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Educational Paper

Presentation and publication skills: How to prepare a scientific poster

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SUMMARY

A good scientific poster should capture the interest and imagination of the viewer and the overall aim should be to make the target audience want to know more about the topic. A well prepared poster will speak for itself and significantly aid the presenter in sharing the findings of their work. It can often lead to new and exciting collaborative opportunities. Although a well presented poster cannot make up for poor data, a poorly presented poster can lessen the impact of the work and cause it to be overlooked. This article emphasises some of the considerations that need to be borne in mind to make a poster scientifically valid, have visual impact and be attractive to the viewer. The key points are brevity, clarity, neatness and readability.

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Learning Objectives

After reading this paper, you should be able to address the following items:

- 1 Prepare a poster suitable for presentation at a scientific meeting

Key Messages

This paper provides a perspective on:

- 1 The effective presentation of scientific research
- 2 Engagement with an audience
- 3 Developing a scientific network

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1. Introduction

A good scientific poster should capture the interest and imagination of the viewer. Much like posters for movies or retail companies, the overall aim should be to make the target audience want to know more about the topic. Although posters presented at scientific meetings are not aiming at selling products and will contain a lot more information than viewed on a typical billboard, many of the principles relating to good design are translatable.

When attending poster sessions at meetings it is clear that too many presenters make similar mistakes when preparing their work for display. If the presenter is not in attendance to explain their work at the designated time, this can often leave it impossible to understand to someone not overly familiar with the topic. In contrast, a well prepared poster will speak for itself and significantly aid the presenter in sharing the findings of their work and can often lead to new and exciting collaborative opportunities.

Although a well presented poster cannot make up for poor data, a poorly presented poster can lessen the impact of your work and cause it to be overlooked.

1.1. Considerations when making your poster

Firstly, you must ensure that the title and content match the submitted abstract. Many conference attendees will prepare ahead of poster sessions by reading abstracts and identifying posters they wish to visit. The title of the work is important, it needs to accurately represent the work you have performed but it will also be the first thing that grabs the attention of the viewer. An engaging title suggesting an interesting study with exciting results will attract more interest than an overly long descriptive heading to your work. Should you change the title of the poster it will deter viewers or cause them to miss your work if they do not recognise it. Also, as abstracts are reviewed and scored before acceptance to a meeting, it is expected that the content presented matches that originally submitted. As such, the planning for your poster effectively begins when writing the abstract for submission.

In many cases the meeting organizers will provide a template or heading section for the poster sessions. Although these are often well thought out and provide a recognisable brand for the meeting, they still allow a great deal of flexibility and individuality for the presenter.

Read the instructions provided by the meeting organizers carefully before creating the poster. This is especially relevant if you are making your poster locally before traveling to the meeting. It has often been observed that posters produced in landscape orientation when the poster boards can only fit portrait formats do not give a good impression. Similarly posters that are either too small or too large for the space allocated detract from the work.

1.2. Text colour and size

One of the main errors made in poster presentations is in the size of font used and the amount of text, figures and tables included.

Firstly, the text should be large enough to be comfortably read from about 2 m away. It is not unusual for several people to view a poster at the same time and so the font should be clearly legible and not require anyone to move any closer. Typically a minimum font size of 18 or 20 points should be suitable for the main text and the title of the work should be clearly readable from a distance of 5 m.

Consider the choice of font as this can make a significant difference to the readability of the work. Avoid any form of script font and generally choose from one of the sans-serif options. Serif fonts (e.g. Times New Roman, Courier or Cambria) should not be used as these are not good choices for any viewers with accessibility issues (e.g. dyslexia) and plain fonts such as Arial, Calibri or Aptos are considered better options.

You should also give some thought to the colour options available. Black text on a white background should again be avoided due to accessibility concerns, and also it is possible to make your work more visually engaging by judicious use of colour. On occasion, the meeting template may limit the design options for the poster, however, it should still be possible to highlight areas of importance.

