Routledge
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Developing Information Literacy and Academic Writing Skills Through the Collaborative Design of an Assessment Task for First Year Engineering Students

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In this project, a collaborative three-way partnership approach to assessment design utilising the combined skill set of a lecturer, librarian and first year learning advisor was taken. The project aimed to design a first year assessment task that encouraged success and confidence by allowing for the development of core skills in information literacy and academic writing whilst maintaining disciplinary standards. Team skills were identified, tasks were negotiated and carried out collaboratively, and the process documented and reflections noted. The agreed-upon key tasks underpinning the success of the new scaffolded design were selective topic selection and careful question formulation to improve student engagement and understanding. The new scaffolded approach to assessment was rewarding for staff, and preliminary student feedback suggests an enhanced learning exercise for students.

Keywords: information literacy; academic writing; librarian; first year advisor; collaboration; assessment; assessment design; first year; engineering

Introduction

There is a need for supportive learning environments in the transition to higher education to allow students to become accustomed to discipline norms and academic standards. Kift and Field (2009) called for a holistic approach to the first year experience with embedding of core academic skills within a high-challenge, high-support curriculum. The current trend is to direct effort towards providing educational instruction for first year students so that key learning outcomes such as information literacy (McGuinness, 2007) and written communication (Beckman & Rayner, 2011) are met from the start of the degree. This ensures students have these skills when required in later years and into employment situations (Venables & Summit, 2003). To support the acquisition of these skills through curriculum development, partnerships have been formed between lecturers (faculty) and librarians (Bruce, 2001; Dobozy & Gross, 2010; Ford, Foxlee, & Green, 2009; Lo & Dale, 2009; Massis, 2012; Meth & Florence, 2012; Palmer & Tucker, 2004), between librarians and academic advisors (Pan, Valliant, & Reed, 2009), and lecturers and academic advisors (Dudley-Evans, 2001). Less common is the three-way partnership approach to support the development of these skills to enhance student success (Einfalt & Turley, 2009).

In the current study, the team approach developed by the librarian, the first year learning advisor (FYA) and the lecturer extended to all facets of the assessment process with each member drawing on individual expertise and contributing to devising the

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assessment task, lectures, tutorials, online, face-to-face and informal support, evaluation and review. This inclusive approach of embedding academic literacies within the discipline provided a holistic assessment task designed to enhance first year engineering students' generic skills in information literacy and academic writing. The authors' ability to articulate their individual contributions using common language across content and first year pedagogy, with confidence and respect, contributed to the effectiveness of the collaboration. It is however widely acknowledged that there are many potential barriers to developing effective collaborative partnerships (Pham & Tanner, 2015) and this paper also explores how some of these were overcome.

Information literacy

'Information literacy is the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning' (Association of College & Research Libraries [ACRL], 2015).

Information literacy has now evolved to become more than just a set of specific skills to be taught and acquired, as seen in the old model of generic library classes. According to the new 2015 ACRL framework, information literacy acquisition has the ability to empower and transform individuals, organisations and society. The role and power of information as a socially constructed phenomenon does however, come with added responsibilities. Academic staff have a greater responsibility in providing opportunities for student engagement with the core ideas about information and scholarship within a discipline-specific context. This can be done by designing well-constructed curricula and meaningful assessment tasks that foster these skills within the discipline. Librarians and academic advisors also have a greater responsibility in identifying areas where collaboration within the faculty can lead to the creation of a more cohesive and integrated approach to information and knowledge synthesis with the ultimate aim of extending the learning opportunities for students. Constructive alignment of assessment tasks to better equip students with life-long learning skills can be attained by adopting a holistic three-pronged approach by lecturer, librarian and FYA.

Information literacy is considered important in the development of engineering students (Liu & Sun, 2012), and Engineers Australia (2013, p. 6), includes '*professional use and management of information*' as a key element of the Stage 1 Competency Standard for professional engineers. Although students now enter university more tech-savvy than in previous generations, information literacy cannot be assumed (Kennedy, Judd, Churchward, Gray, & Krause, 2008; Lea & Jones, 2011). According to Salisbury and Karasmanis (2011), librarians are ideally placed to identify gaps in the information literacy levels of students. These gaps include tasks such as identifying and understanding new information, developing sophisticated search strategies and finding journal articles.

