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HOW TO PREPARE A SCIENTIFIC PRESENTATION AS A POSTER

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Poster sessions are becoming an increasingly important part of scientific conferences, and usually represent the first occasion to gain experience with scientific communications.

Since guidance in preparing a poster presentation is widely available from scientific societies (1-4), published recommendations (5-10) and the Internet (11, 12; a Google search for poster preparation guidelines in scientific society sites reports more than 16,000 hits), our aim here is to synthesize a few simple suggestions to prevent the most common mistakes that could detract from poster effectiveness and to avoid, as Wolcott says “to give the poster presentation no one remembers” (13).



The aim of a poster is to outline some findings in a visual form that is easily assimilated and able to stimulate interest and discussion. The poster should be simple, so that any reader can grasp its main message in 1-2 minutes, but graphically appealing to capture people's attention. In fact, the average person spends just a few seconds scanning each poster and then, only if there is something of interest, reads accurately the text (6). During poster sessions, part of the efficacy of the communication relies on visual impact and part on oral presentation of the poster to peers or colleagues. Consequently, both aspects of this kind of communication have to be prepared accurately (14).

1. VISUAL PRESENTATION OF THE POSTER

1.1 Design

A poster is not a research paper stuck to a board but a different mode of presenting research using visual logic to express its essential content in a graphic way. A careful design phase, before actually composing the poster, is helpful to evaluate the effectiveness of different graphic solutions in involving the viewer.

The poster audience is composed of persons with different interests, that can be divided into 3 main groups: people who personally know the authors and their work; scientists working in the same general area as the poster's authors, but sometimes in different sub-specialties; and researchers whose work has little or no relationship to those of the authors. Poster layout has to be aimed in particular to attract the second group of poster audience, because these may provide valuable suggestions and insights about the presented research (14).

1.2 Structure

The poster is composed of different sections, usually: Title and Authors' names with affiliations, Introduction, Aims of the study, Materials and methods, Results, Conclusion, References and Acknowledgements. To save space, if not explicitly required by the organizing committee, an abstract section is not necessary, since it is already present in the abstract book of the scientific event.

Title - The title must quickly orient the reader to the main result of the work presented. To do this, it must be assertive and direct. It is better not to typeset the title in capitals because they are difficult to read and do not allow to highlight acronyms. The title, and the authors' names, affiliations, and email addresses, should be prominent and placed in the upper center portion of the poster. The Institutional logo enhances the aspect

and communicates quickly who the authors are: its size must be consistent with that of the title, and should be placed on one side of the title (4). Not necessary but a nice touch if you want to remember the occasion in which poster was presented, the logo of the scientific event can be positioned on the other side of the author's Institutional logo.

Introduction - If necessary, it will contain the background (rationale, previous research) on which the study is based.

Aims of the study - This section is short in a poster and describes the goal of the research.

Materials and Methods - Here are quickly and precisely described all the elements necessary for the specific research and essential to reproduce the study. Details should be kept to a minimum, unless the research is on a new methodology. It is a good idea to resort to drawings, flow-charts, tables or photographs whenever possible. Remember to mention statistical analyses that were used and how they were used. A more complete description could be provided verbally, or presented to interested viewers in handouts (an A4 paper reproducing the poster on display) or further material.

Results - Since it is probable there will not be room for every result, it must be considered a summary. Often this section represents the largest portion of the poster because here the reader can find the end product of the research. Quantitative results should be presented in the format of a graph wherever possible. One or more tables may be used to present some data, e.g. demographic and clinical data, but lengthy or complex tables should be avoided.

Conclusions - The last section of the poster should draw brief conclusions, giving the reader a clear take-home message. It is not a Discussion section as in a paper - in a poster there is no room to go into depth, e.g. comparing the results with those of other authors.

References - Many readers like to get information about previous results or methodological aspects described in other studies. Therefore, references are generally welcome, but should be limited to the minimum necessary, i.e. no more than 5.

Acknowledgements - Specific contributions to the project such as equipment donation, statistical advice, laboratory assistance, and funding should be mentioned here.

Each section should not be longer than 200 words, except for the title (1-2 lines), Aims of the study (max. 100 words), Acknowledgements (max. 40 words), and References.

