

ICT supported scaffolding of generic skills acquisition by first year students: A collaborative approach



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Students arrive at university with diverse backgrounds, expectations and levels of curiosity and varying abilities to cope with their first semester. The generic knowledge, skills and attitudes to learning acquired at secondary school, at vocational training institutions or in the workplace, are sometimes inadequate for the demands of successful university study. To do well and to lay a firm foundation for their professional development, students need to enhance and expand their abilities to work and learn effectively within the more demanding university context - **fast!** This poster describes a collaborative approach to scaffolding the development of first year students' generic skills: information literacy, information communication technology [ICT], critical thinking and teamwork skills, and the negotiation of their university's Learning Management System [LMS]. Collaborations between the lecturer and specialist support staff: an educational designer, academic skills advisers, a campus librarian and an instructional designer, resulted in a number of carefully structured ICT-supported learning tasks in a first semester, first year unit. Importantly this approach ensured access to the highest available levels of expertise for scaffolding the development of each particular skill and for embedding developing knowledge and skills in a discipline context. Class activities and assessment tasks, often ICT-supported, provided an opportunities for students to embed their newly enhanced skills in a realistic manner. After giving an overview of these activities and tasks, this paper provides insights into both the students' and our own reflections on this experience. It presents our conclusions about the benefits offered by this approach and briefly describes plans for future research.

Keywords: ICT-supported learning, scaffolding, collaboration, generic skills

Introduction

The first semester of a student's first year at university is both an exciting and a harrowing time. Nelson, Keft and Harper (2005) write that "environmental, social and cognitive factors combine in a catalytic process and affect students' abilities to engage in the learning process" (p. 2) Yet, as well as mastering discipline-related content, students are expected to develop the generic abilities to think more critically, and to work in teams with previously unknown peers. We also require them to demonstrate these and other skills in an increasingly online teaching and learning environment, preferably within weeks of their commencing their studies. Many new students are very familiar with ICT and the Internet (see for example, Oblinger & Oblinger, 2005; Oliver & Goerke 2007; White, 2007), but they are not necessarily well-prepared for the intensity with which they are expected to use online tools at university and can struggle to use them effectively.

These gaps between students' existing generic skills' levels and those they need to learn effectively and efficiently at university must be addressed in the students' first semester if students are to "meet [the] challenges and adopt positive learning skills that [shape] their entire learning experience" (Nelson et al., p. 3). Simply telling and showing students what they need to do to bridge each gap does not necessarily provide the learning support that many students need— there is too much happening, too much adjustment going on, for students to absorb and apply all the information they are given. As described in the following section our approach to bridging these multiple gaps in a first semester first year unit in an Information Systems [IS] degree, has been based on the concepts of the 'zone of proximal development' (ZPD) and scaffolding by knowledgeable others.

Literature

Vygotsky (1978) used the term ‘zone of proximal development’ [ZPD] to describe a situation where learning occurs when another more capable person provides the learner with assistance that is both timely and appropriate. Verenikina (2003) stated that such assistance was anticipatory, quoting Yaroshevsky’s assertion that education must “run ahead as the adult helps the child to climb the next step” (in Verenikina, p.4) and that teaching was “as a lever with which the student’s thought, with its structural characteristics, is shifted from level to level” (in Verenikina, p.4).

Scaffolding, the term often used to describe such assistance, involves the design of *scaffolded* learning and/or assessment tasks. It has been argued that scaffolding provides the support that learners need if they are to “focus on the aspects of the task that they can manage, while still keeping an understanding of the task as a whole” (Thomas *et al.*, 2007, p. 1). As learners master initial aspects of the learning task, scaffolding can be reduced, allowing them to put into practice new skills and knowledge independently.

Designing the scaffolding for tasks that will help first year students to rapidly negotiate the multifaceted ZPDs inherent in the university environment is also a complex problem for staff. Oliver and McLoughlin (2001) note that a well designed web-supported problem based learning environment had been able to provide “an active and engaging environment that encourage[d] and support[ed] student learning by providing authentic contexts for learning and a range of learning scaffolds and supports” (p. 223). In particular, Oliver and McLoughlin commented that the ICT environment “had appeared to encourage and support all students in the development of their generic skills” (p. 223). However, to use ICT effectively to scaffold students’ learning of other generic skills, McLoughlin and Marshall (2002) suggest that there is a need to “rethink issues of agency, and the respective roles of peers, facilitators and teachers in offering learning support” (p. 50). Whilst academics have on the whole embraced the opportunities that new technologies provide (Laurillard, 2002; John & Sutherland, 2004), many lecturers lack the time (Menzies, 2007) and/or the necessary ICT-skills and backgrounds to design online learning activities that will scaffold students’ generic skills development in the online setting.