Librarians have found the best way to teach information literacy is through embedding the relevant skills within the units of study, rather than teaching generic skills in library workshops during orientation. Anecdotal feedback from librarians at the University of New England (UNE) regarding library workshops is that students mistakenly link self-perceived technological adeptness with an ability to find information in their new tertiary setting. Students tend not to engage in non-compulsory tutorials on generic skills, and other opportunities are needed to support students to learn the discipline-specific requirements (Beckman & Rayner, 2011). These issues can be overcome when

information literacy skills are embedded within the discipline in a timely fashion so that students can see the need for the skills and have the opportunity to apply the skills in a meaningful way (Leckie & Fullerton,1999; McGuinness, 2007). Notably, information literacy is taken more seriously by students when the assessment task is counted towards their final grade for the subject (Macklin, 2001). A successful way to integrate information literacy skills is for librarians to actively target academics ('academic champions') who are sensitive and sympathise with the difficulties students experience when researching topics for assessment tasks (Manuel, Beck, & Molloy, 2005).

Academic writing

For first year students, the tertiary landscape is unfamiliar and expectations are unclear; this is particularly so in the area of academic writing (Armstrong & Sanson, 2012; Moss, Pittaway, & McCarthy, 2006). Academic writing is governed by rules and practices that adhere to traditional conventions. Written communication is a Stage 1 competency for engineers: *Effective oral and written communication in professional and lay domains* (Engineers Australia, 2013) and is a focus of academic and professional development. Unsurprisingly, academic writing continues to be a major issue presenting for first year students seeking academic support at UNE.

At UNE, over a decade ago, academic support and skill development for first year students moved away from the traditional centralised model of generic support. This was somewhat unusual at the time and the FYA provided discipline specific support that recognised the needs of the institution's increasingly diverse first year cohort. The FYA, although managed centrally, was employed as an academic and was located within the teaching areas for the science and engineering disciplines.

This situation created a space that favoured establishment of constructive working relationships and the development of joint curricula. Elton (2010) posits that the disciplinary rules of academic writing are often tacit and successful development of skills is reliant on input from disciplinary specialists as well as writing specialists. Co-location afforded crucial collegial conversations where assumptions and values could be safely explored and challenged. This led to an understanding of roles, sharing of knowledge and ideas and ultimately contributed to the credibility of the FYA. As it is generally agreed that academic writing skills are most effectively developed within disciplinary contexts and framed to meet the requirements of specific assessment tasks (Tinto, 2009), the development of positive relationships was critical to the success of the FYA in supporting the writing needs of new students.

Assessment

Assessment is important at a student, lecturer, institutional and community level; and is about understanding the quality of student learning (Australian Universities Teaching Committee [AUTC], 2002). A well designed assessment task can encourage students to study and keep up to date with their work, as well as promote the development of knowledge acquisition skills. Students require a clear understanding of what is expected in the assessment task and they also need information about their academic progress. Coinciding with this, the lecturer needs to know how the students are progressing in their understanding of key concepts and how proficiently they are mastering the required skills. The tasks need to be assessed in a manner that ensures academic standards are upheld (Adie, Lloyd, & Beutel, 2013). Overarching this is the need of the institution to

communicate high academic standards to ensure graduates are well prepared for practice and employment (Coates, 2010).

Essay tasks form an important, and often early, assessment component as they are able to assess higher levels of thought and complex intellectual ideas. To undertake an essay task a student must find, analyse and synthesise information. An argument has to be structured, and clear and concise evidence provided to support a point of view without being biased (Toohey, 1999). Essays draw on a student's understanding and integration of content, information literacy and academic writing.

Academics often work in isolation when developing course curricula; however, the development of an essay writing task is an ideal situation for a collaborative process between academic, librarian and learning-support staff (Beckman & Rayner, 2011). This paper describes the collaborative processes which led to a re-structured essay task that was responsive and encouraged success and confidence by allowing for the development of core skills in information literacy and academic writing.

The original task

The initial assessment task in a core unit for first semester engineering students was a 1500 word essay where a draft-redraft process included writing an essay for initial submission (draft), and then rewriting the essay incorporating feedback from markers in the redraft stage. This final submission was not achieving the desired outcomes in the development of academic writing and information literacy. Although the feedback on the draft essay was comprehensive and supported by in-class discussion, final submissions (redrafted essay) demonstrated limited active engagement by students. Students frequently resubmitted the first draft with minimal, if any, changes or simply reordered the material so it appeared they had made changes with no real change. To enable comparison between the draft and redraft submissions, students were requested to attach the original to the redraft for final assessment. This was problematic as not all students were compliant with the instruction. As a back-up for markers in later years the original marking framework was recorded and a copy of the feedback sheet was kept to ensure students had addressed the issues raised in their draft. Overall, this process was very time consuming for staff. A revitalised assessment task incorporating input from FYA, librarian and lecturer was instigated.