In general, all the sections should be allocated harmoniously and in an orderly way, separated one from the other in such a way that the reader can easily and quickly find the part of interest of the communication; blank spaces can be used to highlight section breaks. It is also important not to leave large parts of the poster blank. The content (text, graphs and images) should be placed in columns, top to bottom, left to right, especially in horizontal posters. It is useful to supply clues, such as numbers and arrows, in order to guide the viewer through the poster.

Authors have to resist the temptation to include every possible detail, leaving them for the oral presentation of the poster: the content has to be concise and focused in clear messages. Given the visual nature of the poster, the text should be kept to a minimum: a sentence should not exceed 50 words, wherever possible use phrases instead of complete sentences.

1.3 Style

The style of a poster should adopt a consistent visual grammar (13) based on composition rules which are adhered to throughout the poster: e.g. the typeface of headings should be used only for headings; to highlight important information either color or bold characters should be used, not both, etc.

Text

The text should be easily readable by a person standing about 1 meter away, while the title and major headings must be readable at a distance of 3 meters. In fact, a crowd of readers could be gathered in front of the poster or some might not have perfect eyesight. Hence, the size of the typeface is essential. To improve the poster's aesthetic appeal, it is better if the text is written using different character sizes according to the importance of the sentence (e.g. title, subtitle, text) or to the specific section (e.g. introduction or references). Table 1 summarizes the suggested typeface characteristics.

Serif fonts (e.g. Times Roman, Garamond, Palatino and Century Schoolbook) are recommended for their readability; even if the Comic Sans makes the poster friendly, it is not regarded as a professional font by designers. The use of multiple typefaces should be avoided. As a maximum, for further emphasis, two fonts can be used, for instance non-serif (e.g. Arial) for text in figures and serif for the remaining text. When a fixed width font is absolutely necessary (as in reproduction of old printouts or in outputs of statistical programs), Courier should be used.

It is better to avoid capital text in whole sentences, as this can be visually distracting and annoying to the reader (15).

Colors

Color should be used for emphasis and in a consistent way. It is better to keep the number of different colors to a minimum to prevent visual confusion. The color scheme is particularly important (over and above personal

TABLE 1. Suggested typeface characteristics depending on reading distance, adapted from (14)

	Suggested Typeface Characteristics		
	Typeface size (points)	Type weight	Reading distance (meters)
Title	60-80	Bold	3
Name of authors	44-54	Bold	3
Department and Institution	40	Bold	3
Heading	44	Bold	3
Text	36	Normal	1
Captions	32	Normal	1
References	24	Normal	1
Text in figures	24	Normal	1

taste) since the combination text-background colors determines contrast. The combination dark background-light text color should be avoided since it is visually tiring. It is better to avoid green on red/pink or red on black combinations and vice versa as these can cause confusion for color-blind people. Different colors for different characters can be used to highlight sections, words or concepts such as, for example, the title or the name of some therapy or device. The background is better if it is a single, solid color; a light background image, if it does not interfere with text readability, can be used. Color can be used also to draw attention to specific areas or sections. Also colored arrows, bullets, lines etc. can be used to enhance meaning through graphic cues.

Figures and Graphs

Good graphics are essential for an interesting poster. The poster should be as attractive as possible and photos, images and graphs can help make it more pleasing to eyes that have been scanning a multitude of posters. Diagrams and pictures should be of sufficient size to be visible from a distance. Photos should have a 10x12 cm size, while drawings should be at least 20x25 cm in size. Use proper resolution in digital pictures, since enlarging low resolution images results in poor quality figures.

Charts are often the preferred way to present data and results (5). They allow long descriptions to be reduced and avoid use of complex tables. Distribution and line charts are frequently used to suggest trends and correlations; pie charts can be utilized to show sample composition while bar charts can be used to show changes in the dependent variable across groups (16). Graphs that include confidence intervals around point estimates are an effective way to present effect size and statistical significance. In multivariate analyses, it could more practical to present the results for the main variables of interest, listing the other variables in a footnote and relegating complex statistical tables to the handout (9).

Graphs usually need to be edited for poster use: for instance a short title - maybe a rhetorical question or summary of the main finding - should be provided, and the text has to be resized and lines fattened and eventually colored to make them more readable from a distance. While each figure needs to be self explanatory, do not clutter it with too much “nondata ink” such as unnecessary or excessive labeling, arrows, grids, bullets or other visual objects on the chart: see these suggestions at work (7).

