Helping Students Develop Strong Communication Skills: Clear Data Presentation and Effective Feedback

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Introduction

Six graduate students receiving the Graduate Assistance in Areas of National Need (GAANN) fellowship in the department of Developmental and Cell Biology at the University of California Irvine developed this workshop as an activity for the incoming graduate students to the department. Since the student body has diverse background and not everyone has a mentor that invest time to teach the students to develop presentation skills, we wanted to give the incoming graduate students some guidance on how to deliver effective research talks and on how to give constructive feedbacks. The mini-workshop we presented during the 2014 ABLE conference was a slightly modified version to target the undergraduate students and we narrowed the focus of the workshop to organization and presentation of data with emphasis on the importance of giving and receiving constructive feedback.

Objective

UC Irvine is a very large university with about 5000 new undergraduate students per year. And the School of Biological Sciences has more than 3000 students enrolled in an academic year. These undergraduate students need to develop effective communication skills, especially those in the science field, to prepare them for their careers, especially in the field of medicine, research, or teaching. However, many of the classes especially the introductory classes like our freshmen biology course have hundreds of students per section and students do not really get a chance to learn and practice how to communicate with others about science. Fortunately, there are discussion sections and laboratory courses that offer smaller class sizes. These types of classes offer students opportunities to practice giving presentations in front of their peers through activities like paper presentation. *The goal of this mini-workshop was to demonstrate a hands-on activity that will teach students how to organize and present data and give constructive feedback.* This activity would be helpful in guiding students how to present their data clearly in a laboratory course or in a lab meeting for students who are involved in undergraduate research. Similar methods can be modified to address other components of presentation.

Materials

Laptop, badly organized data slide, evaluation form (Figs. 1, 2, and 3).
Note: Part 2 of the workshop requires students to work in a group to modify a powerpoint slide. Students can bring their own laptops or this whole workshop could take place in a computer lab. For the mini-workshop, we used a modified version of data slides from one of the fellow's actual project since this talk was initially developed for graduate students. The slides were simplified to be more suitable for undergraduate students. The information on the data slides can be substituted for other basic science or non-science related area as well.

Methods

Part 1. General Tips on Organizing a Presentation

Even though this workshop focuses on data presentation and feedback, students will find it helpful to receive some general guideline on giving presentation. Some of the tips we provided were as follows:

1. Have in mind why you are giving a research presentation:

   To:
   - Give the audience a sense of what your idea/work is
   - Make them want to understand more fully
   - Get feedback on your work

   Not to:
   - Impress the audience
   - Tell them all you know about a subject
   - Present every little detail of your work

   You may be new to giving talks on your research, and it's important to consider the motivation behind our talks in order to best structure them. We can often fall into feeling that we are being judged on our work, or that we must be sure everyone leaves with the highest opinion of us. This mindset can lead to talks that don't actually serve the purpose that they were initially meant for. Let's first consider what talks are not meant to do. We should not be trying to impress the audience. Our work, when presented appropriately, can speak for itself. We should not focus on trying to convey all our knowledge on a topic to the audience, since this will be a relatively short period of time in their day and they will most likely not absorb all of the information. And we should not feel compelled to incorporate every detail of our work. Instead, we would like to give the audience a general sense of what our work is about and its significance. From this, the audience may desire to learn more, which can be accomplished through more personal interaction. And finally, and in many ways most importantly, we should seek feedback on our work and presentation from our audience. In this way, we can continue to improve our skills in all areas, the bench and the seminar room.

2. Know the general components of research presentation:

   - Title
   - Relevant background information
   - Significance
   - Rationale
   - Hypothesis/Specific aims
   - Data/Analysis
   - Summary
   - Future Directions
   - Acknowledgements (say 'thank you')
   - Questions

