Comparing the self-efficacy and writing-related abilities of native and non-native English-speaking students

Gerry Rayner1,2*, Theo Papakonstantinou1 and Roslyn Gleadow1

Abstract: The internationalisation of higher education generates several issues related to quality, uniformity of subjects taught across campuses and the role of differences in English-speaking ability, which may affect student learning and skills development. This study used a self-assessment survey framework to investigate Australian (native English speaking) and Malaysian (non-native English speaking) students’ perceptions of their writing-related competencies. These perceptions were then correlated with students’ grades for specific writing tasks at the Australian and Malaysian campuses of Monash University, a research-intensive tertiary institution. Student perceptions of six competencies were determined upon commencement and completion of a core science subject, SCI2010. Australian and Malaysian student perceptions of their abilities improved for all six, and four of the surveyed competencies, respectively. Upon commencement of the science unit, Malaysian students’ self-efficacy was higher than that of Australian students for three competencies. However, by completion, Australian students had higher self-efficacy for all six competencies, which correlated with their higher literature review grades.

ABOUT THE AUTHORS
The authors are science academics with a diverse range of teaching and research interests, including plant sciences, ecology and evolutionary biology, molecular biology and science communication and dissemination. Their scholarly research in learning and teaching include facets of work-integrated learning, effective use of technology to enhance student learning and skills development, and evaluation of students’ self-efficacy of their generic skills. Additionally, the authors are actively engaged in curriculum innovation and renewal across tertiary science curricula, including large enrolment foundation units and core subjects at higher year levels. They have collaborated with science colleagues to develop, implement and evaluate inquiry learning across undergraduate programmes, and to enhance tutor capability with respect to these pedagogies. The authors have been the recipients of a range of grants and awards, including national grants for disciplinary and pedagogical research, and university and faculty awards for education and teaching excellence.

PUBLIC INTEREST STATEMENT
This paper presents valuable information about the differences in confidence related to writing and writing-associated abilities between native English- and non-native English-speaking university students. These two sets of science students attended an Australian and Malaysian campus of Monash University, respectively. The possible relationship between students’ writing-related confidence and their actual writing ability was also investigated. Initially, Malaysian students were more confident about their writing-related abilities than were Australian students, although this pattern reversed over the course of the course. This study demonstrates that assumptions cannot be made about students’ confidence in their writing-related abilities, regardless of their English-speaking proficiency. Further, the study shows that universities with international campuses must provide effective and targeted help to maximise students’ writing and writing-related skills.
There was no difference in grades for the annotated bibliography assignment. These results have important implications for the delivery of university subjects across international campuses.

Subjects: Education; Higher Education; International & Comparative Education; Multicultural Education; Pedagogy; Teaching & Learning

Keywords: demographic differences; student perceptions; writing skills; ESL; comparative assessment; pedagogy

1. Introduction

Over the past two decades, higher education has become an increasingly global enterprise (McBurnie & Ziguras, 2006; Woodrow, 2011). Transnational education programmes comprise three broad elements. The first is the burgeoning international student market, in which courses at established Western universities are available to fee-paying students (Kell & Vogl, 2012; Ziguras & Law, 2006). The second element comprises long-standing, but increasingly popular “study abroad” programmes, which promote student mobility through study at an international campus of their university or at one of a range of overseas partner universities (Bakalis & Joiner, 2004; Marginson, 2006). The third element has been the establishment by Western universities of overseas branch campuses, which serve to enhance their international reach and profile (Altbach & Knight, 2007). The number of international branch campuses of such universities has grown from 35 to 200 over the past decade (Lawton & Katsomitros, 2012). Where the same course is offered at local and international campuses, potential issues of logistics, the tailoring of content to suit local context (Woodrow, 2011) and uniformity of curricula and quality assurance need to be addressed in order to maintain comparable standards, regardless of study location (Castle & Kelly, 2004; Dobos, 2011).

Academic success is determined by a range of factors, including prior knowledge (Prosser, Trigwell, & Taylor, 1994), university entrance score (McKenzie & Schweitzer, 2001), language proficiency (Andrade, 2006; Parkinson, 2000) or combinations of these (McKenzie & Schweitzer, 2001; Rayner, 2014). Writing ability has also been identified as a critical factor in academic success (Patterson, 2001). Writing competencies belong to two broad groups: writing proficiency and writing task-related skills. The former includes abilities such as punctuation, grammar, word choice and composition, and latter-related skills include an ability to source information and apply suitable writing conventions (Pajares, 2003). Although writing-related tasks pose difficulties for most students (Wilson, 1997), they can be particularly stressful for non-English speakers (Baker & Hawkins, 2006; Cheng, 2004). For such students, writing English may be a considerable contributor to a phenomenon known as “foreign language anxiety” (Horwitz, Horwitz, & Cope, 1986; Tran, Baldauf, & Moni, 2013). Such anxiety may be contributed to by non-English speakers’ concerns about attribution and the need to avoid plagiarism, which have been previously noted (Shi, 2012).

