

## **“Talking the Talk”: Industry and Student Perspectives on Oral Communication in Science Education**

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### **Abstract**

A number of urgent questions face university communication faculty. Should oral communication training make up a part of university level education? What role should it play? And on what rationale should the decision on its inclusion be made – purely pedagogical, or taking into account vocational concerns? If industry demand does shape the approach to teaching oral communication skills, how can or should oral communication training be incorporated alongside training in the technical skills of differing disciplines? Should educators take into account students’ perspectives – and what exactly *are* students’ perspectives on the role oral communication skills will play in their future careers?

This paper argues the case for expanding the teaching of oral communication skills in university science programs. Based on a large-scale study into communication skills training in a science communication course at Massey University, New Zealand, it reviews recent perspectives on oral communication reported by Australasian employers and argue the limitations of employer studies to this point. Through analysis of a qualitative and quantitative study of the attitudes of 300 students and 50 employers in science-related industries, the paper discusses precisely what employers in specific industries define as valuable oral communication skills, and how students perceive the value of specific oral communication skills for their own future careers.

## Introduction

On her first day of school in Dickens’ *Hard Times*, Sissy Jupe is required to stand and recite the definition of a horse.

(Sissy Jupe thrown into the greatest alarm by this demand.)

So the villainous Bitzer must stand and speak.

‘Quadruped. Graminivorous. Forty teeth, namely twenty-four grinders, four eye-teeth, and twelve incisive. Sheds coat in the spring; in marshy countries, sheds hoofs, too. Hoofs hard, but requiring to be shod with iron. Age known by marks in mouth.’ Thus (and much more) Bitzer.

‘Now girl number twenty,’ said Mr Gradgrind. ‘You know what a horse is.’ (p.3)

One thing that hasn’t changed since Dickensian times is students’ horror at the prospect of speaking in front of their peers, although some might argue that the general uselessness of student presentations hasn’t changed either. The role and importance of oral communication training to students remains a vexed issue in a number of countries.

This paper seeks to respond to a number of urgent questions. Should oral communication training make up a part of university level education? What role should it play? And on what rationale should the decision on its inclusion be made – purely pedagogical, or taking into account vocational concerns? If industry demand does shape the approach to teaching oral communication skills, how can or should oral communication training be incorporated alongside training in the technical skills of differing disciplines? Should educators take into account students’ perspectives – and what exactly *are* students’ perspectives on the role oral communication skills will play in their future careers?

The study on which this paper is based inquires into communication skills training in a science communication course at Massey University, New Zealand. This paper will review recent perspectives on oral communication reported by Australasian employers and argue the limitations of employer studies to this point. Through analysis of a qualitative and quantitative study of the attitudes of students and employers in science-related industries, the paper argues for expanding the teaching of oral communication skills in university science programs.

It has been argued that oral communication, in which students actively gather, synthesise, and critique information and ideas, provides a critical venue for knowledge acquisition, and represents a fundamental mode of learning (Cronin and Grice, 1993; Davis, 1992; Garside, 1998; Modaff and Hopper, 1984; Palmerton, 1992). Building on social constructivist theory, the case for expanding the teaching, learning, and practice of oral communication skills in university education has gathered force particularly in North America in the last twenty years: Cronin and Glenn (1991), Cronin, Grice, and Palmerton (2000), Morreale (1990), and Steinfatt (1986), among others, specifically argue the importance of oral communication training in university education, and experts agree that skill in communicating orally is not solely relevant to a ‘communication studies silo’ but is a foundational skill in all fields (Cronin and Grice, 1993; Modaff and Hopper, 1984; Rubin and Morreale, 1996).

Feedback from employers reveals that employers agree on the fundamental importance of communication skills. Over the course of the last fifteen years, several studies of the New Zealand and Australian job markets have confirmed the findings of a number of large international studies, delineating a consistently expressed desire on the part of employers for "strong communication skills" on the part of their employees (Andrews, 1995; Australian Association of Graduate Employers, 1993; Higher Education Council, 1992; Reid, 1997; Tapper, 2000; Victoria University, 1996).<sup>i</sup> However, most of these studies have maintained only a general approach to the issue of communication skills; they have not inquired closely into what specific attributes are indicated by the umbrella term "communication skills." When responding to questions, the surveyed employers might have had in mind solely written communication skill, or interpersonal communication skill, or oral communication skill, or a combination. For researchers specifically interested in oral communication, these results are too general to be enlightening.<sup>ii</sup>