2. INSTRUMENTS

A few years ago authors tended to print their posters in separate sections on many A4 sheets which they would paste together on a board. This is now considered not professional. In fact, at present authors prepare the poster on a single page electronic document, that can be printed in poster size on glossy heavy bond paper at most copy centers. Page layout applications such as InDesign or QuarkXPress can be used to design and produce large format posters, along with the most popular graphics packages such as Illustrator, CorelDraw and Freehand, but the most common software for preparing posters is PowerPoint, due to the wide diffusion of related Microsoft Office products and its availability on Mac and PC platforms. These programs allow the authors to create an image in which different components of the poster (texts, pictures, and so on) can be freely composed, placed, moved and modified until a satisfactory result is obtained; all these programs can produce an electronic document (in PDF or other formats) that can be sent to a printing or service bureau for the actual printing of the poster.

First of all, it is necessary to define the working surface of the poster once it is printed; for instance, in PowerPoint this result is obtained in “Page Setup” under the main File Menu (Fig. 1), choosing Custom Slide Format and setting layout, height and width according to the specifications of the conference organization, which are usually reported in the author section of the conference program.

Reducing the zoom, it is easy to ‘paste’ all the contents already prepared or compose them directly on the page as defined, in the first instance without too much regard for precision or effect. This first draft is useful to judge the ratio between text, images and blank spaces and the overall visual effect (Fig. 2). The necessary successive adjustments (such as text reduction

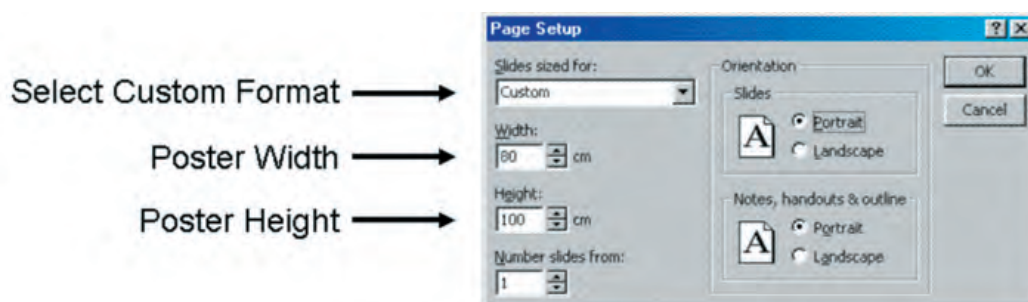


FIGURE 1. How to dimension a poster in PowerPoint.