Additionally, student judgements of their writing self-efficacy have considerable potential to impact the actual quality of their writing, through the integrative effects of effort, interest, attention to detail, and perseverance and resilience under stressful conditions (Pajares, 2003). In this context, self-efficacy is defined as students’ relative confidence (Bong & Skaalvik, 2003; Bong, 2008) in relation to their writing and writing-related abilities. Previous investigations of a possible connection between students’ self-efficacy and their actual writing ability show no consistent pattern, with considerable research showing a positive correlation between these factors (Multon, Brown, & Lent, 1991; Pajares, 2003; Pajares & Johnson, 1996; Prot-Sala & Redford, 2012), and some research indicating no such correlation (Jones, 2008; Ong, 2015), regardless of students’ English language competency.

More than two decades ago, Silva (1993) called for research comparing native English-speaking (L1) and non-native English-speaking (L2) students’ efficacy of their writing-related skills. While a considerable body of research has subsequently built on Silva’s call for further exploration of the
topic, these studies have largely been in secondary educational settings (Bruning, Dempsey, Kaufman, McKim, & Zumbrunn, 2013), pre-service teacher education (Kwan & Yunus, 2014) or tertiary disciplines other than science (Chae, 2011). A thorough review of the literature suggests that comparisons of L1 and L2 university science students’ self-efficacy of their writing and writing-related abilities is a poorly researched and/or reported area of scholarship. Based on the above information, the aims of this study were to:

1. Investigate possible differences between L1 and L2 science undergraduates’ self-efficacy of their writing and writing-related competencies.
2. Explore the potential impact of SCI2010 on students’ self-efficacy of these competencies.
3. Compare L1 and L2 student grades for two writing tasks to investigate possible correlations between their self-efficacy and actual achievement.

With respect to these aims, we hypothesised that (1) L1 students would have greater self-efficacy than L2 students regarding their writing-related abilities; (2) SCI2010 would have a positive, but not differential impact on the self-efficacy of students’ writing-related abilities; and (3) there would be a positive correlation between students’ self-efficacy and their actual writing ability.

2. Methodology

2.1. The study setting and student cohorts

SCI2010 is a core second-year subject taught at both a Malaysian (Sunway) and Australian (Clayton) campus of Monash University, focusing on science communication and practice, and undertaken over a single university semester. Undergraduate students who completed SCI2010 over 2010–2012 were chosen for investigation. Given the uniformity of teaching and assessment protocols in SCI2010 over this three-year period, this provided an excellent setting against which to investigate the research question. The two cohorts (Australian: n = 2,600 and Malaysian: n = 669) were subsequently standardised such that each contained only students with the same writing history, that being completion of two first-year biology essays in their degree studies. To prevent potential confounding effects, students who had completed essays or literature reviews in other first- or second-year subjects during 2010–2012 were excluded from analysis. Students studying on Monash University exchange programmes were also excluded from all analyses. Final cohort sizes were n = 535 for Australian students, and n = 66 for Malaysian students.

2.2. Students’ self-efficacy of their writing-related competencies

Via pre- and post-semester surveys, administered using the online course management system, SCI2010 undergraduates assessed their self-efficacy to undertake a range of writing and writing-related competencies. Assessed competencies were their self-efficacy regarding the ability to (i) prepare written summaries of scientific papers, (ii) prepare a written scientific literature review, (iii) find relevant scientific literature, (iv) ask and refine questions on scientific topics, (v) understand scientific referencing requirements and (vi) avoid plagiarism. These competencies were chosen as they constructively align the learning objectives and assessment criteria for the writing tasks in SCI2010, and constructive alignment between subject learning objectives and assessment criteria is considered a hallmark of educational excellence (Biggs & Tang, 2011). The surveys did not gauge students’ self-efficacy of writing skills such as grammar, composition, clarity of expression or punctuation. Data for each competency were pooled across the six semesters from 2010 to 2012.

