INVITED EDITORIAL

How To Give A Good Talk

Zura Kakushadze, PhD
Quantigic® Solutions LLC, President and a Co-Founder;
Full Professor, Business School & School of Physics,
Free University of Tbilisi, Georgia

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Abstract

I give my two cents on this subject based on what I have learned from others and my own experience. I avoid various abstract bullet points and convoluted, generic and cliché advice you can Google aplenty. Instead, I base my discussion on real-life examples accompanied by pictures, slides and stories. I discuss three basic parts to giving a good talk: i) picking a right subject; ii) good slides; and iii) delivery. I discuss tools for getting the job done to: i) convey to the audience why what you're doing is important; ii) imprint a key message onto your audience; and iii) make your talk memorable.

Keywords: Presentation, talk, slides, public speaking, finance

Why?

Google it and you'll find plenty of advice – and some is pretty good – on how to give good presentations. So, why do I bother? Well, a lot of it is either too convoluted, or generic, or cliché, etc. Secondly, I've figured it might be more interesting – and hopefully entertaining – to share my two cents on this subject via real-life examples as opposed to abstract bullet points.

I gave my first academic talk entitled "Negative Absolute Temperatures" at (then) Tbilisi Polytechnic Institute. I was 14. As I remember it, it actually was not a bad talk. During the Q&A afterwards someone of stature commented on something I said during the presentation. A brief discussion ensued, which I ended by saying (to the effect – this is a translation): ***"That's your understanding, and this is mine."*** Evidently, there are certain benefits to being fourteen…

I've learned a few things about giving talks since then – I hope. My first source of real – and truly invaluable – advice in this regard was my Ph.D. thesis advisor Prof. Henry Tye at Cornell University. I worked on string theory as a physics graduate student and later as a postdoc and a professor. String theory is deemed by many to be a candidate for The Theory of Everything, it is highly mathematical by nature, academic jobs in that field are scarce, so giving good, accessible talks is especially important. Much of what I discuss below I learned from Henry, who learned some of it from others, and I've had 20+ years to build upon it based on my own experience.

Where to start?

I would break giving a good talk down to three basic parts: i) picking a right subject; ii) good slides; and iii) delivery. When you give a talk, it's important to be considerate to your audience.

To most people attending a talk is a chore, it's an hour of their valuable time they have to devote to listening to and watching you speak. And if the audience consists of more than just a few experts working on the very specific topic you are going to discuss, chances are most of them haven't thought about all the intricate issues you may wish to pepper them with. This results in a tacit expectation (or even an entitlement) by the audience that they be ***entertained***.

In fact, there are myriad topics out there that are very interesting as, say, research projects, but are not suitable for talks. It is important to pick your topic so it is not boring for most of your audience. At times your latest project or paper might not fit this simple criterion. It's better to talk about an older, more engaging topic than have most of the audience fall asleep…

"No talk is too simple!"

That's what Henry would tell me – because hailing from the former Soviet Union (Georgia) I had a propensity to be too technical. Henry taught me: ***"You write the first equation, you lose half of the audience. You write the second equation, you lose the other half. You write the third equation, and everyone's asleep!"*** If I absolutely must write a relatively nontrivial equation, here's a trick Henry taught me that appears to work for me every time. I tell the audience that I don't expect them to study the equation in detail and present it simply to give them a flavor of what's involved, to illustrate a point (by highlighting an important term), etc. (see Slides, p.5).

When possible, I prefer to give less technical, more accessible talks, and the larger the audience, the more enthusiastic I get. Many people believe that less technical talks are easier to give. Quite the opposite. It is much harder and sizably more time consuming to give a good nontechnical talk on

a technical subject. It's easy to copy and paste a bunch of equations and text from your paper's LaTeX, Word, etc., file into your slides. What is much harder – and ultimately much more rewarding – is to make it ***accessible*** to your audience. Preparing a good talk is time consuming. In this regard, as an analogy, a famous quote from Pascal [1656] comes to mind: ***"I would have written a shorter letter, but I did not have the time."*** Same for talks.

