Presentation Skills

In my previous message in the February issue, I wrote about the value of belonging to a community like the IEEE Control Systems Society (CSS). Let me continue on this topic by saying a few words on conferences.

Attending a conference is a key feature in a scientific community. What is the objective? Simple. We wish to present our latest results and convey them to our colleagues. In this way, we contribute to a scientific community and also make a scholarly achievement. We also wish to learn the latest developments in the field by attending talks given by others. In both cases, communication is clearly of central importance. On one hand, it is important to deliver our message effectively so that the audience can understand it, and, also as part of the audience, it is equally important that the presentation be given in a clear and understandable way. If a talk is unclear or impenetrable, it is simply a waste of time and energy for everyone in the lecture room.

Those of you who attended the last IEEE Conference on Decision and Control (CDC 2012) must have received a message from me and the CSS Executive Committee on some guidelines on how to give a presentation along with the link: http://www.ieeecss.org/sites/ieeecss.org/files/CDCGuidelineforSpeakers.pdf.

Actually, I am writing this article before CDC 2012, so we do not yet know the outcome of this effort. I hope that many people have benefited from it. However, since the description there was rather brief, I would like to elaborate more upon this topic, with an analysis of the status quo of our conferences and also the need for such guidelines.

Yutaka Yamamoto in Dubrovnik, Croatia, while attending the 2012 IEEE Multiconference on Decision and Control (MSC 2012).

By first let's start with a warning. Let me quote Paul Halmos from *How to Write Mathematics* [1]:

> the writing of such an essay is bound to be a thankless task. […] "By the time a mathematician has written his second paper, he is convinced he knows how to write papers, and would react to advice with impatience."

Some senior colleagues may also feel that there is no need to review their way of presentation. If you feel that way, perhaps you should stop here and proceed no further. On the other hand, if you feel in any way curious, you can proceed; I hope some of this analysis might offer some interesting intuition.

As stated previously, there is usually a dual purpose for a person to attend a conference. One purpose is to give a presentation, and the other purpose is to attend talks. For both purposes, we wish the presentation to go well; as a speaker, the talk should be well received and make some impact, and, as part of the audience, we hope that the presentation is easy to understand and is fruitful for our own research.

When we present our paper as an author, we naturally want to impress the audience as much as possible. This often leads us to prepare lots of material packed in a large number of slides. As a result, we tend to present densely packed slides that are full of mathematical formulas or complicated logical statements, presented in a rather short time, say one minute per slide. All these slides inevitably entail treating our audience as a "god" or some divine being who can understand anything in a very short

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(From left) Yutaka Yamamoto, Iven Mareels (Plenary), Stjepan Bogdan (General chair), Bozenna Pasik-Duncan (Tutorial and Workshop chair), Veysel Gazi (Registration chair), and Eric Rogers (ISIC Program chair) at MSC 2012, Dubrovnik, Croatia.

time. The fact is, the audience is neither a god nor a super being and listens to your talk for the first time. It is always hard to follow new concepts/contents in a short time for anyone, especially when he/she does not know in advance what the focus of the talk is. Naturally the audience gets lost very quickly after the first few slides, possibly on slide number 2 in the worst case.

On the other hand, when we attend a talk as part of an audience, we often get lost exactly in the same way as above. Curiously enough, this phenomenon can occur to the same person. That is, when we are a speaker, we have the tendency to make our presentation densely packed as above, thereby making it often incomprehensible, while as part of the audience we tend to complain about such talks. I have seen many of my students or young colleagues fall into this trap.

When I was young I used to get lost in many talks. I naturally placed the blame on myself, not knowing enough background. I thought that things would gradually improve as I matured; to some extent this happened, and I became able to follow more talks. But I still get lost in many talks I attend. I did a small survey among my esteemed colleagues, and, to my surprise, it is not only me who gets lost so often; actually it seems that the percentage of getting lost in a talk seemed to be much higher. Should we place the blame on ourselves as members of an audience? Probably not.

The general problem is, I suppose, that the speaker often tends to forget the audience's viewpoint and attempts to impress them perhaps a little too much. Here is an irony. The harder we try to make our talk impressive, overflowing our slides with too many materials, the less comprehensible the talk becomes. We may end up failing to convey such fundamental information as the objective, motivation, and what the problem is. We can even get resentment out of this. This is deplorable.

A typical symptom from the audience side is the following: We first see the title and look for a natural introduction, or a brief problem statement or a background. Unfortunately, we often witness a speaker getting right down to some formulas or technical statements. And we—the audience—get lost not quite understanding what the author is driving at. On the other hand, when we are a speaker, our psychology is totally opposite. We start with a rather professional technical statement, showing the global picture of the problem, and immediately get down to technicalities. We are so eager to show how difficult the problem is, and how wonderful is the solution that we have obtained, that we forget the audience's views.