2.3. Examining the alignment between student writing task grades and their self-efficacy

Students completed two writing tasks for SCI2010: (i) an annotated bibliography (AB), comprising summaries of five scientific papers, followed by (ii) a literature review (LR), an 1,800-word thematic science essay. Marking of the AB and LR was undertaken by experienced and trained tutors, all of whom had undertaken a marking and assessment workshop, which included cross-checking and
subsequent discussion to prevent potential biases. This assessment strategy is consistent with accepted practices for such writing exercises (Song & Caruso, 1996). Students used Turnitin® plagiarism detection software prior to submitting their assignments, with a 10% similarity index set as the maximum allowable threshold. Although Turnitin® is not mandated by Monash University for plagiarism detection in students’ written work, it has been shown to enhance their understanding of academic integrity and the requirement for attribution (Graham-Matheson & Starr, 2013), and to enhance the paraphrasing ability of L2 students on English-writing tasks (Davis, 2007). Students’ use of Turnitin® in SCI2010 was supported through printed and online materials, together with dedicated tutorials, which reduce rates of plagiarism (Heckler, Rice, & Hobson Bryan, 2013). The AB and LR assignments were assessed using separate rubrics to evaluate four general criteria, content, structure, style and referencing, which align with the learning objectives for the unit and the assessed competencies. AB grades were pooled across the six semesters, and means determined for each of L1 and L2 cohorts. This method was also used for the LR assignment.

2.4. Statistical analyses

Means and standard error measurements (SEMs) of student self-assessment survey data were calculated using a modified, 10-step Likert-type scale (Likert, 1932) from 0.0 to 1.0, with students using a 0.1 step choice. One-tailed t-tests (Gosset, 1908) were applied to derived means, with differences considered significant if \( p < 0.05 \). Cohen’s (1988) \( d \)-values of effect size were calculated using Microsoft Excel®. Analysis of variance (ANOVA) was carried out in SYSTAT® to test relative differences between L1 and L2 students in terms of their increased self-assessed ability for each competency.

3. Findings

3.1. Student self-efficacy of their writing-related abilities at commencement of SCI2010

Comparing cohorts, L2 students started at a significantly higher level of confidence than L1 students for three of the six writing and writing-related competencies. These were their perceived ability to (i) prepare written summaries of scientific papers, (ii) prepare a written literature review and (iii) ask and refine questions on scientific topics (Figure 1).

While L1 students ranked their self-efficacy to prepare a scientific literature review significantly lower than all other competencies (t-values between 2.2 and 10.3, with corresponding \( p \)-values <0.0001), L2 students ranked it lower than only three other competencies (t-values between 1.4 and 2.3, with corresponding \( p \)-values <0.004). This competency was not significantly different than students’ perceived ability to (i) prepare written summaries of scientific papers and (ii) ask and refine questions on scientific topics (Figure 1).

Upon commencement of SCI2010, L1 students ranked their capacity to avoid plagiarism significantly higher than all other competencies (t-values between 2.0 and 10.3, with corresponding \( p \)-values <0.0001) (Figure 1). L2 students ranked this ability higher than four of the other five competencies (t-values between 0.9 and 2.3, with corresponding \( p \)-values <0.03). The only non-significant difference related to L2 students’ understanding of scientific referencing requirements (Figure 1).

3.2. Student self-efficacy of their writing-related abilities on completion of SCI2010

In contrast to the pattern observed at commencement of this subject, by completion of SCI2010, L1 students had significantly higher self-efficacy than L2 students for each of the six competencies (Figure 2). Nevertheless, L1 students still rated their self-efficacy to prepare a written scientific literature review significantly below all other competencies (t-values between 1.8 and 7.2, with corresponding \( p \)-values <0.0001). Contrastingly, L2 students continued to rank this competency lower than four of the other five competencies (t-values between 1.2 and 1.6, with corresponding \( p \)-values <0.009), with a non-significant difference between this competency and asking and refining questions on scientific topics (Figure 2).
With regard to their self-efficacy to avoid plagiarism, upon completion of SCI2010, L1 students ranked this ability significantly higher than four of the other five competencies (t-values between 1.5 and 7.2, with corresponding p-values <0.001). The only non-significant difference was with L1 students’ self-efficacy to understand scientific referencing requirements (Figure 2). By contrast, L2 students’ self-efficacy to avoid plagiarism ranked higher than only two of the other five competencies (both t-values between 1.1 and 1.2, with corresponding p-values <0.02). There was no significant difference between this competency and students’ self-efficacy to (i) understand scientific referencing requirements, (ii) find relevant scientific literature and (iii) prepare written summaries of scientific papers (Figure 2).

