

# Technically Speaking



**Presentation essentials for  
scientists, engineers and other  
technical professionals**

**Brad Wallace**

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# **Getting Started**

# Chapter 1: Presentations - what you want, what your audience wants

This book was *going* to start with an overview of the importance of presentations and presentation skills in your current and future career, until I realized that I would be preaching to the converted. If you are reading this book you already realize the importance of presentations. So I decided not to waste my breathe (so to speak).

There still is, however, the question of what the *purpose* of making presentations actually *is*. Simply put, what are you trying to do when you make a presentation?

Abstracting things out, there are two purposes to making a presentation. The first is to *share* information, while the second is to *influence* an action of some sort.

The first purpose - sharing information - seems pretty obvious. After all, you are talking about *something* and this something is something that your audience is not as familiar with as you are (or else why are you doing it?).

The second purpose - influencing actions - may not be so obvious to some of us though. After all, not all of us are doing sales or talking to decision makers, so what action are we influencing?

Consider, though, that sharing information is one of the most basic requirements of the technical world. It is by sharing information that we advance science and technology. It's the whole "If I have seen further it is only by standing on the shoulders of giants" thing. So even if you are doing something as seemingly innocuous as giving a talk at a conference, you are still seeking to convince your

audience to take an action - to take your results into consideration in *their* work.

The idea of seeking to influence an action will not sit well with some of you. None of us like the idea of being related to the stereotypical used-car salesman. So you need not worry - I am not going to spend time talking about the art of influencing other people. I could, but I won't.

Instead, I am going to talk about techniques to enable you to *share* your information more efficiently and effectively. If you can share information effectively you will have a head start on influencing actions, but that is not the purpose of this book.

## **Sharing information - what do you want?**

Let us look at the 10,000 ft view of a presentation and ask “what is it that you [the presenter] want?” I don’t mean the “in the weeds” things like “I want to explain the use of the Greens Function in modern electrical circuit theory” (if that even makes sense). Abstract things out. Way out.

If you look at things from this very abstract point of view you can see that there are three things that you want from a presentation:

1. You want your audience to *understand* what you are telling them,
2. You want your audience to *remember* what you are telling them, and
3. You want your audience to *act* on what you are telling them.

Now, we have already agreed that we are not going to look at the *influencing* aspect of presentations, so we will concentrate on the first two desires - helping your audience understand what you are saying, and helping them remember it.

## **Understanding = Clarity**

The key to helping your audience understand your information is to make your presentation as clear as possible. This is not the same as talking down to your audience. Instead, it is about helping your audience.

Consider this: You will likely be presenting on a topic that you are familiar with (or, at least, more familiar than most of your audience). You may have a degree that others do not, and you may have been working on the topic for weeks, months or years.

Your audience, however, probably does not have the same amount of knowledge of the topic. In fact, they may only have the length of your talk to learn about, and understand, your topic. 15 minutes? An hour? Whatever. It is not a lot of time to pass on information and understanding that has taken you much longer to amass.

This is why clarity is so important. Anything that muddies the waters, distracts the audience, or is simply ambiguous, will waste precious minutes and lessen your audience's understanding of your topic. So you have to avoid creating barriers to your audience's understanding.

## **Working memory and the power of three**

One of the terms worth remembering is "working memory." Consider the path that data must travel into your memory. On the outside you have the inputs - the pictures, the words, the sounds. These inputs reach your sense organs (in this case the eyes and ears) and proceed into the short- and long-term memory. Between the senses and the short- and long-term memory however, is a receiving area of sorts - the working memory.

The working memory actually does several things, including taking information out of short- and long-term memory and manipulating it when you are actively thinking. For our purposes, however, the

important point is that the information that your senses provide is pared down to fit into your working memory *before* being stuffed into the short- and long-term memory.

Why is that important? Because the working memory is amazingly small. In general, working memory has been shown to hold only 3 or 4 “chunks” of information. It really depends on what type of information we are talking about, but the bottom line is that working memory is small. Very small. And this sets a limit on how much information you can feed your audience at a time.

Let me be clear here. Whatever your talk, your audience is going to come away with about three points. That’s it. Just three. What you need to do is make sure you know *which* three points you want the audience to take away, and make sure they *do* take those points away. Structure your talk around that fact and you will be successful.