As a further limitation, the studies have tended to report on employers en masse, not differentiating between employers from different industries and their potentially different communication requirements (exceptions include Coll and Zegwaard's study of science and technology graduates). It is even more doubtful, given the wide range of skills which are included in the umbrella term "oral communication skills," that all employers agree on the value for their business of the same *kinds* of skills.<sup>iii</sup>

In attempting to respond to the call for graduates with strong communication skills, universities face a number of challenges. For institutions developing curricula or policy relating to communication, the general survey findings reviewed above fail to give a clear indication of what skill instruction needs to be integrated into university programs. Furthermore, anecdotal evidence attests to deeply rooted and widespread student resistance to oral communication training. Faculty resistance is in many cases no less entrenched. As Cronin, Grice and Palmerton (2000) admit, interpersonal and oral communication skills are often perceived as hard to teach and hard to measure, and there is still a dearth of empirical evidence demonstrating the link between oral communication training at university level and successful outcomes in the workforce. Contending with the additional factor of increasing budgetary pressure on time and resources, university faculty often resist adding oral communication assessments into already stretched curricula, preferring that students who wish to 'elect' to take a course dedicated to oral communication.

However, stand-alone courses in oral communication, teaching generic skills, do not provide the answer to either universities' compressed programs or employers' insistent demand. A growing body of scholarship argues persuasively that discipline-specific communication practices must be taken into account in the teaching of communication skills (Cronin, Grice and Palmerton, 2000; Darling and Dannels, 2003; Garside, 1998). Because 'effective communication' varies between one discourse community and another, the oral genres, standards of effectiveness, and evaluative processes of the discipline in question must shape the instruction in oral and written communication that students in different disciplines receive. The Communication in the Disciplines framework suggests oral communication within a discipline serves as an important site for students to learn "what it means to communicate as a member of and expert in their own discipline" (Darling and Dannels, 2003, p.2; see also Dannels 2001).

In summary, oral communication skills benefit a student both in the process of learning and as a valuable gained proficiency. New Zealand employers clearly desire strong

communication skills, and scholars argue persuasively that such skills are best developed through instruction that reflects the genres, audiences, and evaluative practices of specific disciplines. What remains to be ascertained is what, precisely, employers in specific industries define as valuable oral communication skills, and how, precisely, students perceive the value of specific oral communication skills in their future careers.

## **Case Study**

Massey University, New Zealand, is a public university with an enrolment of approximately 18,000 students, many of those enrolled extramurally in the Distance Learning program. While the university recently approved an overarching language, literacy, and communication skills policy, no implementation of that policy has occurred, and no compulsory Oral Communication requirement exists within undergraduate courses at Massey. Most Bachelor's degrees are taught in three intensive years with students beginning specialized programs from their first year of entry. Because many degree programs are extremely tightly structured with compulsory courses, students have very constrained opportunities to take elective communication classes, of which there are, in fact, very few.

Acknowledging both Massey's lack of communication training and the need to base that training in discipline-specific conventions, a new course was introduced in 1999 at Massey: Communication in the Sciences. This was the first communication in the disciplines course to be established in a New Zealand university. Grounded in Writing Across the Curriculum theory, the course was made compulsory for almost all students enrolled in a science major. The course included several written assessments and one oral communication assessment, an individual seminar presentation of seven minutes, followed by a three minute question and answer period.

From the outset of the course, both students and science faculty members repeatedly suggested that the seminar presentation be dropped from the curriculum. While a number of faculty members, particularly from the applied sciences, were strong supporters of the seminar presentation, a very vocal minority (primarily from the pure sciences) questioned its usefulness and argued strongly for it to be discarded. At the same time, many students expressed the view that the seminar presentation caused unwarranted and extreme anxiety. One preliminary study suggested that student resistance was caused by a belief that the skills developed by this assessment are not important to a career in science (Emerson, 1999). However, the Communication in the Sciences teaching staff felt very strongly that the skills taught and practiced by the seminar presentation were too important, both to the development of student learning and to the development of necessary career skills, to be jettisoned.