3.3. Comparing student self-efficacy at commencement and conclusion of SCI2010
Regardless of campus, students’ self-efficacy of their writing and writing-related abilities was mostly higher at completion of SCI2010 compared to commencement. An increase in confidence was observed for four competencies among L2 students, and for all six competencies among L1 students, with effect sizes ranging from small (0.1) to large (1.0) (Table 1). L2 students did not show a significant increase in self-efficacy regarding (i) their understanding of referencing requirements and (ii) their capacity to avoid plagiarism (Table 1). Further, the increase in L1 students’ self-efficacy was significantly higher than that of L2 students for five of the six competencies (Table 1).

3.4. Comparison of L1 and L2 students’ assignment grades
There was no significant difference between the cohorts in terms of overall mean grades for the AB assignment (Figure 3). Nonetheless, the mean grade of L1 students for the LR was significantly higher than that of L2 students (Figure 3). Thus, the higher increase in the self-efficacy of L1 compared to L2 students to write a scientific LR (Table 1) is reflected in the actual grades obtained for this task, even if this relationship is not evident for the AB assignment.

For both cohorts, there was no correlation between their level of confidence to prepare the AB and their grades for that assignment. While there was a weak but significant positive correlation between L1 students’ level of confidence to write a LR and their grades for the LR (r = 0.1, F = 6.87, p = 0.009), this was not observed for L2 students.
4. Discussion

The higher self-efficacy of L2 students at commencement of SCI2010 (compared to L1 students) for three of the competencies is unexpected, and does not support our initial hypothesis. This observation may result from three interacting variables, the first of which is the positive relationship between students’ perceptions of their ability and their degree of self-regulation (Pajares, 2003; Schunk & Zimmerman, 2006). This relationship has previously been reported by Volet, Renshaw, and Tietzel (1994) for south-east Asian learners. Self-regulation is an important determinant of student learning outcomes and achievement (Heikkilä & Lonka, 2006; Pajares, 2003), and L2 students may thus have felt better prepared after their first year of study to undertake the SCI2010 writing tasks. The second interacting variable is that L2 students may have undervalued or discounted required academic standards for the unit, and thus initially over-inflated their abilities. This is consistent with the findings of Kruger and Dunning (2009), who reported that students sometimes lack the capacity to distinguish accuracy from error, and that such deficits may lead to an inflated perception of their ability in specific intellectual domains. The third interacting variable is that many L2 students come from comparatively privileged situations, and their high level of self-efficacy may be due in part to a broader sense of entitlement and the confidence that often accompanies this (Vandrick, 2009).

The improvement in both L1 and L2 science students’ perceptions of almost all of their writing and writing-related abilities over the course of SCI2010 demonstrates this subject’s pedagogical effectiveness with respect to such competencies, across different demographic settings. In regard to the relatively small effect sizes obtained for L2 students’ perceptions of these competencies, as Coe (2002) points out, in relation to educational innovation, an effect size of 0.1 can be regarded as worthwhile, particularly when applied equally to all students, as was the case in our study. While we recognise the limitation of unequal sample sizes of our cohorts, these results are consistent with other those reported by researchers, including Soontiens (2004) and Wilkins and Balakrishnan (2012). Collectively, these outcomes reinforce the potential of core science subjects, such as that described herein, to improve students’ communication skills (Daly, Leveson, & Dixon, 2011), regardless of their English-speaking background.
The lack of significant improvement in L2 students’ perceptions of their ability to avoid plagiarism and understand scientific referencing requirements is consistent with what has been reported for such students (Shi, 2012). However, that L2 students started at a higher level of confidence than L1 students with respect to this attribute is noteworthy, and further study in this area is required in
order to better resolve these somewhat conflicting results. Plagiarism is a considerable and growing problem across the higher education sector, both in Australia (Devlin & Gray, 2007) and internationally (Park, 2003). A lack of confidence among L2 students in their English-writing abilities has been previously reported (Robertson, Line, Jones, & Thomas, 2000), and may be a contributing factor to the observed lack of an increase over the course of the semester in their self-perceived capacity to avoid plagiarism. If correct, this calls for greater scaffolding of skills development through provision of iterated writing assignments, workshops, targeted tutorials (e.g. Rolfe, 2011) and/or exemplars to enhance the writing, paraphrasing and citation skills of L2 students. It is not known whether students’ self-efficacy regarding their referencing and attribution skills correlates with their actual ability, as our study did not have this level of resolution, and this is therefore an area worthy of future research. In a related study, Flaspohler, Rux, and Flaspohler (2007) showed that collaboration between writing support staff and discipline academics, supplemented by formative feedback and online resources, enhanced student sourcing and use of references in preparing an annotated bibliography.