Of course, this is not always the case. There are certainly many excellent speakers in our community who can make a good balance of the two standpoints. Nonetheless, it cannot be denied that there are also such cases as above, and quite unfortunately, our precious occasion of scientific exchange of ideas is lost or wasted.

It is perhaps best if the authors/speakers can learn from such superb speakers. However, to do this, it is better to have a focus on how and what we should learn. The objective here is to help the reader who may wish to learn more about presentation skills. In fact, the whole objective of the guidelines posted on our CSS Web page is to give a brief introduction to such skills. Needless to say, there are many such textbooks on the subject, e.g., [2], and we can learn from them or via an Internet search like "how to give a presentation."

To sum up, the audience is generally interested in knowing the following:

» What is the problem?
» What is its significance?
» What are the results?

If you succeed in conveying the answers to these questions, your talk is at least an 80% success. By showing intricate technical slides, a presenter can never convince the audience. After all, the allotted time is only 20 min. How much can you accomplish in 20 min? Even if the talk lasted for one hour, the same situation would occur. The presenter can never have enough time to talk about everything. Even if a presenter did have enough time do this, the audience does not have the patience to follow every detail. The irony is, as I said, that the harder you are pressed to impress the audience, the less comprehensible the talk becomes.

Let us finally take a revived look at the guidelines posted on the CSS Web page, with some brief descriptions.

1) *Prepare a simple single message,* and try to convey it as effectively as possible. Crystallize what you want to say into one single sentence, and say it first in your presentation. In other words, give the punch line first. Conference talks are not a detective story, so you

Sunset seen from the terrace of the Dubrovnik Palace Hotel, the 2012 MSC conference site.

need not hide your secret. Say it simple, straight, and to the point. This will wake up the audience's interest or curiosity. For example, something like, "By using the new method XY_68, you can increase the computational efficiency by ten times." If you find this difficult, you can present the simple single message after you have finished stating your problem, but this approach might decrease the impact of your talk. So present your message as early as possible.

2) *What is your problem?* State your problem as clearly as possible. Why is the problem interesting, and in what context? Without such an understanding, the probability of the audience' understanding is 0%. In other words, your talk will have no positive outcome.

If you have successfully conveyed the above two messages, you have accomplished half your purpose. In other words, nothing can be accomplished without these messages being transmitted to your audience.

3) *State your solution.* If possible, tell the audience how your approach is different from the usual approaches. This statement can take the form of a theorem, but not necessarily. The important thing is to have a certain impact on the minds of the audience. If you succeed in generating the interest of the audience, they may well look up your paper in the conference proceedings. Also, if you can, try to contrast your approach with a usual conventional approach. This contrast will give a stronger impression.

4) *What are the consequences of your result(s)?* This is probably even more important than the result itself. Unless the audience is interested in *exactly the same* problem, they often fail to appreciate the importance of your result. If you can give an idea of what the result is good for or what consequences the result may induce, that will greatly increase the impact of your message. With this statement of consequences, you can attract far more interest than you might expect from merely presenting results.

5) *How you derive or prove the result.* This part can be of secondary importance from the significance of the results. After all, it is not possible to convey every detail of your proof or derivation in just 20 min. Yes, you may wish to show where there is a knack to your proof or derivation. If so, contrast your approach with a conventional approach or a possible standard scenario. That is, show how a "usual" approach fails and how and why your approach works. That will surely convince the audience.

6) *Conclusion.* This is important. You have to summarize what you have said, what you have accomplished in your talk, because even in a short period of time of 20 min, the audience cannot generally grasp what you have done in your 20-min talk. If you can give a good summary, it will give a good impression.

7) *Define your audience.* This should be done before preparing your slides. This is implicitly obvious and hence not explicitly given in the guidelines, but it is the first thing you have to do. To whom are you talking? Are they professionals or an audience with a wider scope? Are they novices or experienced in your field, and so on. You should have a fairly good idea of your audience, but it may help to define your audience more explicitly to yourself before preparing your slides.

Let me conclude by quoting Norman Steenrod from [1] again:

> when a reader has finished a book, he will retain in his memory only a more or less rough picture of the formal structure. This being so, why shouldn't the author assist the reader in formulating this rough picture?

As usual, your feedback is welcome. I can be reached at yy@i.kyoto-u.ac.jp.

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[2] N. J. Higham, *Handbook of Writing for the Mathematical Sciences*. Philadelphia, PA: SIAM Press, 1998.