

## Why Formatting Matters, Part 2: Graphics

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***It may seem that formatting of your proposal is a superficial concern, but it's important to understand the effect formatting can have on your reader.***

Last month, we discussed the importance of formatting text. This month, we'll discuss the use of graphics. You have probably heard the advice that including graphics in proposals is a good idea. Graphics help break up the text and provide visual appeal. More importantly, they can provide an overview of complex information at a glance. This is particularly important in complex proposals, where a reviewer might easily become confused. Below are some tips on how to maximize the effectiveness of the graphics in your proposals.

### When to Use Graphics

While graphics can be very useful, they also take up space, which is at a premium in most proposals. The rule of thumb for using a graphic should be that it communicates ideas or concepts better or more concisely than they could be communicated in text. A particularly appropriate use for graphics is to communicate concepts, plans, or ideas that are inherently non-linear, for example, how several parallel research thrusts are interrelated, or the multiple inputs and outcomes of a project plan. Since text is inherently linear—you read one sentence after another—it can be difficult to communicate these kinds of complex, non-linear concepts using text. Often, a graphic can communicate in one glance what might take paragraphs to communicate in text. It can also provide an overview before you delve into details, making it easier for your reader to follow your discussion. Figure 1 provides an example of a flow chart for a research plan that involves four tasks; two of them will be conducted in parallel, the results of which will feed into the fourth task. A figure like this gives the reader the big picture before you describe each task in detail.

Graphics are also very useful in presenting research results, for example, preliminary data that establishes that your approach is likely to be successful, that poses questions that you will answer in the proposed project, or that demonstrates that you have experience with a particular methodology. These research results might be presented in graphs, charts, micrographs, or illustrations and provide the reader not only with details, but also provide evidence that you have done the work that is more concrete than a mere description in the text would provide. For example, you can state in the text that you were able to synthesize carbon nanotubes with 1 nm diameter, coated with a uniform gold layer, and the reviewer is unlikely to consciously doubt you, particularly if you've published the results. But including a micrograph of those nanotubes clearly showing that the diameters are 1 nm and the gold

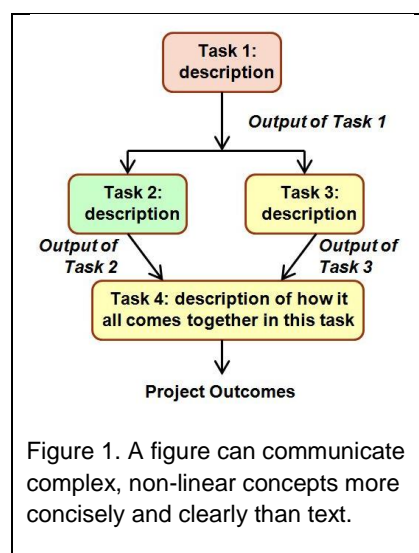


Figure 1. A figure can communicate complex, non-linear concepts more concisely and clearly than text.

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layer is uniform will be much more compelling to the reviewer at a subliminal level because the evidence is right there in front of the reader's eyes.

Similarly, because when a reader first looks at a page, her eyes are naturally drawn to the graphics on the page, graphics can be used to emphasize important points. They can also be used to provide a concise summary of points that you want the reviewer to understand. For example, if you're planning a complex, institutional transformation or educational project with numerous activities aimed at accomplishing several different objectives which support your overall goal, you might include a table listing the activities and the objectives that they will help meet (Table 1). The point of this table is to provide an easy-to-find summary of all the activities and show how they relate to the objectives of the project. This information will be repeated in the text in much more detail, but it can be difficult for a reader to see how all of the activities described over 10 pages fit together. The graphic can serve to tie together what initially might seem to be a collection of disjointed activities.

**Table 1. Planned Project Activities and Objectives Addressed**

Project XYZ Activities	Project Objectives			
	Objective 1: Recruit more minority students into STEM undergrad majors	Objective 2: Reduce first-year attrition	Objective 3: Lorem ipsum dolor sit amet	Objective 4: consectetur adipiscing elit, sed do eiusmod
High school summer STEM camp	♦	♦		
One-on-one mentoring	♦	♦	♦	♦
Study skills enhancing cohorts		♦	♦	
Ut enim ad minim veniam, quis nostrud exercitation ullamc	♦			♦
nisi ut aliquip ex ea commodo consequat		♦	♦	
Ut enim ad minim veniam, quis nostrud exercitation ullamc			♦	♦
Aliquip ex ea commodo consequat.	♦	♦	♦	♦
Ut enim ad minim veniam, quis		♦	♦	♦

Schedule and milestone charts provide another example of how this approach can help bring together information for reviewers (Table 2). Even though you have spent numerous pages describing in detail your research plan and all the associated phases and tasks, a schedule chart (Gantt or similar) can bring all of this information together in one place for a tired or confused reviewer. Often, reviewers will flip through a proposal before reading it, stopping at the figures and the schedule chart in order to get an overview of the project before reading the text. This is an opportunity for you to engage that reader and get her interested.

