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Designing technology to assist first year university students

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ABSTRACT In the past decade there has been a significant increase of use of new technologies by students in Universities. This presents educators of first year university students with both challenges and opportunities. This paper overviews a web-based learning application designed to assist in the retention of first year university students.

New opportunities in teaching first year university students

Technology offers the potential for new opportunities and methods of teaching and supporting first year university students. Saville-Smith and Kent (2003) suggest that technology such as hand-held computers can assist in developing motivation, organisational skills, a sense of responsibility, and both independent and collaborative learning, all of which assist learning. Technology does not replace face-to-face learning, but supplements it (Lim & Benbasat, 2002). It is not an end in itself and rather “enhances the achievement of educational goals” (Boud & Prosser, 2002; p.243). Oliver (2007) suggests that quality learning is achieved through engagement. He states that deep learning occurs when students are engaged with the experience or event and this is where alternative delivery methods are most useful (Oliver, 2007). Micro learning - learning in small chunks, over short periods of time - helps to engage students. The advantage of micro learning activities is that students with digital devices (phone, iPads, notebooks) can engage with small chunks of learning, “while in transit, alone or in groups, and particularly between formal leaning experiences” (Oliver, 2007; p.372). The introduction of new information and communication technologies has resulted in a shift in the role of the university lecturer: “from the ‘sage on the stage’ where transmissive, didactic learning took place to the ‘guide on the side’ where more student-centred learning takes place” (Holley & Haynes, 2003; p.393).

Intentional design, which considers the first year university student experience with regard to new mobile learning technologies, will promote deeper learning. Boud and Prosser (2002; p. 238) note that:

the way students perceive and understand their learning environment and the way they approach their learning in relationship to these perceptions have been found to be major intervening factors between teachers’ teaching and student’s learning outcomes.

These authors state that students must be engaged, involved and able to actively construct their own experience (Boud & Prosser, 2002). Boud and Prosser (2002) developed a framework with four key elements which are necessary in order to enhance students’ experience of their learning activities, whether through traditional or technology-based delivery. The first element is engaging learners by taking into account prior knowledge, identifying with their desires and goals, building on their expectations, and providing a sense of control over the activity. The second is acknowledging the learning context and the current circumstances, task demands, and resources available. Thirdly, it is necessary to challenge learners to participate actively and make decisions regarding their learning and actions. Fourthly, providing opportunities for practice in order to develop confidence and skill is vital (Boud & Prosser, 2002).
Educational design of learning technology to support first year university students

The priority must be to design technologically based learning which is predicated upon sound educational theory. Oliver and Goerke (2007) believe that it is important that learning theory inform technologically-based learning design. Dyson et al (2009) state that mobile learning should be used ‘to develop learning situations that will encourage students to adopt deep approaches to study, actively engage them in knowledge discovery, and improve their perceptions of the learning context’. It must include learning which places the student at the centre of the learning process and encourages independent learning behaviour. They note the importance of experiential and constructivist learning, where “the student’s active experience is the primary driving force from which learning comes” (Dyson, et al., 2009; p.253). Bloom’s Taxonomy of Learning Objectives was specifically chosen as a framework for the development of the following learning tool as it supports student’s learning journeys through six levels; knowledge; comprehension; application, analysing; evaluating; and creating (Anderson, et al., 2000; Bloom & Krathwohl, 1956; Conole & Warburton, 2005).

The development of a pedagogically sound learning support tool

As educators of first year university students, the authors became aware of problems that students had in completing written assignments, particularly essays and reports. It was noticed that often students who had researched well and engaged in critical thinking skills still did not achieve very highly often due to the lack of skill in academic writing. Some students seemed not to be accessing necessary information from classes or textbooks or were not sufficiently engaging with this information as it was provided in its current forms. The solution was to develop a learning tool for first year university students, designed to supplement other learning, which was easy to access, engaged students and gave them control of an experiential learning process.

Therefore a learning tool was developed to assist first year students with writing essays and reports and referencing in the correct style, based on the Australian Style Guide. The tool is an online interactive template application that supports and guides students throughout the writing process by breaking each stage into three distinct steps; Planning & Structure, Writing and Completing. Two templates exist; one for report writing and one for essay writing. Similarities exist, however as essays and reports differ, each template has special inclusions.

In step one (Planning & Structure) of both templates, users complete mandatory individual information which is used to generate a title page to the report or essay. A word count is included in this stage. Students are asked to save the work at this early stage and numerous save features are highlighted throughout the application at various stages to encourage good practices of computer use. Once this section is completed, students type in the assignment question. Any content, limiting and directive words contained within the assignment question are automatically displayed on the computer screen, with an explanation of what each one means. This helps to focus the student on the task requirements. The question (as entered by the student) will automatically transfer to a ‘floating box’ which will follow the student during stage one and two within the tool, constantly reminding them what they have been asked to do. This ‘floating box’ is a unique feature of the application, designed and patented by the company. The ‘floating box’ is intended to keep the student focused on the requirements of the task.
The student can then engage in a brainstorming activity, using Kipling’s 5Ws & 1H method to identify potential inclusions about the topic. Students then type in topic headings drawn from the brainstorming exercise. The application automatically allows 10% of the word count for both the introduction and conclusion to the assignment, and then equally divides the remaining word count into the number of topic headings (for reports) or main points (for essays) the students have identified, providing a suggested word count for each topic. This supports students over or underwriting.

