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"Degrees of deception" to degrees of proficiency: Embedding academic literacies into the disciplines

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Increased participation in higher education has resulted in concerns about falling standards and lowering levels of academic literacy. There is a growing body of research which suggests that embedding academic language and literacies into the disciplines is the most effective way for students to improve academic standards and meet the demands of tertiary study. Results from a previous longitudinal study, which spanned the duration of a decade (Maldoni & Lear, 2016) showed that embedding improves student learning both in the discipline and in the development of academic language and literacies. Building on prior research, this paper reports on the expansion of the Unit Support Program (USP) from first and second year units to also include a third year unit across two disciplines. The USP is founded on the Unit Specific Model, which promotes an embedded, integrated and team-taught approach to teaching and learning. Both discipline and academic language and literacy staff work in partnership to embed discipline-specific content and literacies into the units. This study sought to measure the impact of embedding on student engagement, retention, learning and ultimately student success. Quantitative data from attendance, progression rates, and final grades suggest that embedding developmental opportunities for learners within disciplinary contexts has considerable benefits, especially for students identified as 'at risk' of failure by a diagnostic academic writing test. The results from this study demonstrate a model of best practice and will benefit those intending to adopt a collaborative and inter-disciplinary approach, like the USP, to embed academic language and literacies into the disciplines.

Key Words: Unit Support Program (USP), Unit Specific Model, academic literacies, embedding, integrated, team teaching.

1. Introduction

Higher education has shifted from an elite system to mass higher education with an increasing emphasis on quality, performance and accountability. The rapid expansion in participation has changed the nature of higher education which now comprises a more diverse and varied student body (Arkoudis, Harris & Kelly, 2018; Probert, 2015). Increased rates of access and participation also impact on how institutions operate and compete for resources as well as their ability to attract and retain their student population. As universities continue to enrol students with greater diversity in their profile and capacity, academic quality and performance, in terms of academic literacy, may be compromised. In practical terms, this suggests the student cohort may lack the requisite skills assumed to be necessary to succeed in the tertiary environment. It is not surprising, then,

that the current debate about the quality of university education has resulted in the perception that academic standards are falling (Arkoudis & Kelly, 2016; Barthel, 2015; Palmer, Levett-Jones, Smith, & McMillan, 2014; Fenton-Smith, Humphreys, & Walkinshaw, 2018; Foster, 2012; Probert, 2015; Ransom, 2009; Kennelly & Tucker, 2012). In point of fact, students' levels of English language proficiency and academic literacy have received considerable attention in the media. The Four Corners report, 'Degrees of Deception,' highlighted increasing cases of plagiarism, claims of soft marking and falling standards (Foster, 2015; ICAC, 2015). More recently, incidents such as contract cheating (Bretag et al., 2018) have brought to the fore the low English language competence of international students. Accordingly, there has been a call for key higher education reform that meets the current challenges brought about by changes in the student demographic.

Academic literacy has been defined here as "the ability of students to use the English language to make and communicate meaning …" (DEEWR, 2009, p. 1), particularly in the context of an academic discourse community (Wingate, 2015). However, Lea and Street (1998) advocate a pluralistic notion of 'literacies' which encapsulates more than just language; they are viewed as divergent communicative practices, which vary according to the particular discipline. The academic literacies model, then, views student learning as a more multifaceted pursuit, which involves "both epistemological issues and social processes" (Lea & Street, 2006, p. 228). Also called the 'new literacies' (Lankshear & Noble, 2003), this model acknowledges differences which exist not only in the requirements of each discipline, but also those dictated by the institution, such as notions about what constitutes plagiarism (Lea & Street, 2006), To meet the demands of academic study, students are required to apply a wide array of literacies appropriate to each field of study and "switch practices between one setting and another" (Lea & Street, 1998, p. 159). This presents a significant challenge for students, especially when disciplines are characterised by specialised vocabulary, concepts and knowledge, along with different genres, rhetorical structures and approaches to argumentation (Murray & Nallaya, 2014). Palmer et al., (2014) offer an alternative model which categorises 'academic literacies' into three diverse areas: language and grammatical competence, the enculturation of students into specific discourses, and a critical reflection of the institutional practices within academia. This multidimensional understanding of literacies provides students with opportunities to establish both competence in language and literacy development, and a wider understanding of university practices. The theoretical framework for this study was based on the academic literacies model as described above and supports the development of students' academic language and literacies within the context of a discipline.

Although the academic literacies debate has largely focused on the needs of international students (Bretag, 2007), from 2009, changes in government policy relating to widening participation have called for the adoption of an institution-wide approach to language and literacy development (DEEWR, 2009; Dunworth, Drury, Kralik, & Moore, 2014; TEQSA, 2011, 2015) to meet the needs of the diverse student body. In 2017, Universities Australia recognised the need to support "the development of English language proficiency and academic literacies throughout a degree within disciplinary learning" (p. 3) rather than by means of front-end mechanisms. In addition, they recognised that differentiated support might include more strategic alignment of academic language and literacies development within an embedded curriculum approach, which is increasingly supported in the literature (Arkoudis et al., 2018; Arkoudis & Kelly, 2016; Arkoudis, 2014; Baik & Greig, 2009; Barrie & Jones, 1999; Bonanno & Jones, 1996; Briguglio & Watson, 2014; Crosling & Wilson, 2005; Devereux, Wilson, Kiley & Gunawardena, 2018; Harris & Ashton, 2011; Johns, 1997; Kennelly, Maldoni, & Davies, 2010; Maldoni, Kennelly, & Davies, 2009; Mitchell, 2010; Skillen, Merten, Trivett, & Percy, 1998; Skillen, James, Percy, Tootell, & Irvine, 2003; Wingate, 2006, 2015). According to Dunworth (2013), although some of the studies on embedding have been based on small scale research, they have nonetheless documented its multiple benefits for students (Cochrane, 2006; Hattie, Biggs, & Purdie, 1996; Tinto & Purser, 2006). The many gains documented in the literature include higher pass marks and greater retention (Arkoudis, 2014; Hammill, 2007; Huerta & McMillan, 2004). Bordonaro (2008), for example,

found that students achieved higher pass marks when the processes of information literacy and writing were taught simultaneously and embedded into the discipline. Indeed, recent research has shown positive outcomes for students in terms of student learning as measured by academic results (Mort & Drury, 2012) and higher grades among students (Baik & Greig, 2009; Kennelly et al., 2010; Maldoni & Lear, 2016; Thies, 2012). Using a mixed methods approach, Baik and Greig (2009) demonstrated that students enrolled in a content-based ESL program not only generated higher pass rates than non-attendees, but were also more likely to achieve superior grades and increases in retention rates one year after the intervention program. Similarly, Hamilton (2016) highlighted the benefits to student learning in a study which used discipline-specific writing models in a collaborative framework between the discipline and literacy expert.

2. Models of embedding

While research on embedding practices has expanded across the university sector, these have not all been based on the same theoretical framework, nor on equivalent methodological approaches. Jones, Bonnano, and Scouller (2001) represented three levels of collaboration on a continuum of learning: *adjunct, integrated and embedded*. *Adjunct* programs provide literacy development outside the unit; *integrated* programs involve academic language and literacy (ALL) staff engaged in the presentation of workshops in the discipline; and in *embedded* programs, both literacy and discipline staff work collaboratively on curriculum practices. The terms *integrated* and *embedded* are used synonymously in the literature; however, like Jones et al., (2001), this paper distinguishes the distinct roles of literacy staff within these two levels of collaboration. Essentially, integrated models engage literacy staff in the *teaching* of the unit while embedded models add the crucial element of literacy staff working with academics on curriculum and redesign of assessment practices. Harris and Ashton (2011) expand this continuum further by merging the two levels to create the *embedded and integrated* model, which emphasises a 'team approach' to the development of language and literacies (see Maldoni & Lear (2016) and Maldoni (2017) for more detail).

Building on Harris and Ashton's (2011) model, the current study adopts the *embedded and integrated* aspects of the continuum, and adds a further element which features 'team teaching' as described by Dudley-Evans (2001) to create the *Unit Specific Model*. Developed by Kennelly, Maldoni, and Davies (2010), the Unit Specific Model aims to embed academic language and literacies within the discipline. Unlike other models, the Unit Specific Model, which gave rise to the 'Unit Support Program' (USP), positions 'team teaching' as a core component in the program, is systematically incorporated into the teaching and learning activities of the unit, and is sustained throughout the teaching period. The *Unit Specific Model* is therefore an *embedded, integrated and team-taught model* that champions a collaborative and inter-disciplinary approach to teaching and learning and represents a model of best practice distinct from much of the embedding work discussed in the literature.

3. The Unit Specific Model

The Unit Specific Model combines discipline-specific content and academic literacies development together to form the Unit Support Program, which is an inter-disciplinary team-taught initiative (see Figure 1). Academic literacy staff work collaboratively with academics, participate in the teaching of the unit as part of a regular weekly timetabled class, and meet on a regular basis outside class to prepare and reflect on their own teaching and learning practices (Maldoni & Lear, 2016). The implementation of a team-teaching pedagogy sought to exploit the expertise of staff in contrasting disciplines in order to enhance the teaching and learning process.

