

Designing scientific posters¹

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1. Introduction

It is surely a phenomenon familiar to us all: the scientific meeting with poster exhibition. Even in the absence of precise statistics or a general evaluation to back up the statement, it seems fair to say that scientific posters are usually heavy going for those viewing them. Quite often they seem to be assembled in a rather half-hearted manner and are not particularly attractive to look at; in many cases, a paper abstract has merely been enlarged and displayed with a figure or a table to spice it up visually.

Posters are generally presentations displayed on a standard A0 size sheet of paper. Their aim is to provide a clear outline of a topic with no further explanation required. Posters are currently acquiring greater significance as communication media, be it as scientific posters on display at conferences, meetings and symposia or as public relations media for open house and public events.

Our assumption in the following is that the viewers of a poster want to see as much as possible and to read as little as possible (see HAMMARLING et al. 2008). If a poster can be designed in a visually attractive and comprehensible way, it stands a much greater chance of exerting a favorable impact on a wider expert audience than would be the case with a talk in one of the numerous work groups at the same conference. Poster contributions are frequently seen – erroneously – as pared-down talks.

The present article seeks to offer practical guidance on designing scientific posters. This guidance is based on some fairly general quality standards. Our intention is that scientific posters should emerge from their shadowy existence and exploit the full potential of a new category of scientific communication.

¹ Quoting: HOFFMANN, V.; HELMLE, S. (2011): Designing scientific posters. In: https://www.uni-hohenheim.de/fileadmin/einrichtungen/430a/Poster/poster-dt-artikel_14-09-2011.pdf, date of downloading: DD-MM-YYYY.

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2. How to design a poster to maximum effect?

In order for a poster to convey information in a comprehensible and original way, the same general standards of quality apply as for texts:

1. Content and message
2. Implementation and design
3. Technique and esthetics
4. Comprehensibility and originality

(LANGER ET AL. 1974 and 2002, SCHULZ VON THUN 1981:140f.). A scientific poster poses additional requirements in terms of its content and message compared with what is expected from other posters or poster-like demonstrations.

2.1 Content and message

A scientific poster cannot be regarded as an advertisement or event poster. With regard to quality, the poster's key message has to be assessed on the same basis as a statement put forward by any other piece of scientific writing. Authors (poster designers) who are unable to say anything new or relevant should remain silent. The title promises information that is relevant and new, and this promise should be kept in the form of the messages contained in the rest of the poster. The trick is to present the essential and necessary information in a concise manner – without over-simplifying the message or making misleading generalizations.

A poster should provide the same information provided by a scientific paper: a description of the issue (identifying the chosen problem); a definition of objectives (what are the objectives pursued in the study or the research project? What are the questions to which answers are being sought?); the methodology chosen (what approach is being taken to achieve the objectives?); the results (what was found out and what significance does it have in relation to the issue at hand and the objectives?); and finally, some conclusions (significance of the results in relation to the issue, and possible consequences for practice and further research). However, the poster display is not designed simply as an enlarged written abstract of the scientific paper: it is a poster, not a text. The following questions provide some assistance in establishing this crucial distinction:

- What is the main content and what are the key messages?
- What makes the content and messages dynamic and exciting?
- Are the content and messages new and relevant?

It is helpful to answer these questions in as short and concise a manner as possible and to use the answers as the initial text for the poster.

2.2 Implementation and design

A person viewing a poster wants to see as much as possible and to read as little as necessary. This involves making use of visualization – the pictographic presentation of information. Of course, some highly abstract topics make the use of visualization almost impossible, and for this reason reviewers have no alternative but to exercise leniency in their judgment, as long as criteria 1 and 3 are fulfilled. Nevertheless, rather than working with running text, it is advisable to:

- work with key terms, short sentences and highlighted information.

In the case of tables, it is worth considering whether the content could just as easily be displayed in a (series of) diagram(s). Where a physical experimental setup or special objects are being described, a picture or a drawing is highly preferable.

The use of color and pictures works especially well as an eye-catcher, and for this reason it is necessary to highlight what is essential, rather than depicting something that is secondary simply because it can be represented in pictures. Visualization must not obscure the scientific information – quite on the contrary, the purpose of visualization is to communicate that information in a comprehensible and impressive way is possible. We recommend using:

- diagrams and charts with legible captions
- pictures and drawings which emphasize the key information.

2.3 Technique and esthetics

Any **text** should be legible to the naked eye from a distance of two to three meters. This applies to pictures as well as to the numbers and text used in diagrams. This can be achieved using clear font types. Sans-serif typefaces, where appropriate in bold (e.g. Arial or Tahoma), are generally more legible and therefore easier to read in small font sizes than those with serifs (e.g. Times New Roman or Courier). Abbreviations should be avoided, or require a legend. Long lists of references should not be displayed on a poster.

