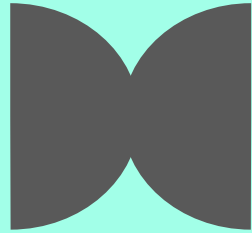


Math Talk Workshop



Melissa Beerbower
Professional
Development

Agenda



1. Identifying the goal of your math talk
2. Crafting your talk's story
3. Organizing your talk
4. Making your talk accessible
5. Carrying yourself during your talk (voice, body language)
6. Answering questions & Troubleshooting
7. Being a good audience
8. Rehearsing

Caution!



Giving excellent math talks takes practice. Lots of practice. Abundant practice. Practice over the course of many talks. For each talk you give, choose two or three actionable ways to improve. Focus on those and do not worry about perfection or even excellence. That comes with time and not with worry.

Giving excellent math talks takes rehearsing. Rehearse two or three times minimum. Sometimes rehearse four or five times. Rehearse every talk you give. *Forever.*

1. Identifying the Goal of Your Math Talk



Not every math talk has the same goal or the same audience. Eventually, you will give talks to other specialists in your field as well as talks at job interviews. For now, your goal is to make your audience feel good about math. You want to:

- Show your audience that your work is interesting and important,
- Share your results and demonstrate that your work is substantial,
- Give them the gift of understanding part of your work, and
- Share your excitement about the future of your research.

2. What is the Story?



Interesting, Important

- Consider why you chose your research question. Did it build off other research? How did it start? Did it sound fun to you? Why?
- What background information does your audience need to know to share your interest and understand your results?
- Which results do you want to share? You will likely need to prioritize.
- What examples (and nonexamples) best illustrate your research or are most easily accessible? The examples you are able to use will shape what you choose to share.

Substantial Results

“Sit down and think about the storyline of your presentation for your audience to follow. Think about the main points and big ideas of your presentations, so that you can really emphasize them when the time comes as you're presenting.”
– Cyrus Young

3. Organizing Your Talk in Three Steps

Here is the outline for your talk:

1. Tell the audience what you are going to tell them.
2. Tell them.
3. Tell them what you told them.

Hee hee! Of course there is more to your talk, but this seriously is your main outline.

1. **Condense your story.** Share a little history and/or motive behind it. Sketch what you were looking for and what you found. State the goal of your talk. Your goal might be something like, “to unpack this crazy equation.”
2. **Carefully unpack your story.** Carefully define and illustrate necessary background info. Lead into your main results, perhaps through some preliminary results (which you might not have discovered first.) Don’t be afraid to cut material to get your story to flow.
3. **Recap your story , highlighting what it means.** You are taking your audience on a journey through your work. They have been working hard to understand and might feel a bit lost in the weeds, seeing lots of trees and no forest.

Exciting Future

3. Organizing Your Talk: Pre and Post Talk Slides



- Title page
- Thank your hosts
- Credit your co-researchers
- References
- Acknowledgments

I cover these requirements in detail in the Beamer Slides Workshop. For now, the takeaway is that you need to provide context for your audience, both context for your research and context for the location and environment in which your audience is hearing your talk. Mathematics is a social activity. In particular, research is built on community past and present. Your proofs are a conversation with other mathematicians and your research gets put to practical use only insofar as you effectively share it with others.

4. Making your talk accessible



Remember that you want your audience to enjoy themselves, not be squinting at your slides in bewilderment. Maybe there is a technicality you must include for accuracy, but you can reassure your audience that they don't have to worry about it. Perhaps there is an example or illustration or characteristic that you like for some reason. Say that. Say that you think it is cute. Say the characteristic surprised you.

Gift of Understanding

"Know who your audience is. Do your very best to present the math you show in a manner that is clear, simple, yet appropriate for your audience. Try to only show your audience the math that they really need to know, or the stuff that you really want them to learn. Otherwise, try to find a way around showing them that technical lemma."
– Cyrus Young

4. Making your talk accessible



- Keep your slides uncluttered.
- Use pauses.
- Consider proof by example.
- Limit technical language.
- Use and reuse examples and counterexamples.

We cover these strategies in detail in the Beamer Slides Workshop

“Give your audience as little to read as possible. If you have slides, have very few words per slide, and if giving a board talk, don't write so much text. Be sure the words you write down have a clear purpose. It's a good idea to have many pictures.”
– Cyrus Young

Gift of Understanding

5. Carrying Yourself During Your Talk



[http://techspeaking.denison.edu/Technically Speaking/Home.html](http://techspeaking.denison.edu/Technically_Speaking/Home.html)

- Preparation
- Delivery
- Visual Aids

“Establish a consistent tone and mood of your presentation. You can do this through a good choice of what you say, the tone of your voice, the pace at which you present, and your mannerisms while presenting. The mood you choose will dictate how your audience will perceive you and process the information you give them.”

–Cyrus Young

5. Carrying Yourself During Your Talk



<http://techspeaking.denison.edu/Technically Speaking/Home.html>

- Preparation
- Delivery
- Visual Aids

“Don't read your lines off of anything! Try to either memorize your lines or improvise what you say. If you need to read something to orient yourself during your presentation, don't read it word for word. The less you read during your presentation, the more prepared and confident you appear.”

–Cyrus Young

5. Carrying Yourself During Your Talk



<http://techspeaking.denison.edu/Technically Speaking/Home.html>

- Preparation
- Delivery
- Visual Aids

Your Turn

Choose one video in each category.
Watch them. For each video, jot down
one actionable step to implement in
your next talk.

7. Being a Good Audience



- Use Dr. Harris' questionnaire to think about talks you attend.
- Notice how many factors are on the questionnaire. That's a lot! Be gracious with speakers and with yourself as a speaker. Taking away a bit more interest in topic than you had before is an excellent result as a listener.
- Be the audience you want to have.
- Remember that you can talk to speakers after talks.
- Never heckle a speaker or argue with a speaker.

Your Turn

Choose a 10-20 minute math talk to watch. Fill in the questionnaire while listening.

Take the questionnaire to the next math talk you attend.

[Joint Mathematics Meetings - YouTube](#)

6. Fielding Questions, Troubleshooting



- Do not go over time!
- Go to the venue ahead of time and familiarize yourself with the technology.
- Have your slides available to you in multiple formats: on a thumb drive, in your emails, in the organizer's emails, maybe in print (not every slide printed, just key slides).
- Save most questions for the end. Answer clarifying questions during your talk (what does that notation mean, maybe they spotted a typo in the slide, etc.), answer it, otherwise move on.
- Rehearse these phrases, "Good question! I address that later in the talk," "Interesting question! I hadn't thought about that. Let's talk during the tea time," etc.

8. Rehearsing

Remember the caution at the beginning? It still holds.

Your Turn!

Rehearse your first REU talk once with a colleague and once with a mentor. Ask your rehearsal partner to time you and give you feedback.

Note that rehearsing doesn't always need to be formal. Maybe you are walking and you can talk through your slides to yourself.

Your Turn!

Choose a favorite theorem or math problem and record a five minute video of yourself explaining the theorem. Use a whiteboard, chalkboard, or slides so you can see yourself interacting with visual aids.

References & Acknowledgments



Thanks to my colleague, Cyrus Young, for allowing me to share his advice for math talks.

Thanks to my mentor, Dr. Pamela E. Harris, for passing on her abundant knowledge of, experience with, and joy in giving math talks.

And for the use of her math talk questionnaire.