## **Student and Employer Surveys**

In the light of the debates outlined above, and given the lack of specific information from the existing literature, the Communication in the Sciences teaching team decided that hard data was needed to clarify whether oral communication skills were important to employers in science-related industries, what science employers meant by oral communication skills, and which skills they prioritized. Additionally, the team wished to confirm the hypothesis that science students did not see the value of oral communication skills for their future careers within science-related industry. The research team generated a number of research questions in order to investigate these issues:

- *What do New Zealand science employers mean by 'strong communication skills'?*
- *What specific oral communication attributes may be identified as desirable to New Zealand science employers?*
- *Do science students have an accurate understanding of employers' requirements of oral communication skills?*
- *Are science employers finding the oral communication skills they desire in graduate employees?*

Answers to these questions would, we hoped, provide quality data on the importance of specific communication skills, which could then be used both to strengthen the case for communication courses within university science programmes and to help in curriculum design and assessment decisions.

## **Method**

Questionnaires were supplied to approximately 300 science students and sent to 50 New Zealand employers. These questionnaires identified 15 written communication attributes, seven oral communication attributes, and 13 interpersonal communication attributes. The survey asked respondents to value the importance of each attribute on a seven-point Likert scale, with 1 being "not at all important" and 7 being "extremely important," and also to rank the relative importance of each attribute.

The seven oral communication attributes listed in the survey were:

- The ability to speak professionally with clients
- The ability to give an effective seminar or speech (to a non-academic, non-scientific audience)
- The ability to listen carefully to others
- The ability to persuade other people to do something
- The ability to present a paper (to an academic/scientific audience)
- The ability to orally instruct other people on how to do something
- The ability to interact socially with different kinds of people.

Of the 50 questionnaires mailed to employers, 23 were returned, a relatively robust 46% response rate. The questionnaire invited interested respondents to volunteer for a follow-up telephone interview, and six did so. A range of businesses were represented in respondents: 52.38% worked for a national organization; 33.33% for an international organization; 9.52% for a small business employing less than 25 people; and 4.76% from regional organizations. The kinds of industries represented also varied widely, including general business, agribusiness, research institutes, and a variety of others including financial and consulting firms.

The student questionnaire was distributed in a first year course compulsory to all science students and achieved a response rate of over 92% ( $N=280$ ). Of these respondents, 58.9% were enrolled in a Bachelor of Science and 20.7% in a Bachelor of Applied Science.<sup>iv</sup>

## Findings and Discussion

At the most basic level, the survey showed that New Zealand science employers agree with the undifferentiated employers in previous surveys. 100% of responding science employers agreed that "good communication skills are among the top five qualities businesses are looking for when they employ graduates". This feedback was not unexpected, although the unanimous agreement was something of a surprise.

The seven specific oral communication skills listed in the questionnaire, designed to provide answers to the question, *What specific oral communication attributes may be identified as desirable to New Zealand science employers?*, yielded more nuanced results (see Table 1). Employers ranked listening carefully to others as the most important area of oral communication, giving this skill the value of 6.75 out of a possible 7 ( $SD=0.6$ ), and telephone interviews underlined employers' regard for listening skills. Employers identified managers, clients, and colleagues as possessing information critical to a new employee's successful completion of any given task, and stressed that the employee had to recognize the importance of being receptive to and processing that information. One employer stated: "From a feedback perspective, when an employee has a brief from a project manager, it's incredibly important to get that as right as possible. Listening's important in order to pick things up, understand what the issues are, sell products and services to clients... A whole range of reasons."

Study findings also highlight a difference in the kinds of oral communication skills most valued by science employers. Overall, science employers valued an employee's ability to *receive* information value more highly than an employee's ability to *deliver* information (for the relative rankings of oral communication attributes given by science employers and science students, see Table 2). Science employers gave the highest rankings to the three oral communication attributes that foregrounded the two-way aspect of the communication process: listening, speaking professionally with clients, and interacting with others socially, respectively. The implicit position that science graduates must be receptive to information and instruction, and must recognise that they still have a great deal to learn, was expressed succinctly by one employer: "They [new graduates] have a perception of their abilities much higher than they actually are."

Results also show that science employers differentiate between oral communication skills as applied to professional and social contexts. Thus "the ability to speak professionally with clients" was ranked by employers as the second most valuable oral communication skill, with a value of 6.3 ( $SD=0.7$ ), while "the ability to interact socially with others" received the lower score of 5.9 ( $SD=0.8$ ).