I must admit that I have "sinned" and given technical talks with many equations, and I don't mean back in the day. However, if I give a technical talk these days, it's usually because I am taking a calculated risk based on my audience (or its subset) and what I'm trying to accomplish. If you need to give a technical talk, do it, and if it's not simple, make it as accessible as possible.

Too many, too busy slides

Speaking of length, I often see three common and evident shortcomings in many talks:

First, speakers prepare too many slides and then are forced to skip many of them, which does not leave a good impression (that the speaker put slides together haphazardly, lacks skills, etc.). It is fine to include a few extra slides that you may have to skip. E.g., if there are many questions during your talk, you may have to skip a few slides. In fact, sometimes I deliberately include a few slides that I don't intend to go over in detail (see Slides, pp.9-10). Why? I quickly flash them to imprint on the audience things that are too difficult or time-consuming to go over, e.g., that a backtest, a computation, etc., has been done. This is best done with ***graphics***.

There is simply no way one can go through 40-60 slides in 1 hour in any meaningful fashion. Having more than 20 (not-too-busy) slides for a 1 hour talk is usually too many. In fact, if I can do it in 15 slides, that's even better, albeit it's not always possible. The notorious "one slide per minute rule" (see, e.g., [Wentz, 2013]) is unsustainable for a good talk – in my humble opinion.

Second, busy transparencies are no fun to look at. I use some simple tricks. I wholly avoid complete sentences (unless it is a quote). Instead, I opt for a quasi-telegraphic style of sorts (see Slides). I avoid "sentences" that spill over a single line. I further avoid too many of such single-line "sentences" on one slide. This yields easy-to-follow, not-too-busy, ***pleasant*** slides.

Third, excessive use of quotes can get boring very quickly. If I use a quote at all, it's usually just one short, sweet and to the point quote that helps me achieve my objective. Quotes are complete sentences (cf. the preceding paragraph), make slides too busy and hard to follow. If you do include a

quote, there is no need to read it out loud – the audience knows how to read…

Colors and graphics

Colors are a great tool. They can liven up an otherwise monotonous text. Too much color, and it loses its power and can become annoying, so it should be used thoughtfully. I use some simple tricks based on how humans perceive color. Green soothes, red irritates, etc. I use green to reinforce the points I wish to imprint, the points I wish to go over smoothly without too much emphasis (e.g., too difficult or time-consuming to go over in detail), etc. Normally, I would use red for emphasis. However, often I opt for off-red orange (especially for text on non-white background). It is not as irritating as red. In that case I use red for special emphasis, etc.

Back when I was in physics, I would use old-fashioned transparencies and write them up by hand using markers (as opposed to using LaTeX or PowerPoint). I felt it added a personal touch to my talks and I believe the audience did appreciate it. The downside was that I had to rewrite my transparencies a lot, which is time consuming. However, I think it was all worth it. Now I use LaTeX Beamer and try to add a personal touch via, e.g., organic pictures (see Slides, p.8).

As they say, ***"A picture is worth a thousand words!"*** In many cases a very complex concept can be illustrated with a simple picture, which for the audience is not only easier to understand and more entertaining, but can help eliminate the need for complicated equations, etc. Often the underlying concept is abstract and it is an art to find a way to express it through a picture.

Speaking of pictures, I would be unwise not to use a picture to illustrate this point. Recently I've given a number of talks on my paper "Heterotic Risk Models" [Kakushadze, 2015]. I use a picture to illustrate my key idea. In a nutshell the idea is this. When you try to compute a risk matrix for, say, 2,000 stocks but only have, say, 20 days' worth of historical data, your matrix is singular. For financial applications you need the risk matrix to be nonsingular (invertible). One idea is to use the so-called factor models (see, e.g., [Grinold and Khan, 2000]), which reduce the computation of the risk matrix for stocks to another risk matrix for many fewer risk factors. The problem is that if the number of risk factors is large, e.g., 200, and you only have, as above, 20 days' worth of historical data, the risk factor matrix is also singular. No good. So, I proposed to model the risk factor matrix via another factor model with fewer risk factors, if the resulting smaller risk factor matrix is still singular, model it via yet another factor model with even fewer risk factors, and repeat this process until the remaining risk factor matrix is nonsingular. I have termed this successive,