The apparent caution of L2 students, reflected in a significantly lower increase in their writing skills-related self-efficacy over the course of SCI2010 compared to L1 students, may be the product of various interacting factors. These include underlying differences between the two cohorts (Ramburuth & McCormick, 2001), differences in teaching methods or approaches (Dunn & Wallace, 2006) and differences in L1 and L2 learning styles (Ling, Arger, Filonenko, Chua, & Yin, 2005). This finding aligns with that of Soontiens (2004), who found that L1 students reported greater improvement in their writing skills than L2 students over the duration of an international management subject. These results reinforce the potential role played by the above-stated interacting factors (self-regulation, naivety of academic standards and socio-economic status) in explaining differences among students in their self-efficacy of writing and writing-related abilities. Such differences call for the integration of targeted writing programmes, more accurately tailored to the needs of L1 and L2 students. This would go some way to address the different learning needs of each cohort, and overcome the assumption that one particular teaching approach will suit all students, regardless of demographic location.

The relationship between the increased confidence of L1 students and their higher grades for the LR, but the lack of such a relationship for the AB, may relate to the timing of these respective writing tasks, together with the feedback provided on the AB. Submission of the AB early in semester precluded students from benchmarking their writing and writing-related abilities. However, by the time the LR was submitted, students had received considerable feedback on these abilities. Our findings with respect to the LR align with other literature reporting a positive relationship between student self-efficacy and academic achievement (Cassidy, 2007; Prat-Sala & Redford, 2012). The absence of a correlation for L2 students in our study is consistent with Ong (2015) for Singaporean students, although Badiozaman (2012) reported a strong positive relationship between Malaysian students’ self-efficacy and their writing ability. Thus, the relationship between self-efficacy and writing achievement is inconsistent, particularly for different ethnic groups, and may be affected by factors such as the degree to which students “like” a subject (Otunuku & Brown, 2007). These inconsistencies may result from the assignment assessment process, which included specific “writing-skills” criteria, such as the clarity of expression, grammar and punctuation, which were not components of the self-efficacy survey administered to L1 and L2 students. This is an area of potential further study, particularly in enhancing the connection between students’ self-efficacy of their writing skills and actual performance for particular writing tasks, as has been previously suggested (Pajares, 2003).

5. Conclusions
This study demonstrates that regardless of campus or nationality, Monash University science undergraduates reported a perceived improvement in their writing and writing-related abilities over the course of a core second-year subject. This validates the potential of appropriately structured and contextually aligned subjects to enhance science students’ writing-related skills. This study’s identification of inherent demographic differences among students regarding their writing and
writing-related abilities needs to be carefully considered in the context of transnational education. The greater increase in self-efficacy of L1 students compared to their L2 counterparts to write a scientific literature review, which is reflected in these students’ grades for this written assignment, suggests that greater university support be provided for L2 students in order for them to improve their writing-related proficiencies. To build further on these findings, we call for the development, implementation and evaluation of tailored, iterated writing programmes that will optimise writing skills development outcomes for all undergraduate science students, regardless of their English-speaking ability.

Acknowledgements
The authors would like to thank Dr Kirsti Abbott for provision of student survey data, and Dinah Crogg for the second-year self-assessment survey data. We would also like to thank all student participants who contributed to the survey.

Funding
The authors received no direct funding for this research.

Author details
Gerry Rayner1,2
E-mail: gerry.rayner@monash.edu
Theo Papakonstantinou1
E-mail: theo.papakonstantinou@monash.edu
Roslyn Gleadow2
E-mail: ros.gleadow@monash.edu
1 School of Biological Sciences, Monash University, Clayton, VIC 3800, Australia.
2 Office of Vice-Provost Learning and Teaching, Monash University, Caulfield, VIC 3145, Australia.

Citation information
Cite this article as: Comparing the self-efficacy and writing-related abilities of native and non-native English-speaking students, Gerry Rayner, Theo Papakonstantinou & Roslyn Gleadow, Cogent Education (2016), 3: 1179164.

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students avoid plagiarism. Research in Learning Technology, 21. doi:10.3402/rlt.v21i0.17218


