Teaching Oral Communication in Science

Writing Across the Curriculum+ Program
January 18, 2017
Workshop Outline

• Introductions
• Evidence for importance of oral communication in employment
• Oral presentation competence and barriers, reflections
• Design principles for developing oral presentation competence (learning environment)
• Student/educator resources, workshop survey
Workshop Objectives

By the end of today’s workshop you will:

1. Reflect on your criteria for successful oral presentations;

2. Recognize evidence-based design principles for developing student oral presentation competence; and

3. Practice applying evidence-based principles to begin developing an oral presentation assignment.
Evidence for the importance of oral communication for future careers

• Good oral communication skills are critical for sharing ideas and to understand and solve problems, particularly in an international society (Krajcik and Sutherland 2010).

  – Debating scientific claims made by media/online
  – Large amount of time spent in group and interpersonal oral communication (survey of practicing engineers, Darling and Dannels 2003)
Evidence for the importance of oral communication for future careers

• Communication skills (including oral) are highly valued by employers (Cregten 2013, Andrews and Higson 2008, Archer and Davison 2008, Casner-Lotto et al. 2006).
  – 86% of 233 UK employers ranked it as important
  – 95.4% of 400 US employers ranked it the #1 skill

• However, studies indicate a wide gap between the required and actual skill levels of graduates (Jackson 2009, Archer and Davison 2008).
Evidence for the importance of oral communication for future careers

• Students generally value oral communication skills highly (Carter 2011).
  – However, value most skills highly, particularly as upper level undergraduates (Leggett et al. 2004)

• Some science students may not value communication skills as highly as other skills.
  – Lower level undergraduates listed lab skills and gathering information as the most important skills (Leggett et al. 2004)
  – May not see value in science communication training or communication with the public (biotechnology students, Edmonston et al. 2010)
Oral presentation competence

• “The combination of knowledge, skills and attitudes needed to speak in public, in order to inform, self-express, to relate, and persuade” (De Grez et al. 2009a).
Oral presentation competence

• For example, industry-relevant oral communication competencies for business (Jackson 2009) include:

  – Ability to give effective presentations.

  – Presentational speaking: creating and developing a presentation appropriate to the audience, structuring and developing information clearly and effectively and delivering ideas with impact.

  – Oral literacy including listening and questioning.
Barriers to oral presentation competence

- Communication apprehension
- Self-efficacy
Barriers to oral presentation competence

- Communication apprehension
  - “An individual’s level of fear or anxiety associated with either real or anticipated communication with another person or persons” (McCroskey 1977).
  - Communication apprehension is correlated with poor oral presentation performance (Brown and Morrisey 2004).
Barriers to oral presentation competence

• Self-efficacy
  – An individual’s belief in their capability to accomplish a task (Bandura 1994). Self-efficacy affects motivation, persistence, behaviour and how people think and feel.
  – Important predictor of oral presentation performance (De Grez et al. 2009a).
  – Self-efficacy can be improved by mastering tasks, watching others succeed, positive talk and reducing negative stress or emotions (Bandura 1994).
Design principles for developing student oral presentation competence


• 7 design principles for the learning environment.
  – Instruction
  – Learning Activities
  – Assessment Strategy
Design principles: Instruction

#1 - Include clear learning objectives that are specific to the criteria for oral presentations and are clearly communicated to the students.

• Can focus on:
  – content,
  – form of presentations,
  – presentation delivery,
  – interaction with the audience,

but focus on particular areas, since it is difficult to evaluate them all at once (De Grez et al. 2009a).
Design principles: Instruction

#1 - Include clear learning objectives that are specific to the criteria for oral presentations and are clearly communicated to the students.

- Clear and specific learning goals set by the instructor are related to substantial growth in oral presentation competence (*Kerby and Romine 2009*).

- Learning goals can also be effective when set by the student as a personal presentation goal (*De Grez et al. 2009a*).
  - Specific student goals led to better performance than general instructor goals alone.
Design principles: Instruction

#2 – Set an assignment that is authentic, relevant to students and course content and gets more complex as the course progresses.

