

# **Analysing the Effectiveness of Changes to Assessment Methods between Full Fee Paying International and Domestic Students within a First Year Undergraduate Management Unit**

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*Research previously undertaken into assessment methods in an undergraduate management unit led to a restructuring and rescheduling of assessment tasks for the 2012 academic year. The significance of this new study is to determine whether the move away from time pressure constructed response exams to multiple choice exams is a fairer way of assessing the international student's knowledge of the unit's learning objective. This paper compares the changed assessment methods and student results within a first year undergraduate management unit offered within the business faculty of an Australian university in 2012 with those of previous years. The first year management unit is generally compulsory for those studying for a commerce or management degree in Australia. The assessment results of full fee paying international students were compared with those of domestic students during the first teaching semester of 2012 and compared with 2682 students taking the same unit in 2009 and 2010. This analysis compares 577 domestic and 201 international students' numerical results in semester one 2012 for two constructed response assignments and their results for an examination comprising multiple choice questions. The findings show that the new assessment regime removes part of the bias against international students. On average, international students achieve lower results than domestic students for constructed response assessment tasks, but slightly higher or similar results to domestic students for multiple choice question examinations. The results of this study align with earlier research indicating that international students may know or be able to memorize the content of the unit, but are less successful when they express their unit knowledge in writing, especially under exam conditions. These findings have implications for instructors who are trying to provide a level playing field for both domestic and international students.*

**Field of Research:** Management discipline assessment methods

**Key Terms:** Management education, Higher education, assessment, multiple choice questions, constructive response questions

## **1. Introduction**

This paper compares the changed assessment methods and student results within a first year undergraduate management unit offered within the business faculty of an Australian university in 2012 with those of previous years. The first year management unit is generally compulsory for those studying for commerce or business management degrees in Australia and it is also a very popular elective for students from other faculties, especially engineering.

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In 2010 approximately 115,000 international students were studying management or commerce at Australian universities and it is the most common unit for international students. (AEI 2011) The unit has a wide relevance as no matter what occupation the student later chooses, it is expected that the majority of university graduates will eventually be managing people and resources regardless of the occupation they choose. (McElvaney 2009; Deakin University 2009).

However, low retention and often high failure rates means that these units face problems that need to be addressed by faculty. (McElvaney 2009). Prior to the commencement of this research up to 35% of all enrollees either failed or did not complete the management unit. This very high student attrition rate has severe consequences on future income for the universities and more importantly the missed opportunities and effect it has on student lives (Erickson, Peters & Strommer 2006. McElvaney, Fermelis & Strawbridge 2012).

Large core units such as Management that often attract over 1,000 students per semester provide considerable income for many universities and business colleges. To minimise costs and to achieve uniformity these large units often choose Fredrick Taylor's method of "...one best way to do the job". (Waddell et al. 2011). This philosophy may satisfy the needs of students, but not the wants since 80% of students in a 2008 survey indicated that they were less than happy about the assessment methods. International students felt disadvantaged by the then purely writing-based research, or constructive response (CR) methods used for assessment. (McElvaney 2009).

That survey led to changes in the exam by reducing the constructed response component down from 100% to 50%. After changes had been introduced, the management unit team analysed students' assignment, examination and final results during 2009-10 to determine the success of the new assessment mix. Results across the board improved, but there was still a high failure rate amongst international students in the exam, largely due to time pressure and a failure to articulate their findings into English. (McElvaney, Fermelis & Strawbridge 2012).

In this report international students (IS) are those, according to the Organization of Economic Cooperation and Development (OECD), who travel to a country different from their own for the purpose of tertiary study. For Australia, 'International Students' are defined as those studying onshore only with visa subclasses 570 to 575, excluding students on Australian-funded scholarships or sponsorship or students undertaking study while in possession of other temporary visas. New Zealand citizens do not require a visa to study in Australia, so are not classed as international students. Domestic students (DS) are those who are Australian citizens, New Zealand citizens or holders of a permanent visa.

