develop poster displays for scientific meetings and special occasions. The staff also assisted the U.S. Environmental Protection Agency (USEPA) in Corvallis, OR, to create 11 posters for the December 1987 American Society of Agronomy annual meeting in Atlanta, GA. Completing one of the USEPA posters, an overview one for the others, serves as our example of undertaking poster presentations in general.

**Front-end Planning**

We held a half-day planning meeting with potential poster authors in August 1987 to address several questions and to establish time lines before beginning the poster production process (Table 2). Our known audience would comprise students, university professors, scientists, and interested laypeople from agronomy, crop science, forestry, and soil science disciplines. Display instructions specified a size limitation of 1.2 by 2.4 m (46 by 94 inches); a 46 cm wide (18 inch wide) table would be placed between the display and viewer. Format was poster/exhibit style for a formal audience (Table 1).

Two effective components of a scientific poster presentation are a strong central theme and sufficient attention-getters to attract potential viewers. Because of the number of posters being presented and the broad investigative nature of the USEPA Project, we suggested integrating to a central theme and a limited number of subthemes. An already existing theme was the USEPA Project logo, which incorporated major components of the ecosystem in one spot-art symbol: the atmosphere and

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**Fig. 1.** Spot-art symbols are effective attention-getters on individual posters and can be used as a unifying theme for multiple poster displays.
acidic deposition, vegetative cover, the soil landscape, and surface waters (Fig. 1). The letters DDRP stood for the project title: Direct/Delayed Response Project.

Four subthemes that described ongoing DDRP work activities were soil mapping, soil sampling, map analyses, and laboratory analyses. Accordingly, we developed spot-art symbols for each of these subthemes and introduced them on the overview poster. Finished posters had the project logo on the right of the title board and a subtheme spot-art symbol on the left (Fig. 2). In summary, spot-art symbols were our primary attention-getter visuals; they were designed to capture audience interest and to direct viewers to specific posters.

We covered other items at the initial planning meeting. These items included general poster do's and don'ts (Table 3), sketching of a preliminary scaled design (Fig. 2), and graphics/mounting hints for making a poster display (Table 4). We chose foam core subpanels mounted on foam core main panels (Fig. 3). Although yarn, string, or arrows can be used to indicate information flow (1), we believe that proper design accomplishes the same thing and allows extra space for visuals and explanatory text. Finally, a coordinator was selected to handle logistics between poster authors, the Graphics Services section, a Forest Service professional editor, and off-site scientists who were independently making nine additional posters.

**Secondary Planning and Review**

We held a second planning meeting with poster authors in early October 1987 (Table 5). We critiqued the draft text and sketch layout for one poster. Major changes were deleting figure captions from visuals, simplifying text, and improving the over-sized attention-getter figures. We also learned to carefully verify the accuracy of edited, technical text. Where needed, text was changed back to its original form to reflect the author's intended meaning.

Authors then evaluated draft sketches of the four spot-art symbols for design simplicity and ease of comprehension. For example, the soil survey subtheme in completed posters was depicted by a spade and shovel, two tools traditionally used in field mapping work. The rough
Fig. 3. A completed 1.2 by 2.4 m overview poster display as presented at a national scientific meeting. Individual boards are 102 cm long by 46 cm wide and the title board is 15 cm wide. The poster introduced spot-art symbols (board no. 2 and 3—second and third from left) for soil mapping, soil sampling, map analyses, and laboratory analyses subthemes explained in an additional 19 posters.
sketch showed mapped soil delineations on rolled overlays; this was judged too complicated for viewers to comprehend. Similar iterations were necessary before approving other spot-art symbols.

In late October 1987, poster authors and we proofread draft figures and full-size print text generated by desktop publishing software. We checked punctuation, the matching of text and figures, overall completeness, and retention of the authors' original ideas. Most changes, such as inconsistencies in acronyms and phrases, were generally caught by someone other than the original author; all were sent back for correction.