Building on a long established working relationship and experience of assessment strategies across the units taken in the first semester by engineering students, the team of lecturer, FYA and librarian set out to review the initial assessment task. Whilst there was an appreciation of the existing draft/redraft essay design as embedded in social constructivism, there was a desire to increase opportunities for the development of information literacy and writing skills in a supportive learning environment that acknowledged and valued the diversity of student backgrounds and promoted early success. For almost a decade, a feed-back loop had existed between the students, FYA and lecturer. In addition to this, the librarian had acquired an understanding of the students' information seeking behaviour and support needs. The shared observations of the lecturer, librarian and FYA, student comments and an evaluation of the effectiveness of the task in achieving the desired learning outcomes, contributed to redesigning the assessment.

The redesigned task

Overall weighting of the task (40%) and the learning outcomes were retained from the original assessment task, but the redesigned task was staged to introduce students to the

expectations of essay writing in a scaffolded manner. The assessment was divided into four steps that addressed basic essay writing and emphasised such threshold concepts as critical reading and synthesis (Meyer & Land, 2005). To keep students engaged in learning, the early steps built on skills required for the main task (essay) and were linked by content, thus establishing and maintaining task relevance.

Part A (referencing and annotated bibliography – 5%) required students to construct an annotated bibliography consisting of one of two journal articles (supplied), and finding four refereed journal articles on the topic of the essay (Part C). In Part B (5%), students were asked to synthesise information from three journal article extracts into a well-structured paragraph on a given topic, related to the topic of the essay. In the first year curriculum it is important to have early assessments to ensure students are engaged and have timely and relevant feedback. To ensure students see the value in undertaking the task it should count towards the final grade, but be of low weighting (Taylor, 2008). In Part C students were required to write a 1500 word academic essay (25%) due in the later part of the semester. The final step, Part D, consisted of a reflection (5%). Students were asked to reflect on the process of finding information and writing their essay. They were also asked to provide advice to new students undertaking a similar task. These steps, which were spread over 13 weeks and submitted in weeks 2, 4, 9 and 13 are shown in bold in Figure 1.

The collaboration

The collaborative approach to topic selection and finalisation of the essay question took several weeks to complete. Whilst this represents a considerable time investment, the work took place well ahead of the busy teaching period. This process has now been streamlined and we are now much more time efficient. It was important from the librarian's point of view that the chosen essay topic had adequate library resources to assist students. Initial discussions between the lecturer and librarian about current issues of interest and significance to the unit informed and streamlined the librarian's research on possible topics. In her experience of supporting students in finding information for assignments, she found that some topics were much easier to retrieve relevant resources than others. The content knowledge of the lecturer and experience of the librarian together enabled the identification of topics suitable for first year undergraduate students. As this unit is about environmental sustainability the topics chosen included the concept of food-miles, impact of bio fuel manufacture on food security, e-waste recycling and methane production from landfills.
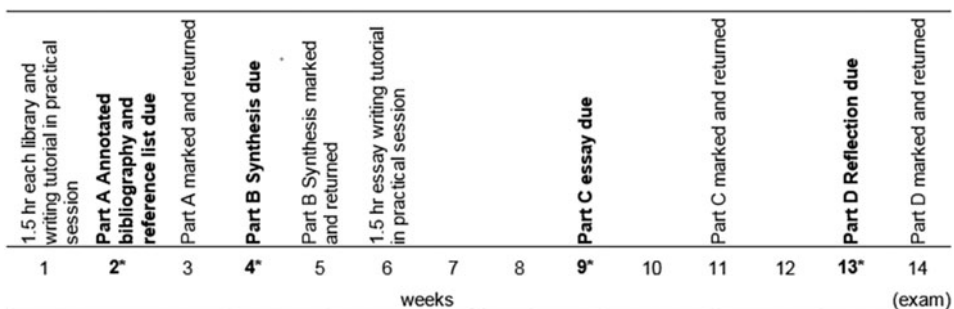

Figure 1.   Timeline showing tasks and embedded support available throughout semester. *Task submission weeks.