This paper reviews literature by Wainer and Thissen (1993), Moncada & Moncada (2010) Magdziarz et al. (2006) and Hautau & Turner (2006) into constructed response and multiple choice assessment methods. Pedagogy and the teaching of international students is reviewed utilising the writings of Ramsden (1992), Biggs (1999) Kuechler & Simkin (2010) Erickson, Peters, & Strommer (2006) and Bacon (2003). The methodology section takes a brief look at research carried out in 2011 before detailing the methods used to analyse the 2012 data. The findings compared the overall results, constructed response assessment and multiple choice exam results of international and domestic students.

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The conclusion is that the assessment changes in this first year management unit did not disadvantage domestic students, but was fairer to International students.

### 2. Literature Review

Teaching, learning and assessment according to the literature are clearly linked. Designing appropriate assessment is an integral task within the planning and organisation of any unit, as it is regarded as of vital importance to accurately and fairly evaluate student knowledge. As part of the unit planning stage, academics need to ask themselves 'what our students should be able to do intellectually, physically or emotionally as a result of the learning in that unit. (Biggs 1999, p.49). First year students in particular frequently struggle with the standard university research requirements, and the analytical and applied requirements of many assessment tasks. (McElvaney, 2009).

Much has been written about the strengths and weaknesses of assessment by multiple choice questions (MC) compared to written or constructed response (CR) questions, in relation to research and analytical assignments as well as written examinations. However there is an absence of research that compares the performances of full fee paying international students with government assisted domestic students under different types of assessments.

Although constructed response (CR) formats may often be viewed as a more suitable tool for accurately evaluating student knowledge, they do possess certain disadvantages. These include the subjectivity that can exist or be seen to exist in the marking process, the requirement for markers to possess subject mastery and the increased time to mark the CR component. (McElvaney, Fermelis & Strawbridge 2012. Kuechler & Simkin 2010).

Most universities do not reward or penalise faculties for the quality of their examinations (Bible, Simkin & Kuechler 2008, p56), so CR components effectively penalise academics. Feedback takes longer, and the format may favour students with greater English proficiency and written skills (Kuechler & Simkin 2010, p. 57). Hickson (2010, p. 275) noted, on the basis of several studies, 'all ethnic groups have a relative disadvantage compared with Europeans in CR'. For all groups other than those from an Asian background the disadvantages do not occur when controls for student quality are introduced. It was concluded that 'rather than an ethnicity issue, this is likely to be a language issue'. (Hickson 2010, pp. 275-6).

Empirical evidence suggests that MC questions may well be used with undergraduate classes because of the difficulty in designing MC questions for assessment beyond the first three cognitive levels of knowledge, comprehension and application within Bloom's taxonomy (Simkin & Kuechler 2005, p.90). Later research by these authors in the computer programming discipline concluded that CR questions are not homogenous at the upper levels of knowledge in Bloom's taxonomy (Kuechler & Simkin 2010, p.68). From another perspective, new university students have expressed a preference for MC in order to smooth the transition from high school to university learning in ways that are both familiar and gradual (Erickson, Peters, & Strommer 2006; Bacon 2003). Some researchers argue that rote learning and memorization could assist students to gain a good understanding and grounding in the subject. (Magdziaz 2006 & McElvaney 2009).

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Research differs about the intellectual value of MC assessment over CR assessment. Some evidence suggests that it is theoretically possible to construct MC items that measure many of the same areas as CR questions (Kuechler & Simkin 2010, pp. 56-57). Wainer and Thissen (1993) however, challenge the theory and posit that 'the multiple choice items may not be measuring the same thing, and so validity is served better by having both methods of assessment' (cited in Kennedy & Walstad 1997, p. 360). This concurs with Hautau & Turner (2006, p. 260) who found that when writing assessments were carried out during the semester, performance on MC exams improved.

Other concerns have been raised by a number of authors on whether MC tests evaluate the same level of understanding as those measured by CR tests. Such as the "Test reliability as well as item difficulty and discrimination need to be considered to gain useful insights as to the validity of any instrument for measuring desired learning outcomes" (Moncada & Moncada 2010, p. 27). Nevertheless, indications are that MC questions are being frequently utilised for assessment purposes within at least some Australian universities, in response to tight budgetary constraints and increased teaching workloads. (McElvaney 2009).

Consequently, especially when dealing with a large student cohort for compulsory first-year units, and students from diverse ethnic backgrounds, such as is currently the situation in most Australian universities, it is extremely important that adequate time be allocated to analysing, testing and refining suitable assessment regimes. It is necessary to produce assessment outcomes that are not only cost-efficient, but also valid and reliable in accordance with unit objectives and furthermore, reasonable and appropriate for diverse student populations. The move to more progressive CR assessments and less lengthy multiple choice examinations was seen as a possible method to address the above.

### 3. Methodology and Research Design

This investigation focuses on the assessment methods used in a first year management unit, compulsory for students enrolled in an undergraduate degree unit within a business and law faculty at an Australian university. The aim is to investigate a large data set to discover whether IS and DS receive similar or different final results, and similar or different scores for CR questions compared with MC questions. This improves on past research by also gathering and analysing the data for an exam comprising only multiple choice questions. It only includes students who completed all assessment tasks and received a final score for that management unit, across the metropolitan, regional, rural and on line campuses.

During semester 1 2012, 1260 students were enrolled in the management unit, 343 (27%) dropped out and 139 (11%) completed the unit but did not carry out all of the 3 compulsory assessment tasks, leaving a total of 778 (62%) students available for this study. The assessment results of these 201 full fee paying international students were compared with those of 577 domestic students during the first teaching semester of 2012. This analysis also compares those 577 domestic and 201 international students' numerical results in semester one 2012 with 1995 domestic and 687 international students in 2009-10. It specifically compares the results of the two constructed response assignments and their constructed response examination results with their multiple choice questions examination. Analysis focuses on comparing the results obtained by IS with those of DS.

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Four assessment components were included; assignment 1 and 2 results, 2 exam component results and the final exam mark.

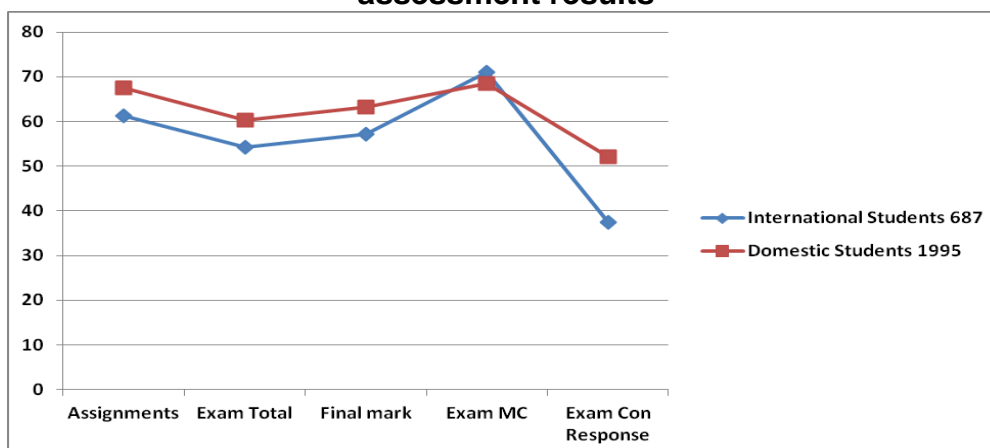
The 2009-10 assessment in the management unit consists of 40% progressive assessment and an examination worth 60%. The progressive assessment is divided into two assignment tasks: first, a 1,000 word, individual literature review and research essay worth ten percent of the student's final score; and second, a 3,000 word case study report assignment worth thirty percent, which requires teams of two students to research, analyse and compare various companies.

The 2009-10 final examinations which covered the entire semester's work was a three-hour, independently administered session divided into two sections, each of which was worth 30 possible marks. The first section included 60 MC questions worth half a mark each. Each question referred to a separate aspect of management theory and provided four possible answers, labelled A to D.

The second section of the 2009-10 examinations contained five short answer CR questions, each worth 6 marks. Each student entered their answers into an examination script booklet, which was then individually read and graded by an examiner. As the number of students examined within each semester was so large, it was not feasible for a single examiner to grade all CR answers in all papers within the allocated period of time. Therefore student CR responses were graded by experienced examiners who were pre-trained in the assessment of the specific CR questions on the examination paper and whose scoring was also moderated to maximise consistency. Because up to ten different examiners were working on the examination papers at the one time, any potential for inconsistency was also minimised by three markers being used for each student exam paper, spot-checking of individual examiners' scores by the Unit Chair, and blind double-marking of the papers of all students who had achieved a final examination score below 50%.

