

# Chapter 6

## Presentations

*I hate quotations.  
Tell me what you know.*

Ralph Waldo Emerson, *Journals*,  
1849

### 6.1 Introduction

Suppose that you need to find out about a new topic. What do you do? You can of course find a good book on the subject, or a technical paper if the topic is too specialized for a book. You can go to the internet, and find information about your topic that ranges from a high-level overview to detailed research reports. However, if you have the opportunity, the fastest and most effective way to learn about a new topic is to *talk to someone* about it. Interestingly, that “someone” need not be an expert in the topic, although they do need to know a little more than you do. Surprisingly, it’s often more useful to talk to a novice; that is, someone who has just begun learning about the topic, than to talk to an expert.

Assuming that you agree with the claim that talking is more effective than reading—and this is a generalization that, while true for most people most of the time is not necessarily true for all people all the time—*why* is this so?

In a conversation:

- the content can be tailored to the audience;
- the parties can communicate non-verbally—with looks and gestures—to indicate that a point is simple, and the speaker should move

on, or that something is confusing, and needs more discussion;

- the listener can ask questions;
- the parties can draw a picture and point to it, to help focus the discussion or to communicate a difficult point.

Why does a novice sometimes make a better teacher than an expert?

- The expert may have forgotten what it was like not to know; the novice can remember that only a few days or weeks ago he or she was equally puzzled by just that point.
- The expert may use technical jargon, forgetting that most people don't know what it means — or even that the terms in question *are* jargon.

It is precisely because talking is more effective than reading that *every* academic and professional meeting includes presentations. At academic conferences, being scheduled for a presentation normally requires that one first submit a paper to a panel of referees, and, if it is accepted, then revise the paper to meet their concerns. The revised papers are then published, so in a sense the presentations are superfluous: attendees could just read the papers. However, in practice, the presentations — at least, the good ones — are the focus of the meeting. A good presentation is not “reading a paper”. Instead, a good presentation approximates what goes on in a personal technical conversation; the more we can make the presentation like a conversation, the more effective it will be.

## 6.2 Preliminaries

When you meet someone to begin a conversation, you don't plunge right into a technical topic: you first exchange some pleasantries, ask about their journey or their family, and generally get to know them and their state of mind. Then you establish the parameters of the conversation: how much time is available, what topics will be covered, and whether this will be an isolated conversation or part of a series.

A good presentation starts in the same way. The first priority is to get to know your audience. If you are presenting to a seminar group of which you are a member, you will know the audience before you start. If you are visiting another institution, you should ask your host about the likely audience before you arrive. Will the audience be academics from your specialty, or from another discipline? Will it include graduate and undergraduate students? With what background? If you are speaking at a conference or workshop, find out who typically attends. For example, if I'm talking about my

research in programming tools, I will give a different talk at a conference on human–computer interaction—where I would presume the audience to know about designing and evaluating interactive tools—than I would at a conference on software engineering—where I would presume the audience to be familiar with the process of software development.

Why is it important to know what your audience already knows? Talks are invariably time-limited, so you will always be faced with having to decide what to leave out. If there is something that you can rely on every member of the audience already knowing, that’s one thing that you don’t have to say. Nevertheless, be careful not to assume that the audience knows a piece of background information that is vital to your whole talk without checking first.

## 6.3 Kinds of Talk

There are various kinds of talk, characterized by their length and by the size of the audience, which governs their formality.

**Standard Conference Talks.** Most conference presentations are 15–30 minutes; the audience may be as small as 50, but has no upper limit. A listener can take away at most one or two ideas. Treat such a talk as an advertisement for your research—your goal is to persuade listeners to look further, in particular, to read your paper.

**Long Conference Talks (invited talk, special slot).** An hour-long talk to a large audience (100 people or more). The goal of such a talk is to educate the audience on the research. Listeners can take away at two or three ideas.

**Class presentation (usually: 10–15 minutes).** These presentations are directed at your peers and the instructor. Your goal is to demonstrate mastery of the class material. You can take advantage the common background and experience of the audience. It is similar in many respects to a conference talk, but will usually be geared to an audience of 50 or less.

For all kinds of presentations, gathering material for and creating good visual aids is a good starting point..

## 6.4 Gather Material

Gathering supporting material for your slides is an important task in the preparation step of your presentation. Before finding material, create a

rough list of ideas that you want to present in your talk. Then, knowing how long your talk will be, figure out how much material you will need to illustrate the points on your list.

### **6.4.1 How much material do you need?**

There are two approaches to collecting material: too much, and too little. Both can work.