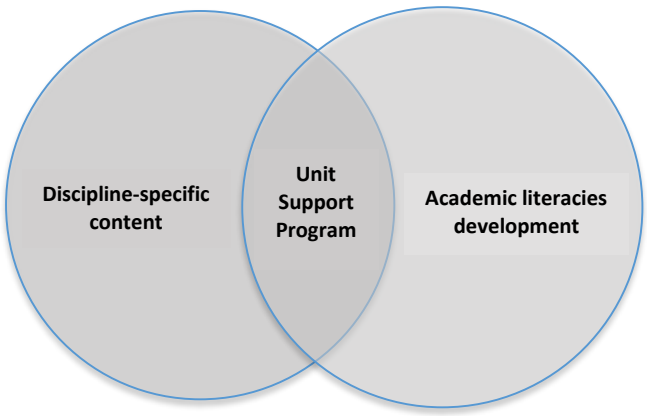

Figure 1. The (modified) Unit Specific Model (Kennelly, Maldoni, & Davies, 2010).

A project of embedding academic literacies in the discipline has been in effect at the University of Canberra over the last decade. Using the Unit Specific Model as the theoretical framework, the Unit Support Program (USP) was introduced in 2006 in 'Introduction to Management', a first year prerequisite unit for a number of degrees in the Faculty of Business, Government and Law (BGL). Initially, the USP aimed to enhance the learning experiences of English as an Additional Language and Dialect (EALD) and other students demonstrating insufficient academic language and literacies for success in first year university study. In addition to the project reported in this paper, the program has been run a further seventeen times with almost 4000 students taking part. Drawing on both qualitative and quantitative data, it has been successful in improving student learning with participation rates increasing by more than five times since the first USP in 2006 and results from the project demonstrating improved retention, significant increases in pass rates, and above average grades by the USP cohort compared to the unit as a whole (Kennelly et al., 2010; Maldoni et al., 2009; Maldoni & Lear, 2016). These longitudinal studies have important implications for the development of academic literacies in first year core units, which can be most effective in laying the foundation for later years.

Many studies acknowledge the benefits of embedding academic literacies in first year units (see for example, Gunn, Hearne & Sibthorpe, 2011; McWilliams & Allan, 2014; Murray & Nallaya, 2014). In an effort to target the later years, Percy, Moore & Mitchell (2001) mapped the tertiary literacy skills of an undergraduate bachelor's degree across the years. Other studies have focused on embedding practices in postgraduate programmes, particularly in courses with high international student enrolments (Davies & Maldoni, 2004; Evans, Tindale, Cable, & Mead, 2009; Harris & Ashton, 2011). However, there appears to be a gap in the literature surrounding embedded practices which focus on the later years in university, particularly with evidence of improved student learning outcomes. Arkoudis and Kelly (2016) use the term "front-loading" for the integration of the development of academic literacies in core first year subjects, which they affirm, is quite common. However, "while these programs can show that students develop their oral and written skills by the end of a semester, there are very few programs that extend into second and third year" (p. 5). With this in mind, the author sought to explore whether the results from previous embedding projects using the Unit Specific Model could be replicated with students in first year using a larger cohort base, and extended into second and third years. Accordingly, the process of embedding academic language and literacies into multiple units in the same faculty across two different disciplines and over discrete years of study sought to determine the impact of the project on student engagement, retention, success, performance and learning in the discipline.

4. Methodology

4.1 Methodological framework

Building on the work of Kennelly, Maldoni, and Davies (2010), and Maldoni and Lear (2016), this study used the Unit Specific Model to embed academic language and literacies within three units in the Faculty of Business, Government and Law (BGL) at the University of Canberra (UC) over one semester in 2014: Introduction to Management (ITM), a first year unit with 525 students; Organisational Behaviour (OB), a second year unit with 220 students; and Contemporary Issues in Accounting (CIA), a third year unit with 160 students[1]. Although earlier attempts at embedding in a second year undergraduate unit (see Maldoni & Lear, 2016) and a postgraduate preparation program (see Davies & Maldoni, 2004) had both yielded positive results, research into the later years had not been previously undertaken in any systematic manner. This paper differentiates from prior research given that the study reports on a larger cohort base in first year and extends into second and third year units. Accordingly, using largely quantitative data by means of student attendance, retention, progression and academic results, this study examines the expansion of the Unit Support Program (USP) and investigates whether the program benefited student learning and indeed performance for all students in first year and beyond.

4.2 Data collection and analyses

Mixed methods research involves the collection of both quantitative and qualitative data "to provide a more comprehensive analysis of the research problem" (Creswell, 2014, p. 210). This mixed method study used a convergent (or parallel or concurrent) design in which quantitative and qualitative data were collected in parallel, analysed separately and then merged. Importantly, the study emphasised a QUANT-qual analysis (Ivankova, Creswell & Stick 2006), with priority given to the quantitative data and analysis. While qualitative data (in the form of student questionnaires) was not the focus of this paper, it was instrumental in providing further insights into the findings (Creswell & Clark, 2011), particularly the attitudes of participants regarding the potential for the USP to influence academic performance and success. The triangulation of data sources which drew on students' perceptions of the program in this way provided support for the interpretation of the evidence for the effectiveness of embedding academic language and literacies into the three disciplines through the quantitative results presented (Evans & Cable, 2011).

Participants assigned themselves to a group (either USP or non-USP) through self-selection. The quantitative data was collected by the following means, and results were compared for both groups and 'at risk'[2] students with the cut-off for statistical significance set at 5% for all statistical tests:

(a) *Student attendance*: USP workshop attendance was regularly monitored by each USP convener with a particular focus on how successful the USP was in attracting and retaining students, especially those considered to be 'at risk'. Additionally, data from student attendance was correlated with the final results to determine the types of students attracted to the USP, including the different levels of ability of the students who participated in the program.
(b) *Retention data*: Although retention is normally defined as the proportion of students who complete their degrees (Olsen, 2008), in this paper, retention is defined as those "who completed the unit in the same semester", often referred to as 'subject completion' or 'completion rate' in the literature (Atchley, Wingenbach, & Akers, 2013). A sample of retention data obtained over two years from 2013 to 2014 across the three units provided the opportunity to

[1] These figures are for student numbers at the beginning of the semester.

[2] See section 5.2 for the criterion by which students were determined to be 'at risk'. See also Section 7.2 where students' results are used to assess the validity of the criterion.

establish whether the USP might have had an impact on "retention" in a first-year course with a high attrition rate, when the USP was offered as compared to the semester when it was not.

(c) *Pass-fail rates*: Pass-fail rates of all students who completed the course were initially used to assess student success in the unit in the USP and non-USP groups. A second analysis was conducted to assess students' engagement with the unit in the two groups.

(d) *Final student results*: An analysis of the distribution of final results for both groups aimed to determine whether the USP only tended to attract students from a limited portion of the spectrum of academic abilities.

The main threat to establishing causal relationships in any quasi-experimental design, such as was used for this study, is the possible inequivalencies of the comparison groups on variables other than the intervention (Fraenkel, Wallen, & Hyun, 2012) that might influence students' results. For this study, in addition to attendance or non-attendance at USP sessions, each group might also have differed on average in terms of initial language proficiencies, level of commitment and interest in the course, or the number of hours spent in paid employment. Consequently, to strengthen confidence in the possible causal relationships suggested by a quasi-experimental design, it was necessary to try to match, or control for statistically significant differences in the comparison groups on as many salient factors as possible (Creswell, 2014). In this case, the results of an initial diagnostic test were used as a proxy to control for the possible influences of variability in initial academic competence. (The diagnostic test itself is described in Section 5.2 and Appendix A, while the percentages of students in each unit determined to be 'at risk' by the test are given in Section 6.1. The use of the test as a proxy is discussed in Section 7). In addition, possible variations in levels of commitment to the course were *partially* controlled for by only including in the relevant analyses, students who had actually completed all forms of assessment.

5. The Unit Support Program

5.1. The workshops

The USP was facilitated by two teachers: a discipline academic and an academic language and literacy specialist, both working closely with faculty staff, which in all comprised four unit convenors and/or lecturers, ten tutors, four academic language and literacy staff, and several administrators. Due to the increased number of staff involved in the project and its expansion in units beyond first year, staff training was organised prior to the commencement of the semester to ensure a uniform approach. The training highlighted the importance of the two disciplines (content and literacy) represented in both the preparation and teaching of the USP, and the experience further enabled cross-disciplinary engagement of staff so that learning was mutually beneficial (see Maldoni (2017) for more detail about the training process). Using the *Unit Specific Model* as the framework, the USP workshops were team-taught by the content and academic language and learning specialists. Consistent with the literature, the author was guided by the premise that academic language and literacies are best developed in a discipline-specific framework and in close collaboration with disciplinary colleagues (Briguglio, 2014). Cross-disciplinary collaboration was wide-ranging with regular team meetings used to map academic literacies to assessment tasks, explore the processes by which the literacies could be taught, and consider how students might develop the required competencies to achieve the learning outcomes of each unit.

