Assembling A Talk: Two Wrong Ways and a Right Way

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1   What Not To Do

Here is one algorithm for generating a talk.

```
1  Open PowerPoint
2  while talk is not done do
3  │   Think real hard
4  │   Make a slide
5  end
```

Here is another algorithm.

```
1  Open PowerPoint
2  for each section in the paper do
3  │   Convert section into bullet points
4  │   Put bullet points on a slide
5  end
6  Insert images and videos. Somewhere.
```

Both of these algorithms will generate *a* talk. They will not generate a *good* talk. When I was a post-doc at IBM TJ Watson Research Center, the second algorithm was used extensively, and I saw lots of terrible talks. The logic was that people who did not attend the talk should be able to obtain all the relevant information by flipping through the slides. I do not agree. Obtaining all the relevant information by reading tons of text is called *reading a book*. Attending a talk should not be the same as reading a book.

I will show you a different algorithm. You don't have to use it. Just don't use these two.

2   A Better Way

When you are giving a talk, you are performing a one-person play or film. The first algorithm fails because it starts building sets and shooting scenes *before there is a script*[1]. The second algorithm fails because it assumes that the film should *fawningly adhere to the novel*[2]. Both are well-established formulas for making terrible films.

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[1]See **The Devil's Own (1997)**, a film that Brad Pitt called "the most irresponsible bit of film making – if you can even call it that – that I've ever seen".

[2]See **The Goldfinch (2019)**, which currently has a 24% on Rotten Tomatoes.

2.1 Write a script.

Write a script. Write out everything that you want to say in the talk. By everything, I mean *every single word, in order, from beginning to end*. This is often the most time-consuming part of assembling a talk, because you have to decide exactly what information to present, and the order in which to present it. When you are deciding the order of information presentation, you are *building a plot*. You should decide what plot you want your talk to have. If you don't, your talk will have the dismal plot.

- **The Dismal Plot:** Here's a bunch of stuff that happened. In no particular order.

The dismal plot is confusing, boring, and enraging. There are plenty of other plots out there to pick from.

- **The Wedding Singer (1998)**: We were stuck with Algorithm A, not knowing that there was something better out there. Here's Algorithm B, which we will show is superior in every way. We will end by showing an amazing new result that was not possible with Algorithm A: Getting to meet Billy Idol.

- **The Lion, the Witch, and the Wardrobe (1950)**: We are going to present a whole new problem statement that was hiding in plain sight, and you didn't even know was there. Let's step inside and see amazing new possibilities that we never even knew existed.

- **Kung Fu Hustle (2004)**: Algorithm A is okay, not great, at solving this problem. However, we will show that one slight tweak unblocks its ch'i, turning it into a kung fu master that obliterates all other competitors.

- **Freaky Friday (2003, Lindsay Lohan not Jodie Foster)**: Algorithm A is not great. After an extensive and harrowing journey with many twists and turns, we will show that it can be improved by 5%.

- **Pride and Prejudice (1813)**: At first, we thought that Algorithm A was great, and Algorithm B was terrible. However, after extensive analysis, we have come to the realization that Algorithm A is awful (a wicked, wicked Wickham) and Algorithm B is great and we want to marry it.

A variety of micro-decisions need to be made when sequencing your plot. For **The Wedding Singer**, should you start with a flash-forward that shows all the amazing results that Algorithm B can generate, and then rewind to Algorithm A, throwing into relief just how terrible it is? Or, should you start by showing the terrible Algorithm A, and establish its terribleness by showing it failing in a variety of scenarios? These micro-decisions are yours alone to make.

The individual equations and technical concepts are the *characters* in your plot. Make sure each is introduced properly, and accordance with their importance. Just like nobody should be walking out of **Avengers: Infinity War (2018)** wondering *"Who is this Thanos guy again? Was he in the one of the Marvel movies I didn't see?"*, nobody in the audience should be asking *"What is Navier-Stokes? Was it somewhere in that wall of equations two slides ago?"* If there's a really important equation in the paper, make sure that it gets a big entrance, such as a slide all to itself, and a verbal emphasis like *"This is the key equation of the algorithm"* or *"This is the key equation we are trying to solve."*

In a movie, it is considered bad storytelling to just come out and say *"Voldemort is the most powerful and evilest villain that anybody have ever seen."* Indirect methods must be used instead, like everybody being afraid to even whisper his name. In contrast, it is perfectly fine to say *"People have been trying to defeat the Navier-Stokes equations for over 200 years"* in a paper presentation. Take advantage of the narrative bluntness that is permitted by the technical presentation medium.[3]

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[3]At the same time, listing the scholars that have tried before and failed (i.e. showing the field of strewn bodies) could be used to provide complementary visual emphasis.

2.2   Build a storyboard.

Once you have your script, don't convert it into slide bullet points. Instead, look over the script you have written, and identify logical breaks where one idea ends and another begins. These breaks should correspond to transitions between slides. If a slide is trying to communicate more than one idea, then it will do a bad job. This is why bullet point slides usually fail: they try to communicate n ideas as n bullet points, all on a single slide.

Once you have identified each slide, think about what *visual information* you could show that would help communicate the idea corresponding to that slide. The visual should support what you are saying verbally; inserting text onto the slide that redundantly repeats your words will work against you. The audience will then try to read the text while half-listening to your words, simultaneously reducing the effectiveness of both communication channels. Imagine watching a movie that consisted entirely of an actor reading a screenplay, and the only visual is a slow scroll through the Microsoft Word document of the same screenplay. You'd probably wonder *"When is somebody going to turn this into an actual movie?"* When you got bored of the actor's voice, you would start trying to read ahead. Don't let this happen to your presentation.

