Building on solid bedrock: Embedding language development in first-year geology curriculum

Leslie D. Almberg
Department of Applied Geology, Curtin University

Christine Symons
Curtin Business School, Curtin University

Abstract

Collaboration between experts in language learning and non-language disciplines is a practical approach for reshaping assessments to ensure student language development within the discipline context. While embedding language into curriculum is by itself a valuable application, our professional partnership yielded broader positive impacts. This alliance supported professional reflective practice by providing a unique perspective on means to overcome challenges of first-year assessment and feedback, and support for students to become independent learners. As part of a larger community of professional practice, this cooperative work promotes student success across multiple disciplines and faculties.

Introduction

Solid communication skills are fundamental to any field of study and science is no exception. It can be said that science is fundamentally about communication; un-communicated science does not, in essence, exist (Yates et al., 2005). Experts in a particular field, however, may lack the necessary skills or confidence to build this capacity in their students (Arkoudis & Tran, 2010), hence the teaching of communication skills is often relegated to language experts with little to no knowledge of science (Catterall 2003). This common course structure reinforces a faulty perception in students’ minds of ‘doing science’ and ‘communicating’ as two unrelated objectives (Yates et al., 2005) and runs counter to the principles of constructive alignment (Biggs, 1999). It also hinders students in their specialist language development and concept mapping because they have fewer opportunities to use their new language to develop and share their knowledge (Woodward-Kron, 2008; Leggett et al., 2007).

Clearly, there is a necessity to intrinsically intertwine or contextualise the learning of, the doing and the communicating of science (Leggett et al., 2007; Catterall, 2003). This approach is required to overcome the student perception that they can be good at what they do without clearly conveying to others what they have done. With this in mind, Almberg (2011) developed an innovative first-year geology assessment and the authors further embarked on the current reflective practice to enhance and refine its efficacy. The partnership between discipline expert and academic language and learning advisor was born out of a larger project on embedding language within a discipline, based on proven success of this style of curriculum development and delivery (Evans & Cable, 2010; Crosling & Wilson, 2005; Brackley & Palmer, 2002; Arkoudis, 2003; Ng et al., 1999).

While the primary focus of this partnership was on language development, it was a pilot program that grew organically into much more. The emphasis shifted toward creating closed
feedback loops within the assessment and supporting students to make meaning of the assessment criteria, which are powerful tools for engaging students and fostering deep approaches to learning (Bovill et al., 2010; Lumsden et al., 2010; Nicol, 2009; Nicol & Macfarlane-Dick, 2006; Orsmond et al., 2002).

**Academic partnership for an enhanced first-year geology experience**

*Sowing the seeds of change*

This professional partnering of discipline expert and language advisor was the result of a university-wide project which had as its broad aim ‘the embedding of language development activities and assessment within core discipline-based units’. No exact guidelines as to how we might achieve this aim were provided. This absence of guidelines was purposeful, as the project managers understood that language-based activities for each unit would need to be tailored to achieve the best possible outcomes. This freedom enabled us to focus on the assessment pieces in Geology 101 with no preconceived ideas. What became clear as we actively reflected on our aims as we progressed was that more clarification and consequently, scaffolding of the tasks was needed. In effect, the lecturer’s expectations needed to be spelt out in greater detail. The bedrock of the assessment pieces needed to be made explicit to students.

*Building a foundation of strong roots*

This realisation guided and focused our efforts. Students who understand clearly what is expected of them and then deliver, develop greater levels of cognitive competencies and as a result, experience greater levels of satisfaction, motivation and self-efficacy (Bandura, 1997). In the case of Geology 101, it is the aim that students will experience what Bandura (1997) describes not only at an individual level but also at a group level. Great emphasis is placed on group/teamwork in the contemporary workplace and communication skills play a vital role in the healthy and effective functioning of such teams (Robbins et al., 2008). As such it was considered vital by the discipline expert and language advisor to focus on appropriate skills required for success in a group environment.