In consultation with the FYA, the lecturer and librarian defined the essay question and the lecturer wrote an essay plan. It was important for the FYA that the question wording was optimised to ensure students had a clear understanding of the question being asked and that the expectations of students and lecturer were aligned (Figure 2).

The outcome of the continued collaboration between the lecturer, librarian and FYA was an assessment strategy in four achievable parts, building one upon the other and using a high-challenge, high-support approach with staff collaboration and embedded support to develop confidence and promote student engagement. The notion of high-challenge, high-support assessment tasks is fundamental to intentional first year curriculum (Kift & Field, 2009) and is considered as best practice in first year pedagogy (Kift & Field, 2009; Kift, Nelson, & Clarke, 2010).

Also considered best practice, according to the American Library Association's *Characteristics of programmes of information literacy that illustrate best practices: A guideline* (2012), is the process whereby librarians effect collaboration in information literacy embedding projects with disciplinary faculty members. This focus on enhancing student learning and skill development within a discipline-specific context is more effective when it takes place at different stages – as in this project: at the planning, delivery, assessment, evaluation and refinement stages of the intervention.

Embedded support was provided by both the librarian and FYA throughout the semester. The librarian produced search strategies that showed students where to find
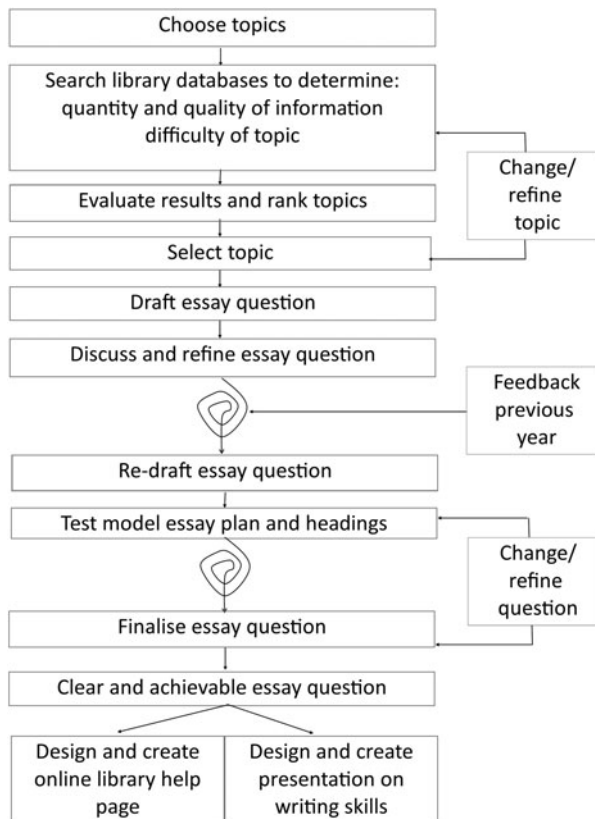

Figure 2.   Schematic diagram of the collaborative process.

background information and which library databases to use to locate relevant full text articles – a previously identified difficulty for this cohort (Gurney & Wilkes, 2008). Targeted search strategies were placed on an assignment help page which was then placed in the online Moodle unit in the Learning Management System. The librarian also designed and presented a 1.5 hour hands-on library tutorial including search strategies and tips to develop information literacy skills which complemented the online assignment help page.

The FYA designed a 1.5 hour tutorial to instruct students on how to approach an annotated bibliography and how to write in a scientific, engineering style in higher education. In week 6, the FYA and lecturer ran another 1.5 hour tutorial on how to approach the essay including structured advice as to breaking down the essay into five paragraphs (Cismas, 2010). In 2009 and 2010 the tutorial was presented as a lecture, but on reflection of student comments and observations by both the lecturer and FYA, from 2011 it was conducted using a social constructivist approach (Sullivan, Johnson, Mercado, & Terry, 2009). Students were given a copy of an exemplary essay on a previous topic and asked to critique it using the same marking framework used to assess their assignment. The FYA was available for one-on-one and small group consultations with students throughout the semester either by face-to-face, telephone, email or through the Moodle discussion forum.