Interestingly, science employers ranked the ability to deliver presentations lowest in importance amongst the specified oral communication skills, although again they drew a distinction between social and professional contexts. With a score of 5.36 ( $SD=1.2$ ), "the ability to give a seminar/speech to a non-specialist audience" was valued by employers as more important than "the ability to present a paper to an academic or scientific audience" (valued at 4.6,  $SD=1.3$ ). However, both kinds of presentations were ranked lower than the less formal and more commonly undertaken forms of oral communication, "the ability to persuade other people to do something" (valued at 5.3 ( $SD=0.8$ )) and "the ability to give others oral instruction," (valued at 5.8 ( $SD=1.1$ )).

Our third research question, *Do science students have an accurate understanding of employers' requirements of interpersonal and oral communication skills?* elicited a number of disparities as well as unexpected agreement. While we were somewhat surprised by science employers' 100% unanimity on the importance of communication skills in employees, we were even more surprised to find the degree to which science students concurred: 97.9% agreed that communication skills were among the top five important attributes for employment. Students also agreed with employers that the ability to listen carefully was the most important of the listed oral communication skills, although they gave it a value of 6.3 ( $SD=0.9$ ), as compared with the employers' value of 6.75.

When science students were asked to consider the importance of other specific oral communication skills, the results become further differentiated and more revealing. In contrast to the views of science employers, science students perceived a far greater importance in telling others things. Students ranked “the ability to give others oral instruction” as equal second in importance of the listed oral communication skills, and valued it at 6.2 ( $SD=1.0$ ). Interestingly, students also valued “the ability to persuade others to do something” slightly more highly than employers (valuing this attribute at 5.4 as compared to employers' 5.3). With these disparities reinforcing employers' interview comments, it seems students may be overconfident about the level of knowledge they will have when they graduate.

Unlike science employers, science students valued an employee's ability to speak socially in a general context over the ability to speak professionally with clients, giving social interaction skills a 6.2 ( $SD=1.1$ ) and client interaction skills a slightly lower 6.1 ( $SD=1.2$ ). However, the small difference between the scores attached to these skillsets may indicate that students perceive relatively little difference between speaking in a professional context and conversing socially. As the difference between the two oral communication situations is perceived as more significant by employers, these findings reinforce the case for more training of students in analyzing particular audiences and tailoring communication content, style, and form, with an emphasis on practical and situational application.

While several students wrote into their questionnaires the importance in the workplace of presentation skills, including the use of visual aids, science students like science employers ranked the ability to deliver presentations as least important amongst the oral communication skills specified in the questionnaire. Both stakeholder groups agreed that the ability to present to a generalist audience was more important than the ability to address a specialist scientific audience, and both kinds of presentations were ranked by both groups lower than the less formal forms of oral communication, “persuasion” and “instruction.” Interestingly, despite oft-articulated resistance to presenting seminars, students seem in agreement with employers on the significance of this particular oral communication attribute in their future careers. Similarly significantly, while specialist scientific presentations were ranked least important by both groups, the values given were nonetheless relatively high (5.0 of a possible 7 on the part of students, and 4.6 of a possible 7 on the part of employers.) The ability to deliver an oral presentation clearly remains a recognised and valued oral communication skill in the New Zealand scientific workplace.

While the questionnaire revealed striking agreement amongst both employers and students concerning the importance placed on oral communication generally, the question: *Are science employers finding the oral communication skills they desire in graduate employees?* found disappointingly negative answers. While no science employer reported