Some presenters try to gather three times as much material as they think they will need. This works for them because the process of gathering material is also an aid to understanding more deeply what they will present. Having a plentiful supply of material helps them pick the best examples and illustrations for the talk. Gathering more material also builds up their background on the topic, which boosts their confidence and will help them to answer questions that go beyond what they eventually present.

Other presenters will start with a bare outline, and fill it in with examples and illustrations until they have a talk of the appropriate length. They never have more material than they need, so they don't waste time collecting material that they don't use. This approach can work well if you already have a good understanding of the topic, and know where to look for supporting material.

### **6.4.2 Where do you find material?**

If you are presenting your own work, for example, at a conference, the primary source for your material will probably be your own accepted paper, but you may also have results or experiences that post-date the paper. You should certainly include such material if you have it.

If the talk is an overview of work primarily done by others, such as an invited survey talk or a class presentation, you will need to inform yourself about the topic before you can inform the audience. Fortunately, there are many of sources for supporting material: relevant research and survey papers, books, tutorials, webpages, and videos. Cite your sources on your slides. If you borrow from other people's slides, acknowledge them, and make sure that you understand what the slides are saying.

### **6.4.3 Kinds of Material**

There are four types of commonly used supporting materials: statistics, definitions, examples, and comparisons and contrasts.

## Statistics

Numbers are one of the most useful kinds of evidence that something needs to be improved or that one thing is better than another. Numbers are more powerful than words when you show the performance of a system or algorithm.

## Definitions

Sometimes you will need to explain the terms you use in your presentation. The way that you use definition depends on who you are talking to. If most of your audience are experts in your topic, then use the accepted formal definitions. But if most of your audiences are not in your research field, you may need to rewrite the definitions, or use graphics instead of words.

## Examples

A good example can save you a lot of time explaining a complex idea, and can liven-up your presentation. Read your examples carefully, and find the best examples to support your talk; you may find that you now know more than when you wrote the paper, and can construct a better example. You may also find that you can replace a formal definition with an example.

## Comparisons and contrasts

When you need to explain something new to the audience, its often a good idea to compare it with something with which the audience is familiar. For example, you might describe a new machine learning algorithm like “Adaboost” by comparing it with its earlier version “Boost”.

# 6.5 Create the slides

Slides should be used as illustrations for your talk; they give you pictures, diagrams, data and examples that help highlight your key ideas. Slides should be created to complement your talk, and not as a substitute for it.

## 6.5.1 Title and Introduction

The first slide is usually the title slide. Remember that the title of your talk need not match the title of the paper or source you are presenting. Also, it is fine not to put title on all slides.

Follow your title slide with a short introduction to the problem. In a longer talk, consider a contents slide *after* the introduction, to give the audience some perspective. Your presentation should tell a story, but it is important that the audience learns the main point of the story *early*, so that they can use it as a frame of reference for the other ideas.

## 6.5.2 Conclusion and Acknowledgments

You should always include a conclusion slide; leave it up while answering questions. You should also have slides with acknowledgments and references. It can work to place the acknowledgments at the beginning; this gives the audience an opportunity to get used to your accent, without risking that they miss a major point.

## 6.5.3 Managing Time

Depending on how much time you have, you should decide the approximate number of slides you need. It takes around 1.5–3 minute per slide if you are trying to explain a major point. Title and conclusion slides take much less time. So, a 10 minute presentation has between 5 and 10 slides. However, you can have more slides if you explain a key idea by a series of diagrams or animations where each slide is viewed for a few seconds only.

Draft your slides on quarter pages or index cards; this helps gauge the size of the slide. Not every slide needs a title; consider using title to highlight a change of topic. Plan some flexibility into your talk so that you can skip a few slides to fit the talk into the available time without affecting your rhythm or omitting key ideas.

Depending on your target audience, provide context. Emphasize results and techniques from a variety of sources. Expect to use a non-uniform level of detail pertaining to the interest of the audience. That is, select a one or two ideas to examine in detail, and others to skim over.

## 6.5.4 Conveying the Key Ideas

Knowing what you want to convey is important, but it is equally important to understand how to convey it so that the audience understands your key ideas. Do not write more than 4–8 lines per slide. Wherever possible, use a graphic (rather than words) to explain the key idea of the slide. On text slides, use visual aids like color, indentation, text highlighting, and varied line lengths to make the content more comprehensible for an audience member taking who is taking a cursory look. Abbreviations and sentence fragments are fine in presentations; they actually help the user to follow and

read quickly.