Opportunities and challenges

Collaboration between the lecturer, librarian and FYA brought together knowledge and skill sets that promoted developmentally appropriate assessment and sustained a holistic approach to student learning The librarian offered expertise in organising, evaluating, and locating resources; essential skills for academic success. As content expert, the lecturer supported students to synthesise, theorise and add meaning to the essay topic as well as grade the assessment. In an environment without the feeling of being judged, the FYA provided an avenue for students to discuss challenges and difficulties with the task. Neither the librarian nor the FYA graded the assessments.

Identification of team skills revealed interesting overlaps (see Figure 3). All three team members held science degrees and postgraduate qualifications in higher education (Graduate Certificate in Higher Education, GCHE), were experienced in their respective fields, and had a keen interest in supporting student learning. These attributes alone do not necessarily mean that collaboration is easy, indeed there are many complex dynamics at play in the collaborative environment. Pham and Tanner (2015) investigated some of the enablers and constraints on the collaborative process suggesting that 'relationship-building over time is fundamental; collaborations do not occur without mutual trust and respect of the involved parties'.

Frequently librarians struggle to find buy-in from faculty to seamlessly incorporate information literacy skills into the curriculum and assessment tasks. Badia (2013) suggests lecturers, despite thinking that information literacy competencies are important for their students to master, have not yet found systematic ways to integrate this into their units. Tewell's (2013) survey indicated that whilst 82% of faculty felt that information literacy instruction was required by all students, 47% never actually addressed it in their teaching. The availability of library staff and academic advisors to assist in this area is often not taken up by lecturers for many reasons – often time-constraints are cited – and it remains the responsibility of the librarian to engage in discussions to encourage this activity. When an academic is actually interested and passionate about information literacy, the opportunity to become involved in the assessment process provides a good entry point for a librarian and FYA. Additionally, the FYA involved in the first year engineering unit
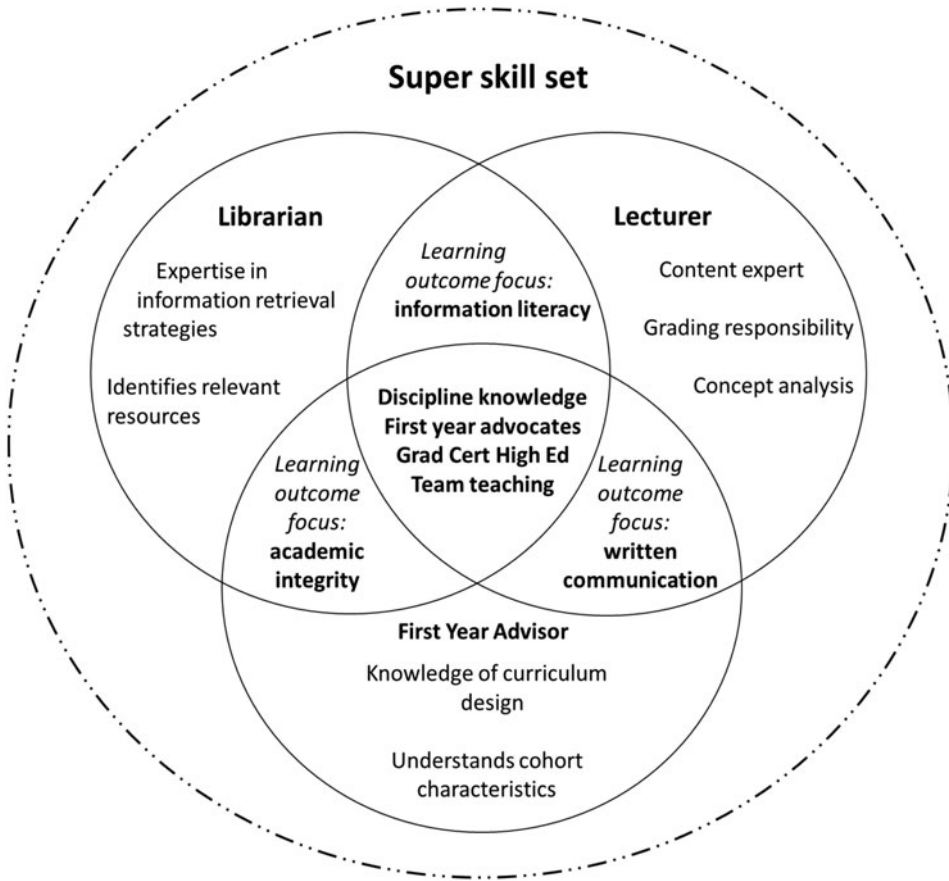
Figure 3. Schematic diagram showing the skills and context each member brought to the team.

initiative had already worked with two previous coordinators of this unit and the current lecturer could see the value of including the FYA's support.

