Predicting a student’s success in Health Sciences based on their academic writing skills.

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Abstract

Writing skills underpin academic success in any tertiary course, irrespective of the discipline. Anecdotal evidence suggested that first year undergraduates in the Health Sciences frequently underestimate the importance of writing skills. This study explored the relationship between a student’s academic writing in their first semester of academic study, as assessed through a Post Entrance Literacy Assessment (PELA), and their performance in a core academic literacy unit, and an anatomy unit at the end of semester. The PELA was useful in identifying students with deficient writing skills, but did not reliably predict overall performance in the literacy unit. Students identified as “at risk” by PELA testing failed to engage with optional academic support programs. This led to increased collaboration between colleagues in the Academic Enabling Support Centre and Health Sciences to instigate a School wide policy change making it compulsory for any “at risk” student to attend support workshops.

Introduction

The particular challenges of writing at university

A student’s academic achievement and approach to tertiary study are critical factors affecting both retention and attrition in first year students (Tumen, Shulruf, & Hattie, 2008). Students often cite their reason for withdrawing from tertiary studies as their lack of academic literacy skills, particularly in research and writing (Goldfinch & Hughes, 2007). Many students enter university with the expectation that the standard of writing that they have been producing in the past, for example, in high school, will be adequate; however, few university entrants, domestic or international, have the academic writing skills necessary for success at a tertiary level (Goldfinch & Hughes, 2007). Students who lack fundamental skills, especially in writing, find it difficult to cope with their normal course work load (Lau, 2003). Many students arrive at higher education without the necessary prerequisite skills, support structures, role models and cultural capital (Bourdieu, 1991) which are essential for academic success (Lillis & Scott, 2007). The capacity to write well is an essential skill for lifelong learning (a point not fully appreciated by some first year university students), as is the ability to effectively communicate ideas (Breivik, 2000). In recent decades the student body within the Australian university sector has become increasingly diverse, culturally and linguistically (Lawrence, 2005)

Academic support centres within universities are often expected to teach (or to co-teach) incoming students the mechanical dimensions of academic writing (Harris & Ashton, 2011).
It is feasible, in a short period of time, to teach students the appropriate structure of an essay, how to shape thesis statements, and to use the thesis as a central argument. Once taught those basics, it does take practice and effort for students to apply those skills to assessment tasks (Crosling & Wilson, 2005). Provided with quality feedback (Hattie, 2007) students can then make significant skill gains in a relatively short period of time. However, whilst short courses may increase students’ mechanical skills, it is only through enculturation into the life of academic studies, and through exposure to both discipline-specific content knowledge, skills and understandings, that students come to fully appreciate the complex writing demands usually imposed by university study (Briguglio, 2007).

**University writing: two dimensions**

Therefore, there are two distinct dimensions to the writing that is completed at university level study. There is the mechanical aspect, where writing has specific forms and structures, and uses a particular approach and genre (RocheCouste & Kaldor, 2002) and this presents unique challenges to novices. Some of the challenges that most students face early in their studies are the use of in-text and end-text referencing, the ability to paraphrase and summarise, and the ability to use the work of others without plagiarising (Lusher, Pittam, Payne, Elander, & Fox, 2009). On many occasions university writing programs need to overcome the effects of previous schooling; many students openly acknowledge that at high school, they would copy and paste directly from web pages, and that this was rarely identified as being inappropriate. It is problematic that unlearning is significantly more difficult than learning something for the first time (Becker, 2010). As they begin their university studies, students are also enculturated into the ethical behavioural standards that are required for academic work, as noted by (Rosamond, 2002) p168: "Ethical behaviour is the cultural glue that enables academia to function successfully". Time pressures are likely to encourage poor academic literacy, such as cutting and pasting from online documents (Brabazon, 2007), and students need this awareness. Writing at university requires sufficient time for a student to write, reflect and edit. For many students this longer and more engaged process of reflection and editing is new to their writing experience, and they find this difficult to manage. Writing at university regularly means that more time is spent in editing, than was apportioned to writing - a new concept for the novice writer. The second dimension to university writing that students encounter is vastly more complex than the mechanical aspects; it is coming to understand that they need to engage with higher order thinking skills, to transform information, to make it their own, and to reflect critically on the sources used (Graham, 2009). Several researchers contend that this is a culture-specific Western concept (Canagarajah, 2002) and can certainly pose particular problems for some International students. In Australian universities, students are expected to be able to evaluate, synthesise and apply information in relatively innovative ways, particularly as they advance through their studies. Assessments at university which are likely to gain the highest grades are not only mechanically accurate, but more importantly, interrogate ideas and concepts, transforming information, and the writer's intellectual growth, via ‘the writer’s voice’, is often palpable. Mechanically sound essays might achieve a pass or credit grade, but only papers which demonstrate higher order thinking are likely to achieve higher grades. If few
students have sophisticated mechanical writing skills on entry, fewer still have capacity to apply higher order thinking skills to the way information is sourced, reviewed, reflected upon, and then articulated.

