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Right from the Start: A Rationale for Embedding Academic Literacy Skills in University Courses

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This paper summarizes relevant research concepts, and then describes a case where online tutorials were used to integrate one generic academic skill - information literacy - into first year business courses. Tutorials covering the skills and information required to complete course assignments were designed so the content can be easily modified for different subjects and assessment tasks. Feedback from trials suggests that significant gains can be made using this embedded approach. Theoretical grounding of design concepts, integration into course activities and collaboration between course lecturers and academic support staff are all key success factors. The authors propose that this integrated approach is the most effective way to promote academic literacy skills development in large university classes, and that the learning design principles used in this case for Information Literacy could work equally well in other academic skill areas. Further research will be conducted to test this assumption.

academic skills, curriculum design, integration, online tutorials

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Introduction

Universities around the world publish intellectual standards and attributes that all their graduates will achieve. While each discipline sets its own professional standards, academic skills such as critical thinking, reflective writing, reasoned analysis, problem solving and information literacy are common to all. Various strands of research from the past 40 years recommend embedding these skills in the curriculum as the way to promote student success, yet this practice is not yet mainstream. The University of Auckland, like most tertiary institutions, defines these intellectual skills and capabilities in graduate profiles (The University of Auckland 2003). Research informed practice models show that well-designed activities embedded within discipline-based programmes are one highly effective way to promote acquisition of these skills (Martin & Ramsden 1987; Wopereis et al, 2008; O'Hanlon & Diaz, 2010). Dimensions such as relevance, interest and motivation are addressed by this approach. Furthermore, learners are required to practice and reinforce the skills in meaningful contexts. The ideal way to produce fully capable graduates is to embed academic skills in the first year curriculum, then continue their application, reinforcement and further development throughout the degree programme. With increasing scale, flexibility and student diversity at tertiary level, this alignment across years and programmes can easily be lost and coordination becomes unmanageable. A further challenge arises where teachers assume that students will come fully equipped with the necessary skills, and if they don't, it's their own problem and someone else's responsibility to fix it. This is problematic on many fronts. It prompts a potentially inefficient approach to curriculum design, causes peaks in demand for support services if students choose to call on them and inconsistent results if they need support but don't make use of available services.

Research on academic skills integration and the increasingly common collaborative relationships between lecturers and central units such as libraries and elearning services offer new opportunities to ensure that graduate standards are maintained. Johnson et al, (2010) identify such collaboration as part of a key trend, which sees students, their peers and teachers all working towards the same goals. This paper summarizes relevant research, and presents brief details of a case study to illustrate one such opportunity.

Research on academic skills development

Back in the1980s, research into student learning identified the benefits of embedding generic academic or intellectual skills into subject focused learning tasks rather than teaching them as separate activities.

> *The recognition that study techniques training may be misleading or harmful to students, and that the advice given is idealized, often irrelevant and not based on our knowledge of how effective student learning actually takes place has lead to an advocacy of 'integrated' learning skills programmes and to learning to learn guides and courses which emphasize awareness of purpose and of the means of the ends rather than a selection among the means of studying*, (Martin & Ramsden 1987, p165).

In *The Thinking Curriculum* Nisbet (1993) promoted infusion of what are variously referred to as metacognitive skills, effective learning skills or critical thinking skills. The position this work adopts is that subject based study and generic skills acquisition are two inseparable aspects of learning. Diana Laurillard was one of the early researchers to study learning in authentic settings because she believed context and process were inextricably linked (Laurillard 1979). This has since become prerequisite for most educational research. While early authors talked about *the natural context of teaching and assessment* (e.g. Martin & Ramsden, 1987), more recent literature refers to the inclusion of generic skills in *authentic tasks and authentic assessment* (e.g. Herrington & Oliver 2000). This supports acquisition with relative ease of what Waters & Waters (1992) call competencies such as searching, selecting, analysing and referencing, by students whose higher-level reasoning determines they are required to complete a task. Students need to be competent in the use of these generic skills, as well as able to select and apply them at appropriate times in a range of meaningful contexts.

> *Effective lessons in metacognitive skill development interrelate subject matter with cognitive strategies and skills*, (Patrick 1986).