The lecturer and librarian undertook their GCHE together and developed a productive working relationship along the way. Both the science degree and GCHE qualification provided a shared common language and an enthusiasm for developing new ways of engaging students. A shared interest in information literacy resulted in two projects examining how students were using information (Gurney & Wilkes, 2008; Wilkes & Gurney, 2009).

The FYA had the same professional background, along with a heightened awareness of student support requirements at the first year level. These positive factors helped to overcome the often stifling constraint of power asymmetry seen between academics and support staff (Pham & Tanner, 2015). Diverse professional backgrounds and cultures can challenge a collaborative partnership, but mutual understanding and respect for the abilities of each of the team members can contribute to its success. The lecturer realised the common ground and shared interest with the librarian and FYA could instigate improved information literacy outcomes for students. From this heightened awareness, new methods of improving students' experiences were envisioned.

Pham and Tanner (2015) also highlighted the temporal and spatial dimensions of collaborative relationships – the 'time-space' factor. In the present collaboration, the

lecturer, FYA and librarian have worked hard over a number of years to refine the assessment task, always respecting each other's skills and expertise which are brought to the table. The lecturer found the collaboration beneficial in focussing on the Scholarship of Teaching and Learning and reflecting, researching and publishing in her practice of teaching. Early career researchers with heavy teaching loads and imperatives to publish can develop productive relationships, as in this case, providing them with avenues for research output that are non-traditional for scientists.

The opportunity for the librarian to become involved with the assessment task provided three levels of interaction. An initial Library hands-on class, followed by the creation of an assignment help page which was added to the Moodle unit, plus ongoing interaction throughout the period of assessment all increased the validity of the Library as a go-to place for student support. The unique lecturer, FYA and librarian interaction was instrumental in promoting these services to faculty.

For the FYA, involvement with this assessment task provided scope for the normalisation of learning support that promotes early help seeking behaviour which is critical to student success. Notably, as the FYA works with considerable autonomy, the opportunity to form a partnership and work collaboratively with the lecturer and librarian has afforded great opportunities to support the FYA role within the university.

Future directions

The establishment of collaborations with other lecturers to improve student information literacy and academic writing skills within teaching units will always require the basic enablers of a successful collaborative relationship. Essential to these collaborations are a focus on communication, shared values and benefits, and recognition and balance of the power asymmetry often experienced on a university campus. The 'time-space' dynamic of developing personal understanding and respect takes time and commitment from all parties and is necessary for successful university collaboration.

The ongoing positive relationship between the lecturer, librarian and FYA was strengthened through this collaboration, exemplifying how librarians can be regarded as partners with lecturers, rather than servants (Malefant & Demers, 2004). The members of the team have many similar skills and discipline backgrounds ensuring that each is on a 'level playing field' in interactions (Figure 3).

As found in previous studies (Pan, Valliant, & Reed, 2009), all team members have a strong desire to support students to succeed and this provides motivation to continuously optimise this assessment task and their research nexus. The collaborative process has contributed to the professional development of the team members through presenting conference papers, writing journal articles, applying for grants, mentoring and motivating each other to continue lifelong learning through research and training.

It was important for the team to reflect upon the assessment to make improvements and ensure academic standards were being maintained. Some of the ways in which one may reflect upon an assessment task are by: learning from students' mistakes and changing teaching methods to address this; focusing on validity before reliability; asking yourself if you could answer the question posed; thinking of better ways to give feedback to help students improve; and finally, doing 'everything in your power to lessen the anxiety raised by assessments' (Ramsden, 2003).

This collaborative approach, drawing on the skills and knowledge of the lecturer, librarian and FYA, in an open, transparent and trusting environment enabled the successful redesign of the assessment task. The scaffolded task was created, enhancing the

opportunity for students to develop their information literacy and writing skills. Reflections of staff were documented throughout the development and review stages to help inform assessment tasks in later years. The two most important criteria for the success of the assessment task were topic selection and the clear formulation of the essay question.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes

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Lisa J. Gurney is the Librarian supporting staff and students within the Schools of Environmental & Rural Science and Science and Technology, UNE. Lisa holds tertiary qualifications in Horticultural Science, Library and Information Management and Higher Education. Her research interests are collaborative information literacy embedding into first year undergraduate units and the first year experience at university.

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