• Presentation content

• Presentation complexity

• Context
Design principles: Instruction

#2 – Set an assignment that is authentic, relevant to students and course content and gets more complex as the course progresses.

Presentation content

• Students score better when presenting on a topic that interests them (De Grez et al. 2009).

• Problem-based learning or case studies (authentic topics) improve oral presentation skills and student confidence (Econopouly et al. 2010, Kolber 2011).
Design principles: Instruction

#2 – Set an assignment that is authentic, relevant to students and course content and gets more complex as the course progresses.

Presentation complexity

• Students show more progress in oral presentation competence when they present a less complex topic first followed by a more complex topic (*Grace and Gilsdorf 2004*)
  – Within a course or across the courses in a program.
Design principles: Instruction

#2 – Set an assignment that is authentic, relevant to students and course content and gets more complex as the course progresses.

Context

• Students presenting for a real audience or video camera showed increased confidence to present again to a real audience, but greater effect for real audience (Leeds and Maurer 2009).

• Presenting to a real audience (e.g. outside the classroom) also increases students’ self-efficacy for presenting to peers and other adults (Tucker and McCarthy 2001).
Design principles: Learning activities

#3 – Provide opportunities for students to observe model presentations, from either peers or experts.

• Observing a peer present increases student self-efficacy (Adams 2004, Tucker and McCarthy 2001) and oral presentation competence (Taylor 1992).

  – Students watching a peer present (versus a lecturer) (Adams 2004)
  – Training that includes observation of a peer model presentation (Taylor 1992)
Design principles: Learning activities

#3 – Provide opportunities for students to observe model presentations, from either peers or experts.

• Expert models may also have a positive effect on oral presentation competence (Swanson et al. 1992) and confidence (Econopouly et al. 2010).

  – Medical residents receiving training that included a model presentation by an investigator (Swanson et al. 1992)
  – Assignment with an instructor/TA case study presentation (Econopouly et al. 2010)
Design principles: Learning activities

#4 – Allow students to practice oral presentations in order to develop competence and reduce communication apprehension.

• With practice, students:
  – score better (Kolber 2011, De Grez et al. 2009b)
  – show increased oral presentation competence (Rubin et al. 1997, Swanson et al. 1992)
  – show reduced apprehension (Leeds and Maurer 2009, Rubin et al. 1997)
Design principles: Learning activities

#4 – Allow students to practice oral presentations in order to develop competence and reduce communication apprehension.

– Improvement both as individuals and in groups with repeated presentations (Kolber 2011)

– Greatest gains between the first and second presentation (De Grez et al. 2009b)

– Medical residents giving multiple teaching lectures, greater improvement if also received feedback and observed a model (Swanson et al. 1992)

– Practice over a semester (Rubin et al. 1997)
Design principles: Learning activities

#4 – Allow students to practice oral presentations in order to develop competence and reduce communication apprehension.

– Students giving video presentations practiced more (in teams/individually) with greater reduction in apprehension than live presentations (Leeds and Maurer 2009)

– Presenting to a real audience, during service learning, increased self-efficacy compared to students that did not participate in these presentations (Tucker and McCarthy 2001)

– Students that did not rehearse were less focused and had poorer speaking skills (Econopouly et al. 2001)
Design principles: Learning activities

#4 – Allow students to practice oral presentations in order to develop competence and reduce communication apprehension.

• At the end of a study on the effect of video self-assessment, students concluded that practice was the most necessary aspect to improve future performance (both on their own and repeated in the classroom) (Smith and Sodano 2011).
Design principles: Assessment strategies

#5 – Feedback should be specific, clear and come at an appropriate time and intensity.

• Students receiving feedback performed better on the feedback-targeted presentation areas compared to students did not receive feedback (Smith and King 2004).
  – Students that are highly sensitive to feedback show the greatest gains.
  – There is some evidence that feedback perceived as direct personal criticism or overly negative and harsh (high intensity) can negatively affect these students.