Many researchers agreed that repeated application and additional focus on teaching for transfer to different contexts was required for effective learning to occur. In simple terms, the concept of transfer is what allows students to acquire skills in one context then select them, as appropriate, for application in another.

> *...research has also shown that metacognitive skills can be trained, maintained and transferred to dissimilar situations* (Osman & Hannafin 1994).

The assumption that transfer would occur as a natural consequence of proficiency proved unreliable, as students were unable to build conceptual bridges between different study contexts without the assistance of models, explicit instruction and practice opportunities (Swartz 1987). Ennis (1989) found that transfer of skills and abilities from one domain to another depended on the creation of opportunities for broad application and practice. The point at which generic skills become procedural and can be called up without cognitive effort, combined with high-level understanding of requirements, is what finally allows learners to select and apply appropriate skills with full concentration on the task in hand.

While much of this research was conducted around thirty years ago in different circumstances, it remains relevant today, and is perhaps even more informative in the contemporary institutional context. The current challenge is how to embed this model of generic skills acquisition across large, diverse student populations and flexibly structured degree programs. The literature shows that it is not sufficient to design first year courses with embedded generic skills because effective learning requires practice, reinforcement and the ability to transfer skills. All this cannot realistically be achieved within one year of study. For example, Pope (2009) recommends level one modules focused on basic skills as the foundation on which to build contextually and incrementally in later years. Ford, Foxlee et al. (2009) found 2nd and 3rd year students had not retained generic skills explicitly taught in first year. The problem is compounded when university teachers do not consider these aspects of learning to be part of their responsibility, and qualifications from disciplines other than education may leave them ill equipped to address them.

Collaborative relationships with specialist staff from academic support units offer significant opportunities to overcome these hurdles.

Focus on information literacy

Information literacy is the example used here to describe how academic skills can be taught using an embedded model in the current university context. It is reasonable to suggest that the same learning design principles could be applied to any other generic academic skill. The University of Auckland's Information Literacy (IL) Policy aims to ensure that information resources are sourced and used as effectively as possible within teaching and learning environments. One strategy used to achieve this aim is integration of the Library's IL programme with subject based courses and teaching. The programme has been in operation for many years, though lately it has offered greater flexibility through elearning, including the use of interactive and self-paced tutorials as part of credit bearing courses. The aim is to engage students with core concepts through tutorials that are presented as part of the curriculum, and can be easily tailored to meet the needs of different subjects, courses and assignments.

Shifting to online learning

The shift to elearning started when increasing numbers of students enrolled in first year courses began to limit the opportunities for personalized, face-to-face instruction in business information literacy skills. Prior to development of an elearning solution, Librarians presented a specifically focused lecture as part of the course, and students were advised that they could attend further courses offered at the Library. While this arrangement reached many students, it was not considered ideal either as a learning design or a learning opportunity. Not all students took advantage of the one off opportunity to attend the lecture, and even though course-relevant examples were included, the staff involved did not perceive the skills to be as well embedded as they could be. Further challenges arose from the diverse backgrounds of international students with English as an additional language (EAL), and from mature students returning to graduate study requiring reiterative high quality information literacy instruction. A general trend towards elearning in large first year courses across the university brought the potential of online tutorials into focus. It also provided a way to begin to embed another raft of graduate skills, i.e. for use of information and communications technology (ICT). The Library, in collaboration with the University's Centre for Academic Development set out to develop a suite of online, self-paced information literacy tutorials to service these demands. The Librarians contributed many years of front line experience to the design. A similar depth of experience of research into practice for facilitating student learning came from the academic development side. Since integration was a key objective, cooperation with a Business School lecturer was also required. While the lecturer's commitment took time to develop, demonstration of a working prototype did much to advance this agenda by showing what was possible, and what had already been achieved. Evidence of the potential became much clearer when a tangible product was available for presentation.