Figure 1 below highlights significant differentials in 2011 that led to the change of assessment for 2012 and the impetus for this study.

**Figure 1: Comparison of International and Domestic students' assessment results**



Source: McElvaney, E.J, Fermelis, J and Strawbridge, H. 2012 Assessment method difference : comparisons between international and domestic students within a first year undergraduate management unit, *International review of business research papers*, vol. 8, no. 5, pp. 205-214,

The figures show that overall there was a 10% across the board variance between International (IS) and Domestic students (DS) in all level of assessment. One could

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argue that this would be expected and no cause for concern. However on closer analysis it reveals that in the constructed response (CR) section of the exam, IS were severely disadvantaged and could only average a mark of 37%. McElvaney, Fermelis & Strawbridge (2012) demonstrate in Table 1 below a significant difference in the variation of scores attained in the exam by DS and IS in the CR short answer question section (SAQs). A statistically significant difference shows in the average mark with DS clearly attaining a significantly higher result on average than IS in all constructed response assessment tasks. ( $p\text{-value} = 0.000$ ).

**Table 1: Analysis of Performances by Citizenship status  
Examination Constructed Response Short Answer Questions**

Exam Construction Response 2009-10	N	Mean % mark	Std. Deviation	Std. Error Mean	Variances%
International Students	687	37.35	19.75	0.62	-39.7
Domestic Students	1995	52.18	18.05	0.385	+39.7
All management Students	2682	48.38	18.48	0.445	

As a result of the above findings, further changes were made to the 2012 exam to remove the constructed written responses and to include 100 multiple choice questions x 0.5 marks each in a shorter 2 hour exam instead. The construction response assignments were changed to a 20 mark and a 30 mark literature review and research essays. The findings regarding these 2012 changes form the basis of this paper.

The modified 2012 assessment also consists of 50% progressive assessment, and an examination worth 50%. The progressive assessment is divided into two assignment tasks: first, a 2,000 word, individual literature review and research essay worth twenty percent of the student's final score; and second, a 3,000 word individual literature review and research essay worth thirty percent, the requirement to work in teams was discarded.

The 2012 two hour independently administered final examination covered the entire semester's work and comprised of 100 MC questions worth half a mark each for a total of 50 marks. Each question referred to a separate aspect of management theory and provided four possible answers, labelled A to D (see sample questions below).

1. The factors that affect organisational structure are:
  - a. organisational environment, suppliers, customers and human resources
  - b. industry conditions, suppliers, technology and customers
  - c. industry conditions, suppliers, technology and markets
  - d. organisational environment, strategy, technology and human resources
 (answer = d)
  
2. Distinguishing an organisation's products from the products of competitors in dimensions such as product design, quality or after-sales service is termed:
  - a. differentiation strategy
  - b. diversification strategy
  - c. multi-dimensional strategy

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d. better value strategy  
(answer = a)

For this section of the examination a Scantron scoring sheet was utilised. Marking was conducted by scanning answer sheets electronically, with points awarded for a correct response, but no point deduction for an incorrect response. Even though students were free to complete the examination tasks in any order, most students in practice appeared to complete the MC section first.

Assessment data from all students' assignments and examination results was downloaded into an Excel spreadsheet with all marks converted to a percentage to enable consistent comparisons across the data since some results related to a total possible score of 30 and others to a total possible score of 60 marks. There were five separate scores for each student: the first CR assignment, the second CR assignment, the exam MC, the examination CR plus the student's final total score for the unit. Data was then imported into statistical software SPSS for in depth statistical analysis with the view of proving or disproving the hypotheses below:

### Hypotheses:

**H1:** That international students will on average, achieve lower scores than domestic students for constructive response assignment tasks in a first year management unit.

OR

**H1 alternative:** That international students will on average, achieve similar or higher scores than domestic students for constructive response assessment tasks in a first year management unit.

**H2:** That international students will on average achieve similar or higher results for multiple choice assessment tasks.