Surveys of students’ attitudes towards writing indicate that students are able to identify that a lack of familiarity with academic conventions was likely to be a difficulty (Briguglio & Howe, 2006). Novice students need to be enculturated, over time, into the differences that exist between university study and a non-university environment, and these more complex demands. These are generally multifaceted skills and develop over time; and no short supplementary writing course can provide these for any student. Students need to be exposed to content which challenges their thinking, which is difficult, which they have to wrestle with, in order to grasp new ideas and to form new connections (Thomas, 2009). Students need to be trained to postpone judgement and tolerate ambiguity when learning, and to resist the urge to dismiss material not yet fully understood. It is only through this ambiguity that concepts can be grasped, expressed, and transformation occur. Stronger students will persist, and struggle, in order to come to new understandings, or to position themselves in such a way that they are able to challenge concepts and ideas with intellectual rigour. Universities need to supply training and skill development in a sequenced, logical and incremental manner, developing skills through carefully considered in class tasks, and assessments.

**Writing in undergraduate Health Science courses**

Academic research and writing becomes synonymous with knowing how to learn in effective ways (Graham, 2009). Health Science courses from first year position topics that attempt to apprentice students into research and writing tasks that are academically rich (Higgs, Sefton, Street, & Hay, 2005). Students entering university need the capacity to undertake study and research and to communicate their findings and knowledge in a manner which is appropriate to the disciplinary conventions that exist within the particular genre, and field of study (Hyland, 2008). Students need to realise that different disciplines use different styles, referencing formats, and methodologies towards writing and expressing ideas. The writing skills that students need to be successful at university, need to be learned in the context of their discipline area, embedded within the curriculum (Andon, Cogo, & Wingate, 2011) in an ongoing and systematic way, and be part of an integrated process of skill development within undergraduate studies (Baik & Greig, 2009). Health Science students need to be trained to approach any writing task with a ‘big picture view’ and that they need to able to construct a cogent argument supported by evidence and research (Luckman, 2009).

Academic staff in the School of Health Sciences at the University Of Notre Dame Australia (UNDA) have been concerned with the declining literacy standard of first year undergraduate students but had no empirical data to support such an assertion. In 2010, UNDA introduced a post entrance literacy assessment (PELA) across all academic faculties. The test involved a reading and comprehension section, a vocabulary test, and an extended writing task where students have to construct two paragraphs of an essay, with the first paragraph having to contain a thesis statement. The use of a diagnostic assessment task to identify students needing additional support, and providing a program for those students, allows for a focus on
potentially vulnerable students (Huxham, 2006). Diagnostic writing completed in class allows for a fast and valuable identification of students who are “at risk”, as (Brunk-Chavez & Fredericksen, 2008) (p.89) note: "The in class diagnostic essay may serve as a useful indicator of a student’s ability to succeed". Students, who choose not to engage with support offerings once identified as needing them, are far more likely to fail within their studies (Huxham, 2006). The PELA was administered to all first year Health Science students via CO115, Academic Research and Writing in Health Sciences, a discipline specific core literacy unit.

The purpose of the present study was to determine if the PELA test could:

(i) reliably identify “at risk” students who are likely to perform poorly in all units of study including CO115,
(ii) reliably identify a correlation between performance in the PELA test and the final grade obtained in CO115, and,
(iii) reliably identify a correlation between performance in the PELA test and the final grade obtained with other units, most specifically the core first year anatomy unit, BMS100.

Results

Most students who enrolled into the Health Science courses in semester 1 2011 were recent high school graduates (57%) who met, or exceeded, the minimum Australian Tertiary Admission Rank (ATAR) score set by the University, for each course. There were 10% of students who entered their undergraduate course after completing a semester long Academic Enabling Support Centre (AESC) run bridging course, called the Tertiary Enabling Program (TEP), 15% came from a Certificate IV pathway via TAFE, 3% came from students entering via a Special Tertiary Admissions Test (STAT) and 14% were those “Other” students entering UNDA from another university course, mature age entry, or transferring from another course within UNDA.

Health Science students enrolled full time at UNDA must complete four units of study in their first semester; these include the foundation unit CO115: Academic Research and Writing for the Health Sciences which is compulsory for all students, the core Human Anatomy unit BMS100 Human Structure and Function, is a requirement for three of the five undergraduate Health Science courses, while the remaining two or three other units come from either a Health Science or Biological Science unit(s). At the start of semester one 2011 there were 201 students enrolled in the CO115 unit and the PELA test was delivered in week one of semester one 2011 but only 163 of the enrolled students completed the test. The test was marked by staff at the AESC and the CO115 unit coordinator. Those students who were at or above the bench mark (≥65%) score were identified as being “sound” with literacy skills and required no follow up. Those students below the benchmark score (<65%) were identified as “development needed”. These students were followed up by the CO115 unit coordinator, and were advised to attend free academic support workshops, available over a variety of dates during the semester, covering academic reading and essay writing. In semester one 2011, 58/163 (35%) students were identified as being “sound”, while 105/163 (65%) were
identified as “development needed”. Halfway through semester it was noted none of the 105 “development” students had attended any of the free support courses provided by AESC. These students were followed up with another round of communication from the unit coordinator, during week six. By the end of semester one, only three “at risk” students had enrolled in the essay writing workshop, but none of them completed the workshop. The final grade distribution for the CO115 unit was that 13% of students failed, 29% achieved a pass grade, 37% achieved a credit, 17% Distinction, and 4% High Distinction.

We analysed the final CO115 grade distribution of the “development” and “sound” students at the end of semester one. Nearly half of the students identified in the “development” group (48% = 50/105) achieved either a Fail or Pass grade, compared to 33% (19/58) for the “sound” students (Figure 1A). The CO115 cohort consisted of 62% females and 38% males overall and when the final grade distribution in the CO115 unit was examined by gender, we found that male students were more likely to perform poorly. There were 16% (12/76) male students who failed the unit compared to 11% (10/88) of female students and 49% (37/76) of the male students who achieved either a Fail or Pass grade compared to 36% (32/88) of female students (Figure 1B).

A comparison of the entry pathway into University for the students was conducted to see if it might reflect on the final grade achieved in CO115 at the end of semester one 2011. Of the recent high school graduates, 30% achieved Distinction and High Distinction grades, compared to 7% for the TEP students. The weakest performing students in CO115 were those who entered the University following a Certificate IV program and those who entered University on the basis of a STAT test result (Figure 2). It is noted that 65% of the Certificate IV students achieved a fail or pass grade in CO115, which indicates that these students were at a high risk of failing more than one unit over the semester and is in line with our previous studies (Figure 2) (McNaught & McIntyre, 2011). It is interesting to note that overall, male students, and those from a Certificate IV entry pathway, were the weakest performing students in academic writing that were identified by the PELA test.

Failing CO115 may reflect that these students are likely to struggle with the academic demands of units such as BMS100 Human Structure and Function, which is a unit renowned for a higher than usual fail rate each semester. In addition, the other compulsory units studied during semester one have a higher demand for reading and writing skills, which could be problematic for the weaker students identified by PELA testing. A comparison of the semester weighted average (SWA) of combined scores from all units of study in semester one 2011 for those students identified by PELA testing as being “sound” or “needing development” was undertaken. The data shown in Figure 3A shows a higher frequency of the “at risk” “development” students (21/105 = 19%) who had a SWA in the fail range compared to those students who were identified as “Sound” (5/57 = 9%). The SWA for students was then compared to the final grades obtained for CO115 and BMS100. In semester one 2011, 49/163 (29%) of students were awarded a fail grade in BMS100; this was significantly higher than other units (averaging a failure rate of 14%). A moderate linear correlation between the final CO115 grade obtained for each student who had completed the PELA test and the SWA (r² = 0.407) (Figure 3B) was identified.
Figure 1. Performance in CO115 by gender. A. The graph shows the distribution of male and female students in the CO115 class in semester one 2011. B. The graph shows the frequency of male and female students and their final grade in the CO115 unit.

The correlation between the final grade score obtained in BMS100 and the SWA was stronger with a moderate relationship observed \( (r^2 = 0.6673) \) (Figure 5C). Unexpectedly, only a weak linear correlation was observed between the final grade scores obtained for CO115 and BMS 100 \( (r^2 = 0.1034) \) (Figure 3D).

**Discussion**

This study began with the question of whether a PELA test could reliably identify “at risk” students who are likely to perform poorly in units of study including the core academic literacy unit (CO115) and if there was any correlation between performance in the PELA test and the final grade obtained in CO115. The data shows that the PELA test could reliably identify those students with weak writing and literacy skills, but surprisingly, found no major correlation between the PELA test results and the final grade obtained in CO115. Profiling students, in combination with PELA results, and in the light of the degree being undertaken, was far more useful than the test results alone.

Most concerning to academic staff was that out of the 105 “at risk” students identified in the PELA test, none of these students appeared to identify the potential benefit of attending free
academic support courses in reading and writing. The pervasive question and issue remains: Why do ‘at risk’ students not take up support courses?

**Figure 2. Performance in CO115 based on entry pathway to UNDA. The graph shows the proportion of students achieving the final grade in CO115 in semester one, 2011.**

These students received regular communication about the support courses from the unit coordinator, and they were well received by students who attended them. The courses were offered on multiple occasions through the semester and were free. As a direct response to this research, for semester two, 2011, a change was made to the School Regulations, making attendance at support courses compulsory for students who were flagged in the PELA testing. Research is now required on the efficacy of this measure to ascertain if it does improve student performance. There was some concern by staff that loading support courses with reluctant and resentful participants could be detrimental to the learning environment. Early indicators suggest that even though some students attended begrudgingly, once physically present at the support classes, they participated amicably. Their exit survey feedback was as positive as those students who attended by their own volition. Health Science students enrolled full time at UNDA must complete four units in their first semester; one being the core Anatomy unit, BMS100. The BMS100 unit requires a significant amount of rote learning to memorise and recall the discipline-specific information, whereas the other three units usually completed by first year students rely more heavily on reading and writing skills for success.

Certainly, in an ideal situation, the support courses would not be compulsory because students would, as independent and motivated adult learners, be choosing to take up mechanisms which enable them to be more successful with their studies. Mechanisms which demand support through compulsory methods are less likely to engender deeper values around independence as a learner.

In this study, a weak linear correlation was observed between the final grade obtained in CO115 and BMS100 ($r^2 = 0.1034$). Perhaps this is not surprising given that the academic skills required to pass these two units are quite distinct. CO115 requires students to formulate written assignments where they are asked to explore a theme or a specific question. In contrast, BMS100 has a high reading load, a voluminous ‘reader’, and requires the students to grasp a range of subject-specific vocabulary. BMS100 assessment tasks also require that
students are skilled with short answer question strategies, as this form is used heavily within assessment.

Figure 3. Comparison of semester weighted average scores (SWA) and final grades in foundation year units. A. Histogram shows the frequency of students achieving an SWA over a range of scores of 0-100. The groups were divided on the basis of the students performance in the PELA test and shows their SWA across 4 units of study in semester one 2011. B. A linear regression comparing the SWA versus final grade obtained in the CO115 unit in semester one 2011. C. A linear regression comparing the SWA versus final grade obtained in the BMS100 unit in semester one 2011. D. A linear regression comparing the final grade in BMS100 versus final grade obtained in the CO115 unit in semester one 2011.

We observed a moderate linear correlation ($r^2 = 0.407$) between the students final grade in CO115 and their SWA across all units of study in semester one. Therefore, a student’s grade in CO115 could be a reasonable indicator of performance across the semester. The focus in the CO115 unit is to teach students the required academic writing and referencing skills to enable them to perform well at an academic level across a wide range of Health and Science subjects. Therefore CO115 is not strictly a “heavy content” unit, rather, students are provided a variety of assessment items to build on the skills of constructing and writing a research report and a literature review. Ultimately, they need to be proficient in reading and comprehension as well as writing. They simply cannot rely on rote learning skills to pass the unit but instead are required to build on their pre-existing writing skills that should have had their foundations laid down in High School. We suggest that students completing English courses less than stage 3, at High School, are unlikely to have adequate literacy skills, which sets them up for poor performance at the tertiary level.
Through the course of the present study it became apparent that many Health Science students identified as “at risk” through PELA testing do not appreciate the value of academic writing skills to their chosen course, and this was especially true for those students in a sport-related fields, e.g. Bachelor of Exercise and Sports Science (BESS) and Bachelor of Health and Physical Education (BHPE). The academic staff who teaches CO115 are innately aware of the importance of strong writing skills for continued success throughout a student’s course in both Health and Science units. Students acquire these skills through a variety of assessment items within their units of study. Unfortunately, as demonstrated through self-assessment data collated as part of the PELA, many Health Science students do not have a realistic self-awareness of their own academic skill set. It was speculated that students entering the BESS and BHPE courses have probably excelled at sport during their formative teenage years. These students may have a misconception that tertiary Science based courses in BESS and BHPE are likely to be about "playing sport" and that their sporting skill will sufficient to get them through their course. Another factor that could perpetuate a lack of realistic sense of one’s own skill set is that students are able to negotiate High School and/or TAFE to gain direct entry into their chosen university course without having to do academically demanding courses. That 105 students, identified in the PELA assessment did not engage with the free academic support was alarming. Further investigation is needed to see if the lack of self-awareness is unique to the Health Science students in general, or specific to this cohort, or if it is a more endemic characteristic of contemporary High School students, across all academic disciplines.

Conclusion

The research presented demonstrated the value of academic and professional partnerships to enhance the FYHE experience. Close collegial relationships between staff in the Health Sciences and the AESC which led to more responsive interventions designed to assist these “at risk” students to achieve success within their studies. It led to strong debates between staff, and eventually, from that robust discussion, to an articulation of shared understandings, and willingness to pilot particular academic interventions. Future research will be directed at following the “at risk” students identified throughout 2011 to compare the course outcome for those students who attended academic support programs during their first academic year, to those who ignored the advice of academic staff.

References