Involve the audience by asking a rhetorical question, or a question related to common experience. Give explanations and definitions via example. Remember that the audience only has a few seconds to look at your slide so you need to highlight what they are supposed to see. Build in “re-entry points”: places where a listener can pick up the thread again. Remind people of a definition if several slides have passed between its introduction and use.

Keep in mind that the purpose of any presentation is to help the audience understand your key idea rather than to impress them with your knowledge of your presentation tool. So, keep your slides simple and clear. Graphics should be straightforward and uncluttered; make sure that there is a “grammar” to the graphical components. For example, all the lines should be of the same width and color, unless there are really two different kinds of line, in which case the two kinds should be distinguished in both width and color.

Try to give the audience a visual outline of the story. Put visually-interesting features, such as diagrams, tables, graphs, or photographs, on at least one-third of your slides. If you are including diagrams from other sources, decide if you need to re-draw them for the presentation, so that they can be of an appropriate size and style. Use fonts large enough to be seen by the audience. The best font size to use depends on the font, as well as the size of the room in which you will be presenting.

If there is a reason to put more than one idea on a single slide, use color to differentiate them. Remember that about one-quarter of North American males are red-green colour-blind, so don't depend on the audience being able to see the difference between small areas of red and black. Yellow and pastel shades can disappear against a white background, so if you use these colors, outline them in black. Similarly, red can disappear against a black background.

Finally, always number your slides. It helps enormously when it comes to question time. It's also very useful when your colleagues are helping you to improve you talk.

### **6.5.5 Directing Attention**

When explaining a concept in a conversation, you might move over to a whiteboard to draw a picture. You don't overwhelm the other person by drawing the whole picture at once. Instead, you draw a fragment of the picture and direct the other person's attention by limiting explanations to this fragment. After they understand the current fragment, you extend the drawing with the next fragment and explain that. Introducing a big concept in pieces keeps everyone on the same page, and makes the completed picture

understandable.

When you are giving a presentation, even though your visual medium is likely to be slides rather than a whiteboard, it pays to think about the conversational whiteboard metaphor when designing figures. If you present a complex figure all at once in a single slide, you will shock the audience with too much information. Instead, break up the figure into fragments and use a series of slides, or animations, to add one fragment at a time. This way the audience can match up what you are currently explaining with the current fragment of the figure. You can even “gray out” everything but the current fragment, and then have a final slide where all the gray has been removed from the figure.

## 6.6 Practice the talk

Practicing the talk will not only give you an estimate of how long it is, but will also help you to evaluate its coherence and organization. The best way to practice is to deliver your talk out loud in front of a mirror, or by video recording it. Video-recording has the advantage that you don't have to deliver the talk and evaluate it at the same time; it also lets you share your video with colleagues and family for feedback. Using a mirror is simpler, demands less equipment, and is faster when you are fine-tuning the talk.

As a result of practicing your talk, you may decide to:

- reorder slides for better flow;
- add a slide to connect parts of the talk that seem disconnected;
- reduce the number of slides, or the content of some slides, to keep within the time limit; and
- add figures or examples to help explain an idea.

Did you find yourself waving your hands or drawing in the air? If so, add a figure so that you can point to a slide instead! Did you find yourself spending much longer than you expected on a slide, explaining an idea that was not explicitly called out? If so, you should either skip over that idea entirely, or add a prior slide explaining the idea explicitly. You will probably find that adding a slide of explanation will take less time than having to extemporize over it.

Try to anticipate questions. Identify the parts of your presentation that may be hard for the audience to understand, and try to think of the questions that they may ask. Prepare backup slides that help you answer these questions.

## 6.7 Giving the Talk

### 6.7.1 Before the talk

What better way is there to make a bad first impression than to show up late, not know how to run the equipment, and then have to rush through the rest of your presentation to make up for lost time? Don't let this happen to you!

Build familiarity with the venue. If you traveled to give the talk, find out where the venue is on a map, and know how long it will take you to get there from the hotel. Will that be affected by rush-hour traffic? If you have to park a vehicle, how long will that take.

Visit the site of the talk beforehand—certainly a few minutes early, and, if possible, the day before. Even if you are familiar with the venue, still come early, especially if you are the first presenter of the day. If something is broken, you will have a time buffer to use getting the equipment repaired. How does the audio system work? Is it a microphone and podium arrangement, or will you be equipped with a wireless microphone? How about the video equipment? Operate the equipment and make sure that it works—this is also a good opportunity to practice part of your presentation. Check that the projector has a working bulb. Is there a spare bulb? I've seen it suggested that you make sure that the spare bulb works too, but in practice you will not want to disassemble the projector in someone else's venue. Is the data projector 4:3 ratio or 16:9 ratio? Can you pre-configure your computer so that your slides are not distorted or cropped?