OR

**H2 alternative:** That international students will on average achieve lower scores than domestic students for multiple choice response assessment tasks

**H3:** That international students will on average achieve lower scores in a management unit overall where the overall assessment is 50% or more construction response tasks

OR

**H3 alternative:** That international students will on average achieve higher scores in a management unit overall where the overall assessment is 50% or more construction response tasks.

## 4. Findings and Discussion

The study found that the average student final result score for the unit improved in 2012 with domestic students (DS) receiving an average overall mark of 64.48% (up 1.9%) compared to international students (IS) who received an average overall mark

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of 62.15% (up 8.7%). These final results are included in Table 2 below, where students are categorized according to their citizenship. The variance between IS and DS showed a reduction of 6.1% over the two periods indicating that although the change in assessment favoured both sets of students, IS gained the greatest comparative benefit.

**Table 2: Students' final results according to citizenship status**

2009-10 Final overall marks	N	Mean % mark	Std. Deviation	Std. Error Mean	Variances%
International Students	687	57.07	14.82	0.595	-9.7
Domestic Students	1995	63.23	13.24	0.465	+9.7
2012 Final overall marks	N	Mean % mark	Std. Deviation	Std. Error Mean	Variances%
International Students	201	62.15	13.95	0.645	-3.6
Domestic Students	577	64.48	13.26	0.445	+3.6

The overall results show a big improvement for IS in 2012. However on average, there is still a significant difference in results between DS and IS indicating the hypothesis *that international students will, on average, achieve lower scores in a management unit where the overall assessment is 50% or more constructed response tasks* should be accepted.

### 4.1 Constructed Response Assignments

In 2009-10 the assignments were individual literature review and research (10 marks) and group analytical research case study report (30 marks). In 2012 the assignments were individual literature review (20 marks) and individual literature review and research (30 marks).

On average DS received a statistically significant difference in the average mark with DS clearly attaining a higher result on average of 10.1% in 2009-10 and 10.05% in 2012 than IS ( $p\text{-value} = 0.000$ ).

These results are consistent with earlier research published by Hickson (2010) and could be anticipated for a first year university unit considering the many difficulties faced by international students experiencing their initial year in a country with a different language and culture. As shown in table 2 below, IS scored lower results than DS for the two CR assignment tasks.



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**Table 2: Analysis of Constructed Response Assignment Performances by Citizenship Status**

2009-10 (CR) Constructed response	N	Mean % mark	Std. Deviation	Std. Error Mean	Variances%
International Students	687	61.32	15.54	0.565	-10.1
Domestic Students	1995	67.58	15.41	0.425	+10.1
2012 (CR) Constructed response	N	Mean % mark	Std. Deviation	Std. Error Mean	Variances%
International Students	201	56.42	15.14	0.645	-10.05
Domestic Students	577	62.72	14.46	0.445	+10.05

Consistent with earlier research by Hickson (2010) and McElvaney, Fermelis and Strawbridge (2012), based on the above there is still a significant difference between the results of DS & IS and accordingly the hypothesis *that international students will on average achieve lower scores than domestic students for constructive response assignment tasks in a first year management unit* should be accepted.

### 4.2 Exam-Overall Result

The 2009-10 the three hour exam was for a total of 60 marks. This was made up of 5 short constructed response answer questions worth 6 marks each totaling 30 marks. Plus 60 multiple choice questions worth 0.5 marks each totaling 30 marks.

The 2012 two hour exam consisted entirely of 100 multiple choice questions worth 0.5 mark each, totaling 50 marks. All exams were conducted under strict examination supervision in week 14 after a 12 week teaching semester.

**Table 3: Analysis of Performances by Citizenship status Examination Combined Components**

2009-10 (CR&MC) Exam Combined	N	Mean % mark	Std. Deviation	Std. Error Mean	Variances%
International Students	687	54.24	13.81	0.57	-10.4
Domestic Students	1995	60.31	13.15	0.45	+10.4
2012 (MC) Exam	N	Mean % mark	Std. Deviation	Std. Error Mean	Variances%
International Students	201	67.88	15.14	0.977	+2.25
Domestic Students	577	66.25	13.65	0.646	-2.25

Table 3 above demonstrates a statistically significant difference in the 2009-10 average exam mark with the DS clearly attaining a higher result on average than IS ( $p\text{-value} = 0.000$ ). Readers can be 95% confident that on average DS attain an exam mark anywhere from 5.35% to 7.98% higher than IS.