The exception to this rule is if you are trying to add extra emphasis to what you are saying. In that case, it can be effective to show text that echos exactly what you are saying, e.g. "GOTO CONSIDERED HARMFUL. REALLY." However, it is only effective if you haven't already been doing this the entire time.

2.3   Build the sets.

Once you have the screenplay and the storyboard, *only then* it is time to create the slides. These will be the sets and scenery that will support your later performance. In the process of making these sets, it will become obvious that certain things you wrote in the script are not going to flow well, or that they will be ineffective at conveying the concept that you had in mind. For example *"Oh right, I dropped the viscosity term from Navier-Stokes, so there's no reason to explain it five slides back"* or *"I thought that coloring in the matrix with three colors would convey the idea, but now that I see it, it's just confusing."* That's fine, and it happens to everybody. Rewrite that part of the script, rethink the visual, and try again.

Even the most experienced directors go back for reshoots. **Back to the Future (1985)** originally cast Eric Stoltz in the role of Marty McFly, but *four weeks into a fourteen week shoot*, Robert Zemekis saw that it wasn't working (Stoltz agreed), and started over with Michael J. Fox. Conversely, it is impossible to imagine that upon seeing the first version of Yoda's lightsaber battle with Count Dooku in **Star Wars: Attack of the Clones (2002)**, nobody worried that *this doesn't look as cool as I thought it would.* The scene stayed for whatever reason, and now we're stuck with the image of Christopher Lee wrestling what appears to be an angry koala with a glowstick stuck to its paw. Don't be like 2002 George Lucas. Be like 1985 Robert Zemekis.

Making visuals can take *a lot of time*. Sometimes there are images or figures from the paper that you can re-use, but often you need to build new ones because the flow of ideas in the talk will not be the same as that in the paper. For very important concepts, it is not uncommon to generate entirely new sequences that were not in the original paper. Vito Corelone teasing his grandson in the garden with the orange slice (**The Godfather (1972)**) is not in the original novel, but the movie would be immensely weaker if Francis Ford Coppola had just cut directly to Vito's funeral. Don't be afraid to create new visuals.

With both the script and storyboard in place, you can now focus *locally* on each individual slide. You do not need to think about how each slide fits into the *global* narrative, because you already mapped that out. Instead, focus on ensuring that the *current* visual supports the *current* concept in the strongest possible way.

2.4   Rehearsals and audience screenings.

Do a run-through of the slides to get a sense of what works, what doesn't, and how long your talk runs. The first few rehearsals should give you a sense of what flows smoothly and what is clunky. Go back and fix the

parts that clunk. Be ruthless with your editing. Even if a slide contains a visual that took forever to create, and even if it's your favorite image in the whole talk, if it's not working, you should cut it. Do a run-through with a friend, collect comments, and repeat the process. If you don't do a practice run of your talk, it will be really obvious at showtime that you and the audience are both seeing the presentation for the first time: *"Yeesh, did this play even have a single rehearsal?"*

Make sure that your talk ends *on time*. If it is too short, it will look like you don't have anything to say, the paper was not interesting, or that you were lazy and wrote a two-page essay when the teacher asked for three. A talk that runs long signals that the you don't respect the audience's time. You don't care that you're stealing time from the next speaker, or that the audience is hungry and you're now keeping them from lunch. No matter how good your talk is, every second you run over will rapidly erode away any positive impression that the audience might have had.

3 Nuts and Bolts

A few final observations, in the form of a bullet list, that thing I told you not to use:

- When preparing a talk, *each minute* of the presentation usually requires at least *one hour* of preparation. If you found that you spend less time than that, your talk is probably not very good. If you have never prepared a talk before, spending *two hours* per minute is not uncommon.

- Every 100 words in my scripts correspond to one minute of presentation time. I have established this by writing dozens of scripts over the last 15 years and timing the resulting talks. Your rate is probably different, so write scripts, deliver talks, and determine your own words-per-minute rate.

- It is possible to over-rehearse a talk, in which you know the material so well that you just repeat it robotically. In this case, you will lose a sense of empathy with audience members who are seeing everything for the first time, and the surprising and interesting parts of the paper will instead come across as dull and pedestrian.

  Rehearse enough that, for any point in the talk, you know what is coming next. During your presentation, when you do a transition, make sure you aren't surprised by the next slide. At that point, back off from further rehearsing unless you have made major changes.

- Cut and paste the script you have written for each slide into the "Notes" section in PowerPoint. Ideally you won't need to look at them, but in the worst case scenario where you draw a total blank on the intent of a slide, you can always read the notes directly. Your speech will sound unnatural, but it is much better than a frozen silence.

  Also, if your boss from IBM comes charging into your office yelling that *"Flipping through the slides should be like reading a book!"*, you can always shoot back *"I put the book in the notes section!"*

- Put a strong visual result on the first and last slide. The first slide will be up for a long time while you are setting up and being introduced, and the last slide will be displayed during Q&A. Use this opportunity to, for example, show a loop of the paper's best result, or throw up a link to your source code release.

  Many venues insist that you use a slide template that feature the name of the conference in massive letters on the first and last slide. Ignore them. Unless everybody in the audience was smashed by a coconut and now has amnesia, they already know what conference they're in. Use this time and space for something more useful.