Now I am sure that some of you are asking “if the audience is only going to take away three points, why am I busting my butt filling out 15/30/60 minutes of a talk?” The reason you are busting your butt is that you want the audience to not simply be *exposed* to the points, but *convinced* that they are true. So the rest of your talk has to support the three main points. Your audience may not remember what you said to support the points, but they will remember whether they were convinced, and if they are convinced then they will accept your three points “truth” (whatever that means in your context).

Pick you three points and support them. Do this well and your talk will be a success.

## **Repetition, Repetition, Repetition**

So you have your three points and you have the evidence/information/arguments needed to support them. How do you make sure

that the audience takes away the three points that you *want* them to take away?

The short answer is repetition. Each time that your audience hears a point, the point will become slightly more embedded in their memory. The best way is to repeat a point three times: two times in fairly close succession, and once more some time later. As will be discussed later, you could make a point, present the supporting information, and then summarize the point before moving onto the next point. Then, at the end of the talk, state the three main points again to help drive home their importance.

## Emotion

The final hook for hanging your points on is emotion - people simply tend to better remember things that have some emotional connection for them. Politicians, salesmen, and motivational speakers know this, and if you pay attention to what they say you can see where they are trying to tug on the heartstrings for their purposes.

For scientific and technical talks this can be harder - how do you tie emotion into a Fast Fourier Transform? And although it may be hard, it is not impossible. Many talks will involve a “eureka” moment, or perhaps a feeling of relief, or something similar that your audience can identify with. Use those moments to help add that extra little bit of emotion to your talk.

## Mid-chapter Summary

When making a presentation you want your audience to:

- understand your message
- remember your message
- act upon your message

To meet these goals you want to

- avoid anything that distracts from your message
- repeat your points several time
- insert emotion when you can

## **Know who you are talking to and what they care about**

Well, that seems like a stupid title for the section, doesn't it? Who are you speaking to? Your audience of course.

But life is more complicated than that. Consider four types of audience that you could have:

1. A group of industry executives
2. A group of engineers from within your company
3. A classroom of undergraduate students
4. A room full of media

The list is obviously not exhaustive, but it does illustrate that not all audiences are created equal. Each of these audiences will have different backgrounds, different levels of technical competency, and different interests and goals in attending your presentation. Given this, does it make sense to present your information to all four groups in exactly the same way?

The answer is obviously "no." But if the answer is "no" then we have to confront the next question: "How should I craft my presentation for each audience?" Predictably, that is the subject of this section.

## Identifying audience needs

To craft a presentation for an audience, you need to first *understand* the audience. What factors should you consider?

1. The audience's prior knowledge of your topic
2. The audience's technical background
3. The goal of audience in attending your presentation

Let us consider these individually...

### Audience knowledge of your topic

Let's face it - you know what you are talking about (or, at any rate, you *should*). Chances are that you have had training in the area and have probably been doing some work in it, for days or weeks, possibly even years.

It is of course possible that your audience may have a similar background - they may *also* have been immersed in your topic for some length of time. But probably not. If you are giving a presentation it is because you know something that (at least some of) your audience does not - why else would you be giving the presentation?

But your audience might be coming in totally cold - no knowledge of your topic at all. Perhaps you are a microbiologist and are giving a talk to a group of computer scientists to interest them in helping you analyze your data. Or perhaps you are a hardware engineer looking for some help with interface design for a new product. Or maybe your boss is giving a tour to management consultants and he has asked you to give some background on your work.

What would you do in this case, where your audience is completely ignorant of your topic? Well, you could treat them to a presentation that deals with the fine details of your work, or you could give them

a backgrounder that presents the work at a very high level. Put yourself in the shoes of the audience - which of these two options is more likely to overwhelm the audience? Which are they more likely to understand?

Contrast this with a situation where your audience is well versed in the area of your work, but not your particular project. Perhaps you are doing the control system for an oil processing plant and you are providing an overview for the eventual operators as part of a customer review. How much background and context do you need to provide? Does it make sense to get into the weeds here?

The point here is that unless you consider the audience knowledge of your area you could grossly miscalculate the amount of background and the depth of detail needed. That would lead to the audience tuning you out - either because you have overwhelmed them with detail that they have no context for, or because you are repeating information that they learned in grade school. Either way, not good.

## **Audience technical background**

From the previous section you may think that this section is redundant, but there is a subtle yet important difference. Instead of asking what background knowledge the audience might have, you are now looking at the ability of the audience to absorb the technical details.