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As stated earlier, this finding agrees with earlier research published by Hickson (2010), but with only a 10% average difference between the cohorts these statistics by themselves don't ring any alarm bells, because it's in line with the findings in the written assignments. It's when we analyze the different components of the exam that we can clearly notice the problem associated with articulation in a stress environment. The 2012 MC exam is consistent with the expectation that IS will on average achieve similar or higher results for multiple choice assessment.

### 4.3 Exam- Multiple Choice (MCs)

The 2009-10 exam also consisted of 60 multiple choice questions worth 0.5 each totaling 30 marks. The 2012 exam consisted entirely of 100 multiple choice questions worth 0.5 each totaling 50 marks. The Exam was conducted under strict examination supervision in week 14 after a 12 week teaching semester.

In Table 4 (below), a statistically significant difference is shown in the 2009-10 average mark with IS clearly attaining a significantly higher result on average than the domestic student ( $p\text{-value} = 0.002$ ). This is opposite to the CR SAQs data. On average IS attain 0.8% to 3.7% more marks than DS in a multiple choice examination. However, when the 2012 exam was changed to fully multiple choice the IS still outperformed the DS, but the variance between IS and DS was reduced to only 2.25%.

**Table 4: Analysis of Performances by Citizenship status  
Examination Multiple Choice Questions**

2009-10 (MC) Exam M/C only	N	Mean % mark	Std. Deviation	Std. Error Mean	Variances%
International Students	687	71.12	15.82	0.62	+3.7
Domestic Students	1995	68.48	13.2	0.385	-3.7
2012 (MC) Exam Combined	N	Mean % mark	Std. Deviation	Std. Error Mean	Variances%
International Students	201	67.88	15.14	0.977	+2.25
Domestic Students	577	66.25	13.65	0.646	-2.25

Based on the above, where there is no significant difference between the DS & IS cohorts results then hypothesis 2 *that international students will on average achieve similar or higher results for multiple choice assessment in a management examination* should be accepted.

## 5. Conclusion and Implications

For both assignments, the examination and the unit overall, DS outperform IS by almost 10% in 2009-10 but due to the assessment changes from constructed response to a full multiple choice exam this differential was reduced to 3.6% in 2012. The changes meant that the pass rate for DS increased from 91% in 2009-10 to 92.2% in 2012, but more importantly the pass rate for IS increased from 72% in 2009-10 to 79% in 2012.

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The increase in pass rates amongst IS indicates that the changes in assessment provided a somewhat positive outcome for IS than was previously the case. Considering the many difficulties faced by international students in language, culture, adjusting to different methods of teaching and the lack of parental support in their initial year at an Australian university a 21% failure rate may be understandable. The failed International Students may have worked hard, but it was their articulation of English not necessarily knowledge of the unit that contributed to their failure.

The results of this study align with earlier research in indicating that international students may know or be able to memorise the content of the unit, but are less successful when they express their unit knowledge in written English, since there was still a consistent 10% difference in the constructed response assignments.

It could be argued that the articulation of English is part and parcel of an Australian University Business degree and as such all management students must be assessed on this competency. However, it could also be argued that faculty should concentrate on assessing their student's knowledge, comprehension and application of management principles not their level of written English during their first semester of a 3 year business course.

Because this study only examined a first year undergraduate unit and only involved 778 students in the first semester of 2012 it does have limitations. Studies need to be carried out using a larger sample size in many units over the full three years of an undergraduate business course. The changing demographics of students at Australian universities also indicates the need for further research into assessment methods involving international student teaching and learning in order to maximize learning outcomes.

Although not a specific part of this study, 27% of all enrolled management students in 2012 officially dropped out of the unit before the end of the semester. There could be countless reasons for this, but it would appear that having the submission date for the first constructed response literature review assignment coinciding with the university's cutoff date for 'no penalty for dropping out' leads to a higher dropout rate. Research is needed to improve the low retention and pedagogy in first year units. It is recommended that the early assessment tasks within the academic program use non-constructive response formats to improve retention rates and also allow for the quicker identification of 'at risk' students and provide faculty with time to assist international students in attaining the academic writing standards expected by Australian universities.

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