One-hour workshops were held on a weekly basis immediately after the lecture for each unit. The timing was intended to maximise participation in the program over the 13-week semester. While the USP was in addition to the formal program of study, all students wishing to improve their success were encouraged to attend and participate in the workshops. 'At risk' students (i.e. those considered to be at increased risk of failing the unit by virtue of poor performance on the diagnostic test described in Section 5.2) were also identified as potential students who would benefit from the program. Students were informed of the program in the initial lecture and the workshops were further promoted on a weekly basis in lectures, tutorials, and via the UC's LearnOnline

student management system (Moodle) in conjunction with regular emails by each USP team. Within the workshops, the collaborative relationship between staff provided a medium for the development of academic language and literacies, and improved theoretical and applied understanding in the disciplines. With a view to integrating the two disciplines further, unit convenors and tutors were invited to regularly attend and become active participants of the USP workshops when the focus was on preparation for major assessments in each unit (For a more detailed discussion of the workshops, see Maldoni (2017)).

5.2. Identification of students 'at risk'

The USP project sought to identify and support students 'at risk' of failing within each discipline to succeed. Given the diversity in the current student body, 'at risk' students can fall into either the international or domestic group, and often, neither group takes advantage of the support services available across Australian universities (Kennelly & Tucker, 2012). To help address this issue, a diagnostic writing task was administered in the first lecture to all students. The task was assessed using a criterion-based rubric (see Appendix A), which measured range and accuracy of vocabulary, sentence structure, organisation and content. For the purpose of the USP project, students deemed 'at risk' were those who tended to score below 5 (out of 10) in the writing diagnostic in at least three of the four criteria. As the task assumed little or no knowledge of the discipline, the final criterion was considered less important in identifying the 'at risk' group. Students with a particularly limited range of vocabulary and control of word formation, frequent grammatical errors, incorrect sentence structure and lack of coherence were likely to score below 5 due to low levels of competence in what Murray (2011) identifies as language proficiency, limited conversancy in academic discourse, and intercultural competence. As a result, students with low scores in these areas served to determine the 'at risk' students (Barthel, 2009; Harris, 2013; Read, 2015), and this group was particularly encouraged to attend USP sessions via direct email and verbal suggestions by tutors and USP staff. The same diagnostic task was administered again in the final week of the semester to compare the development of academic language and literacies in the attending and non-attending USP cohorts to their skills at the beginning of the semester. Students were also considered 'at risk' and identified through other determiners by means of referrals and recommendations by tutors based on low tutorial attendance or poor performance in one or more assessment tasks during the semester.

6. Primary results

Quantitative and qualitative data were collected to evaluate the success of the embedded USP within the disciplines. Quantitative data, which included attendance, retention, pass-fail rates, and student final grades, were triangulated with qualitative data in the form of student evaluations to provide support for the interpretation of the quantitative results in relation to the impact of the program in key areas (see Maldoni (2017) for more detail).

6.1. The initial language diagnostic revealed relatively high proportions of potentially 'at risk' students in each cohort

As detailed in Section 5.2, the percentage of students deemed to be 'at risk' was determined by performance on a diagnostic writing task held in the first lecture of each unit. As shown in Table 1, fewer than half of each cohort attended the first lecture, the outcome of which limited subsequent analyses. While it is uncertain how representative the levels of risk identified in the students attending the first lecture were of the entire cohort, Table 1, nevertheless, shows that for those who completed the diagnostic task, an average of 38% of students were considered 'at risk' of failing the unit, which represents a rather sizeable proportion of students.

Table 1. The number of students identified as being 'at risk' from diagnostic testing.

Unit	Total enrolment[a]	Total students who completed diagnostic test	Students identified as being 'at risk'[b]
ITM (1st yr)	525	225 (42.9%)	66 (29.3%)
OB (2nd yr)	220	40 (18.2%)	13 (32.5%)
CIA (3rd yr)	160	55 (34.4%)	28 (50.9%)

[a] Total commencing enrolment. Some students in each cohort withdrew from the course prior to the end of the semester.

[b] At risk percentage is the percentage of the students who completed the diagnostic test and were diagnosed to be 'at risk'.

6.2. USP attendance

One important measure of the success of the USP program is how successful it was in attracting students, especially the target group identified as being 'at risk'. Table 2 shows that while only around 15–28% of the total cohort in each unit regularly attended USP workshops, some 38–82% of the students deemed to be 'at risk' were regular attendees. In particular, the ITM and CIA attendance figures suggest the USP attracted reasonable proportions of the diagnosed 'at risk' students, and in fact students with the full spectrum of academic abilities: see Figures 2–4. Given that students considered 'at risk' do not often take advantage of the support services available within universities (Dunworth, 2013; Harris, 2013; Kennelly & Tucker, 2012; Ransom, 2009), these participation rates are quite encouraging in view of the efforts of the cross-disciplinary staff in actively identifying, monitoring and encouraging participation by the at risk group and others wishing to improve their performance in the units. When comparisons are made with the total unit enrolment, the data also reveals that on average, students attended eleven from the twelve workshops available during the semester, representing a sizeable proportion of participation per workshop. Such consistent attendance provides support for the view that the attending students highly valued the workshops since our general experience is that attendance at adjunct workshops tends to drop off considerably after the first few weeks of semester. Notably, attendance peaked for all units when the first assessment was due, and grew steadily again until the end of the semester when the final assessments and unit examinations were imminent. This reflected the 'just in time' assistance and opportunity students took advantage of when assessment deadlines were due.

Table 2. USP attendance (*N* and *n* refer to numbers of students).

	Regular Attendees			Average number attending USP workshops	Total number of workshop attendances[f]	Average number of workshops attended per student[g]
Unit	'At risk' students *n* (%)[a]	'Other students'[b] *n* (%)[c]	Total *N* (% of total cohort[e])			
ITM	28 (42.4%)	61 (38.4%)	89 (17.0%)	26	308	11.8
OB	5 (38%)	29 (107.4%)[d]	34 (15.5%)	9	92	10.2
CIA	23 (82%)	22 (81.5%)	45 (28.1%)	20	220	11.0

[a] Percentage of students identified as 'at risk' by the diagnostic test.

[b] 'Other students' are students not identified as 'at risk' by the diagnostic test, but could also include 'at risk' students who did not take the diagnostic test.

[c] Percentage of students not identified as being at risk by the diagnostic test. It is assumed here that only students who took the diagnostic test attended the USP, which is evidently not the case, so this percentage is an estimate only.

[d] This result shows that students who did not take the diagnostic test also attended the USP, and so reveals that the percentages in this column do not have an unambiguous interpretation.

[e] Including both the 'at risk' and 'other' students.

[f] Includes students who attended more than once.

[g] The maximum possible was 12.

6.3. Possible impacts of the USP on unit retention rates

In addition to increases in participation rates, a sample of retention data was obtained over two years from 2013 to 2014 comparing student retention rates over two semesters. Since the USP was run in semester 2, 2013 but not semester 1, 2014, this provided the opportunity to explore whether the USP might have had an impact on "unit retention", defined here as the percentage of students initially enrolled in each unit who then completed the unit in the same semester. Table 3 shows that for the first year ITM unit, there was a very large and statistically significantly higher proportion of students retained when the USP was offered compared to when it was not. Since there were no major changes to the unit from 2013 to 2014 to otherwise explain this result, this suggests that the USP may have had a major positive impact on retention for this first year unit.

To explore this notion further, student responses from the mid-semester evaluations specifically sought to ascertain the likelihood of continued attendance in the remaining weeks. From the 65 mid-semester evaluations collected across the three units, all students affirmed their intention to continue participation in the remaining USP sessions indicating that the disengagement rate appeared to be lower in the USP cohort. In fact, several students indicated they would have either 'dropped out' or failed without the support of the workshops. Therefore, USP attendance suggests that students are more likely to persist with the unit and remain engaged, thereby increasing the likelihood of completion or retention in the unit. Further research, however, should investigate whether these results can be replicated, perhaps with other first-year units.

Table 3. Unit retention rates 2013–2014.

Unit	USP Sem. 2, 2013	No USP Sem. 1, 2014	*p*
ITM % retained (cohort size)	87.0 (560)	66.2 (195)	0.000[a]
OB % retained (cohort size)	90.8 (218)	86.3 (241)	0.066[a]
CIA % retained (cohort size)	86.1 (144)	91.6 (95)	0.20[b]

[a] Test of the hypothesis that the USP led to a higher retention rate using a one-tailed *z*-test for proportions.

[b] Because the observed difference was in the opposite direction to the hypothesised one, a two-tailed *z*-test for proportions for the inequality of the retention rates was performed for this case.

For the second year OB unit, while there was a slightly higher retention in the year the USP was run compared to when it was not, this difference did not quite achieve significance at the $\alpha = 0.05$ level (see Table 3), although one could argue that it approached significance. Since retention was quite high even when the USP was not run, this indicates that there was little scope for the program to have had an impact, possibly since by second year, students might be more committed to their studies. These comments also apply to the third-year CIA unit where the retention percentages were not statistically significantly different[3].