Online tutorials – the concept

Developing online interactive tutorials is a common strategy in universities that seek to reconcile the challenges of scale while continuing to apply principles of learner-centred instruction. The literature on elearning reveals a range of opportunities to address the practical and educational aspects of this challenge in efficient and effective ways (see e.g. Wang & Hannafin 2005). For example, Gunn (2006) found some of the challenges of scale could be addressed when individual learners engage with, and receive immediate constructive feedback from online tutorial and

assessment systems. While many things are possible, sustainable development of generic academic skills, or indeed of any skills, still relies on appropriate learning and interaction design. In this case, the aim was to design a range of online activities that:

- Can be customised and incorporated into the curriculum for specific assignments in different subject areas;
- Align with terms of the University's Academic Plan and Graduate Profile statements;
- Are flexible, portable and user-focused;
- Use a range of video, audio, graphics and interactive web-based technologies within learning designs to motivate and engage students from a range of educational backgrounds and age groups.

It is increasingly common for development of this type of elearning resource to involve collaboration between teachers who are also subject matter experts, multimedia and web developers and learning designers. In this case, the initial proposal for online Information Literacy modules was presented to the University's eLearning Group (eLG) by a team of Business Librarians. As the scoping phase progressed, existing Online Information Literacy (OIL) modules produced for a national funding initiative by the University of Otago, Dunedin College of Education and Otago Polytechnic were considered as potentially reusable resources (http://oil.otago.ac.nz/oil/index/Modules.html). The content and reuse potential of the modules rated highly. However, practical considerations around hosting, access through the local learning management system, and integration with the content of course assignments suggested a locally developed solution would be ideal.

The open access / open source nature of the OIL modules meant that any parts of them could be copied and revised for use within locally produced resources, thus offering Library and teaching staff greater flexibility, as well as control of content and use scenarios. Consultation with a key member of the OIL development team brought considerable additional expertise and background information to the local initiative. The locally developed solution also offered an effective way to upskill the staff involved in the project, as they acquired reusable elearning design and development capabilities in the process. They also gained deeper understanding of the content, of learning design for effective teaching and for student learning and engagement.

The aim to reuse and recycle

The information literacy project drew on the experience of an earlier study of a reusable elearning system conducted at the same university. That study related the topical concept of reusable learning objects to a project where an elearning system developed in one faculty was successfully reused in two others (Gunn et al 2005). At a practical level, this was an efficiency measure that used investment in one area as a substantial building block in others. At a conceptual level, it was also an attempt to address the broader issue of why the 'learning object economy' described by Campbell (2003) and other authors (e.g. Downes 2001; Johnson 2003) was not taking off as expected. Reasons needed to be found, so that barriers to wider use and reuse of valuable learning resources could be removed. In the local study, Gunn et al (2005) concluded that teachers need to understand at a detailed level how learning objects or systems function before they can translate that potential into learning designs or activities for use in their own subject area, i.e. they have to

operationalize their understanding of the resources before they can use them. This conclusion is endorsed by the concept of teachers' pedagogical content knowledge described by Barnett & Hodson (2001). Furthermore, what early researchers defined as 'the not invented here syndrome' means that just being given resources developed by others does not foster this level of understanding (Darby 1992). The resources may have to be customized or repopulated with relevant content before they can be meaningfully incorporated into a teacher's professional practice tool kit. The level of time commitment and the learning effort involved are great enough to deter many potential users.

This concept of reuse requires a broader definition than the one that is commonly applied, which simply sees resources developed in one place being picked up and used in others: the latter concept having achieved limited impact. Where the broader definition has been applied, there are many cases where it has successfully addressed those limitations. The broad definition of reusability underpins development of the Business Information Skills Online project http://www.flexiblelearning.auckland.ac.nz/business_information_skills/.

The modules were built with software that provides a rapid prototyping environment and easy to use tools for web course development and publishing. It provides access to all the common features and capabilities of interactive online courses, and empowers users with basic skills in course development and maintenance so they can work with minimal assistance. The aim of this capacity building approach is to foster deeper understanding of elearning tools and development processes in the same way that repurposing the OIL modules resulted in new, reusable learning design skills for staff involved in Business Information Skills Online. At a conceptual level, this narrows the gap between technical development and operationalized elearning design skills using a component-based system that is accessible to experienced teachers and support staff with limited technical abilities. It reduces reliance on specialist staff and, perhaps more importantly in the generic skills context, it allows the learning design effort invested by one person or group to be cloned for reuse by anyone in the institution. Although reuse still relies on a level of operational understanding, the simplicity of the system does much to develop this potential.

