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## The Unilearning project: online academic learning support

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## The Unilearning project: online academic learning support

### Abstract

The Unilearning project has developed a website that provides students with academic writing and study skills instruction. The development of the website has involved partnerships in three key areas. These are: a partnership between teaching and technology, a partnership between teaching and learning, and a partnership between theory and practice.

### Keywords

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## **THE UNILEARNING PROJECT: ONLINE ACADEMIC LEARNING SUPPORT**

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### **Abstract**

The Unilearning project has developed a website that provides students with academic writing and study skills instruction. The development of the website has involved partnerships in three key areas. These are:

- a partnership between teaching and technology,
- a partnership between teaching and learning, and
- a partnership between theory and practice.

The development of the website has partnered the teaching of academic skills with the use of innovative technology; the result is an interactive web-based learning resource that takes advantage of the possibilities and benefits of the technology to maximise student learning outcomes. The development and design of the instructional material on the UniLearning website has also involved a partnership between teaching and learning since the need for multiple learning pathways is married with the notion of an expert-directed instructional sequence. Finally, the project has involved a partnership with theory and practice, with cognitive load theory being used to inform the design of the website. This theory uses some aspects of cognition and of the structure of information to provide instructional designs that enhance learning by reducing or ideally eliminating any mental activities that are extraneous to learning. Cumulatively, these partnerships have enabled the production of resources which both exploit the potential of the web as a teaching medium and

which take into account teacher needs, learner needs and aspects of human cognition.

It is increasingly accepted in Australian Universities that knowledge about academic skills is most easily acquired or substantially refined through direct instruction (Samuels, Tennyson, Sax, Mulcahy, Schermer & Hajovy, 1988; Cook & Mayer, 1988; Jones & Bonanno, 1995; Skillen, Merten, Trivett & Percy, 1998). This instruction is beginning to be delivered via the internet and while this innovation does have advantages over traditional forms of delivery, most of the available online academic skills resources do not exploit the advantages of this technology. Instead, they simply provide a replication of the existing print-based materials using a different technological medium. The resultant product is akin to the traditional *book model*: the resource consists of a flat page of information that is sequenced from beginning to end. Pages are turned electronically through the inclusion of hotlinks, a feature considered mistakenly by some to give interactivity to the resource. If assessment or testing is included in the resource, most are only able to provide expert answers against which learners must compare their own answers. They do not provide direct feedback on the learner's answers. Resources structured in this manner, despite their method of delivery, do not exploit the possibilities of computer technology in the learning process.

The UniLearning project, funded by a National Teaching and Development grant, aims to redress this situation by exploiting the possibilities and advantages of computer technology in teaching tertiary level academic skills. The project has developed a comprehensive range of web-based, interactive resources for teaching skills such as academic writing, effective writing, essay writing,

report writing, note-making, critical reading, critical thinking, and grammar. The inclusion of the newest web technology in this teaching process has created an advantageous partnership. It has enabled the use of interactivity in an entirely different way to most current web-based academic skills resources. Interactivity in these resources is much more than mere electronic page turning: learners are provided with many opportunities to develop skills through interactive exercises that provide real time feedback.

Technology has been used in the UniLearning project to create a truly interactive website for teaching academic skills. The website provides learners with an opportunity to practise, synthesise and test their knowledge: exercises are sequenced so that both sub-skills and higher order skills are assessed. In addition, the final section of each module provides a holistic multi-stage test that provides the learner with the opportunity to assess their knowledge of all skills covered within the module. Feedback on all the question types is provided in realtime; this ensures that learners are not responsible for evaluating their own response with that of an expert answer. Multimedia technologies such as animation and sound have been used to actually demonstrate specific academic skills at appropriate points in the instructional material. The inclusion of the interactive exercises and multimedia demonstrations has meant that the UniLearning website moves beyond the limitations of current online tertiary level learning support: the website acts as a learning tool, and as such, is able to maximise student learning outcomes.

The interactive exercises have been developed to fit within one, or a combination, of five question type models developed at the beginning of the project. The question types available include:

- multiple choice questions (including pull down menus that are useful for within text exercises);

a click and drag model where words, phrases, sentences or paragraphs can be inserted into a larger text structure;  
selection of a textual feature (through hidden hotspots in a larger text structure);  
exact text recognition; and,  
'intelligent' text recognition (key words and their synonyms, and the relationships between these keywords, are checked within the learner's response, allowing the range of what is deemed as a correct answer to be extended).

As the UniLearning website covers a wide range of topics and provides a large amount of detailed instruction on tertiary literacy skills, there was a need to provide learners with multiple learning pathways. This need had to be balanced with the need to make the instruction effective. Expert-defined instruction is an effective instructional method since complex information can be sequenced and presented gradually so that the learner is able to build on previous knowledge. Learner freedom, however, can be curtailed by expert-defined instruction. The tension between these two competing ideals was resolved on the UniLearning website through a partnership between teaching and learning needs. On the website, learners have the ability to select learning pathways to a certain level beyond which the instructional sequence is expert-defined. This design concurrently allows learner freedom while facilitating the development of understanding and expertise. The needs of learners are also met by a quick and user-friendly navigation system: menu screens providing access to any of the three upper (learner selected) levels can be reached from any level of the site with a single click. In addition, most instruction is accompanied by interactive exercises so learners are able to test and get feedback about their learning.

The partnership between theory and practice results from the dependence on cognitive load theory

(for a recent summary, see Sweller, 1999) to inform instructional design of the site. This theory uses some aspects of human cognition and the structure of information to provide instructional designs that facilitate understanding, learning and problem solving. Cognitive load theory has been used to generate a range of alternative methods of instruction designed to enhance learning by reducing, or ideally eliminating, any mental activities that are extraneous to learning. Although initially only applied to the design of paper based instruction, increasingly the theory has been applied to the design of computer based instruction (Mayer & Chandler, in press; Pollock, 2000; Pollock & Trivett, 2000; Kalyuga, 2000; Kalyuga, Chandler & Sweller, 1999).

The design of the instructional material on the UniLearning website adheres to several of the empirically validated design principles generated by cognitive load theory. These include the physical integration of mutually referring sources of information, the elimination of redundant material, the use of multimedia instruction when presenting complex concepts and the provision of many worked examples to model both correct and incorrect answers to problems. In addition, the instructional material has been modularised and sequenced in accordance with the findings of Pollock, Chandler and Sweller (in press). Results of experiments from this study indicate that a learner's working memory could be overwhelmed if complex concepts were presented in their entirety to novice learners. Thus material on the Unilearning site has been layered so it can be presented gradually and sequenced to build in complexity. The UniLearning website is the first large-scale educational website to have been developed whose design has been guided by cognitive load theory. It is expected that both the teaching and learning of tertiary academic skills will benefit.

The UniLearning project has been conceived to provide interactive online learning support for Australian University students. Through a partnership between technology and teaching, teaching and learning and theory and practice, a comprehensive resource covering many academic skills has been developed. The website exploits the possibilities and advantages of computer technology as well as producing instructional material that incorporates theoretically informed instructional design principles. Cumulatively, these features result in a resource that enhances the teaching and learning of tertiary level academic skills.

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