6.4. Pass-fail rates

Aside from the attendance and retention figures, an analysis of the pass-fail rates for each unit was also considered. As shown in Table 4, when pass rates were compared between the USP attending and non-attending cohorts, the data shows that the pass rate for the USP cohort was comparably higher than the non-attending cohort in all units. Both for the first (ITM) and third year (CIA) units, there was a statistically significantly higher pass rate for USP attending than for

[3] In addition, the relative retention percentages for the CIA cohort may have been impacted by a major restructure in the semester when USP was offered for the first time, which incorporated different teaching staff, new content and assessment tasks, including higher order skills corresponding with graduate level attributes required at 3rd year level.

the non-attending students, with the likelihood of passing and succeeding in ITM and CIA, 14 and 17 percent above the average cohort.

Table 4. Pass rates across the disciplines. (*N* = size of total course cohort, while *n* = number of students in a sub-group.)

Unit	USP		Non-USP		
	n	Pass rate (%)	*n*	Pass rate (%)	*p*[a]
ITM (*N* = 487)	89	91.0	398	77.1	0.003
OB (*N* = 221)	34	100*	187	91.9	–[b]
CIA (*N* = 129)	45	80	84	63.1	0.048

[a] Test of the hypothesis that there was a higher pass rate for USP attendees using a one-tailed *z*-test for proportions.

[b] The *z*-test for proportions was not applied for this case because the pass rate for the USP group had hit the 'ceiling' of 100%. The very high pass rate for the non-USP group for this cohort suggests that there is very little scope for the USP to have an impact on pass-fail rates for this cohort, though it could have an impact on average marks.

* Two students who technically failed OB were excluded from this figure because both students did not submit all assessments, with scores of '0' and '14' respectively.

Although statistically significantly different pass rates were found for ITM and CIA, the differences might not be unambiguously attributed to the impact of the USP, as students who regularly attended and those who did not might differ, on average, in important ways other than attendance at the USP (e.g. level of engagement, determination to succeed, amount of time devoted to studies). To explore, to some extent, the possible impact lack of engagement might have had on these results, an additional analysis was conducted which excluded students who scored '0' or who effectively 'dropped out'. The results of this analysis, shown in Table 6 in Appendix B, were largely consistent with the results presented above.

Further support for the belief that the USP had a positive impact on student success was provided in two ways. First, an analysis of responses to perceptions about the role of the USP in achieving success revealed from the 103 end of semester evaluations collected across the three units by the USP cohorts, that 97 percent of students believed their participation in the USP had a positive effect on their ability to remain engaged and in turn pass the unit (see Maldoni (2017) for more detailed information). In addition, the regression analyses controlling for differences in initial diagnostic test results presented in Section 7.1 suggest that the weakest students initially were much more likely to pass assessment tasks if they attended the USP.

6.5. A comparison of final results for USP attenders and non-attenders

Since students were not randomly allocated to attend or not attend USP sessions, it is not possible to determine without further information what quantitative impact the USP might have had on students' academic performance from their final marks alone (see however, Section 7.1). Nevertheless, the results shown in Figures 2–4 and Table 5 below allow for several worthwhile observations.

First, given that as noted above weak students are often low attenders at support sessions, it is heartening to see from Figures 2–4 that the USP appeared to attract students with a broad spectrum

of academic abilities[4] in similar proportions to those in the non-attending group (though it should be noted that the distribution of results for the USP students is expected to be higher than it would have been for these students in the absence of the USP). This is an important result because weak students often avoid such sessions due to concerns that they are "remedial" and hence only aimed at the weakest students and thus by attending they will be singled out from their peers as needing help (Kennelly & Tucker, 2012). In contradiction to the fears that these sessions are only for the weakest students, the USP attracted several higher performing students achieving Distinction grades (i.e. 75% and above), particularly in ITM and OB with 6.7 and 15 percent of students in the USP group scoring between 80 and 89 respectively as compared to 1.8 and 6.4 percent in the non-USP group. Interestingly, only 2% of attendees achieved Distinction grades in CIA, which is most likely indicative of the complexity of the third-year unit. That the USP attracted a significant number of high achievers or those motivated to improve their results, and that these students found the USP valuable enough to attend most of the 12 sessions (see Table 2), is an important result because being able to reveal to a new cohort that students of all abilities attend these sessions and find them useful may assist in overcoming the reluctance of weak students to attend (For a more detailed analysis of the effect of the USP on student performance, see section 7).

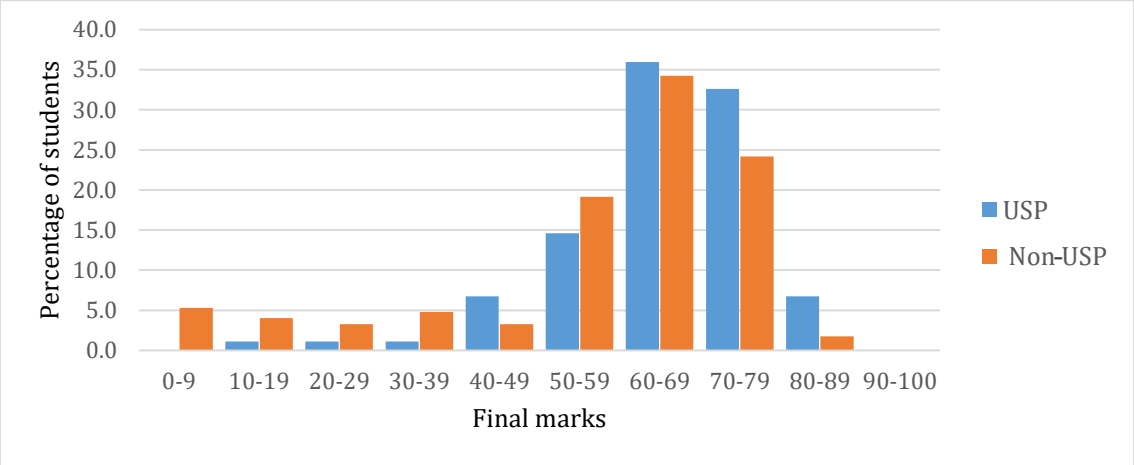

Figure 2. Distribution of final marks for ITM for USP (*n* = 89) and Non-USP cohorts (*n* = 398).

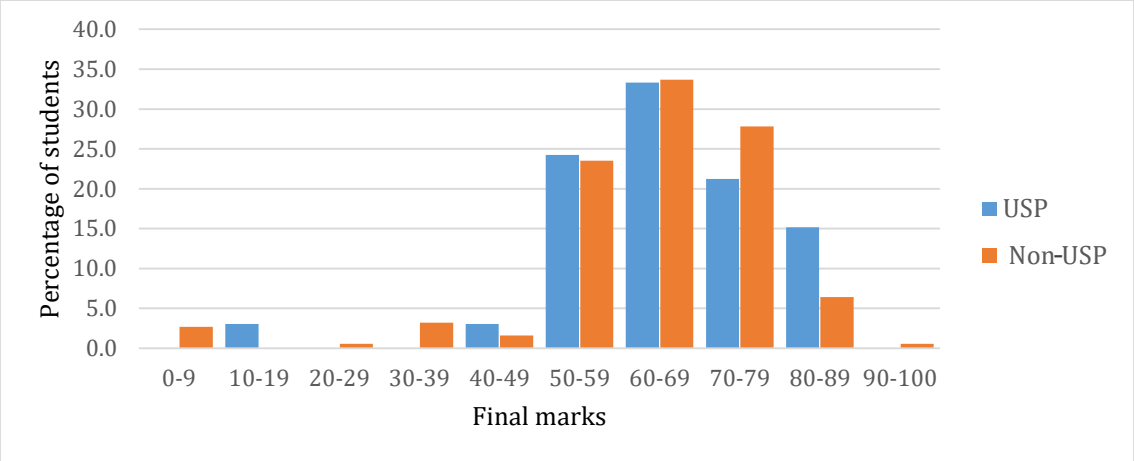

Figure 3. Distribution of final marks for OB for USP (*n* = 34) and Non-USP cohorts (*n* = 187).

[4] At face value, it would appear, however, that the very weakest students (i.e. those scoring below 40%) did not attend the USP in the same relative proportions as they occurred in the units. However, the results in Section 7 suggest the USP had a significant positive effect on the marks of these very weakest students, which might indicate that it is possible that at least some of these very weakest students did attend, and their results were consequently boosted into higher bins in the chart.

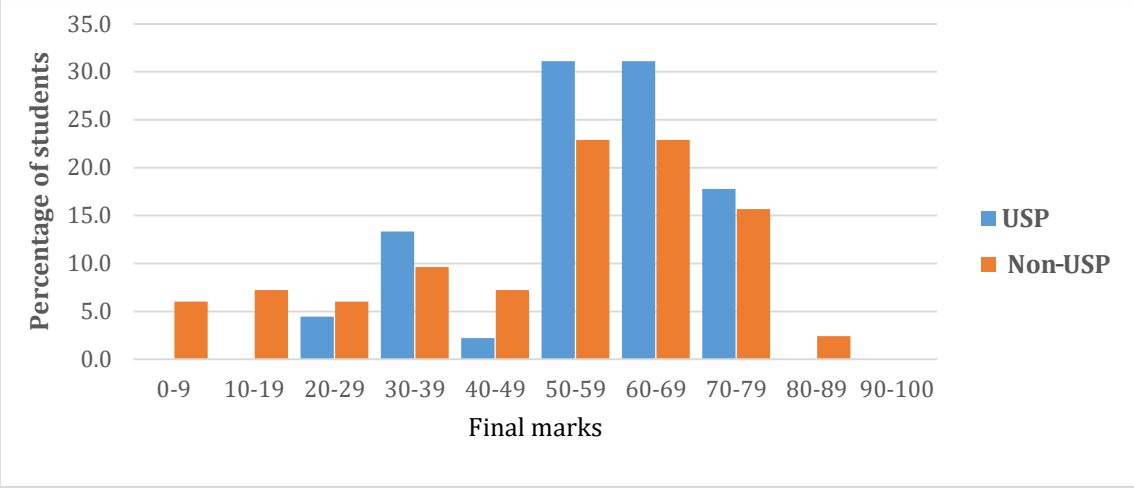

Figure 4. Distribution of final marks for CIA for USP (*n* = 45) and Non-USP cohorts (*n* = 84).