Color is an indispensable element of poster design. Black on a white background is probably the least inspiring choice. Thanks to the range of options offered by digital picture editing, graphic design programs as well as the availability of color printing, there are hardly any limits to the colors we can use. This means we are confronted with the task of choosing from a great variety of colors and combining them in esthetically pleasing ways. The differentiation

of figures and background in terms of color is one of the most powerful design features available and hence should not be dismissed lightly. A pleasant, calming background – e.g. light blue, light ochre, brown, orange, or cognac – enables blocks of information to be highlighted using contrasting or complementary colors. Our example poster (see Figure 1), which is printed without color, works with shades of blue as a background. The boxes containing text are maize yellow with blue and black fonts, highlighted text on a light blue background is in red font, while highlighted text on a normal blue background is in a fresh, spring-like green font. These are just three of a whole range of possibilities. Rather than just taking account of the authors' color preferences, the effect on the viewers should also be considered. Our colored version can be found at <https://www.uni-hohenheim.de/i430a/index2.html>.

In diagrams, color is used to greatest effect in monochrome differentiation, such as hatching. Colors can thus fulfill an important ordering function. Fields with the same shape and color should have a common point of reference. Different meanings or functions should be indicated by the use of different colors. **Functionality** in this case is much more important than technical perfection. Those who do not have the necessary electronic equipment should not be afraid of using a paint brush, paint pot, felt pen, domino paper and scissors. Handwriting and hand coloring are by no means beyond the pale. Moreover, a photocopy machine can be fed with colored paper, which can also be cut into shapes and affixed to a larger background.

Where appropriate, a **surface** can be designed using perspective, to give the illusion of a 3-dimensional image. The existence of **empty space** is also an important feature, as it highlights the importance of the content depicted in the poster. Dividing the surface into different sections does not mean that it should be covered completely. Sequencing, rhythm and dynamics all are elements which ultimately define the overall esthetic impression. If sequencing and symmetry are disrupted from time to time, an interesting impression of rhythm and fluctuation arises.

The esthetic impression should coincide with the poster's message, so that the esthetics highlight the essential content (see SCHNELLE-CÖLLN 1983 and 1993). A pleasing and inspiring poster with a not-too-harmonious design will attract the viewer and encourage him or her to linger and look more closely.

2.4. Comprehensibility and originality

By heeding our advice you should now be able to create a coherent and inventive poster. Designing posters requires some talent and plenty of practice, because it is an art – much like writing a truly comprehensible text which stands out on account of its simplicity and ease of reading. A clear text is succinct and concise, is well structured, and contains additional visual stimuli. This is equally valid for posters (see LANGER ET AL. 2002)!

Originality means dealing creatively with the various elements of design that are available. There is no “best way”: many roads lead to Rome. There is no single rating matrix for this, no checklist or catalogue with weighting coefficients. The quality of design is impossible to measure or to calculate. The whole is greater than the sum of its parts.

3. Test: Poster ready?

If you think your poster is ready to launch, take the time to reconsider your work critically from a distance: sleep on it. Do you have a punchy main heading and an informative sub-heading? Are the names of the authors written visibly below the title and is there a legible contact address at the bottom of the poster? Have the quality standards described here been considered adequately? If you are now fully satisfied, show the poster to someone else, from either within or outside the subject area, and observe their responses closely upon viewing it. Ask these viewers to read the poster aloud to you and to distil its key messages; in this way you will find out whether you have managed to convey your main message(s) to the target audience without any further explanation. Talk with the viewers about their impressions and do not try to defend yourself if you feel misunderstood. The proof of the pudding is in the eating, and you may be surprised at the new ingredients suggested to you in the course of conversation.

4. Vertical compatibility

Creating posters is a worthwhile task, not least because they can also be used for other display formats. Once a poster is stored on your computer you can also distribute it in a smaller format, copy text and graphic elements from it into other documents, and use it to illustrate articles, books or data presentations. For black-and-white illustrations, the colors of graphics can be changed into hatchings. And it is a lot easier to transform a short and concise poster text into a complete report than the other way around.

5. Conclusion


Ultimately, the most important aspect of poster design is to link content with design. It is necessary to pay detailed attention to design and esthetics, as this is what is perceived first of all! The content of a poster may be as new and relevant as you could wish, but it can only be conveyed effectively if the poster attracts the attention of its viewers and if they are able to grasp the content quickly. An emphasis on esthetics gives a poster a special flair in an often very facts-oriented, unemotional research environment. And yet communication is also a part of research – either oral communication in talks or visual communication using posters. Successful communication is an art. It follows that the technical points noted in this paper should not merely be executed, but used to create a composition that makes viewing a poster a part of the viewer's joi-de-vivre. Esthetics is an indispensable part of human joy in life – and this includes scientists' activities and scientific conferences.

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Figure 1: Example of poster design


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Poster, get set, go!

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Viewers like to: **see much & read little**

Hence use **4 quality standards**

Our goal:

- Offer practical guidance
- Convey quality standards

so that posters achieve their full potential

1

Content & Message

- new & relevant

Limit to the essential, without:

- Over-simplifying
- Over-generalizing

2

Implementation & Design

- Key terms
- Short sentences
- Diagrams instead of tables
- Captions & charts legible
- Highlights

3

Technique & Esthetics

Text:

- Legible from a distance of 3m
- Clear fonts
- Avoid abbreviations

Color:

- Figure-background differentiation
- Classification & recognition
- Functionality

Create empty spaces

4


Comprehensibility & Originality

- Simplicity & comprehensibility
- Brevity & conciseness
- Structure & order
- Additional visual stimuli

For scientific posters:

- * Harmonization of content and design
- * Design is perceived first

*** The content is only conveyed if the design supports it!**



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