### 6.7.2 Getting started

Don't start the presentation until you are ready, but start on time. Make sure that the microphone is on, and that you have a clock, or that the time prompter is in sight. Decide where to stand so that you can look at the audience, and not trip over cords when the room goes dark. Prefer sticks, telescopic pointers or the computer's cursor to laser pointers, which tend to be feeble to be easily visible.

If the talk is long, make sure you have some water accessible. If you think that they may help you, have some throat lozenges in your pocket. If yours is the first talk after a break, make sure that the projector screen is not washed-out by outside or overhead light; if it is, remind the AV person to dim the lights.

### 6.7.3 Grab your audience

Toastmaster's International says that audience members will decide in the first 30 seconds whether or not they care about what you have to say. You have just that amount of time to connect with the audience, and to set the tone of having a conversation. You can say something intriguing, tell a personal anecdote such as how you first became interested in the topic, tell a relevant joke, ask the audience a question, quote an interesting statistic, or display a relevant prop. Byron Nevis told me that he once saw a talk at OSCON by Ingy döt Net on a data interchange language called YAML. YAML was so flexible that you could use it even if you couldn't decide which language to program in. To make the point, Ingy döt Net came on stage wearing a fisherman's vest with 200 pairs of glasses attached, and switched randomly between glasses throughout the talk. Bryon says that he didn't find YAML very interesting, but that he couldn't pull himself away from the talk for fear of missing the next glasses change!

### 6.7.4 Use the Available Space

Don't stand rooted in one spot unless you are talking to 500 people in a completely darkened room. As you talk, make eye contact for a solid five seconds with someone in the front row, someone on the side of the room, and someone in the back row. Keep eye contact with different people in the audience throughout your talk.

It's rare to be in a talk where the speaker is too loud. Stand up straight, speak from your diaphragm, and project your voice. Don't be afraid to show excitement in the exciting parts—if you don't show interest in your topic, neither will the audience. If you tend to fidget, hold a pen, a pointer, or a slide-advance clicker, so that you have something to fidget with; it's better than putting your hands in your pockets and fiddling with your keys.

Make use of the space that you have. Use the entire stage, but don't walk around randomly—move around deliberately and with purpose; when you reach a place in the room, stay there for a while before moving somewhere else. If you need to point to something on the far half of a slide, move to that side of the room before that slide comes up.

### 6.7.5 Directing attention

You have to get the audience to pay attention to the right part of your slides. You can do this in a number of ways. Verbally, you can say "notice that the curve has two bumps." You can also gesture by using your finger, a stick, or the computer cursor. If the screen is low enough, walk up to it and point with your arm or a stick. Or anticipate the need to direct attention, and animate a

label onto the slide.

### 6.7.6 Using notes

Try not to use notes; your talk will flow more smoothly if you have rehearsed it enough so that you *know* what to say. Notes are just one more thing to distract you from your audience. If you must use notes, hand-written  $3 \times 5$  index cards are a good mechanism. Alternatively, most presentation software allows you to run dual-screen, with speaker notes facing the speaker, and slides facing the audience. Perhaps you can configure the screen so that the speaker's notes are large enough and prominent enough for this to work for you? Remember, notes are just notes: don't use full text, and don't read your talk. In case you lose the thread when switching slides, consider just one line for each slide with the first thing to say. A little silence is OK; if you need to, stop for a few seconds to gather your thoughts. The audience can use the time to reflect on what you have said so far.

### 6.7.7 Timing

Have targets for the time in your talk by which you should reach certain slides. For example, use notes on your slides to remind yourself where you should be 50, 75 and 90 per cent of the way through the talk. Use these notes to help you regulate your rate of speaking. If you find that you are drifting from your target, adjust your talk on the fly to get back on schedule, either by omitting material you identified as optional, or adding an example or anecdote. If you tend to speak too fast because of nervousness, use speakers' notes to remind yourself to slow down.

In spite of all of this planning, sometimes you will completely lose track of time; this can easily happen if you include a live demonstration rather than a movie. If you hear the time keeper say "Five minutes!", what should you do? Don't just start talking faster, hoping to cram the remaining 20 minutes of your talk into 5! Do you have a plan for this eventuality? If not, take a moment to stop and think: How can I recover? What should I omit? What's the best use of the time I have left?