Students then move on to stage two: Writing. In this stage, the essay and report template differ, as essays and reports have different structures. This section will explain the report template, and the essay template (steps two and three) will be explained in a later section. In the report template the students complete the Introduction section, which includes Authorisation and purpose, Limitations, and Scope components. A text box is supplied for each section, with instructional content for each segment. The instructions are provided to remind students what is required in each section and for what purpose, similar to traditional essay and report writing instructional books. However, the style of wording is deliberately aimed at Net Generation users, who seek short sharp bursts of information, easily read and understood (Jones et al., 2010; Oliver, 2007). Once the students begin to type into the text boxes the instructional content disappears, leaving only the students’ own work. Should students need a reminder of the instructions, these are provided via a pop up box if the students select the online help button contained within each text box. The next section in stage two provides more text boxes, however these are now populated with headings from the topic headings the students entered in stage one of the process. Students can now view the various topics that they have chosen to include, and also a work count for each topic. Students type the content into the text boxes, and each topic has a separate topic summary text box where students summarise the topic. This summary sentence is automatically used to populate the executive summary of the report. Students complete all topics and, where necessary, can add a reference to the work.

An online reference generator is incorporated into the tool, which displays an example of both an in-text and the list of references entry. Student can see the referencing pattern to be followed, and via the use of an interactive reference builder, enter the details of the reference used, following the pattern provided in the example. They enter their own specific referencing information, ensuring that all content entered is always the students’ own work. At the end of this stage, appendices can be added. This reference tool contains an extensive list of reference sources, including the more unusual, such as audio visual media, artwork, images, patents, maps, television and radio programs, emails, Facebook, blogs, Twitter, discussion groups, online forums and podcasts. The developers sought to include less traditional sources such as wikis and YouTube videos as these are now considered to be credible sources of evidence in some situations, yet are difficult for students to find in traditional referencing guides.

At stage three, Completing, the student sees the entire report displayed and has a checklist of editing tips. The work can then be emailed to the student who saves the work into their chosen word processing program. For the report template, the headings are numbered to provide an example of how a table of contents should look, as well as how numbered headings within a report should be displayed. This visual of the table of contents is automatically generated by the tool from the topic headings completed by the student and the standard headings (Authorisation and purpose, Limitations, and Scope, Conclusion, Recommendations etc) that a report contains. Students must then apply heading styles and
generate an automated table of contents themselves within their chosen word processing program, again, ensuring the tool does not complete any of the work automatically for the student, rather, provides examples of what the finished product should look like. A check list of tips is automatically emailed to the student, allowing them to again review the work and complete any specific formatting requirements.

As noted above, the two templates differ. Three steps remain the same, Planning & Structure, Writing and Completing. In step one, users include individual information, which is used to generate the title page of the essay, enter a word count, analyse the question for content, limiting and directive words, undertake brainstorming and identify main points the essay should contain. In step two of the essay template, text boxes for opening sentences, thesis statements and forecasting statements exist. Again, instructional content is included, disappearing when students enter their own content. Main points that the students identified in stage one are transferred to this page allowing students to refer to these and the essay question at any time. These are contained in the ‘floating box’, providing a constant reminder of the task. A conclusion text box is included in this stage. Again, students can enter references during the writing stage, and through their own work, will formulate a List of References in complete and correct style.

Stage three, Completing, in the essay template is similar to the report template. Students can view a full version of their work, use the check list and email the work to themselves for formatting within a word processing program.

**Student views on technology-assisted learning – focus group outcomes**

Informal student focus groups were held to identify students’ use of technology and to evaluate the suitability of the learning tool to the needs of university students. The total number of participants in the focus groups was twenty-three, aged seventeen to forty-five. Sixteen of the students were in their first year of study.

As part of their university studies, the participants were all required to complete essays or reports and to reference using an accepted academic style. The students revealed that as new university students they had various problems with essay and report writing. They felt that they were given too much information at once. They had trouble with report layouts. A large number of the participants stated that they have trouble with referencing, as it was hard to format and tedious, taking time to learn the correct style.

The participants were given a demonstration of the learning tool and asked to assess it in terms of usability and usefulness to first year university students needing to write essays and reports with correct referencing style. The essay and report builders were well received by the students. They stated that the ability to break the essay question or report criteria down was very useful as it helped them to feel organised and that it was very user friendly. The students found the cumulative word count feature to be most helpful, as was the executive summary builder. They liked the step-by-step format and the reminders in the floating box, especially about the topic sentence. One student stated that they were undertaking a university course which covered much of what the Builder does, but that ‘the Builder is easier’. The students were also quite enthusiastic about the referencing feature. They particularly liked that it was searchable and that it had references for a large variety of different sources. They said that it was very helpful as it was like having someone tell you how to reference. The consensus was that the online application would be particularly valuable for first year students, and may also be valuable for high school students as well.
Conclusion

There has been a rapid increase in use of technology, and this presents many opportunities for supporting first year university students. However, poorly designed technology-based curriculum can result in poor learning outcomes, where technology plays merely a replacement, rather than a transformative role. The development of technology-based learning programs should be prefaced by an intentional design, incorporating both the learning preferences of the Net-Generation and sound pedagogical theory in order to maximise a positive user experience as well as optimising learning outcomes.

List of References


Questions for Discussion

Will the increase of hand held mobile devices being utilised by university students change how knowledge is provided to university students, particularly first years?

Does technology based learning support tools have a place in universities?