Table 5. Average final mark comparison for students who regularly attended USP sessions and those who did not (*M* = mean, *SD* = standard deviation.). These marks only include those students who completed all assessments tasks in each of the units.

	USP attendees		Non-USP attendees	
Unit	*n*	*M* (*SD*)	*n*	*M* (*SD*)
ITM (*N* = 403)	80	68.4 (8.84)	323	64.9 (10.43)
OB (*N* = 203)	30	69.08 (10.56)	173	66.82 (10.01)
CIA (*N* = 104)	40	59.8 (10.17)	65	60.17 (12.21)

A second observation from Figures 2–4 is that despite attending USP sessions, some students still did not pass. However, further investigation revealed that of the USP attendees who failed (10 percent in ITM; 6 percent in OB; 19.9 percent in CIA), many attended less than 20 percent of the workshops, reflecting a lack of engagement with the USP and hence the unit itself. For the remaining students who *did* regularly attend USP sessions and yet still failed, these tended to be in the at-risk category. Consequently, it may be that while it appears the USP was able to assist a large number of students to achieve success, a handful of the weakest students may have required more assistance than the USP could offer, especially for those who may have gained entry to the university through indirect means.

7. Secondary results

To at least partially control for other variables which could account for improved performance in the USP cohort, the aim was to compare changes in pre-and post-diagnostic test marks for USP attenders and non-attenders. If substantial improvement were found in the USP group but not in the non-USP group, then it could be concluded that these changes might be due to the intervention (Fraenkel et al., 2012). However, due to unforeseen circumstances which occurred during the research phase, an examination of pre-and post-tests was not possible for the *entire* cohort across the three units. This is due to the fact that not all students attempted the pre-test, and those who completed the post-test were often not the same students who completed the first test, thus precluding the use of these tests for all students. However, pre-test results for 54 ITM students who completed all assessment items and were deemed to be ‘at risk’ by tutors were available for analysis, and given that one of the aims of the study was to measure the impact of the USP particularly

for 'at risk' students, a range of statistical tests are applied in this section on this group of students to explore the possible impacts of the USP on students' results.

7.1. Results controlling for possible differences in initial diagnostic performance

One of the possible confounds for comparisons between the results of USP attenders and non-attenders is that the two groups may have differed in terms of academic ability to start with and that any final difference may reflect this initial difference. The pre-diagnostic test, however, *could* provide a way of controlling for this possible confound if it could be shown to be a proxy measure of academic ability. For the pre-diagnostic test result to be a good proxy measure of academic ability, *in the absence of the USP* there needs to be a good correlation between pre-diagnostic test results and course assessment results.[5] This was in fact found to be the case, at least to a moderate extent. For the 'at risk' ITM students mentioned above, Figures 5–7 show that the Pearson correlations between the pre-diagnostic test and total mark, essay mark, and exam mark for the non-USP students were 0.72, 0.58, and 0.66 respectively.[6]

Having established that the pre-diagnostic test is a reasonable proxy measure of academic ability, the next question to address is how similar the USP and non-USP students were initially, as regression techniques can only reliably control for group differences if the groups are sufficiently similar at the start (Thompson, 2006). Figure 9(a) and Table 7 in Appendix B.2 show that the two groups of students were reasonably alike at the beginning in terms of the distribution of pre-diagnostic test scores, and if anything, the non-USP group was slightly stronger on the skills to begin with.

Based on the above conclusion, regression analyses were then conducted to compare the USP and non-USP students' performances in ITM in total (Figure 5), on the essay (Figure 6), and on the exam (Figure 7), controlling for variations in scores on the initial pre-diagnostic test. (Regressions on the essay and exam results were conducted separately as although the USP aimed to improve student performance on both the essay and the exam, the impacts on each may have differed.) All three figures suggest that the USP may have had a worthwhile impact on the results of the students with the lowest initial diagnostic scores (i.e. less than around 18), though there is little evidence for an impact at higher scores. More data will, however, be needed to confirm these findings. Note, however, that while this analysis controls for possible differences in the initial academic language and literacies level of the two groups of students, it still does not control for other possible influencing variables such as level of motivation and engagement with the course. Nevertheless, the fact that, as mentioned above, qualitative feedback from 103 student questionnaires across all three units indicated that 99% of respondents agreed the USP had offered invaluable assistance to improve their grades, suggests that to some extent these conclusions are likely to be valid.

[5] If the USP particularly helps increase the marks of the weakest students, then the correlation between pre-test results and course assessment items of USP attenders could be quite weak.

[6] The correlation may have been weakest for the essay result as students could seek help with their essay from various sources including UC Study Skills and online help from 'Studiosity' (https://www.studiosity.com).

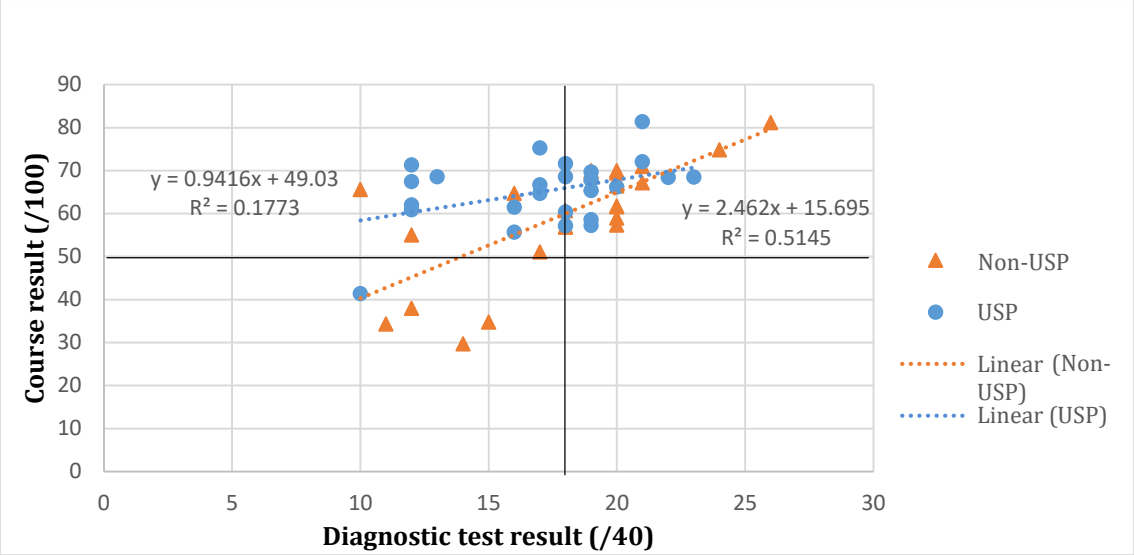

Figure 5. Comparison of pre-diagnostic test and overall course results for USP and non-USP students enrolled in ITM (n = 54).

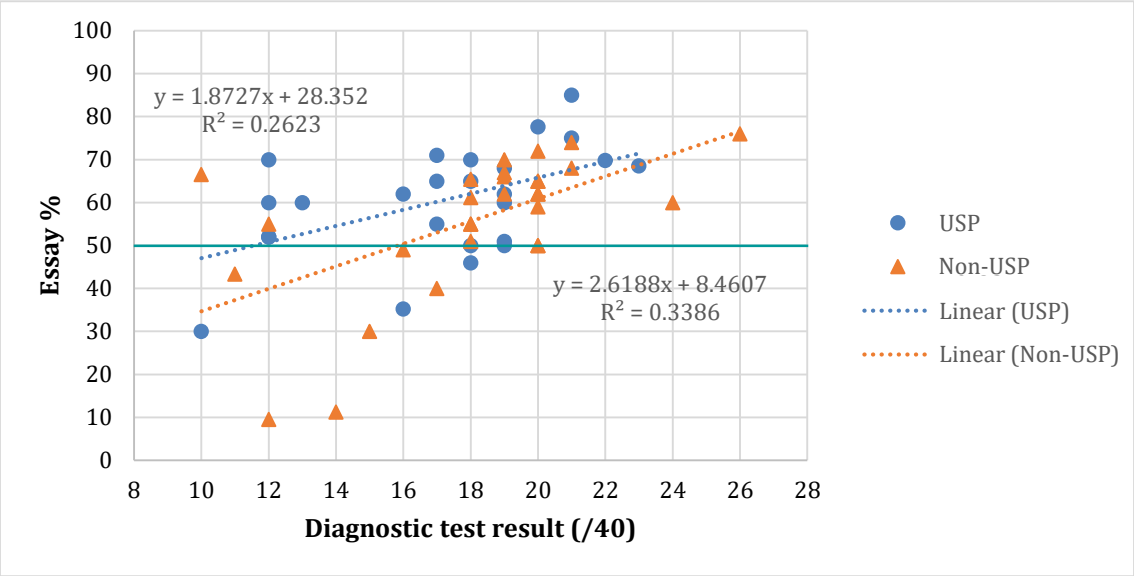

Figure 6. Percentage on essay assessment task versus mark on initial writing test diagnostic for ITM students identified as being "at risk" by the diagnostic. The linear regression lines shown are the best fits through two sets of data separately. Pearson's correlation coefficient for the non USP group is r = 0.58 (p = 0.0007). Only the students who both submitted an essay and sat the final exam are included in the data to further control for possible variations in students' level of commitment to the course.