Development objectives and target groups

As well as being supported by the literature, the need for an integrated approach to developing Information Literacy skills was identified over many years through the front line experience of Librarians working with various student groups. At a general level, the target group for the Information Literacy Skills project is new Business students from diverse backgrounds and at different stages, for example:

- **Management 101 (compulsory stage 1 course)**: large classes with an average of 2,040 equivalent full time students per annum over the past three years. The majority of this group are young, Net Gen students who cannot all be reached by traditional face-to-face library sessions. The group includes many international and EAL students. A typical scenario sees them consulting Library course resource pages and librarians en masse at the point of need when working on assignments.

- **GSE (Graduate Programmes):** current enrolment of 833 expected to rise to 1,000 in 2010. Typically these are mature students returning to studies. Many work full time and need to update their knowledge, or do not have a grounding in business information skills and resources. They have little time for personal consultations or to attend library

sessions, but need to connect with the online environment and the suite of information resources offered.

- **Inter-disciplinary / inter-faculty programmes:** graduate students undertaking Business-related courses (for example, the Bioscience Enterprises programme) who do not have any grounding in business subjects or resources. This group often contains international and EAL students, and typically has a very full workload.

Both the needs, and increasingly the expectations, of these students are for immediate and convenient access to relevant information. The ability to seek guidance, work with examples, self-test and receive feedback are all critical factors. The ability to do this without booking courses, travelling to various locations and scheduling convenient times in already full timetables offers many obvious advantages. From the Library perspective, avoiding the stress and bottlenecks of peak times and feeling confident that up front investment in online tutorials can better serve the needs of students are two clear benefits. Equally important is the opportunity to work collaboratively with teachers and other service units to fully integrate the generic academic skills outlined in university policies and graduate profiles into the curriculum.

Principles of the design

Early discussion to scope the project identified broad objectives to produce materials that:

- Are flexible, self-paced and web-based, available 24/7 to all students at their point of need and able to be used many times over for reference, practice and reinforcement purposes;

- Fully exploit the web environment and the potential of new technologies to offer interactive, connected, multi-dimensional and multimedia sources;

- Draw on the collective theoretical and practical experience of staff in the Library, the Business School and the Centre for Academic Development to match the local context and draw on previous experience of successful online initiatives;

- Provide interactive web-based tutorial modules to develop the business information literacy skills needed by first year, international, EAL and returning mature students, and focus on the qualities listed in the Graduate Profiles, the Information Literacy Policy and the University Strategic Plan.

- Enhance and develop the learning objects in the existing Business Information Skills tutorials so that they can be used individually to develop a specific skill for an assignment or as a whole to build up the full range of business information skills.

- Provide flexible access to study resources through the Library's website and the enterprise learning management system (LMS) with self-test multiple-choice options.

- Achieve greater engagement and integration by linking to assessment.

- Complement face-to-face instruction modes.

The initial plan was for six modules, though the specification changed during the development phase. Four modules, i.e: *Getting started; Business information sources; Starting your search;* and *Continuing your search* were produced. These four modules were tested with users and greatly modified as a result of feedback. The teaching staff of the University's Bachelor of Business and Information Management (BBIM) then made a request for a module for their integrated information literacy programme, which became Module 5: *The Business report*. Module 6 covers *Finding New Zealand Business Information*. Further modules will be designed to include additional aspects of business information literacy.

Embedding and evaluating the materials

The tutorials were presented to first year Management students as an assessed piece of work worth 5% of their final mark under the system of plussage, a discretionary element that can be added to course marks and final grades. After running successfully during trials on a summer school programme, the tutorials, along with an additional module on NZ company information, were approved for integration into the semester long course. Written instructions were provided, and a brief explanation given by a Business librarian during lectures. Students were directed to go through each module, the associated activities and practice quizzes before completing quizzes set up in the LMS. Ten attempts at each quiz were permitted, with a score of 100% gaining one mark in the final grade. Various statistics on the number of completed quizzes, mean scores, number of attempts before correct answers were provided and completion times were collected to evaluate the overall learner experience. Further feedback was gathered through questionnaires, which were randomly distributed in print form to 150 students and returned by 125. The results of this survey were encouraging:

- 92% reported completing all the quizzes;
- Most students required between 2 and 4 attempts to get all the answers right;
- 96% found the instructions clear;
- 90% felt the tutorials had achieved the stated objectives;
- 81% felt they had learned useful skills;
- 60% said they would refer to the tutorials in future.