• WAC+ Providing Effective Feedback on Writing Assignments slides and resource handout online.
Design principles: Assessment strategies

#5 – Feedback should be specific, clear and come at an appropriate time and intensity.

• Immediate feedback appears best for presentation aspects that can be adapted immediately (e.g. eye contact, body language speech delivery skills) (King et al. 2000).

• Delayed feedback (written feedback post-performance) is better for improving things that require time and effort to change (e.g. changing the length of the presentation) (King et al. 2000).
Design principles: Assessment strategies

#5 – Feedback should be specific, clear and come at an appropriate time and intensity.

• Students need feedback that is specific to the presentation context to stop them from making incorrect generalizations about communication that can result in lacking presentation skills (Haber and Lingard 2001).

• Carroll (2006) suggests that developing clear and specific feedback criteria (e.g., a feedback form) is necessary to trigger reflective learning by students.
Design principles: Assessment strategies

#6 – Including peer feedback and assessment during the assignment process helps develop oral presentation competence and attitudes.

• Including peers in formative assessment has been linked to development of oral presentation competence (Cheng and Warren 2005, Econopouly et al. 2010) and as a positive influence on student attitude towards presenting (van Ginkel et al. 2015b) and their perceptions of peer feedback (De Grez et al. 2010).

– Peer feedback together with feedback from a tutor improved performance more than just feedback from the tutor alone (Mitchell and Bakewell 1995).
Design principles: Assessment strategies

#6 – Including peer feedback and assessment during the assignment process helps develop oral presentation competence and attitudes.

• Not all students prefer peer feedback, particularly when they don’t feel competent with assessment criteria (Cheng and Warren 2005).
  – Several studies suggest training peers in the assessment process first (e.g. Cheng and Warren 2005, de Grez et al. 2010).
Design principles: Assessment strategies

#7 – Self-assessment by the student improves self-efficacy, oral presentation competence and attitudes towards presenting.

• Self-assessment improves oral presentation competence (Smith and Sodano 2011, Qurban and Austria 2009, Hinton and Kramer 1998) and self-efficacy levels (Brown and Morrisey 2004) and reduces apprehension (Hinton and Kramer 1998).

  – Using video self-assessment (Smith and Sodano 2011)
  – Written self-assessment with more experienced presenters (Qurban and Austria 2009)
  – Video self-assessment, particularly for students showing low competence at the start (Hinton and Kramer 1998)
  – Through verbal self-talk (Brown and Morrisey 2004)
Design principles: Assessment strategies

#7 – Self-assessment by the student improves self-efficacy, oral presentation competence and attitudes towards presenting.

• Self-assessment improves attitudes towards self-assessment as a way to develop oral presentation skill (Smith and Sodano 2011, De Grez et al. 2012).

  – Students are more likely to apply what they learned from video self-assessment than students that did not use videos (Smith and Sodano 2011).
Design principles: Assessment strategies

• *van Ginkel et al. (2015b)* compared the three sources of assessment and concluded:

  – Educator feedback appears to be better for encouraging presentation behaviour (skills).

  – Knowledge of presenting and student attitude towards presenting develop independent of the feedback source.

  – Self-assessment was the least effective at developing presentation behaviour and attitude compared to the other sources.
Resources for students

• Presentation Skills Student Toolkit, UBC Learning Commons

• Sites with tips online (e.g. CLIMB site, Northwestern University)

• Example PowerPoint presentations (e.g. Robinson, Purdue University)
Workshop Summary

• Evidence for the importance of oral communication in careers

• Oral presentation competence, self-efficacy and communication apprehension

• 7 design principles for the learning environment

• Evidence for how these design principle support competence and self-efficacy and reduce apprehension

• Practiced applying these design principles to start developing an assignment
References


References

• Cregton, S. (2013). Core competencies that medium and large employers want in new graduates. UBC Centre for Student Involvement and Careers.


References


References


Contact the WAC+ Program

Email: wac.coordinator@ubc.ca

Website: http://scwrl.ubc.ca/wac
a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA