The 21st-Century Oral Presentation Tool Bag

How to effectively implement oral presentations in your science classroom

Frank LaBanca

One critical 21st-century skill that science teachers can help students develop is the ability to communicate orally (Joyce 2008). Making presentations to argue a point, describe a process, or justify data challenges students to present information effectively. Presentation software (e.g., PowerPoint, Keynote, Prezi) can enhance the quality of students' communication, as well.

Oral presentations are pedagogically useful when there are many examples or subcategories for the topic at hand. For example, in my biology classes, students make presentations on different species of bacteria—highlighting morphology, benefits or detriments, transmissions, niches, and other relevant information. They also present on a genetic disorder, providing information on background, genetic basis, and treatment.

When designing these kinds of projects, it's important to consider factors that can help increase quality and engage students. In this article, I provide suggestions and tools to help teachers implement successful oral presentations in their science classrooms.

Slide preparation

Content is, of course, the most important aspect of a presentation. But students often get caught up in form (i.e., making the visual component look attractive). Though form is important, it should never trump the purpose of the presentation—to communicate scientific concepts or understanding. I provide students with the following guidelines for preparing quality slides, which help them present their information more effectively.

Word limit

I challenge students to put a maximum of 25 words on each slide. Not only does this make their slides less cluttered, but they realize that their slides are a guide—not something meant to be read. Students should practice their presentations several times before their in-class performances and use phrases to highlight key concepts, instead of wordy, potentially distracting sentences. After all, it is an *oral* presentation, not a reading one.

FIGURE 1

Student–student oral presentation rubric.

	4	3	2	1
Subject knowledge	Student demonstrates full knowledge (more than required) by answering all questions with explanations and elaboration.	Student is at ease with expected answers to all questions, but fails to elaborate.	Student is uncomfortable with information and is able to answer only rudimentary questions.	Student does not have a grasp of the information and cannot answer questions about the subject.
Content	Student presents an abundance of material clearly related to the project. He or she makes clear points and all evidence supports the project ideas.	Student presents sufficient information that relates to the project and makes good points, but there is an uneven balance and little variation.	Student presents a great deal of information that is not clearly connected to the project.	Student's project idea is unclear or student includes information that does not support the project idea.
Organization	Student presents information in a logical, interesting sequence that the audience can follow.	Student presents information in a logical sequence that the audience can follow.	Audience has difficulty following presentation because student jumps around.	Audience cannot understand presentation because there is no sequence of information.
Vocabulary	Student uses technical vocabulary and explains ideas in a way that all audiences can understand.	Student uses technical vocabulary but does not explain in a way that all audiences can understand.	Student occasionally uses technical vocabulary, may struggle over pronunciation, and does not explain in a way that all audiences can understand.	Student does not use technical vocabulary.
Graphics	Student's graphics explain and reinforce screen text and presentation.	Student's graphics relate to text and presentation.	Student occasionally uses graphics that rarely support text and presentation.	Student uses superfluous graphics or none at all.
Mechanics	Presentation has no misspellings or grammatical errors.	Presentation has no more than two misspellings or grammatical errors.	Presentation has three misspellings or grammatical errors.	Presentation has four or more misspellings or grammatical errors.
Eye contact	Student maintains eye contact with audience, seldom returning to notes.	Student maintains eye contact most of the time but frequently returns to notes.	Student occasionally uses eye contact but still reads most of the report.	Student reads entire report with no eye contact.
Elocution	Student uses a clear voice and correct, precise pronunciation of terms so that all audience members can hear the presentation.	Student's voice is clear and he or she pronounces most terms correctly. Most audience members can hear the presentation.	Student's voice is low and he or she incorrectly pronounces terms. Audience members have difficulty hearing the presentation.	Student mumbles, incorrectly pronounces terms, and speaks too quietly for students in the back of the classroom to hear.
Total score				__/32

Images

Images make presentations much more visually interesting. However, students often have to rescale images to include them in presentations. This can sometimes lead to disproportionate axes, resulting in distortion. This can easily be resolved by depressing the shift key before rescaling to maintain the image's original proportions.

Citations

Remind students to properly cite their sources—including images—in the preferred format (i.e., MLA or APA), just as they would for a written paper.

Animations

Most software packages, such as PowerPoint, include fancy methods to transmit information or transfer it from slide to slide. Some even include sound effects. But fancy slide transitions can get old quickly, and sound effects often do little more than annoy and distract the audience. I caution students that animations should be used solely to enhance a presentation—and not just for the sake of using them. I've seen too many presentations in which the sound effects detract from the presentation or the oral component gets bogged down because the student is waiting for information to appear on the screen.

Color and font selection

What looks good on the monitor doesn't always translate well to the projection screen. Reds and yellows are notoriously hard to read; blues and greens are much easier to see. It's usually best to use a light color on a dark background or vice versa.

Fonts that have serifs—semistructural details, small lines, or hooks that extend beyond the extremities of a character (e.g., Times New Roman)—are more challenging to read than sans serif fonts (e.g., Ariel, Tahoma). The font size should be large enough to be seen from anywhere in the room. Larger is usually better.

Data

When students prepare graphs or other forms of data, it's important that they don't include too much information. Students should present trends without distracting listeners with extraneous information that may not translate as well on screen as it does on paper.

External links

Sometimes an external link (e.g., a video) helps clarify or enhance ideas during a presentation. My students and I often find that embedding videos can cause problems (e.g., the video plays on the computer monitor but not on the presentation screen, or it just doesn't work at all). By inserting a link in a presentation—rather than an embedded video—students can easily click to show additional information and then, generally, return to their presentations.