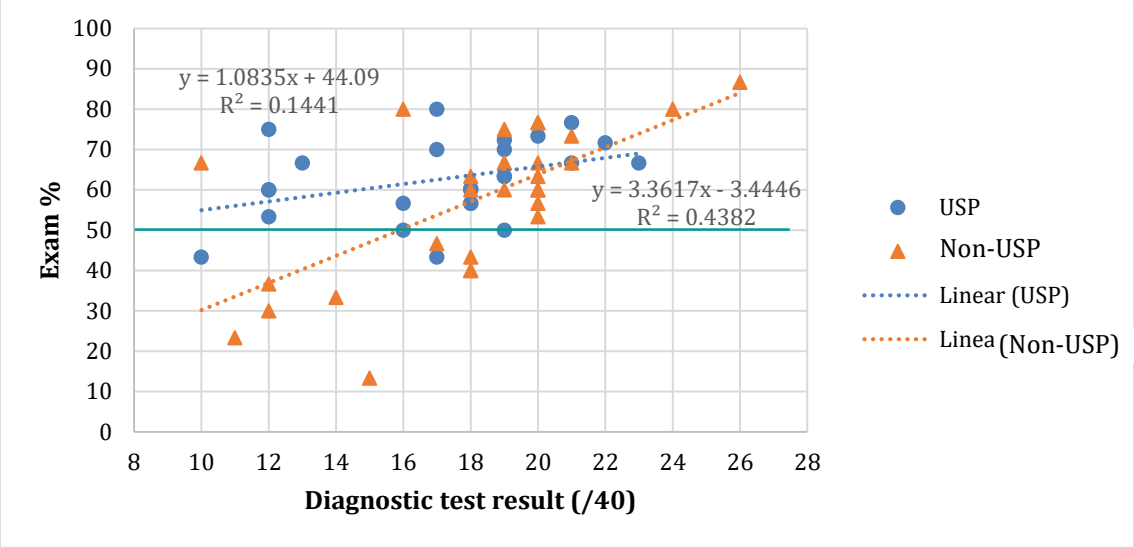

Figure 7. Percentage on final exam versus mark on initial writing test diagnostic for ITM students identified as being "at risk" by the diagnostic. The linear regression lines shown are the best fits through two sets of data separately. Pearson's correlation coefficient for the no USP group $r = 0.66$ ($p = 0.0002$). Only the students who both submitted an essay and sat the final exam are included in the data to further control for possible variations in students' level of commitment to the course.

7.2. Evaluation of the initial 'at risk' criterion

There is one last observation of interest to make from Figures 6 and 7. As indicated by where data points lie in relation to the horizontal pass mark line of 50 percent, below a diagnostic mark of around 18 out of 40, students who did not regularly attend the USP appeared to be much more likely to fail the two assessment items than were the regular USP attenders with similar diagnostic marks. This observation is consistent with the criterion described in Section 5.2 that was assumed to be able to be used to identify at risk students.

The above observation is important because while most of the research on Post Entry English Language Assessment (PELA) has focused on the challenges and implementation of the procedure, there has been little discussion regarding the validity and reliability of assessment criteria, and in addition whether such tests can in fact be used to identify a student as "at risk" and therefore, likely to fail without any support or intervention (Harris, 2013; Knoch, 2012; Murray, 2011). The inference which could be drawn from this study is that the benchmark for a classification of 'at risk' *for this assessment* may be a cut off of *18 or less* due to a substantial increase in the fail proportion in this range of scores for non-USP students. More data will, however, be needed to confirm this result.

7.3. Comparison of pre- and post-test diagnostic results

In the final analysis, to determine whether the USP resulted in improvements to student learning, comparisons were made between the pre- and post-test scores from the sample of students who completed both tests in ITM, to directly measure certain types of learning gain. Table 8 (see Appendix B) shows that there was a statistically significant gain in diagnostic performance for regular USP attendees (see Figure 8), but whether this is due to the USP or other sources of learning cannot be directly determined. Unfortunately, only seven regular USP attenders and two non-attenders completed both the pre- and post-diagnostic writing tests in the ITM unit and hence no definitive conclusions can be drawn. Nevertheless, Figure 8, showing the results for these students, is suggestive of desirable results on student learning due to the USP and that follow-up research into this measure would be worthwhile.

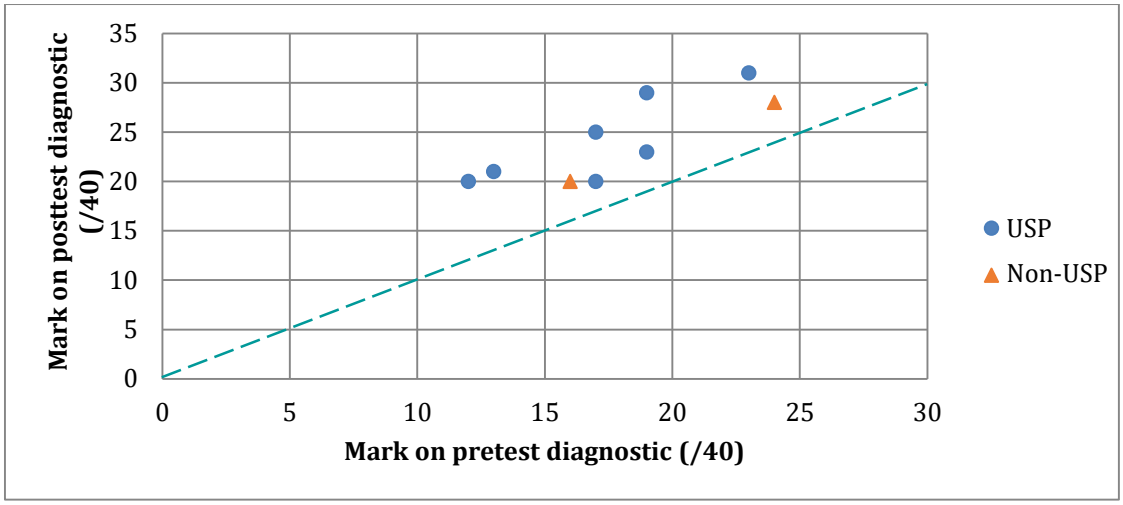

Figure 8. Comparison of pre- and post-test diagnostic results for ITM students. The dashed line indicates the "no change" line.

8. Discussion

8.1. Benefits of embedding

In this study, in excess of 620 students had the opportunity to benefit from at least one USP session during the semester. Indeed, the fact that each USP student attended on average 11.8 out of a possible twelve workshops is also of notable significance, and a testament to the perceived value of the program. Even more noticeable has been the rise in participation rates since the inception of the program, having been implemented to date seventeen times over a period of eleven years to almost 4000 students (e.g. Kennelly et al., 2010; Maldoni & Lear, 2016; Maldoni, 2017). To be precise, from 2006 to 2017, student participation has increased by more than five times. One reason for the consistent rates of participation may be that the USP addresses the complexity of skills in an inclusive and holistic manner. It also provides learning opportunities for all students progressively throughout the degree course so that the development of academic language and literacies becomes part of the culture of the unit. Additionally, Maldoni (2017) asserts that staff and students continue to speak highly of its benefits. This has resulted in increased popularity and momentum for this model of embedding. While there are many strategies and approaches that could be described as good practice (Dunworth et al., 2014), the USP model appears to demonstrate an effective, sustainable approach leading to enhanced language and literacies development.

A similar pattern was evident in increased participation for the target 'at risk' groups. Given that generally students most in need do not regularly attend academic and communication skills programs in addition to their disciplinary studies (Arkoudis et al., 2012; Kennelly & Tucker, 2012; Harris & Ashton, 2011; Wingate, 2006), in this study a reasonable proportion of the identified 'at risk' students as compared with the 'non-at risk' group, while not the majority, did avail themselves of the USP workshops in two out of the three units. As part of their investigation into the reasons why students avoid programs of support, Kennelly and Tucker (2012) found that their reluctance to identify as 'at risk' was one of the most prominent, with some students going to great lengths to avoid PELA and other diagnostic testing (Ransom, 2009). This may explain partly the small numbers of students who sat the pre-and post-diagnostic tests, with less than half the cohorts attending the first lecture where the pre-test was administered. Irrespective of this, the fact that a wide variety of students was attracted to the USP may help to promote the program to 'at risk' students and so address the perceptions of stigma associated with attending academic support programs. While attracting 'at risk' students to support programs, such as the USP, is the most difficult aspect of this type of program (Kennelly & Tucker, 2012), this study is in agreement

with Wingate (2006) about the importance of promoting a positive focus on encouraging attendance to develop simultaneously content knowledge and academic language and literacies rather than the notion of 'remedial' support. When students have access to discipline-specific language support which is relevant and therefore more effective (Barthel, 2015), they are more likely to attend.