For a multiple poster display, final review should be completed at least 6 wk in advance of actual presentation. Ideally, individual or multiple posters should be checked one final time, about 1 wk before presenters travel to the meeting site. Any remaining typos can usually be changed with white-out correction fluid or by press-on letters.

**Costs**

Average cost per poster was about $450. Particularly expensive portions were photo lab costs for reprints, 20 by 25 cm (8 by 10 inches) or larger, and the time of graphic artists to design and revise attention-getter figures. Use of Graphics Services staff and junior graphic artists reduced cost to about one-half of what commercial contractors charge for comparable work. At the other extreme, classroom poster projects can cost under $20 when using computer software, laser printers, and photocopying to enlarge text (3, 5, 8, 15). At some universities, graphics departments have equipment for inexpensive photomechanical transfer (PMT) enlargements of final text and figures (10, 13). Personal darkroom skills will substantially reduce commercial photo lab costs for making oversized poster graphics.

**Predisplay Activities**

A few other activities before display time will enhance a poster presentation (Table 5). Mounting tacks (≥ 1.6 cm [5/8 inch] long) should be purchased; tacks are not always provided at the display site. They can be color coded to match cover paper stock on the panels. A personal touch-up kit is handy for making unforeseen repairs to boards damaged in transit or during mounting. A soft eraser cleans off finger prints and smudges; a soft-bristled brush removes erasure materials.

A written summary of the poster can be handed out during the presentation. The summary can be a reproduction of poster text or a more detailed account of an innovative process or technique described only briefly in the poster. The summary should fit on one or two sides

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**Table 4. Hints on making a poster display.**

<table>
<thead>
<tr>
<th>Lettering</th>
</tr>
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<tbody>
<tr>
<td>1. Use bold typeface for titles, headings, and captions</td>
</tr>
<tr>
<td>2. Use capital and lowercase letters except in titles and headings</td>
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<tr>
<td>3. Use appropriate minimum heights for letters:</td>
</tr>
<tr>
<td>- Titles = 3.2 cm (1/4 inch)</td>
</tr>
<tr>
<td>- Headings, subtitles = 1.9 cm (3/8 inch)</td>
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<tr>
<td>- General text = 6 cm (1/4 inch)</td>
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<tr>
<td>4. Hand lettering or stencils are fine, but time-consuming to make</td>
</tr>
<tr>
<td>5. Transfer or press-on letters are fine, but very expensive</td>
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<tr>
<td>6. Phototypeset is best but is too expensive for many presenters</td>
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<tr>
<th>Graphics</th>
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<tbody>
<tr>
<td>1. Use graphics artist to make line drawings, or</td>
</tr>
<tr>
<td>2. Use available personal computer software graphics packages</td>
</tr>
<tr>
<td>3. Keep all graphs simple but large-sized and readable from 1.8 to 3 m (6-10 feet)</td>
</tr>
<tr>
<td>4. Add color to make the visuals attractive to viewers</td>
</tr>
<tr>
<td>5. Use low film speed (ASA ≤ 200) to minimize grainy, inferior prints</td>
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<tr>
<th>Mounting</th>
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<tbody>
<tr>
<td>1. Keep poster panels of manageable size, 102 cm (40 inches) long by 46 to 66 cm (18-22 inches) wide</td>
</tr>
<tr>
<td>2. Poster board works, but 3 to 6 mm (1/8-1/4 inch) foam core is best and less costly</td>
</tr>
<tr>
<td>3. Cover main panels with colored 31 to 36 kg (68-80 pound) cover stock paper</td>
</tr>
<tr>
<td>4. Mounting text/figures directly on construction paper and tacking this to the display board does not look good</td>
</tr>
<tr>
<td>5. Mounting text/figures directly on plain typing paper and tacking this to a display surface is visually unattractive</td>
</tr>
</tbody>
</table>

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<tr>
<th>Costs</th>
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</tr>
</tbody>
</table>
of a regular 22 by 28 cm (8½ by 11 inch) sheet of paper that easily folds to fit pockets and briefcases. Sometimes, reprints of already published material contained in the poster can be used. The sheet or reprint should include the name, address, affiliation, and telephone number of the presenter.