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**Table 2. Example Project Schedule**

	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Objective 1: Development of the hoosits</b>					
Integration and calibration					
Optimization of frumpits measurement methodology					
<b>Objective 2: Assess XYZ</b>					
XYZ spectroscopy					
MOA microscopy					
ABC testing					
Pandax studies					
<b>Objective 3: Integrate hoosits with XYZ</b>					
Instrument integration					
Instrument testing					
Demonstration					

## **Graphics Do's and Don'ts**

In order to ensure that your graphics are effective, here are some things you'll want to keep in mind:

**Make sure your graphics are legible.** The natural tendency is to insert a very nice, legible figure, but as you work on your proposal and struggle to cut the length to fit the page limit, to keep going back and making your figures smaller. Sometimes a figure doesn't need to be very large (for example, a photo where the fine detail is not important), but often there is text, such as labels, that becomes totally illegible as the figure size is reduced. You may be able to overcome this problem simply by going back to your original figure and redoing the text and labels in the figure to make them larger so that when the size of the figure is reduced you can still read them. Be especially careful about taking a Powerpoint slide and inserting it directly into your proposal as a figure. While that slide may have looked beautiful on a large screen, it is probably indecipherable as a small figure. You may still be able to use that figure, but you'll need to rework it keeping in mind the space available in your proposal.

**Don't make your graphics too complex.** If your graphic is so complex that it will require the reader to spend time deciphering it, you can be reasonably sure that he will simply skip it. This is often the case with very complex diagrams and flowcharts, where the reader may be expected to follow a spaghetti bowl of arrows and squint to read text in boxes. Think about what you want your reader to learn from your figure. If, for example, your point is simply that there is an algorithm, and it's extremely complex, then including such a graphic will make your point. If you want the reader to actually understand the specific steps in a very complex algorithm, then you'll need to find another way to communicate that—perhaps by using a table listing the steps and descriptions, describing the steps in your text, or by providing an overview of the steps in your flowchart without including so much detail. Sometimes, a very complex figure works better when the content is split into two figures. Just remember that a graphic that the reader doesn't easily understand is simply wasted space.

**Use informative figure captions.** It's a universal principle in writing proposals that you don't want to leave it to your reader to decipher what your point is. This is especially true in the case of figures. If you're showing a micrograph of your 1 nm diameter gold-coated carbon nanotubes, if you caption it, "Figure 1. Scanning electron micrograph of gold-coated nanotubes" you are leaving it to your reviewer

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to try to figure out why this is significant. Is the important point that the nanotubes are only 1 nm in diameter (as shown by the scale in the photo, which you are hoping your reviewer has noticed)? Is it that the nanotubes are coated with gold? Is it that you have been able to make carbon nanotubes at all? Even if you discuss these points in your text, the figure and caption alone should make your point, for example, by using the caption "Figure 1. The PI's group are the first researchers who have been able to synthesize carbon nanotubes with a diameter of only 1 nm and a uniform gold surface coating." This way, when the reader's eyes jump down to that graphic and read the caption, he is getting a strong, concise, self-contained message that will make an impact rather than just seeing a picture whose significance he may or may not understand. On the other hand, be careful about using very long, detailed captions. The strength of figures and captions lies in their conciseness. If you include a caption that's a paragraph long, you've lost that advantage. Make your caption brief and to-the-point, and include detailed discussions in your accompanying text.

**Make sure the resolution of your graphic is appropriate for the page.** Some disciplines, such as molecular biology, produce beautiful figures (for example, detailed illustrations of complex macromolecules), and a proposal may include many of those figures. Remember that in many cases, the resolution of the original figure is much higher than is necessary for inclusion as a small figure in a proposal. If you don't reduce the size of those graphics files, you can find yourself with a proposal file that is so big that it won't convert to pdf or crashes when you try to upload it into Fastlane.

Conversely, some figures have insufficient resolution when imported into your document and look fuzzy. A fuzzy figure will irritate your reader and make your proposal look less professional. One cause of a fuzzy figure may be that your original file was too small or low in resolution (for example, if you took a small photo and blew it up). In that case, you'll probably need to redraw or retake the photo. Another cause may be related to the procedure you used to transfer your figure from one software program to another. This has become an extremely irritating problem with later versions of Powerpoint. It used to be that you could draw a figure in Powerpoint and then save it in jpg, gif, emf or other graphics format at a high resolution in order to import the figure into Word. For reasons that are known only to the software gurus at Microsoft, Powerpoint 2007 and later only allows you to save a slide in graphics format (jpg, gif, etc.) at a low resolution (96 dpi). As a result, when you import the file into MS Word, the figure is fuzzy. If you are computer savvy, you can change the default export resolution of Powerpoint, but it requires editing your computer registry, which can have dire consequences (i.e., a crashed computer) if you do it wrong, so if you're not confident in your computer skills you may want to bring in an expert to do it. (Instructions can be found [here](#).)

**Make sure your graphics and text are integrated.** Every graphic should be referred to in the text. Otherwise, you run the risk of your reader puzzling about why the graphic is there. Remember also, particularly when discussing data such as preliminary results, that providing too many graphs related to the same point may actually dilute your point. Present the most important data and summarize your findings and their significance, but don't try to make this section a journal paper.

If you do a good job with your graphics, you'll find that they are a powerful tool to help you communicate with your reviewer.