An unexpected finding from an analysis of participation levels of students in third year revealed that the USP included the most students 'at risk' as identified from the diagnostic task, but interestingly, also comprised the largest number of international and mature age students, together with the highest participation rate of the three units. Given that this was the first time a third-year unit had been targeted for support, and attending students self-selected for USP support, a number of factors could contribute to this observation. Primarily, students were more mature and may have been motivated to attend workshops, this being the last unit of their degree. Generally speaking, mature age and international students are commonly those who actively seek support. This may be influenced by the fact, for example, that mature age students are also affected by factors such as class, background, gender, ethnicity and disability (Mallman & Lee, 2014), and are juggling additional commitments and responsibilities in addition to their university studies (O'Donnell & Tobbell, 2007). Despite the possible aforementioned factors, these students were willing to engage and contribute to the USP workshops across the years, prompting reconsideration of where support is traditionally directed. Providing embedded support not only shows an institutional understanding of student dynamics and needs, but also fills a gap in policy, procedures and services aiming to attract and retain such 'non-traditional' cohorts – important, if all students are to be supported in meeting their educational goals.

An intended benefit of embedding academic literacies into the disciplines is the resultant increase in student retention not only in the targeted units, but potentially successive future units of study. Attrition and retention rates have been a major concern for universities (Johnson, 2012) with university attrition rates increasing from 12.5% in 2009 before the demand-driven system was phased in, to 14.8% in 2014 (Moodie, 2016). While it is difficult to draw conclusions about retention rates over two years, it appears that when the USP was implemented in ITM in 2014, higher retention rates were recorded compared to the previous year, with a 20.8 percent improvement in retention. Provided the only significant difference in how ITM was conducted in 2013 and 2014 was whether the USP was run, then it would appear the USP is likely to have a significant impact on retention, though possibly only for units with a high attrition rate.

Regarding the issue of retention, research shows that attrition rates tend to be higher in first year subjects (Department of Education and Training, 2016). In one study, the strongest predictor of student attrition was academic performance in the first year of study (Harvey & Luckman, 2014). When this is the case then, it follows that programs of support, such as the USP, are crucial because they have shown a significant impact on retention in units with high attrition rates. Consequently, to ensure students complete their studies successfully, better support mechanisms need to be made accessible post-enrolment. In relation to this claim, Kift, Nelson, and Clarke (2010) have noted the importance of an "intentional first year curriculum design that carefully scaffolds, mediates and supports first year learning" (p. 11). This study confirms this view, but also expands it further to demonstrate that course delivery which brings together faculty, academic, administrative and support programs that are embedded within the unit and integral to the achievement of mastery and self-managed learners (Kift & Nelson, 2005) is highly effective in engaging and retaining students (Tinto & Pusser, 2006; Kift, 2009). In fact, when language and academic skills are merged into the one teaching environment, students gain exposure to these skills as interconnected processes, being demonstrable in the completion of assessment tasks. The USP is ideally positioned to fulfil both these criteria because embedding the development of students' academic literacies into the curriculum not only supports students and academic staff, but also dovetails with the educational framework needed for students to have a successful first year.

With a view to ascertaining whether the specific embedding practices implemented in this project led to student success, an examination of pass rates shows that USP attendees appear to have a higher probability of passing the unit as compared to non-attendees, although it must be acknowledged that USP attendees may have simply been more motivated to attend class to begin with. In line with previous research into the impact of embedding on student success in first year (Kennelly et al., 2010; Maldoni et al., 2009) and Maldoni and Lear's (2016) previous longitudinal study which spanned the duration of ten years, results from these studies suggest that USP attendees continue to have greater pass rates compared to the non-USP cohort, with an increased likelihood of succeeding by more than 13 percent across all three units. This same trend continued in the target group, who were identified as 'at risk' of failing the unit, with the higher fail rate of non-USP 'at risk' attenders in ITM being suggestive of the potential impact of the USP on improved student success in first year units for this group. Furthermore, evidence for the possible impact of the USP in enhancing student engagement was also evident in the apparent better progression rates among two out of three USP cohorts. Similar to the results of previous embedding projects which assessed retention and engagement with the unit (Maldoni et al., 2009; Maldoni & Lear, 2016), it was found that generally, students who participated in the USP were more likely to pass the unit, and complete all assessments. While it is difficult to ascribe cause-and-effect with a quasi-experiment, especially when groups are self-selected, the fact that several students indicated they would have either 'dropped out' or failed without the support of the workshops (Section 6.3), supports the conclusion that the USP was helpful in reducing the 'drop out' rate for this cohort as compared to the entire unit.

There is currently a growing body of research that shows improvements in performance in terms of academic results as a result of embedding academic literacies into the discipline (Baik & Greig, 2009; Bordonaro, 2008; Chanock, Horton, Reedman & Stephenson, 2012; Evans et al., 2009; Hammill, 2007; Huerta & McMillan, 2004; Thies, 2012). Results presented in this study from the qualitative feedback in conjunction with the diagnostic tests in relation to the possible impact of the USP on student performance, seem to be in agreement with these findings, especially for 'at risk' students in ITM (see Section 7.1). Since these students were considered to be the most 'at risk', this finding is of particular interest since improving the chance of success in the unit for at-risk students was a central aim of this study. Equally important was the analysis of a comparison for the pre and post-test results of the USP group which suggested an impact on student learning due to the intervention. Further validation of the impact of the program on student performance emerged from the triangulation of other data sources, including students' perceptions that the USP helped them achieve success on various assessment items they were not confident of passing. From the 103 end of semester evaluations, 99 percent of students agreed that the USP had assisted them to improve their grade, with the other one percent stating 'probably yes'. Using a multi-pronged approach to evaluating the USP, thus, supports a more convincing argument regarding the effectiveness of collaborative, discipline-based initiatives (Evans & Cable, 2011). Consistent with the literature (see for example, Arkoudis et al., 2012; Baik & Greig, 2009; Briguglio, 2014; Evans & Cable, 2011; Kennelly et al., 2010; Kennelly & Tucker, 2012; Maldoni & Lear, 2016; Maldoni, 2017; Mort & Drury, 2012; Thies, 2012), the results from this study contribute to the evidence base that embedded type practices are successful in developing students' academic language and literacies alongside disciplinary knowledge.

All in all, these results provide support for the view that the embedding process enriches the development of learning for students. These conclusions have important implications for the development of academic language and literacies, which should not be marginalised to the sidelines; rather, they should be incrementally scaffolded from first year and throughout the degree in similar embedded programs. In other words, improvement in these units stems from the capacity of embedded USP workshops to develop academic literacies, including higher order learning skills,

and increasing students' self-confidence and self-efficacy to become motivated learners (Komarraju & Nadler, 2013). This is necessary, too, in other disciplines where critical thinking and analysis of complex theories and skills is required not only for study but also in the workplace.

8.2. Study limitations

Notwithstanding the numerous benefits of the USP, there were a number of challenges which limited the collection and analyses of available data over the duration of the project. The main challenge related to the diagnostic testing. Using diagnostics is not an uncommon procedure to measure students' knowledge of language skills (Bonanno & Jones, 2007; Erling & Richardson, 2010; Harper, 2013; Read, 2008; Rezaei & Lovorn, 2010), and can be a useful means to also monitor student progress, "improve curricula and teaching practices and target support for students who may be at greater risk of failing, withdrawing from or not achieving their goals for their undergraduate courses of study" (Palmer et al., 2014, p. 69). To identify students 'at risk' of failure and assess improvements in student performance over the semester of the intervention of the USP workshops, this study used a pre- and post-diagnostic test, which is an inclusive common metric and was intended to be administered to all students. However, while tests were conducted during the first lecture of the semester to capture the most number of students, only approximately half of the entire unit population attended these lectures. Given that lecture attendance is declining in universities (Tarrant, 2014), many 'at risk' students were consequently not identified. In addition, the students who completed the pre-test were generally different from those who completed the post-test, thus precluding the data from being used to assess measures of improvement in writing and understanding of concepts for the majority of students. As has been noted, this necessitated the collection of a sample of pre-tests from students identified as at risk in the first year unit. Although an analysis of the pre-test with final marks and individual assessment items provides certain evidence for the positive impact of the USP on performance, particularly for the at risk group, the quantitative analysis of this cohort may not be valid for the following reason. Consistent with Baik and Greig's study (2009), one might not be able to attribute these results entirely to the USP as there could be other contributing factors, social and personal, that could not be defined within the scope of this study. While the diagnostic result can control, to some extent, for variations in initial academic language and literacy, it is not able to control for variations in levels of commitment to and engagement with the course, time management skills, access to support with the essay writing, and levels of help-seeking behaviour, for example. Nevertheless, qualitative feedback from several students supports the interpretations of the data made above.

