

Let There Be Better Lectures!

Ehrhard Behrends (Freie Universität Berlin)



I have now been a professor of mathematics for several decades and, over the years, I have listened to many hundreds of lectures. The demands made on the listener have varied: some lectures have been conceived for specialists while others have been aimed at a broader public. I confess that I have gained little from (too)

many of these lectures and have often been annoyed at the poor correlation between time spent and value received.

The present article was written in the naive (and perhaps a bit egotistical) hope that this situation is amenable to improvement. To be sure, others before me have made similar attempts but, nevertheless, the topic, in my opinion, should be given a thorough airing from time to time.

There are many good reasons why one should attend a lecture. For example, one may have the opportunity to meet at last the great X. But let us ignore this special case for, first of all, such speakers, in my experience, give lectures whose quality is well above the average and, secondly, the goal of meeting a famous person is unrelated to the question of how much one gains from the actual content of the lecture.

There remain the many lectures that one attends at conferences or at one's own university from which one hopes simply to learn something – and not necessarily in one's particular speciality – and/or to obtain intellectual stimulation. From a group-dynamical point of view, what is involved is a complex interplay between the roles of host, lecturer and audience.

Here is my wish list:

Dear Host,

I shall pass over my trivial desires (for example, that the lecture room has been suitably set up and is “ready for action”) and cut to the chase.

My first wish is that you have informed the speaker about the expected audience. Will they all be specialists or will there be colleagues representing the entire subject area? Will students be present and, if so, what level of knowledge will they be assumed to possess? My next wish is that in addition to the title of the talk, some further information be presented to help those deciding whether to attend in making up their minds. A brief abstract accompanying the announcement of the lecture could serve such a purpose.

I can't wish much about the lecture itself from you – such is the subject of my next wish list – except, perhaps, that you might kindly attempt to place yourself in

the other audience members' shoes. Thus if your speaker mercilessly goes into overtime in order to present a proof variant in full detail, this might be of keen interest to you, who may once have attempted such a proof yourself, but many listeners will find themselves in a painful dilemma: should I gnash my teeth and remain out of politeness, even though I have already gotten everything I could out of the lecture, or with a guilty conscience make a run for it?

I have kept the touchiest point for last and that is the issue of providing feedback to the speaker on the effectiveness of the lecture. In my experience, the struggle between honesty and politeness – if indeed such a struggle there be – is all too frequently decided in favour of the latter. But consider, please, that *you* are perhaps the only person who can provide the speaker with insight so that future lectures might go better than this one did. Therefore I beg you: Do it! (It goes without saying, of course, that you would be better off forgetting about the whole thing if packaging criticism in a diplomatic wrapper is not one of your strong points.)

Dear Speaker,

I begin with a quotation from the first lines of the first part of René Descartes' *Discours de la méthode* (1637):

Le bon sens est la chose du monde la mieux partagée: car chacun pense en être si bien pourvu, que ceux même qui sont les plus difficiles à contenter en toute autre chose, n'ont point coutume d'en désirer plus qu'ils ont.

(Good sense is the most equitably distributed of all things because, no matter how much or little a person has, everyone feels so abundantly provided with it that he feels no desire for more than he already possesses.)

Translated to the present situation, this means that almost all of us believe that we have no need of any advice on improving our lectures. Therefore, I shall offer no advice but merely present my wish list.

My first wish concerns the fact that I would like to be able to put what you are about to present in a suitable context. To express this another way, there is an almost endless number of mathematical theories, results, tricks, methods and so on, and every day that number increases. Thus I would like to know why I should be attending *your* lecture to learn about *these particular* theories, results, tricks, methods and so on. What is the background? Where does it lead? Why are your results new, interesting, perhaps even spectacular? It is certainly unnecessary to provide such information to listeners who work in the same specialized area as you but I often attend lectures that have little, if anything, to do with my main areas of

interest (and which are advertised as being appropriate for nonspecialists).

Now we can begin. I know in which corner of the mathematical universe we are rummaging and where we are headed and why. I would be most gratified if on arriving at the end of your lecture, I now had an approximate idea of what methods are used in your part of the world for attacking problems. As an illustration, I can imagine a typical proof in which for me – and I say this quite candidly – the technical details are not of enormous importance.

Don't overtax me! As a lecturer myself, I know of course the temptation to take a couple of pages from my latest preprint, put them on a transparency and use that as the basis of my talk. As a listener, I find it annoying when I am unable to read the material you are presenting, even if I am sitting in the second row. And while we are on the subject of transparencies, let me implore you to use them *very sparingly*. All of us have sat through lectures in which dozens of slides are whisked into and out of the overhead projector, their only purpose apparently being to remind the speaker of the points he wants to make. I would like to be able to read them at a leisurely pace (and perhaps take a few notes). Keep in mind, on the subject of overtaxing, that it is far easier to be alert and concentrated while speaking for an hour than it is to listen attentively for an hour. Thus I always rejoice when after a long and demanding portion of a lecture is over, something a bit more digestible is offered: a summary, an indication of what is to come, an historical note...

I like to be convinced of the truth of something by a variety of methods. I am grateful, when such is offered, for a model that helps me to visualize a topological or geometrical point or a computer simulation that makes vivid what might otherwise have been obscure. Which is not to say that many excellent lectures have been given in which no materials were used beyond a blackboard and a piece of chalk.

Dear Members of the Audience,

Contrary to what is widely believed, you can take an active role in the proceedings. I would like to encourage you to do so. I mean it. You can assist in making it possible for those who have come to hear the lecture to get as much out of it as possible. *You* can usually judge better than the speaker what is understandable to you and your fellow listeners. So raise your hand and ask questions whenever you believe that a significant portion of the audience would be grateful for an explanation yet no one has had the courage to ask ... even if you don't need such an explanation.

This is, to be sure, a delicate matter, since one has to expose one's own lack of knowledge, whether real or simulated. And since there is a general notion of what everyone is expected to know, you might easily embarrass yourself with an impossibly naive question such as: "What is the Lebesgue integral?" Yet how is someone to know that who in fact has no idea what it is? Thus it is those who have the most knowledge and so stand in the least danger of a blunder on whom it is most incumbent to speak up.

I conclude my wish list with a plea for positive feedback. If you really liked a lecture then say so. The speaker will be happy to hear that their efforts were worthwhile. In closing, I would like to emphasise that a necessary – but not sufficient – requirement of a good lecture is mathematical expertise. I find pedagogical legerdemain skating on thin mathematical ice as unbearable as narcissistic, specialist gobbledegook that leaves the listener in the lurch.

And have you nothing, Herr Behrends, to say that is positive? Indeed I have: I would like to thank the countless colleagues from whose lectures I have learned much and been stimulated by important and interesting ideas.

This article is a translation – by David Kramer – of a lightly edited version of a lecture that appeared several years ago in the Mitteilungen der Deutschen Mathematiker-Vereinigung.