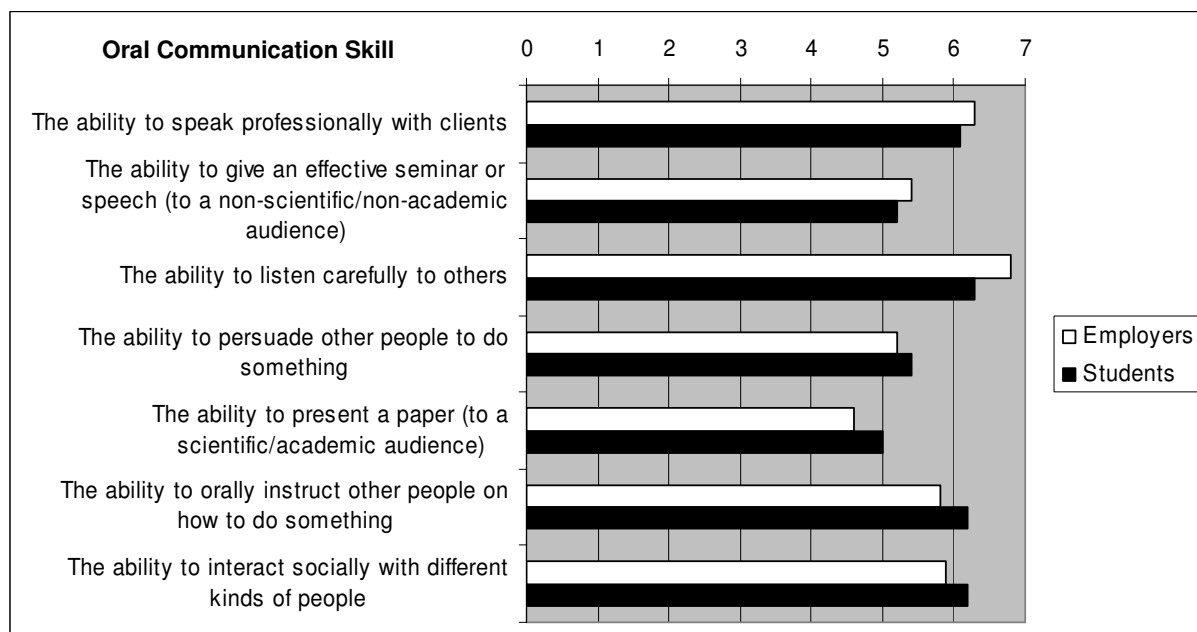
“never” finding these skills in the science graduates they had hired, 55% stated their new hires demonstrated the required oral communication skills only “sometimes” or “occasionally.” One respondent wrote trenchantly: “Engineers and scientists can rarely write and only occasionally present clearly. It is definitely a key area for improvement within the curriculum.”

### Conclusions

The findings of this study clearly support the case for oral communication training to be included in New Zealand university science programs and in the design of communication courses. Science employers indicate that they require and value highly a variety of oral communication skills, from listening, to speaking with clients, to making presentations for general audiences. Perhaps the most surprising result of the survey was that students clearly saw the value of oral communication skills for their future careers. This finding suggests that oral skills training should include teaching in how to handle fear and anxiety.

The study also demonstrates that while science employers and university science students agree that oral communication skills will be important in scientific careers, the majority of employers find the desired level of these skills in new graduates only sometimes or occasionally. The retention of oral skills teaching and assessments, as currently exemplified by the Communication in the Sciences course at Massey University, is clearly indicated. There is also a strong case to be made, despite the difficulties of limited resources of time and funding, for an extension of the focus on oral competencies.

**Table 1: Relative values of specific oral communication skills identified by employers and students**



**Table 2: Relative rankings of specific oral communication skills identified by employers and students**

<b>Oral communication skill</b>	<b>Employers</b>	<b>Students</b>
The ability to listen carefully to others	1	1
The ability to speak professionally with clients	2	4
The ability to interact socially with different kinds of people	3	2=
The ability to orally instruct other people on how to do something	4	2=
The ability to give an effective seminar or speech (to a non-scientific/non-academic audience)	5	6
The ability to persuade other people to do something	6	5
The ability to present a paper (to a scientific/academic audience)	7	7

## **Endnotes**

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<sup>i</sup> In New Zealand, the job market's need for employees with strong communication skills has also been widely reported in the popular press (see for example Bland, 2005; Hart, 2004).

<sup>ii</sup> Burchell et al (2001) and Rainsbury et al (2002) have reported on the competencies required of business graduates in the New Zealand context, and Coll and Zegwaard (2006) draw on the same survey instrument used by both earlier studies to examine the competencies required of New Zealand science and technology graduates. All of these studies omit oral communication as a competency.

<sup>iii</sup> The precise nature of the university's responsibility to prepare students for the workforce is a subject of much debate, in New Zealand as in Australia and internationally (see for example Coll, 1996; Coll and Zegwaard, 2006; Jones 1994; Rubin and Morreale, 2000; Waller and Hingorani, 2006; Zorn, 1998). While Zorn warns against the pitfalls of the increased vocationalisation of university education, he also admits that the need to promote study programs as valuable to career preparation is a reality New Zealand universities can ignore only at their financial peril.

<sup>iv</sup> We did not request that students engage in follow-up interviews, as we considered employers to be our primary research focus for this study; student perspectives were elicited in order to investigate significant difference in responses between students and employers

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