Consider some variations on the examples given above. Perhaps you are a microbiologist that is working on antibiotics for human diseases, and you are giving a presentation to other microbiologists who are looking at the effects of antibiotic buildup in ponds and rivers. Or perhaps you are a hardware engineer speaking to the engineers at a company that may want to use your hardware as a “black-box” in their larger product. In both cases the audience will have technical knowledge similar to yours.

At the opposite extreme consider the management consultants coming through your business. Perhaps you are an computer network systems provider, and the consultants are all MBAs with years of experience working with companies that provide IT infrastructure to other industries. The consultants will undoubtedly understand your company and your role in it, but are unlikely to understand the technical details that you are faced with on a daily basis.

The point here is to understand what sort of technical details the audience could absorb, and how much technical background you can take for granted. Can you talk about spectrum analyzers and assume that the audience knows what you mean? Fourier transforms? The musculoskeletal system? Or is it best to talk in terms of stick figures and lego building blocks? Once again, unless you have some idea what your audience can understand going into your presentation, you will overwhelm, bore, or even insult them.

## **Audience goals for attending your presentation**

Now you understand how much the audience knows about your work area and how technically savvy they are - surely you are ready to go now, right?

Not quite yet. We still need to know at least one more thing, and this is a biggie:

Why is the audience there?

You need to the audience's "who cares" questions. If your audience is sitting asking themselves "why am I here," "why should I care about this" or "who cares," then you have just wasted everyone's time - yours included.

Examples? One fairly obvious one is the case where you are a technical person talking to a group of peers at a technical workshop. In this case the audience goal is to learn about the technical details of your work, and probably at a fairly detailed level. The audience

members may want to know the information simply for future reference, or they may have a specific immediate need. Either way, you would present the technical details of your work.

Or consider the case where your audience already has some rough knowledge in your work, but the knowledge is not technical in nature. An example could be giving a project overview to the company CEO and other executives. What should your approach be then? C-suite executives will typically be interested in a couple of things - how your project is helping to make money for the company now, and how it fits into the company's plans for making money in the future. In this case you would avoid presenting technical details (unless explicitly asked) and speak more to the business opportunities and how your project fits into the company strategic plan. (Yes, this means that you should probably read the company's strategic planning document. Sorry. Wish I could help there).

Somewhat intermediate to the above examples, you could be asked to present your work to middle management as part of a project review. In this case your audience is generally not interested in the technical details, is somewhat interested in how things fit into the strategic plan, but is most interested in things such as costs, schedule, and resources.

So you can see that different audiences will have different reasons for attending your presentation. It could be technical, but it could instead be strategic or programmatic (or educational, or public relations, or sales, or...). Consider now what would happen if you treated all audiences as if they are interested in the same things that you are (generally the technical details that you live and breathe). At best, you will confuse and/or bore the audience to death. Why "at best"? Because confusing the C-suite or middle-management could get your work canceled because the audience does not appreciate what your work brings to *their* needs. So they will conclude that it brings nothing.

And we don't want that, now do we?

## Identifying your needs

We have now dealt with the audience's needs, capabilities and goals in coming to your presentation. What about *your* needs?

Well, presumably you have some idea of what you want, but perhaps it is worth stopping to give it some thought anyhow. After all, the question is not simply what you want, but what your audience can do to give it to you.

Imagine that you have a project that is behind schedule. You have been complaining about not having enough bodies to do the work but you have not been able to get any traction. And now you have the ability to present not simply to your boss, but to *their* bosses and their bosses' boss. What do you do?

Some people would want to paint their project in the rosiest light possible so as not to appear incompetent or whiney. The net result would be that you would not move your request for more resources forward, and in fact you may do it harm. After all, if you convince *your* boss that you need more resources to be successful, he will have to convince *his* boss, and you would have just told his boss that all is going well.

So what do you do?

In this case you would do far better to lay out the importance of your project to your organization, and show the progress that has been made thus far. This would be the positive part, but you should then lay out the consequences of continuing with the status quo (which, I am presuming, would be bad). You could then show what would happen if you got the resources that you want.

The key here is to use the needs of the audience to best advantage for you. But you will not be able to do this if you do not consider what motivation the audience has for being there in the first place.

## Summary

Its all about the audience:

- Their background knowledge of the subject
- Their technical background
- Their goals in attending your presentation
- What they can do for you