nested embedding of factor models as the "Russian-doll" construction. Naturally, I have used a picture of Russian dolls ("matryoshkas") to illustrate it (see Figure 1). I have received compliments on this picture after my talks. It ***imprints a message*** into a mind.

Live demos

Another powerful method for imprinting messages is using live demonstrations. When I was still a grad student at Cornell, I had to give a talk on my work I was doing with Henry Tye. We were trying to build grand unified models from string theory with some basic properties consistent with the observation, such as 3 generations of quarks and leptons (the basic building blocks for all matter around us, and they come in 3 "copies" called generations). At the time of giving my talk we had not succeeded yet, but eventually we did in early 1996. In our quest to build these string models, we used the so-called orbifolds. An orbifold is a geometric object which is obtained by taking a flat space, e.g., a 2-dimensional plane, and identifying points in this space, e.g., via reflections around one of the axis. This creates singular points in space called orbifold fixed points. These are the points on the plane which are unaffected by the reflections. In string theory, when closed strings (which are closed loops) propagate in such spaces, they produce sectors, called twisted sectors, corresponding to closed strings "stuck" at orbifold fixed points. The math is quite nontrivial. So Henry suggested that I use a live demo!

The idea is simple and depicted in Figure 2. You take a piece of paper in the shape of a disk. You cut it along a radius, edge-to-center. You fold it by identifying the points on the edge opposite w.r.t. the center. This yields a cone. The tip of the cone is the center of the disk. This is the fixed point of the orbifold. Now you take a rubber band and use it as a string. When the string is away from the orbifold fixed point, it moves freely (untwisted sectors). However, if it gets "stuck" at the orbifold fixed point, it behaves differently (twisted sectors). See Figure 3.

So, I prepared my demo. This was an internal group talk and we had a tradition that the speaker would bring some sweets. I brought a cake. Before my talk someone asked me if I made it myself. I got it from a bakery. I had concealed my demo, so it would be a surprise. When I pulled it out, I uttered: ***"I didn't make the cake, but I did make this."*** People laughed. Successful jokes make talks better. And bad ones can ruin an otherwise perfectly good talk.

As to my orbifold demo, I recycled it many times in subsequent talks, when I was a postdoc and a professor. Physicists – at least string theorists – usually are an informal bunch and wear jeans and sneakers to their talks. To my audiences' surprise, I mostly wore a black suit. I would pull my

paper/rubber band demo out of my suit pocket like a magician. It worked like a charm!

Demos are good because they are engaging. It makes people wake up. Recently I attended a finance conference. One speaker presented a talk on behavioral finance. Toward the end, he conducted a real-time experiment with the audience as the participants, who were asked to go to a certain webpage and input a number between 0 and 100. The winner would be the person whose number would be the closest to 2/3 of the average number. This was very entertaining, even though I opted not to participate. I bet most people in the audience ***remember*** that talk.

Another example is using unconventional media. Once, among several others, I was invited to speak in a series of "lightening" 5 minute talks at a leading financial institution, it was a new format they were trying out. One speaker was a high school student. His topic was quite basic and not all that informative for all the experts in a rather large audience. However, he chose a fun format for his talk. He spoke for about 1 minute, and the rest of it was prerecorded and animated. I wouldn't want to listen to a prerecorded talk for 1 hour, but it was entertaining for those 4 minutes. In fact, it was a clever trick: the speaker, who naturally had little experience in giving talks, didn't have to worry about time – it's extremely difficult to give a 5 minute talk!

"…what's important is that they feel they understand it."

