Chapter 8
Growing Global STEM Learning in Higher Education

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ABSTRACT

Tomorrow’s graduates must make innovative use of global knowledge, universal work-readiness skills, and advanced multicultural understandings to solve future domestic and global problems. However, universities face compelling challenges in providing these skills. Discipline entrenched curricula often takes precedence over global, multicultural learning activities in Science, Technology, Engineering and Mathematics (STEM) disciplines. This chapter reports on the introduction of global competency and cultural awareness into a postgraduate course at an Australian university. The study demonstrates the advantages of using the existing multicultural learner cohort to integrate global competencies and understandings into the curricula. This research showed that teaching activities such as group learning, global problem-based issues and peer assessment, created successful learning interactions amongst domestic and international students. The outcomes highlight the role of academic staff in planning for global competency in STEM classrooms and changing the global mindset of all students.

INTRODUCTION

If nations are to be productive and progressive economies in the future, a workforce of graduates with global perspectives, cultural understandings and connections is critical. Graduates who have benefited from integrated cross-cultural learning and teaching can introduce new perspectives within their own organisations and, based upon their educational experiences, develop professional connections between their country and the rest of the world. For tomorrow’s graduates, innovative use of global knowledge, universal work-readiness skills, and advanced multicultural understandings will enable them to take their place in solving future domestic and global problems. Universities face compelling challenges in educating these graduates of the future. This is critically evident in STEM (science, technology, engineering and
mathematics) disciplines, where global trends increasingly focus upon the need for cross-disciplinary, industry-related, culturally sensitive approaches that maximise opportunities for future employment and lifelong learning.

However at the tertiary level, STEM teaching remains, for the most part, discipline and culturally entrenched. The STEM curricula within Australian universities, is mostly anchored in domestic teaching, with students focussed upon discipline-based learning. This is in spite of the cultural mix of the student cohort, where approximately one in five tertiary students studying in Australia is an international student (Australian Bureau of Statistics, 2012).

As with most developed countries, the richness of this student body that assembles on Australian university campuses (both on and off-shore; virtual and physical) provides a cohort that reflects global education patterns. Of the Australian campus cohort, almost half a million are overseas students (internationals) studying in Australia, representing 193 countries (Australian Government, Department of Education, 2016). Inbound international students made up almost 24% of the total student population in Australian universities (Australian Government, Department of Education, 2016). This is a significant proportion of the student population studying in Australia at any one time and an untapped source of potential global learning knowledge, cultural skills and global networking opportunities. International students in return make a significant contribution to Australian society, diversifying and enriching communities, and strengthening Australia’s global networks. The decision to study in Australia also offers many benefits to international students, allowing them to gain a high quality, internationally recognised education, as well as the opportunity to experience life in Australia (Australian Bureau of Statistics, 2012).

In addition, the presence of international students offers increased educational income. Currently Australia’s international education activities generate close to $18 billion of export income annually and this revenue supports more than 100,000 jobs (Australian Government, Department of Education and Training, 2015). Australian academic staff, researchers and students gain many benefits from the contributions made by international students and their global perspectives. The value of the international education industry alone indicates the relevance of building upon connections made through education to create sustainable longer term advantages. This is especially applicable in STEM disciplines, where innovative developments are economically prohibitive and reliance upon global breakthroughs in research and application is paramount.

Significant evidence exists that relationships and peer connections developed through learning activities extend beyond the classroom into future arenas, workplaces, global opportunities and cultural understandings (Gothard, Gray & Downey, 2012). In addition, Colvin, Volet and Fozdar (2014) note the importance of designing cross-cultural interaction strategies into the curriculum to support all students, both domestic and international, as a way of growing cultural recognitions. The relevance of “social learning” within educational institutions and the subsequent global competencies built upon such learning is also noted within the literature (Grodsky & Jackson, 2009). The value of internationalisation across all curriculum areas to achieve improved global competencies in students, in particular STEM, is widely acknowledged.

Australian universities accept a large cohort of socially and culturally diverse students. The relevance of this cohort of international students to future global connections and networking has not been ignored at senior policy levels. The Australian Government has announced its commitment to ensuring that education providers adapt their existing practices to improve links with and access to the Asian region (Australia Universities, 2012). This includes examining activities in higher education learning and teaching beyond the existing domestic curriculum to achieve synergies and relationships across students and