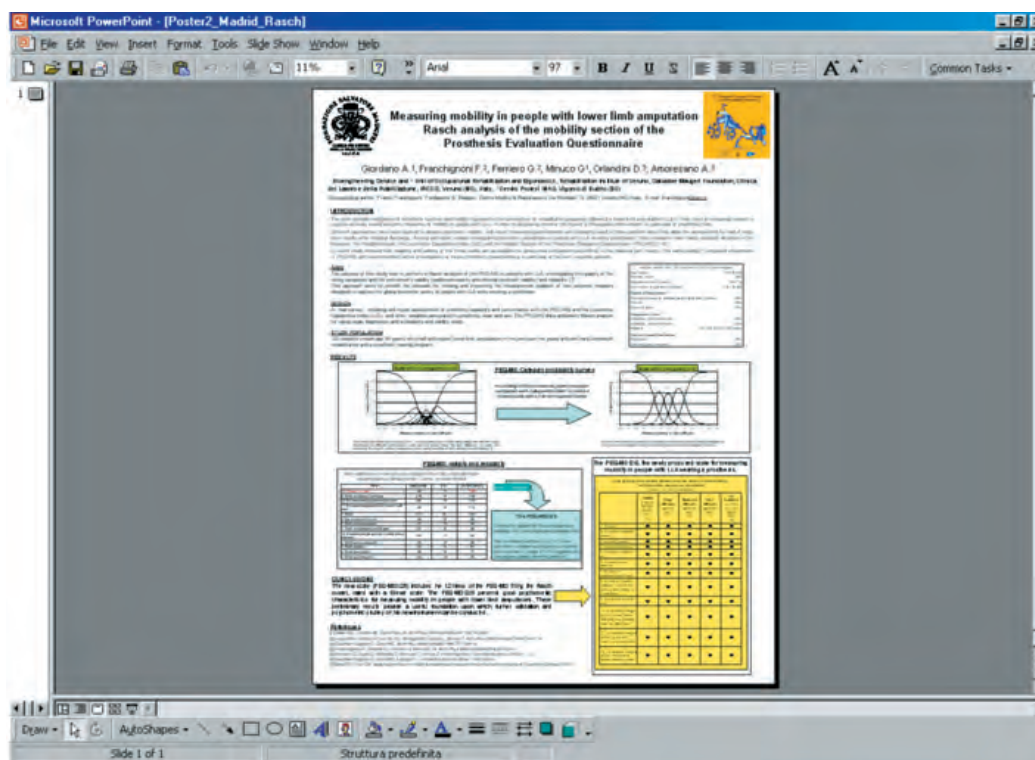


FIGURE 2. PowerPoint workplace with a sample poster

or reformatting, image enlargements, section placement, etc.) can be readily carried out on the draft, with immediate visual feedback, using the instruments available in the software.

A test printout of the poster adapted to an A3 format sheet, while possibly constituting a practical handout, is useful to judge the overall effect of the poster; moreover, if the text is readable on the sheet, it means that it is of adequate dimension to be read on the real poster.

One way to increase the reader's interest in the poster message is to offer the possibility to access online more in-depth data, such as films or publications. This innovative and interactive approach with the reader is becoming more and more common in magazines, and its use in other fields, such as poster sessions, can find new application. It consists in the presence on the paper of a two-dimensional particular kind of bar code, named Quick Response (QR) Code, printed for example near a picture or a reference of the poster. Readers equipped with a smartphone and appropriate scanning software can directly access via the phone's internet browser remote resources, as movies, photos or references arranged beforehand in an accessible repository.

3. ORAL PRESENTATION OF THE POSTER

Prepare a short synopsis of the poster according to the allotted time (generally, 3 min) and rehearse the talk. During the oral presentation of



FIGURE 3. Accessing interactive information via QR codes.

the poster, do not read the poster, but simply use it as a visual aid for the sake of clarity. When explaining the results, refer to graphs and figures but do not forget to face the audience.

Be ready to supply details left out of the poster for space considerations. These details might be made available in extra material (e.g. handouts, reprints, latest data). Sometimes readers are so interested in the poster that they write down some sentences from the poster or take pictures of it. The preparation of a handout to be freely distributed during the conference could enhance the efficacy of the poster intervention. Many copies can be placed near the poster, in a sheet protector, so that readers can take them as a memo. It is very important that the handout also contains the authors' names, affiliations, and addresses (email) for follow-up questions after the conference.

Readers may be interested not only in obtaining additional information but also in making contact with the authors for future cooperation. It is important for the authors to bring their business cards to the conference or ask for the reader's business card (on the back of which they can write some notes about the reader, e.g. questions raised, or request for scientific material). This common marketing tool may represent a good channel for creating and maintaining contacts.

4. PRACTICAL CONSIDERATIONS

Posters must be transported safely to prevent any damage. The best packaging is a poster tube with a carrying handle, of adequate diameter and length so that the poster fits comfortably in with extra room at the

ends. The poster should be rolled up gently and placed carefully inside the tube without bending or ripping it in the process. Finally, the plastic caps of the tube should be properly closed. In the case of distant meetings reached by plane another risk is the loss of the poster tube. This can occur if the poster has been packaged separately for airline transportation. In fact, the safest way to transport the poster is to carry it on the plane as hand luggage, storing it in the overhead compartment or asking the cabin crew to stow it safely somewhere inside the cabin. It is advisable to bring separately the electronic (PPT, PDF or TIFF format) version of the poster in order to be able to print a “last-minute poster” on the spot if the poster gets lost or, if not possible, to print a smaller version of the same acknowledging that this is a copy of the missing poster.

Finally, another good practical suggestion is to bring to the conference items useful to fix the poster to the display board, such as strong double-sided adhesive tape and push-pins, according to the instructions of the meeting. Do not rely on the conference secretariat to supply you with what is necessary to attach the poster.

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