All this brings me to the main message I'd like to convey with this note. Henry would tell me to the effect: ***"When you give a talk, it's not important that the audience understand it; what's important is that they feel they understand it."*** Before you vehemently object, let me preemptively clarify: there is nothing nefarious in this statement. With his usual wisdom, Henry made it easy to understand why. Say you're giving a talk on a project or paper you've been working on for 6 months or a year, or a topic you've been thinking about for 3, 5, 10 years… There is no way you can explain all this in detail to a broader audience that includes people who are not experts in your narrow field, topic, etc., in 1 hour. It's hopeless. Nor does anyone expect you or want you do so. Your job is to: i) convey to the audience why what you're doing is important; ii) imprint a key message onto your audience; and iii) make your talk memorable, so people remember it down the road. The truth is that most talks are not memorable. Making your talk memorable doesn't mean that people must remember any details – that's unrealistic. However, making your talk memorable by including a clever picture or demo is very realistic. In fact, with a cerebral choice you can kill two birds with one stone and not only make your talk memorable, but also imprint a key message. Thus, the live experiment in the aforementioned talk on behavioral finance made the talk memorable and cleverly imprinted the

main message the speaker was trying to convey to the audience, to wit, that the stock market is neither 100% efficient (rational) not 100% behavioral (irrational), but somewhere in between – I remember! Similarly, my Russian-doll picture in my aforementioned talk on heterotic risk models made my talk memorable and simultaneously imprinted my main message, which is nested risk models.

You will often hear an advice to tell a story in your talk. This is a good advice – we, humans, are more susceptible to stories than dry facts. In fact, telling a story is a great way to convey why what you're doing is so important right out of the gate, in the very beginning of your talk. This too kills two birds with one stone: it keeps the audience's attention span high (a story), and it conveys the motivation of your work and talk. For instance, I open my heterotic risk models talk with the sentence: ***"So, you're sitting there trying to trade your favorite 2,000 most liquid stocks…"*** and then gradually build upon it. My audience, even those who are not traders, can relate to this right away, because they are all interested in anything related to real-life trading.

Some final touches on delivery

Public speaking is something of an art. But some people just aren't good at delivery. It's a matter of personality. Some of it can be overcome by practice, but not necessarily all. It's like this: no matter how much I pump iron, I can never look like Arnold Schwarzenegger when he was Mr. Olympia. No shame in that. I don't want to dwell on negatives too much, so I'll try to plow through this quickly. You can decide what you can work on and what's just personality.

As mentioned above, the audience expects to be entertained. Reading from your slides (almost) verbatim is not entertainment: the audience doesn't need you there, they could read it themselves. It is a common occurrence when the speaker blocks the screen. Not good. Using your hands or fingers as a pointer is not ideal as you invariably block the screen. Use a laser pointer if possible. If not, try to figure out a solution that doesn't involve blocking the screen. Some suggest using your entire body in delivery. In my humble opinion this is overkill. E.g., pacing back-and-forth on the stage like a big-shot CEO may work on some, but in my experience most people find it annoying. Keep eye contact with your audience. Literally, look into their eyes. This adds credibility to your talk. Don't stare at the screen, etc. If you need to look at the screen (except when using a pointer), you are not prepared! Recently I attended a talk where for the entire duration of it the speaker looked at the screen and never once looked at the audience. Not good. Be mindful of the microphone. If you're wearing a body microphone, it is easy to hit it, etc. If there's a fixed microphone, every time you turn

away from it, the audience cannot hear you. If the microphone is portable, I just grab it so I have 100% control. Again, be considerate to your audience. No one appreciates arrogant statements such as "everyone knows that", etc. In my humble opinion, "reviewing" known material is no good, it's boring…

Many people have public speaking jitters. Aerobic exercise releases endorphins and calms the nerves. If I have a choice, I always request that my talk be in the afternoon, so I can do my cardio in the morning. 100% chocolate (no sugar, the baking goods section in a supermarket) works for some people. But it's an acquired taste, most people find it too bitter. Alternatively, you can just take the ***"What's the worst that could happen?"***, ***"None of this matters in the grand scheme of things"*** attitude, or just remember that the universe has been around for 14 billion years and will be around for trillions of years longer, to help put things in perspective…