Few problems were reported, and all these were of a technical nature. As is often the case when new online resources are well received by students, there were some requests for further topics to be included and different levels of difficulty introduced. While it was important to evaluate the tutorials at this level to gauge user perceptions and experience, and to identify any necessary changes, the key outcomes are summarized in these informal quotes from staff members involved:

> *The lecturer is delighted with the impact on the standard of student work 'only three inadequately prepared assignments from over 1,000 - unheard of'. One of the Business Librarians commented 'this has taken information literacy skills to a new level, and we realize we can reach more students than the previous workshop model allowed'.*

Further and more formal evaluation may be conducted in future, to measuring the impact on student learning, and to investigate sustainability aspects of the learning that results from using the embedded approach.

Discussion

The benefits of embedding generic academic skills in courses and curricula have been acknowledged, in principle, for many years. Yet many institutions continue to rely on separate, specialist units to support students identified as 'at risk' as part of a remedial process. This approach achieves degrees of success with some students, but does not truly reflect what educational research has shown to be the most effective way to impart these essential intellectual skills. Some courses at some institutions promote an embedded approach. However, this is most common in first year courses, leaving gaps in subsequent years and thus losing the overall coherence and consistency necessary to ensure that all students achieve published graduate standards. Institutions that address these generic skills systematically across degree programmes appear to remain in a minority. The Business Information Literacy Online initiative is just the beginning of something that has potential to develop into a whole programme approach if momentum is maintained, and support from teaching departments and long term sustainability factors are addressed.

The pressures of scale and shifting student demographics may be reaching a tipping point where the embedded approach really needs to take hold. While the separate learning support model works for many of the students that choose to make use of the available services, the results across institutions are inconsistent and therefore less than efficient. The message communicated to students is that these services are optional and the skills assumed. The bottlenecks experienced by support services in libraries and student learning centres at assessment times show that this assumption is unfounded in too many cases. The preliminary evidence of impact produced by the case study featured in this paper is compelling. Every student can be reached, and when generic skills are presented as an integral and assessed part of their course of study, learning is likely to be both uniform and more effective. The workloads of teaching and learning support staff are also more manageable with up front investment rather than demand being addressed on an ad hoc basis at the point of need.

Although this case study focused on just one aspect of the graduate profile, it may be reasonable to suggest that the principle and the practical approach for embedding generic skills might work across them all. The possibility at least warrants further investigation, and further research is in the planning stages. The aim is to use similar principles to focus on critical thinking, reflective writing, relational thinking and English language for EAL students as priority areas. A level of groundswell is building as nationally funded projects address similar issues, and promote sharing of research findings and resources that focus on these areas. However, the fact that projects are externally sponsored suggests that they are not yet institutionalized. The experience of many projects shows that dissemination and wide uptake requires a lot of time and effort that often flags once fixed term funding runs out (Guthrie et al 2009; Gunn 2010).

Embedding information literacy skills into courses through online resources is an approach that reflects the changing technological environment and opens up new opportunities for teaching and learning. Further useful initiatives would be to develop or adapt online resources to allow for their use via mobile devices.

> *Screencasting, podcasting and vodcasting – these are becoming more common in the delivery of IL by librarians and their use on mobile devices is a natural extension (Godwin, 2009).*

Another opportunity would be to make online resources available through Web 2.0 services, such as YouTube and Facebook – in other words, meeting Millennial students where they are, online.

Conclusion

The educational principles and the case study summarized in this paper draw on many years of research and experience in the field of academic skills development at university level. New technology makes implementation of these principles achievable, while current trends in scale and student diversity make it essential to do so. The findings from earlier research in student learning and generic skills development provide firm foundations for current initiatives. It is time to bring together the evidence that supports integration, the technology tools, learning designs and expertise that allow it to happen, and the compelling educational 'problem' that needs to be solved, i.e. curriculum design with integrated academic literacy skills to ensure all students, particularly those in large diverse cohorts, can become fully capable graduates.

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