We addressed both academic staff needs and first year students’ generic skills development by making explicit our approach to learning design (Keppell, 2003). We brought together those professionals with the necessary expertise and the lecturer so that they collaboratively designed the tasks and activities that would scaffold student learning. The next section describes the outcomes from this process.

Scaffolding students’ skills development in the first semester

The first semester unit *Reasoning and Critical Thinking for IS Professionals* [RCT] on-campus unit provides students with opportunities to learn about and apply different styles of thinking to the IS discipline and begin to embed the generic skills of critical thinking and problem solving into the IS course curriculum. The unit has been the focus of an ongoing action research project, the outcomes of which have been reported elsewhere (Thomas, *et al.*, 2004; and Davis *et al.*, 2007). Students taking the unit come from diverse age, cultural and educational backgrounds and vary greatly in their expectations of and abilities to engage in both the unit and university study. Some of the needs resulting from the diversity of student backgrounds are addressed through the unit’s two major process assignments. Each assignment provides a scaffolded approach to developing students’ critical thinking skills through the preparation of a well-reasoned and well-researched opinion about a controversial issue. The process includes anonymous review by students of a number of their peers’ assignments. Recently, the assignments have been revised to make further demands on students’ critical thinking abilities through the inclusion of group work. To fit these additional demands into this existing unit, our anticipation of students’ learning needs in the areas of information literacy, the university’s LMS and effective and efficient teamwork, including online interaction, is reflected in the design of scaffolded activities and tasks that support students’ generic skills’ development as they move through the unit, and complete their assessments. Descriptions of each of these scaffolded tasks and activities are given below.

Preparing for the first assignment: Information literacy

For Week 1 of the semester, the lecturer and a librarian co-designed an overview of the Library’s resources and some online databases containing IS-relevant journals. After IS-related examples, students completed given hands-on exercises. This session alerted students to the relevance of information literacy skills and whom to go to for help in this area. Students also needed these skills for their first assignment. Later in the semester, the librarian returned to show students how to use an online database which enabled them to locate the highly current material necessary for the second assignment.

A new online environment: Learning the way around the university's LMS

In a separate Week 1 session co-designed by the lecturer and an instructional designer, students attended a hands-on session in which they logged on to their LMS space and used LMS tools to download the unit outline, mail the lecturer, participate in threaded discussion and chat sessions, and access online resources related to their first assignment. Students used these skills throughout the semester as they engaged in the unit's day-to-day activities and completed various aspects of their assignments.

A different way of learning: A structured online tutorial

The unavoidable but expected absence of the lecturer for the Week 3 tutorial resulted in the lecturer working with an educational designer to adapt for the online environment, a group based tutorial task that required students to practice higher-level problem solving techniques. The online tutorial used the LMS's threaded discussion tool in a week-long, multi-stage, lecturer-guided discussion.

Thinking critically about their own and others' work: Peer review using the *e-Gallery*

In 2006, the lecturer had worked with academic skills advisers to incorporate a group task into the two existing, similarly structured process assignments. The purpose of the revised assignment structure, and the group process, was to encourage students to think more critically about and then make improvements to their work. The new structure also introduced students to the elements of effective team work and developed their abilities to work in teams. The 2006 assignments required students to complete individual responses to each assignment before they formed teams of 3-5 to generate a 'better' answer than their individual work. Students then individually, and anonymously, reviewed all groups' answers in a poster session. Afterwards, students rejoined their groups and reached a group consensus about '*the best*' response and two other responses that were also of high quality. This provided students with further access to timely and appropriate assistance for their learning through the critical examination of and reflection on their peers' work. Students were reflected on the process. Whilst both lecturer and students judged this expanded process as successful (Kazlauskas *et al.*, 2007), the class-time available for the process was considered insufficient. This problem was addressed in 2007 through the development and use of an online poster session, the *e-Gallery*.