*Developing a strong yet flexible trunk*

While the project focussed on directly related goals and outcomes for Geology 101 students, the applicability of these to future study and professionalism was always in our sights. Actively encouraging students to go beyond silo thinking and participate in what Weick (1993) refers to as ‘sensemaking’ contributes to the ability of students to make meaning from seemingly disparate areas and synthesise what may seem initially to be unrelated ideas. Surely, this is what ‘good’ scientists do! Further, successful synthesis and sensemaking contributes to increased levels of self-efficacy (Bandura, 1997), which in turn can stimulate students’ cognitive capacity and levels of motivation.

Yates et al. (2005) found that students perceived communicating their findings as something to be done after the ‘geology’ and not seen as part of ‘doing geology’, while Copeland (2012) admonishes students of geology not to be lax in their approach to writing and illustrates the pitfalls of imprecise writing, alluding to a common depiction of geoscientists as poor writers. A recent discussion of academic standards with a range of professional geoscience stakeholders (government, private industry, and academia) revealed that high quality communication skills are considered paramount across the profession and sorely lacking in...
most recent graduates. While fundamental geological knowledge is valued, employers realise they will need to train graduates to the specifics of their jobs. They do not, however, want to teach them to write. The consensus is that universities need to do more to emphasise how to communicate science using appropriate language and that communication units alone are not sufficient to do this effectively.

**Results**

*Growing branches of professional practice*

The professional partnership described herein yielded numerous positive outcomes, mostly unforeseen at the inception. Joining forces in a community of practice\(^1\) telescoped our perspective on many aspects of our teaching, which expand beyond the scope of this paper. These insights will be discussed in a separate paper in preparation. Of the many benefits from our collaboration, foremost is the insight we gained into what we wanted to accomplish in providing our students with tools to grow from novice to professional communicators.

Ultimately, we created a new base level upon which the assessment is scaffolded, solid bedrock from which students can build their oral and written communication skills. As a result of our partnership, the teaching now supports students to make meaning of the assessment criteria, places greater emphasis on the role of reflective practice as a learning process, and includes closed feedback loops to support student progress. This outcome is more extensive than the original scope of the collaboration.

*Tasting the fruits of our efforts*

We are implementing these changes in semester 1, 2012 and will report on their effects on student performance and attitudes. We have ethics clearance to interview students who completed the unit in semester 1, 2011 and analyse their responses together with those from 2010 (cf. Almberg, 2011; Almberg et al., 2011). Synthesising two years of data prior to enacting the changes outlined in this paper allows us to evaluate the effects of our collaboration on student success separately from the overall student perceptions of the assessment. Students enrolled in semester 1, 2012 are invited to complete anonymous online surveys to gauge their perceptions of the project in its current form.

**Conclusions**

Reflecting on our partnership to date, we are aware that our work only begins to lay the foundations for Geology 101 students to develop strong professional communication skills. In order for these students to successfully communicate their science to others, all involved need to continually reflect on their contributions to the unit. Discipline expert and learning advisors particularly should endeavour to refine and iteratively modify the teaching and learning opportunities to best promote student success. From this foundation or bedrock, the authors sincerely hope that seeds of collaboration within and across disciplines will take root. As we see it, we need to plant many seedlings to create a forest of engagement, formative feedback, student and instructor reflection, and sense making that will have a lasting positive reverberation.

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**Session Plan**

Building on solid bedrock: Embedding language development in first-year geology curriculum, Nuts and Bolts
Pose two questions to participants:

- What are your language/communication **expectations** for your unit?
- What is the **reality**?!

(Participants are provided with a 5-point Likert scale with exemplars for both questions and a ‘clicker’ to gather and feedback responses.)

Give an overview of our project including who we are, what we created, how the students benefitted.

Place participants into either pairs or small groups. Refer them back to the original questions they answered and ask them to consider how they think they may be able to move from the ‘reality’ to the ‘ideal’ regarding language/communication skills in their units.

Feedback from participants and closing comments.

**References**


Ng, J., Lloyd, P., Kober, R., Robinson, P. (1999). Developing writing skills; a large class experience; a teaching note. Accounting Education, 8(1), 47-55. doi: 10.1080/096392899331035