   While we will discuss more advanced talk organization topics in a moment, we must start with some basics. Here is a list of some general components of a research talk. This can be used as a basic outline for formatting a talk. Some key aspects to highlight here are RELEVANT background information. It is easy to talk at length about our subject areas, but not all of this information may be relevant to the actual work we have conducted. It can be helpful to compose the data and analysis slides first, then reflect on what background information is necessary to understand the work. The significance of our work is important to convey, as far as how it impacts the existing field, as well as the specific hypotheses we are testing. It can be nice to include the direction your work is heading, but this is not always present in talks. And when it comes to the conclusion of a talk, a simple tip is to have the last words you say be "thank you." This will give your audience a clear signal that the talk is over and they may now applaud. We have probably all seen awkward endings to talks, and this will help avoid that.
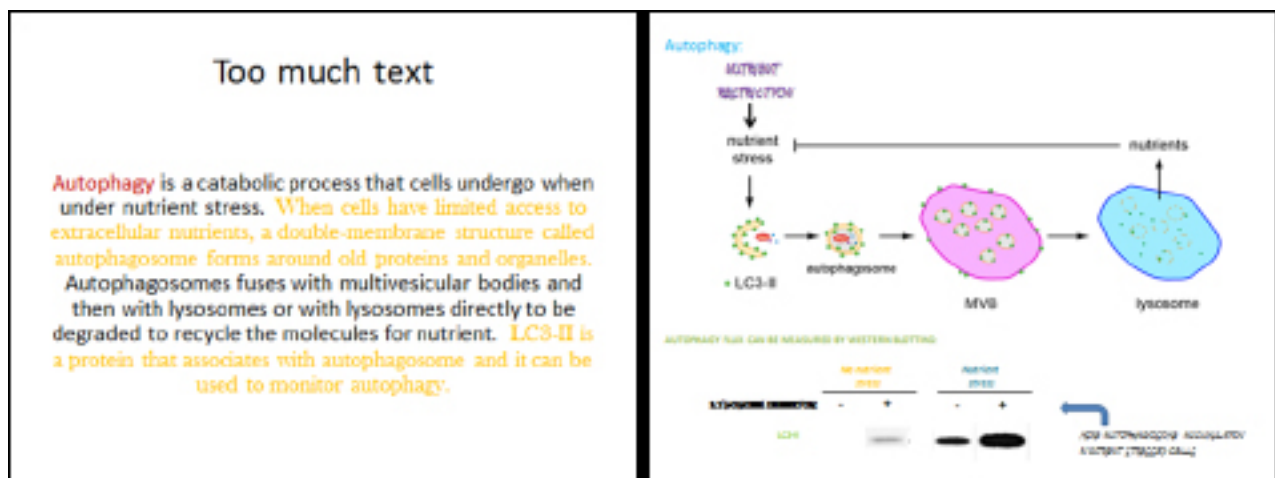

Figure 1. Examples of ineffectively organized slides.

3. Organize slides clearly and effectively:

- Use narration and not text to explain your slide
- Use animation and color sparingly to emphasize not distract
- Have consistent formatting

Continuing with some basics, let's discuss a few points on slide organization. Our slides should serve to enhance our narration, and not the other way around. To that end, remember that less is often more. We want the audience to listen to us and not be completely absorbed in trying to read or figure out what are slides are saying. In order to direct their attention to points or figures on a slide, animation can be used, but we must be careful to enhance and not distract. Be subtle with animation. In addition to animation, color can be used to highlight specific points, but we should consider how certain colors play with others. In general, dark text on light background, or light text on dark background works nicely. And throughout our presentation, pay attention to consistency in all of our formatting.

Slides with bad organization can be used to demonstrate these points (Fig. 1).

The content of the slides are not important so students should focus on the formatting. The slide on the left in Figure 1 is a background information slide that clearly has too much text to serve its purpose effectively. An audience will be drawn to reading the slide, which you may be doing right now. We also see a poor color choice of yellow on white, which actually makes the text more difficult to read rather than point out its importance.

Slide on the right in Figure 1 is another version of this background info slide. We can see some animation has been implemented, but rather poorly. There are variances in the

sizes of text as well as the color which can all be distracting and perhaps disorienting. Without proper labeling and titling, it is difficult to know what this slide is helping to tell us.

Part 2. Data Slide & Evaluation

This activity intends to help students to see not only the importance of data organization but also of clear and constructive feedback. This part is very effective as a group exercise. Before students are divided into groups, individual student will fill out an evaluation form to critique a "messy" data slide (Fig. 2 and 3). Give them about 5 minutes to complete the evaluation form.

After completing and submitting the evaluation forms to the instructor, students can now be divided into groups of 2-3 people per group. Each group should have at least one computer with the powerpoint slide they have just evaluated. The instructor can shuffle the evaluation forms students turned in and randomly pick and hand out one evaluation form per group. Students should now be instructed to modify the "messy" data slide based on the evaluation form the group received. We have found that undergraduate students frequently give vague comments that are not very helpful to the presenters (Fig. 4) and hence the data slide was not changed very much. If there is enough time, groups can project their modified slide and discuss how helpful they found the comments in the evaluation.