Contrast is important as not all poster sessions are held in optimally lit areas and you want to ensure that your work is clear to the reader. Dark gray fonts on pale coloured backgrounds can look very good and are easy to read. Similarly, light (or even white) text on a dark background can be highly impactful. Avoid the use of overly bright or garish colour combinations as these can be off-putting. Also consider that a large proportion of the population have some degree of colour blindness and so using variations of colour shades (especially red and green) to highlight findings can often be ineffective.

It is not essential to attempt to squeeze in all the details of the study and how it was performed. There is no expectation that full materials

and methods are included as for a paper, unless the methodology is the core focus of the poster in which case this will be highlighted. It is now common practice to include references to web sites via text or QR codes so that interested viewers can visit and read more detail from the study later. Similarly, if the work has already been published, providing a link to the journal page is now commonplace. A word of caution about publication prior to the conference - some Societies and Organisations put an embargo on publication of the paper prior to the date of presentation at the conference. Please be aware of this rule as flouting it may lead to recriminations.

The one time in which it is acceptable to decrease the text size is in the inclusion of the references. Although it is important to cite sources and refer to prior work, the reference section of a poster does not necessarily have to be viewable from distance, providing that the sources listed are clear and accessible to the viewer the font size can be smaller, though typically not less than size 12 would be advisable.

1.3. Figures, images and tables

The inclusion of visual elements is integral to the success of the poster. In most cases it will be an image or figure that will attract the casual viewer and engage them in the work being presented.

Many of the common problems for tables and figures relate to them being too small to see and/or the text within them being illegible. Please be aware that the text viewed on a computer screen when creating the poster doesn't always translate well to the final printed version. When figures are too small or contain too much fine detail the overall effect is to reduce the level of interest of the viewer. Again consider what can be seen at a reasonable distance and think about how to contrast text from the background to aid in the legibility.

If more than one figure is included, ensure that the colour scheme chosen is consistent for all images. Ensuring that there is a matching colour palette for all the images will aid the viewer and ensure that your message is effectively conveyed. Also ensure that the image and text on the image are of a high resolution (ideally ≥ 600 dpi), as images can get pixelated when enlarged on the poster and become difficult to view.

Before designing your poster ensure that you consider how many figures and tables are necessary. Having fewer images presented well is often preferable than cluttering the space with too many small panels that are difficult to interpret. Consider that your main finding clearly displayed as a centerpiece to your poster will be more effective than appearing as one panel amongst a series of uninteresting results.

An adequate and explanative title and legend is required for each figure and table. Typically, titles are included above tables and figure legends sit below the image. The combination of a good

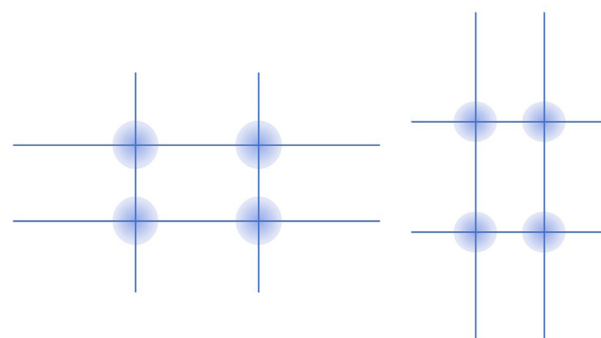


Fig. 1. Illustration of the rule of thirds for images. The circles placed at the intersections of the lines represent the areas of highest visual interest on landscape (left) and portrait (right) orientations.

figure/table and the accompanying legend should be understandable in the context of the poster without the viewer having to read all of the text.

1.4. Overall design and layout

In photography and design you will often see references to the 'rule of thirds' in order to make images more visually appealing. The rule of thirds provides a guideline to the layout of an image to maximise the interest to the viewer.

The simple way to apply this is to imagine vertical lines placed at equal thirds within the space along with lines also placed at equal thirds horizontally. The effect is to create a grid of nine equal rectangles. The four points at which the lines cross are the areas of peak interest to someone viewing the image (Fig. 1).