An old trick for finishing on time—and you should *always* finish on time—is to know that your conclusion will take  $x$  seconds. Then,  $x$  seconds before the time limit, jump to your conclusion slide. Never complain about lack of time during your talk—it is a sign to the audience that you are not prepared.

### 6.7.8 Mistakes

Mistakes happen. The best way to handle a mistake is to publicly acknowledge the it by verbalizing the event, or even making a joke out of it. “Oops! I dropped my notes! But that’s better than dropping my computer!” Trying to cover up a mistake will most likely fail; in the process you will insult your audience. Instead, respect your audience, admit your mistake, recover as gracefully as you can, and move on.

## 6.8 Answering questions

*The art of conversation is the art of hearing  
as well as of being heard*

William Hazlitt, “On the Conversation of Authors”,  
*The Plain Speaker*, 1826

At the end of a presentation, reserve time for the audience to ask questions. Some presenters attempt to avoid the question and answer session since they are worried that they may not know the answers. This is a mistake, because the question and answer session is often the most exciting part of a presentation. It’s also the part that most closely approaches a personal conversation. Answering questions gives the speaker a chance to communicate with the audience directly, and further clarify and consolidate the “take aways” from the talk. So treat it as an indispensable part of the presentation — one which deserves as much planning and control as the delivery of the core material.

**Prepare for questions.** You should prepare yourself for the question and answer session when you prepare the presentation. Naturally, you should understand everything in your slides, including figures from other sources. List possible questions, craft the answers and rehearse them before the presentation. Get ready for difficult questions. Practice answering questions with a confident and a positive attitude. If you anticipate communication difficulties, for example, in a large room without microphones for the audience, consider having some small pieces of paper available for people to write down their questions and pass them to you.

**Listen carefully to the *entire* question.** Don’t interrupt people before they finish the question. Maintain eye contact to show that you are focused on the question, and check that you understand the question before starting to answer it by summarizing the question for the audience, and asking for confirmation from the questioner. It’s always a mistake to rush in to respond to

the question before it is fully stated; you may think that you are saving time, but if you misunderstand the question and provide an unrelated answer, you are actually wasting time.

**Think about the question before responding.** Unless there is a simple factual answer, allow yourself some time to evaluate the question and formulate a response. A pause is OK; the audience will not expect an immediate answer to a difficult question. At the same time, you can comment on the question, such as “That is a good question” — but don’t repeat the same comment after every question!

**Answer the question.** Try to answer a question precisely and honestly. Answer the question that was asked, not some related question. If you are not sure of your answer, say so, for example, you might say “It is my understanding that . . .”. If you don’t know the answer to a question, say so! This is much better than pretending that you know, or giving an unrelated answer: these tactics will fool no one.

Keep your answers brief; avoid going into too much detail or engaging in a long dialog. If the questioner wants to discuss more in detail, you can remind them that other questions are waiting and suggest that you talk after the session. It’s better to allow time for another question than to drift off into a long discussion on the previous one.

Talk to the whole audience while answering the questions and make sure everybody can hear your answer — not just the person who asked the question. As you complete your answer, look at the questioner and ask whether your answer is sufficient, or check their body language.

**Handling tough questions.** If you don’t know an answer to a difficult question, treat it with a calm and positive attitude. For example, you might say, “That’s an interesting idea; I’ve never thought about it”, which sounds more enthusiastic than saying “I don’t know.” If you know there are experts in your audience, you can ask if they can answer the question. You can also write down the question, research the answer and follow up with the questioner later.

Avoid an aggressive or defensive attitude when you are asked a hostile question. Politely thank the person for the question, reply with a firm and collected tone, and move on to the next question.

**Maintain control.** Stay in control of the entire question and answer session. Clearly announce the start of the question session, and explicitly invite questions. Allow only one person to speak at a time. Limit the time you spend

answering each question, and solicit the next question. Avoid answering questions that fall outside of the scope of your presentation.

**End on a high note.** If you can, wrap up the question and answer session with a closing statement. You can summarize your main idea and reinforce your ideas. Don't end your presentation by asking "Any other questions? I guess that's all for today" or by letting the question and answer session peter out. Instead, close the presentation with a strongly, for example, by briefly summarizing what you hope the audience will take away with them

In summary, remember that the question and answer session is just as important as the presentation itself: you should plan it carefully. Involve the whole audience when answering questions. Keep your answers specific and brief, and don't be afraid to admit when you don't know. Stay positive and enthusiastic, and end with a summary or conclusive statement.

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## References