Consistency

Students sometimes want to go wild with different-color backgrounds, images, unusual fonts, and multiple transition effects on their presentation slides. These are distracting and detract from a professional appearance. A consistent, clean look allows the audience to focus on the science content and message.

Assessment

Sometimes it's difficult to keep students engaged while their peers present; some think they can mentally "check out" when someone else is presenting. To mitigate this problem and involve all students, I developed a student–student rubric (Figure 1). As a class, we discuss the meaning of each section, and then students use it to provide feedback for the presenter. I not only require a score, based on the rubric, but also three written comments, including

1. a statement indicating what the student learned from the presentation,
2. a commendation, and
3. an area in need of improvement.

I encourage students to provide detailed, meaningful feedback. For example, "I liked your graphic of the nitrogen cycle" is an unacceptable commendation because there is little meaning in that statement. Instead a student might write, "Your graphic indicating the flow of nitrogen helped me better understand the process of nitrification."

The commendations and suggestions for improvement help increase student engagement. After the first or second presentation, I usually take a few minutes to read some students' statements and comment on appropriateness, letting students know where I'd like to see more detail.

At the conclusion of each presentation, the presenter hosts a short question-and-answer period. This helps me determine how well the student comprehends his or her information, and gives the audience a chance to engage. I usually keep track of who asks questions, requesting that each student ask at least two over the course of the presentations. The subject-knowledge indicator on the student–student rubric (Figure 1) refers to the presenter's ability to answer questions, and I encourage students to help their fellow classmates achieve higher scores by asking questions.

I also have students self-evaluate (Figure 2, p. 54). I again require students to provide written evidence to support and

FIGURE 2

Oral presentation self-assessment.

Indicator	Possible points	Self-assessment	Evidence (If no evidence is provided, score is zero.)
I provided in-depth coverage of the topic.	5		
My presentation was well planned and coherent.	5		
I included appropriate examples and elaboration. I provided explanations and reasons for my statements.	5		
My visual aids were clear and useful.	5		
I maintained eye contact and projected my voice.	5		
I answered questions appropriately, with clear explanations.	5		
Total points			__/30

Rate each indicator according to the following scale:

- 5: excellent
- 4: very good
- 3: good
- 2: satisfactory
- 1: poor
- 0: unsatisfactory

justify their scores. The statement indicators are exemplar behaviors, and students explain how they meet each.

Finally, I score the content of the presentation using a concept- and assignment-specific rubric. I often add information-literacy indicators (Figure 3) to ensure that students have met the obligation to properly cite work.

After each student makes his or her presentation, I collect his or her self-evaluation and the student–student rubrics and store them in an envelope. Once each student has presented, I give students their envelopes so they can review their scores and feedback. I base students' final grades on three indicators: my evaluation, which is usually weighted heaviest and focused on the science concepts presented; the average of the student scores; and the self-evaluation. Some teachers may prefer to use the student scores and self-evaluation as formative feedback, rather than as a basis for the final grade.

Using technology

Digital media offers additional options for student presentations. Students can prepare audio or video podcasts, which help develop oral communication skills. If posted

FIGURE 3

Samples of information-literacy indicators.

	4	3	2	1	Score
Range of resources	Student selects information relevant to the research purpose from print and nonprint resources authored by experts in the field.	Student selects information from valid print and nonprint resources that relate to the research purpose.	Student selects information from a variety of print and nonprint resources with questionable validity.	Student selects information from a limited range of general resources.	
Reference page	Student cites a variety of resources in a properly formatted (MLA or APA) reference page.	Student cites resources in a properly formatted (MLA or APA) reference page.	Student attempts to cite resources in proper format (MLA or APA) in a reference page.	Student acknowledges resources in a reference page.	

online, students can view and evaluate presentations asynchronously. Most platforms allow for comments and feedback, and using a systemic method for this ensures that all students are evaluated in a meaningful way. An asynchronous online strategy can reduce the amount of in-class time dedicated to presentations.

Conclusion

Twenty-first century skills should be transferable, and oral presentation skills are no exception (Rotherham and Willingham 2010). Oral skills are often necessary in the workplace and engaging in oral presentations can help students improve these skills (Stuart 1999). They also require that students learn, synthesize, and reorganize information. Oral presentations can help students improve their public-speaking skills and, with enough frequency, decrease the associated anxiety, as well.

Effective oral communication transcends the science classroom. When we challenge students to create meaningful, well-developed presentations, we help them build transferable 21st-century skills. These may be some of the most important and relevant tools students gain in our classrooms. Developing oral communication skills can make science more meaningful for all students. ■

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On the web

Google Docs Presentation. *http://docs.google.com*
OpenOffice Impress: *www.openoffice.org/product/impress.html*
Prezi: *www.prezi.com*

Resources

Bates College. 2011. PowerPoint: Presentation tips. *www.bates.edu/powerpoint-tips.xml*

Kosslyn, S. 2007. *Clear and to the point: 8 psychological principles for compelling PowerPoint presentations.* New York: Oxford University Press.

University of Illinois at Urbana–Champaign. 2010. Presentation tips and tricks. *http://classtech.cites.uiuc.edu/cct/presentation_tips.aspx*

References

Joyce, P. 2008. Learning the real-world skills of the 21st century. *Techniques: Connecting Education and Careers* 83 (4): 25–27.

Rotherham, A.J., and D.T. Willingham. 2010. "21st-century" skills: Not new, but a worthy challenge. *American Educator* 34 (1): 17–20.

Stuart, L. 1999. *21st century skills for 21st century jobs. A report of the U.S. Department of Commerce, U.S. Department of Education, U.S. Department of Labor, National Institute for Literacy and Small Business Administration.* Washington, DC: U.S. Government Printing Office.