By placing your key results or images on one of the focal points will maximize the interest and appeal to the viewer. The image can be enhanced further by placing it on a contrasting background or framing the table or figure to differentiate it from the rest of the poster.

At most meetings, a standard poster board is used that sits between 1 m and 2 m from the floor. With this in mind, note that the line placed one third down from the top of the poster sits within the eyeline of most viewers. As such, this is the key area to position the main findings of your work in order to attract the largest possible engagement with the reader. Photographers and advertisers will position faces such that the eyes of the subject in the picture sit along this line in order to make the greatest impact with the viewer.

It should be noted that when viewing images people will ordinarily track down from the top left to bottom left before moving to the top right and scanning downwards. As such, if there is a logical progression in the images/figures/tables being presented it is advisable to follow this order.

You should also give consideration to the symmetry of your poster. Although people value symmetry and this often produces a pleasing image, it is more impactful visually to create an asymmetrical image. Therefore, an arrangement of figures/tables in an L-shape covering the focal points has greater impact and is more memorable than a poster that is evenly balanced (Fig. 2).

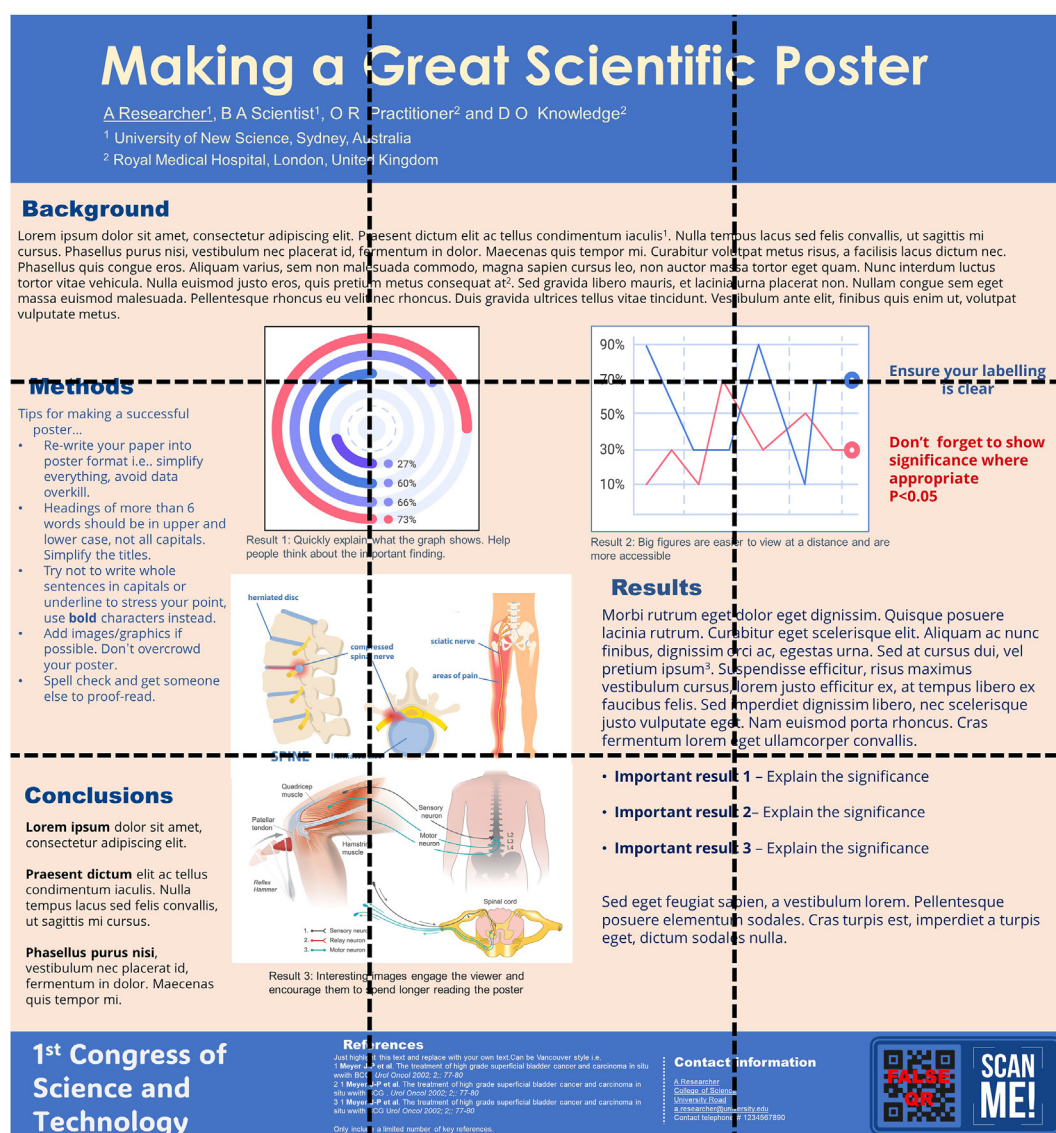
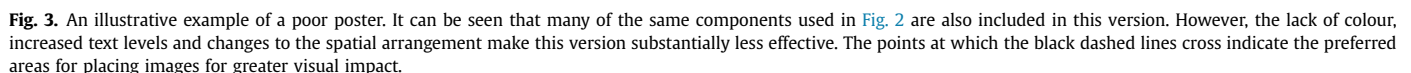