Now allow students discuss within their group and modify the slides as effectively as they can. Have at least one or two groups present the modified slide and point out what they have changed and why. Afterward, ask the students if they have indicated on the evaluation form those changes they have made. Emphasize the importance of clear and constructive feedback and lead into Part 3.
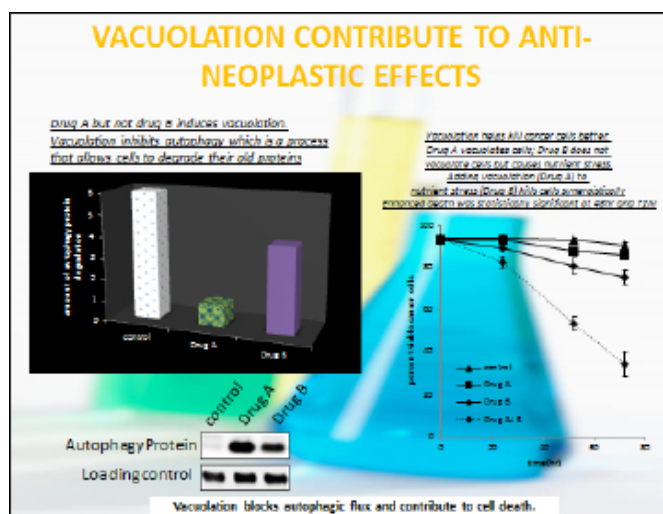

Figure 2. Slide showing an ineffectively organized data presentation.

Please provide feedback to the speaker by circling a response. A rubric is included to aid with scoring and evaluation. Comments are encouraged, please be constructive.

Presentation skills:

A. **Slide Appearance:** The slides were easy to understand and visually appealing.

strongly AGREE = 4   3   2   1 = strongly DISAGREE | Additional comment:

B. **Data Presentation:** Graphs were clearly labeled and color schemas were easy to interpret.

strongly AGREE = 4   3   2   1 = strongly DISAGREE | Additional comment:

C. **Slide Titles:** Slide titles were stated as conclusions (stand-alone statements that took a side).

strongly AGREE = 4   3   2   1 = strongly DISAGREE | Additional comment:

D. **Knowledge/Organization:** The presentation was easy to follow.

strongly AGREE = 4   3   2   1 = strongly DISAGREE | Additional comment:

The best thing about this presentation was

This talk can be improved by:

	4	3	2	1
Appearance of slides	Slides were easy to understand and visually appealing	Slides were disorganized but understandable	Slides were hard to understand	Slides were disorganized and hard to understand
Data Presentation	Clearly explained how to interpret data presented, audience able to draw own conclusions.	Clearly explained data, data not left up long enough to allow audience interpretation.	Briefly covered data presented, unclear how to interpret data.	Did not adequately explain how to interpret data presented.
Slide Titles	Slide titles accurately and concisely captured the main point of the slide	Slide titles captured the main point but were too wordy or not descriptive	Slide titles were not stand-alone statements	Slide titles did not capture the main point of the slide
Knowledge/ Organization	Showed clear and confident understanding of the content. Emphasized key points. Used effective transitions between main points.	Showed adequate understanding of the content. Mentioned key points. Used adequate transitions.	Had some understanding of the content. Poor key points and transitions.	Had a superficial handling of the content. No key points or transitions.

THANK YOU FOR YOUR INPUT!!

Figure 3. Evaluation form to provide feedback to improve the "messy" slide in Figure 2.

Part 3 Conclusion

The following tips on giving Timely, Balanced, Concrete (TBC) feedback were derived from "Seven principles for good practice in undergraduate education" (Chickering and Gamson, 1991).

Timely
- Feedback is most effective soon after event
- However, make sure listener is ready

Balanced
- Important to maintain a balance between positive and developmental feedback
- Balanced feedback maintains listeners openness to feedback

Concrete
- Feedback can be objective or subjective but it must be concrete.
- Provide an examples/alternatives if possible

Acknowledgements

Literature Cited

Arthur W. Chickering and Zelda F. Gamson. 1991. Seven principles for good practice in undergraduate education. In *Applying the Seven Principles for Good Practice in Undergraduate Education*, ed. A. W. Chickering and Z. F. Gamson, 63-69. Jossey-Bass. New Directions for Teaching and Learning, No. 47.Instructor Material

Figure 4. Example of "unhelpful" student evaluation of data slide in Figure 2.

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