A result of collaboration between the instructional designer and the lecturer, the *e-Gallery*, used the LMS's journaling discussion tool and an online grading form. The lecturer posted each groups' assignment in a journal space on the LMS and set permissions to give individual students access to assignments written by groups other than their own. In their own rather than in-class time, individual students then accessed the *e-Gallery*, chose a particular group's assignment, read the assignment and completed the online grading form. Students repeated this process for every assignment other than their own group's assignment. Later, class time was set aside for groups to reach a consensus regarding the three best assignments.

Results and conclusion

The outcomes of this cycle of the ongoing action research associated with teaching the unit indicated that collaboration between lecturers and specialist support staff can design tasks and activities that use blended learning environments to effectively scaffold first year students' learning.

As a result of the contextualised introductory sessions, students successfully negotiated the LMS from Week 1. They acquired the skills to access IS-related library resources necessary for assignments in this and other units. The adaptation of the higher level problem solving task for the Week 3 online tutorial resulted in the lecturer redesigning the task for the face-to-face tutorial, strengthening it considerably. Student participation in the online tutorial was lower than hoped and disappointing, particularly as it was the students who had asked for this alternative rather than attend an alternative face-to-face tutorial. Gerbic (2006) among others (Goodyear *et. al.*, 2004, Ellis & Calvo, 2004) suggested the linking of assessment to aspects of online discussions to increase student participation.

As a result of Week 1's grounding in WebCT skills, some students recognised the value of using the WebCT discussion tool to facilitate their independent group work later in the semester. Contrary to the limited participation of students in the online tutorial, analysis of students participation in these discussion indicated that over the 10 day timeframe for the task, three of the six teams used their discussion space 10 or less times, and the other three groups used their space 17, 21 and 50 times even though this discussion was not assessed. In their reflections on the process assignment, students commented on the usefulness of this tool for their group work because of the lack of synchronicity of

their timetables and part-time work on their ability to meet face-to-face. Of 22 comments relating to their use of an asynchronous online discussion tool, 4 students commented on it providing flexibility, 6 commented that it was successful in emulating face-to-face group work, 4 found it effective for discussions and combining their work; and 2 reported that they had found MSN chat a more effective tool. Of 12 students who commented on the experience of review the work of the groups, 6 stated that it helped them evaluate their own answer, 3 made comments suggesting that they had been able to assess the quality of their own work, to get a better idea of what was expected of them at university or to expand their own thinking. 6 students remarked on the disadvantages of not taking enough time to prepare assignments. Others (21) spoke of how this scaffolded approach had helped them learning how to work as part of a team, that there was value in sharing information and being open to different viewpoints that could result in a better answer and even that "Group work was not so bad after all". Some students also commented on the relevance of both the topic and the process to their future professional lives.

These responses and our evaluation of the improved quality of the students' group assignments suggest that these carefully scaffolded tasks and activities enabled students to cross many of the ZPDs in students' first semester at university, and so begin to embed the generic skills necessary for success in their future studies. A major contributor to the success of these efforts was the lecturer having access to the right expertise at just the right time to support the design and implementation of the scaffolding that would support the students as they acquired both disciplinary knowledge and enhanced the generic skills. The researchers' collaborative, multi-disciplinary approach provided opportunities for both lecturer and specialist staff to address the broader goals of their individual roles through aligning their own expertise with those of other professionals working within the complex, rapidly evolving environment of tertiary education as together they focused on the shared goal of supporting student learning. In the next stage of the research, this scaffolded approach will be repeated to assess its trustworthiness with a different cohort of students. The use of both synchronous and asynchronous discussion tools to facilitate students' group work will also be evaluated.

Acknowledgements

The authors wish to acknowledge the valuable contributions made to

- the design, development and implementation of the 2007 offering of RCT by Instructional Designer Tim Baillie, Academic Skills Advisers Sophie Gimmel and Leighana Thornton, and Librarian Colleen Hutcheson.
- the long-term partnership between Dr Theda Thomas, and Tim Davis and the first author in the development this unit.

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Please cite as: Kazlauskas, A. & Applebee, A. (2007). ICT supported scaffolding of generic skills acquisition by first year students: A collaborative approach. In *ICT: Providing choices for learners and learning. Proceedings ascilite Singapore 2007*. <https://doi.org/10.65106/apubs.2007.2848>

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