Despite the drawbacks, this study recommends that the identification of 'at risk' students should continue; however, more research is needed into online diagnostics and characteristics that appear to be the most predictive of the 'at risk' cohort. While Baik and Greig (2009) raise the importance of mandatory attendance for support programs, in agreement with Read (2008), it may be counterproductive to make it obligatory for students to participate in support programs when they have no wish to be set apart from their peers and are reluctant to acknowledge that they have language needs (Kennelly & Tucker, 2012). Nonetheless, on a positive side, the mark distributions showed that USP attendees came from the full spectrum of capabilities, including higher achieving students. Consequently, this can be used to promote the program to weaker students and change perceptions of stigma associated with participating in academic support programs (Ransom, 2009).

It is recommended that future studies consider several modifications to the research design, particularly ensuring that pre-and post-testing are conducted with the greatest number of students. This may be facilitated by conducting pre-tests in smaller classes, potentially in the tutorials in the first few weeks of the semester when attendance rates tend to be higher (Newman-Ford, Fitzgibbon, Lloyd & Thomas, 2008). Additionally, if samples of pre-and post-diagnostic test results are chosen for analysis, the samples should comprise a wider variety of abilities so as to capture

similar characteristics to the whole population rather than just the weakest students. This would ensure the findings could be generalised to the whole population of students and thus support the reliability and validity to the results.

9. Conclusions and recommendations

The Unit Support Program reviewed in this study was structured according to the Kennelly, Maldoni, and Davies' (2010) Unit Specific Model and aimed to create a learning environment where students were actively engaged in developing academic literacies in the context of the unit. The USP workshops paralleled the weekly unit content and focused on imminent assessment tasks, since they were immediately relevant to the needs of students and formed a fundamental component of the unit (e.g. Maldoni & Lear, 2016). The study used a multi-pronged approach to evaluating the effectiveness of the embedded program, which sought to ascertain the impact of embedding academic literacies into the disciplines on student engagement, retention, success, performance and learning. An analysis of quantitative results suggested a correlation between embedding academic literacies into the disciplines and student success, performance and learning as measured by academic results and progression rates. Other benefits of the USP included improvements in engagement and retention. Data which triangulated evidence from students' perceptions of the program was consistent with the above findings (Maldoni, 2017). A combination of both data sources, then, supports a more credible argument regarding the positive impact of aligning academic literacies with disciplinary content.

The USP represents a model of best practice, which links content with literacies most effectively. The benefits of this embedded, integrated and team-taught model also built on prior iterations (e.g. Kennelly et al., 2010; Maldoni & Lear, 2016) and show long-term sustainable results. This study, in particular, has shown that embedded programs make a significant difference to outcomes for students, and are, therefore, well placed to address the academic language and literacy issues affecting universities today. Despite the challenges, the positive impact of embedding is noted across all years, prompting reconsideration of where support is traditionally directed; targeting first year students lays a strong foundation for the development of fundamental skills in second and third years. In addition, embedding in units at different stages in a degree provides universities with the opportunity to identify and scaffold skill development across the degree program. Continued studies may show greater alignment and development of skills and explicitly document the incremental skills needed across the year levels. One challenge in relation to the use of diagnostic tests remains. Although they are a useful tool to identify academic and linguistic needs, the changing face of tertiary education now may require such tests to be administrated and assessed online.

Acknowledgements

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Appendix A. Writing rubric

The following diagnostic rubric was used to assess the writing task for the Introduction to Management (ITM), Organisational Behaviour (OB), and Contemporary Issues in Accounting (CIA) units.

(Adapted from IELTS Partners, 2009-2015, Task 2 writing descriptors (public version).)

40	Vocabulary	Sentence Structure	Organisation	Content
1-3	• Uses only basic vocabulary often repetitively • Limited control of word formation and punctuation • Errors cause severe strain for the reader	• Uses only a very limited range of structures • Some basic structures are accurate but errors in grammar predominate. • Errors cause severe strain for the reader	• Presents some ideas and information but not coherently • No clear progression of ideas • Very difficult to follow	• Does not address task • Shows little understanding of content • Presents limited ideas which may be underdeveloped or irrelevant
4-5	• Uses a limited range of vocabulary • Makes noticeable errors in spelling and/or word formation • Errors may cause difficulty for the reader	• Uses a limited range of structures • Attempts complex sentences • Makes frequent errors in grammar • Errors may cause difficulty for the reader.	• Arranges information with some organisation • Information may not be presented coherently • Ideas may lack clear progression	• Addresses the task partially or inappropriately • Shows some understanding of content • Presents some main ideas but are not sufficiently developed or may be irrelevant
5-10	• Uses a wide range of vocabulary fluently and flexibly mostly appropriately • Produces rare errors in spelling and/or word formation • Can be followed mostly with ease	• Uses a wide range of sentence structures • Majority of sentences are error-free • Uses a variety of complex structures • Has good control of grammar and punctuation	• Logically organises information and ideas • Presents information and ideas coherently • Clear progression of ideas	• Sufficiently addresses requirements of task • Demonstrates clear understanding of content • Presents, develops and extends main ideas that are mostly relevant.

Each criterion is assessed individually. For example, a student who scores 4 for vocabulary, 4 for grammar, 5 for organisation and 7 for content should be recommended for the USP. Generally, a student who scores below 5 for both vocabulary and sentence structure requires some form of intervention.

Appendix B. Additional Data

B.1. Additional pass-fail rates

Table 6. Pass-fail rates (given as percentages) across the disciplines excluding those who scored 0 in the final exam or dropped out.

Unit	USP		Non-USP		
	n	Pass % (*n*)	*n*	Pass % (*n*)	*p*[a]
ITM (*N* = 477)	89	91.0 (81)	388	79.1 (307)	0.009*
OB (*N* = 216)	34	100 (34)	182	94.5 (172)	–
CIA (*N* = 128)	45	80 (36)	83	63.8 (53)	0.058

[a] One-tailed z-test for proportions.

* Statistically significant.

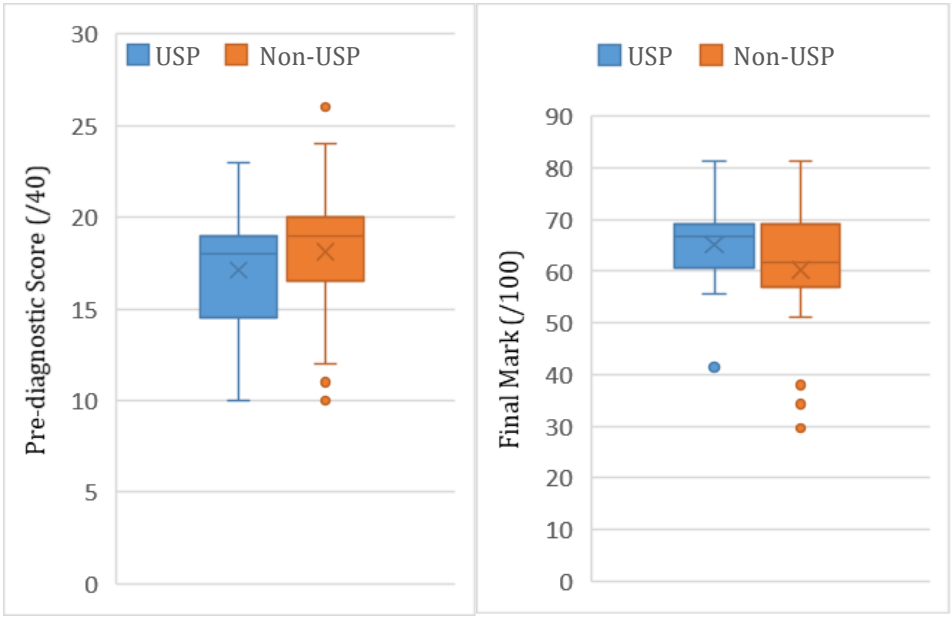
B.2. Comparison of pre-test and final marks for USP and Non-USP attendees

Table 7. Comparison of pre-test and final marks for the 54 USP and non-USP ITM students discussed in Section 7.

	USP attendees (n = 27)	Non-USP attendees (n = 34)	
	M (SD)	M (SD)	p
Pre-test	17.12 (3.49)	18.10 (3.63)	0.25[a]
Final mark	65.2 (7.8)	60.3 (12.5)	0.084[b]

[a] Two-tailed Mann-Whitney test because the data was quite skewed.

[b] One-tailed Mann-Whitney test because the data was quite skewed.



(a) (b)

Figure 9. Box and Whisker plots comparing the distributions of (a) pre-diagnostic test scores and (b) final marks for the 54 USP and non-USP ITM students discussed in Section 7. The crosses indicate the location of the mean and outliers lie more than 1.5 times the interquartile range away from the 25th and 75th percentiles.

B.3. Comparison of pre- and post-tests for ITM

Table 8. Comparison of pre- and post-test results for USP group. Note that as the test was out of 40, an average gain of 7 marks is pedagogically significant.

N	Mean difference	Standard deviation	P-value[a]
7	7.000	2.517	0.00*

[a] Paired sample t-test.

* Statistically significant.

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