



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

Teaching Oral Communication in Science

**Writing Across the Curriculum+ Program
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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

van Ginkel, S., Gulikers, J., Biemans, H., and Mulder, M. 2015a. Towards a set of design principles for developing student oral presentation competence: a synthesis of research in higher education. *Educational Research Review*, 14: 62-80.

• **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*)

- show increased confidence and self-efficacy (*Kolber 2011, Tucker and McCarthy 2001, 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

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