Chapter 3
First Year Chemistry
Language Support at the University of Tasmania

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ABSTRACT
A number of in-class and post-lecture learning strategies are described that have recently been incorporated into the first year chemistry program at the University of Tasmania, Hobart. These methodologies are centered on supporting the various language based challenges that students face in achieving a firm introduction to the discipline. A number of delivery strategies were trialed for in-class activities that overcame institutional specific limitations in access to technologies in an attempt to increase student involvement in lectures and tutorials. Activities included mobile phone-based technologies (and simple overhead transparency/show-of-hand alternatives) for in-class audience surveys, word matching exercises, and chemical songs. The post-lecture approaches also covered a range of delivery platforms, including (i) on-line based quizzes that focused on providing specific, tailored feedback to allow maximal self-reflection on the understanding of key terms and concepts prior to attempting weekly summative assignments where feedback is deliberately kept limited; (ii) developing a broader range of weekly assignment questions (beyond conventional multiple choice) to focus on language issues; (iii) chemical Sudoku puzzles, and (iv) crossword activities. Evaluations of these approaches are presented.

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INTRODUCTION

The introduction to the previous chapter has provided an excellent discussion on the general language based issues that confront students embarking on their pursuit to master chemistry. We do not wish to cover this ground again with any great overlap. Students of the discipline have faced many language based hurdles for centuries (Wellington & Osborne, 2001); however rapidly advancing technologies that have created new niche areas of specialization, changing requirements of graduates (not only in these new areas, but even in traditional vocations), the changing environments of tertiary education and even the level of part-time work students commit to during the academic year have brought new challenges.

The opening sentence of the previous Chapter, “Chemistry is the central science”, is one that is becoming ever more relevant as the life sciences attain increasing levels of understanding at the molecular level and advances in physical sciences and engineering demand new materials (aka chemical substances) with improved properties and reliabilities to construct more sophisticated devices. With this, comes increasing challenges in the teaching of chemistry across a range of areas. Most obvious is in catering for many areas of service teaching that require tailored content (Barrie, Buntine, Jamie, & Kable, 2001). In parallel, delivering effective first year programs for students who intend on pursuing a major in chemistry is always undergoing modernization to adapt to changing needs, important breakthroughs and shifts in emphasis as society progresses. Enforced combined teaching of, previously, often separated streams in the face of budgetary/staffing pressures only adds to these issues. Such compromises can risk specialist programs undertaking the teaching of introductory to intermediate level chemistry within other schools, which has consequential organizational effects within chemistry departments and potentially can put at risk the students not mastering sufficient general grounding in the discipline to be effective in their profession. Ensuring that a student’s first year of university study gets off on the right track is vital across many agendas (Burton & Dowling, 2005; Simpson, 2006; Tinto & Pusser, 2006).

In general, students of increasingly diverse prerequisite chemical knowledge and vocational interests are often being co-taught (Harris, et al., 2007). This broad range of students also tends to have a naturally wider instinctive range of numerical and language related abilities. Across this wide cohort of students with physical and health sciences interests, even personalities and favored learning approaches are, in general, quite disparate. Also adding to the challenge is that relatively few students pursue their first year chemistry study with the passion expected of someone intending on majoring in chemistry (Oliver & Simpson, 1988). This leaves many students seeing this aspect of their training as a necessary task to get through in order to achieve a qualification in their chosen vocation. As noted in the previous Chapter, such motivational issues are of major concern to mastering first year study in chemistry. An unrelated, additional, point relevant to this project is that tertiary institutions have increasingly larger proportions and wider range of diverse student nationalities in their programs, for whom English maybe a second language. This makes tertiary education institutions very interesting work places to work and study, but due to the many first languages and English language skills of the students this creates further challenges in relation to language support in the crucial first year of study for these students. For the institution, and discipline, at stake is retention and progression of students through their degree.

The upshot of all these issues is that (i) a range of significant, increasing language based challenges that all students face in achieving an adequate introduction to the discipline and (ii) teaching staff need to manage these challenges to meet the needs of their students and the many other stakeholders they interface with. It is a chal-
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