"Apologia"

The purpose of these notes certainly is not to offend anyone. It's to help people get better at giving talks. If you recognize some shortcomings described herein in your presentations, that's a good thing, you can work on it. It's not meant as a criticism, and it's nothing personal. In fact, what prompted me to write this up was a question by an MBA student who asked me what my advice would be on giving good presentations. Having thought about it, I figured perhaps my two cents could be complementary to a wealth of material that's already out there.

Giving good talks is like art, it's a bit like magic. If it feels that I am making it sound too mechanical, my apologies. However, just because we know that magicians are using tricks and there is no real magic, it doesn't make those tricks any less magical in the moment. It's no different for talks. It's unlikely you're going to stop enjoying good talks having read my notes…

Acknowledgement:

To my Ph.D. thesis advisor Prof. Henry Tye[1]

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[1] Prof. Henry Tye is the Director of the Institute for Advanced Study and Chair Professor of Physics at the Hong Kong University of Science and Technology and the Horace White Professor (Emeritus) of Physics at Cornell University, where I completed my Ph.D. under his guidance.

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Figures

Figure 1. A picture of Russian dolls (“matryoshkas”) I use in my talks on Heterotic Risk Models. This image appears in [Hodson, 2014].

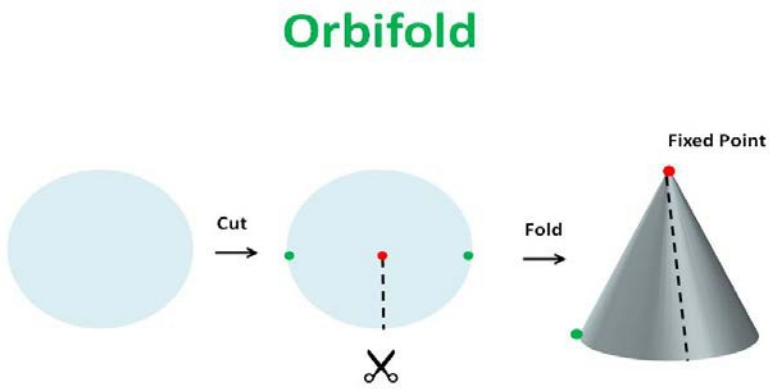

Figure 2. A schematic depiction of a demo for an orbifold. The disc is cut from the edge to the center. Then it is folded by identifying the points on the edge opposite w.r.t. the center. This yields a cone. The tip of the cone is the center of the disk. This is the fixed point of the orbifold. This is an example of a Z_2 orbifold. Each point with the coordinates (x, y) is identified with another point with the coordinates $(-x, -y)$ related to the former via a Z_2 reflection.

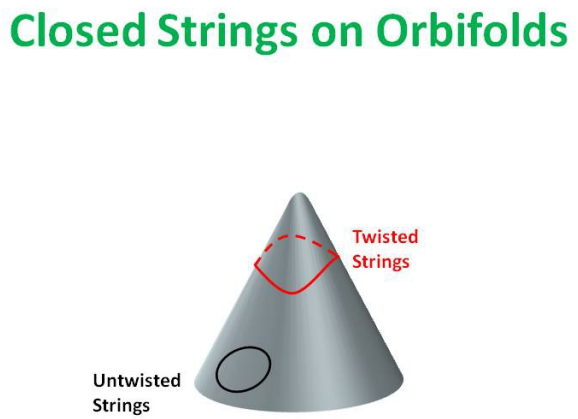

Figure 3. A schematic depiction of a demo for closed strings propagating on orbifold spaces. When the string (rubber band) is away from the fixed point, it moves freely (untwisted sectors). However, if it gets "stuck" at the orbifold fixed point, it behaves differently (twisted sectors).