**Transporting Posters**

Transporting a poster consisting of several foam core panels can be done in several ways. For short trips, inexpensive or costly graphic artist portfolios can be purchased from most office supply stores. To avoid checking a poster as baggage on longer trips, boards can be bundled tightly in plastic and placed in a garment bag stowed upright in an airplane closet. A package of 102 cm long (40 inch long) boards will also fit in some, but not all, overhead storage bins above the seats in an airplane. Accommodating a wrapped poster in such fashion is more difficult during winter months when storage bins are filled with bulky coats. Posters can also be checked as baggage or sent by air courier service and United Parcel Service (UPS), sandwiched between padded packaging material inside airline garment bags, or bundled inside custom-built cardboard suitcases made from sturdy boxes. For transporting multiple poster displays, custom-built boxes of masonite with a solid Styrofoam core can be used.

**Display Time**

If possible, visit other poster displays the day before your presentation to see how panels are mounted. On the presentation day, arrive early to have plenty of time for setting up the display—this is particularly true for first-time presenters. Typical last-minute problems include the following: (i) display boards are different sizes or materials than those specified in premeeting instructions—trimming of materials might be needed to make panels fit a new space; (ii) tacks provided for the display are not long enough—use your own tacks or buy some from the closest office supply store; (iii) cover stock has curled in some places—use glue stick from a touch-up kit to paste the edges back down.

Once the display is set up, place summary sheets or reprints and personal business cards on a table near the display. If a table is not present, a premade booklet with sheets for viewers to write favorable or critical comments and to leave their names and addresses. Ask viewers for their impressions of the poster layout, ease of readability, and use of visuals. Their impressions can be used to improve future posters. Also, some viewers with similar backgrounds could be potential cooperators on future research projects.

Finally, when time allows, walk around the display area and observe posters made by others. Take notes of things that disappoint you or new poster techniques that can be included in future presentations. Talking to other presenters will reveal difficulties they experienced and how these problems were solved.

**Postdisplay**

The last activity in any good presentation is analysis and interpretation of what happened. Critical and congratulatory comments by reviewers and other presenters should be read thoroughly, especially if additional presentations are planned using the same poster. Smudges should be cleaned promptly from panels after a formal presentation; edges might have to be reglued. Additional outlets for posters given at national meetings are local chapters of scientific organizations, citizen or environmental action groups, and project reviews.

From our multiple display, we learned the following. First, poster authors must keep firm deadlines for submitting and rechecking draft text sent to outside contractors for word processing; when deadlines slipped, the entire production schedule had to be revised. Second, presenting results graphically from laboratory soil chemical analyses was difficult; colored figure backgrounds would have been more visually attractive than the simple white background with black lettering that we used. Third, using foam core subpanels mounted on foam core main panels gave all posters a visually appealing 3-D appearance (Fig. 3). Fourth, using three oversized lettering sizes prevented crowding around any poster; viewers could comfortably read poster text from 1.8 to 3.0 m (6-10 feet) away. Fifth, most posters were effectively recycled three or more times after the Atlanta meeting. Audiences included participants at another national soils meeting, elementary school children visiting a science display on acid rain, and officials from the USDA-SCS national office in Washington, DC.

**CONCLUSIONS**

With the proliferation of research results, indications are that the majority of presentations at professional annual meetings will soon be in poster rather than oral format. For this reason, undergraduate and graduate training should include the design and production of poster presentations. If planned well, a single poster or multiple poster display can be both visually attractive and technically informative for diverse audiences. Presented posters allow people to refine their public speaking skills as they answer questions from viewers. Creating multiple posters around a central theme and including spot art is a unique twist to the standard presented poster format. Results from complex interdisciplinary region-wide projects can be effectively summarized in either poster presentation or poster/exhibit format.

**REFERENCES**