Fig. 2. An illustrative example of a good poster. The points at which the black dashed lines cross indicate the preferred areas for placing images for greater visual impact. Note the asymmetric arrangement of the images, the large font sizes and use of bullet points to highlight key findings.



In addition, most meetings will also have dedicated poster tours or specific sessions where selected posters are highlighted by the organisers. These sessions are usually chaired by an experienced

researcher and each poster presenter is given a short time to talk about their work to an audience. It is important to note that these opportunities can be incredibly valuable in developing greater interest in your work as many people will elect to attend the session without necessarily taking specific interest in the individual posters being presented.

The short amount of time allotted to each poster requires the presenter to be well prepared and focussed in their approach. It is not recommended to try and read out the content of the poster, but instead to provide an ‘elevator pitch’ summarising the main points of interest. In a few sentences you should be able to provide some background to give context to the work, before moving on to the main findings. It is often not necessary to spend excessive time on methodology unless this is key to explaining the results.

When presenting, ensure that you make use of the poster to highlight the findings being discussed. The talk should make full use of the images present on the poster to illustrate the points being made. Again, note that many people will be viewing the poster from a distance, especially if there is a large group for the session, so making the images clear and accessible is an important consideration.

When preparing the talk it is important to practice so that the timing is correct and that you know how to make best use of the poster. Unlike during a talk with slides which are brought up sequentially, it is important to be aware of where the individual images are on the poster so that you can easily direct the audience to the correct section.

1.6. Summary

Overall you should consider that a scientific poster session is an effective means to engage the community and generate interest in

Table 1 Checklist of points to consider when preparing and presenting your poster.
A poster is not a manuscript – be brief
Clarity is essential – delegates may visit your poster when you are not present
Use the best fonts and colours to maximise interest in your work
Check the instructions from the conference organisers regarding size and orientation of the poster. Some conference organisers provide a template
The layout should be neat and uncluttered
Images and figures should be of high resolution. Labeling of graphs should be legible
Tables should not be voluminous – consider what information is important to display
Cite only a few relevant references, if necessary
Remember that most delegates spend only a few minutes on each poster. Try and attract them with a clear message

your work. [Table 1](#) provides a useful checklist for you to consider when preparing your poster.

It is important to keep in mind that a good poster will encourage people to consider your work and make them want to discuss the findings with you further. Conversations with people with similar interests are an excellent method to develop collaborations and build networks.

Much in the way that advertisers use posters to encourage people to be interested in their products, it is possible to make poster presentations work to maximize the impact of your research within the community. A good poster, well presented, can be just as impactful as a talk at a scientific meeting.

Declaration of competing interest

The authors declare no conflicts of interest.