

# eLearning initiatives - can their effectiveness really be measured?

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## SESSION

C1: Integration of theory and practice in the learning and teaching process

## CONTEXT

As students' preferred ways of working change over time, so too must the ways in which research skills are integrated in the curriculum. Subject librarians collaborated with academic staff to improve the integration of research skills into a core first year engineering course by changing the mode of delivery from face-to-face only, to a blended model. The change in research skills delivery was concurrent with a move from summative to formative assessment methods within the course and a change in institutional learning management system (LMS). These changes allowed subject librarians to deliver content in a sustainable way that ensured a positive student experience given the predicted growth in enrolments in engineering.

## PURPOSE

The end-goal for this work was to improve student outcomes in independent research, referencing, and academic writing, in a more sustainable and accessible way.

## APPROACH

An eLearning Research Skills course was created, which was linked to the first course assignment using constructive alignment (Biggs, Tang, & Society for Research into Higher Education, 2011) and was integrated into the LMS. The eLearning Research Skills course addressed student needs and incorporated learning outcomes which were concept-based and practical, rather than skills based. Optional face-to-face support was also available via targeted assignment-specific drop-in sessions. User research and needs' analyses were carried out through pre- and post-implementation staff interviews (assignment markers, course coordinator) as well as student focus groups, interviews and an in-lecture survey.

## RESULTS

Staff interviews and student feedback (via the self-evaluation checklist) indicated that the move from face to face to blended delivery maintained student performance. Advantages were noted in sustainability of staff resources and student access at "point of need". The eLearning Research Skills course also provides a good foundation for future studies.

## CONCLUSIONS

Measuring the effectiveness of programme-specific eLearning initiatives was challenging. Further research is required to explore methodologies for evaluating the effectiveness of a blended learning approach.

## KEYWORDS

Blended learning, eLearning, research skills, curriculum integration

## Introduction

The ENGGGEN140 course is a first year core programme course in the Faculty of Engineering with an intake of more than 850 students in semester one 2016. The number of students enrolled in the course increases every year and it is expected that enrolments will reach 1000+ by 2020. Thus the engineering subject librarians face significant challenges in terms of sustainability of the face-to-face delivery of research skills. Research skills include identifying appropriate information sources; searching for information; evaluating information; writing and referencing. Research skills are important for developing student interest in research programmes (Saylor & Kukreti, 2016) and for the development of desirable graduate attributes.

A change in the university LMS in 2016 to Canvas provided the opportunity for subject librarians to work with academic staff to improve the delivery of research skills content; from face-to-face only, to a blended model. Canvas is an open-source LMS developed by Instructure (Whitmer & Daley, 2008). The blended model included an eLearning Research Skills course and drop in sessions allowing students to have a face-to-face discussion on their assignment and ask questions of subject librarians.

The eLearning Research Skills project was initiated in May 2015. The eLearning Research Skills course was launched in March 2016 and was embedded into the ENGGGEN140 course in Canvas.

## Aims

Initial interviews with the course coordinator and assignment markers suggested that students were poor to middling at research and referencing. Academic writing and referencing techniques were not covered well in the existing face-to-face course. The purpose of the eLearning Research Skills course was to improve student outcomes in the areas of research, referencing and academic writing, attributes reflected in several of the capabilities of the Graduate Profile (The University of Auckland, 2017), and to deliver coursework in a more sustainable and accessible way.

## Methodology

### User Input

A variety of methods were used to identify the key issues: interviews were conducted with staff involved with the course before the introduction of the e-Learning initiative; students who had completed the course previously were surveyed and participated in focus groups. Questions asked on Piazza about academic and information literacy were analysed by type. Piazza is an online platform where students can ask questions about the course content and other students, teachers and other staff associated with the course provide the answers in real-time (Sankar, 2009). Written workshop evaluations submitted in 2015 were analysed and an in-lecture survey was conducted in 2015, before the eLearning Research Skills course design was initiated. Findings from the in-lecture survey showed that students found the research skills taught by subject librarians beneficial to their assignment completion. Furthermore, students indicated that the blended model was their preferred delivery mode for this type of content.

The ability to identify and distinguish between appropriate information sources, referencing and citing and writing appropriately for engineering were all identified as areas where students needed support. Previous research conducted on similar topics has also identified the same key issues faced by engineering undergraduate students (Ali, Abu-Hassan, & Daud, 2009; Blicblau, Bruwer, & Dini, 2016; Wertz, Purzer, Fosmire, & Cardella, 2013).

Effectiveness of the eLearning Research Skills course was evaluated after implementation. Staff were interviewed about student performance and students provided feedback using an optional online feedback form.

## **Design Approach**

A student-centred design approach was adopted. Elements of constructive alignment (Biggs et al., 2011) were used to ensure that learning outcomes, learning and teaching activities, and assessment were linked. In order to support diverse learning styles (Mestre, 2006) a blended model with optional face-to-face support was delivered via targeted assignment-specific drop-in sessions.

The design principles of the eLearning Research Skills course were derived from the three broad theoretical perspectives: associationist (learning as activity), cognitive (learning as achieving understanding) and situative (learning as social practice) (Greeno, Collins, & Resnick, 1996; Mayes & De Freitas, 2004). For example, the eLearning Research Skills course included sources of information with repeated patterns, showing differences between them, followed by activities. Each module of the eLearning Research Skills course had self-tests with immediate feedback provided. A self-evaluation checklist was provided for students enabling them to self-assess their performance and learning.

Constructivist perspective where students build knowledge and make meaning (Biggs et al., 2011) underpinned the design. The eLearning Research Skills course was aligned with the first assignment and integrated into Canvas giving it clear meaning and purpose. By using the skills learnt from the eLearning Research Skills course students were able to complete their first assignment and reinforce capabilities in research and writing that would support them through subsequent coursework requirements in their degree.

## **Assessment**

Assessment of skills acquisition by students was the most challenging part in designing the eLearning Research Skills course. Due to the large class size, assessment was based on multiple choice quizzes. Multiple choice quizzes are not an ideal form of assessment as they can inadvertently encourage surface learning (Biggs et al., 2011). However it is possible to avoid surface learning while still using these quizzes by making questions scenario based (Hulse, Han, Melnichenko, & Brookes, 2011). See Appendix 1 for an example scenario question.

Formative assessment self-tests were built into the content of the eLearning Research Skills course, allowing students to test their knowledge throughout, with immediate feedback provided. A self-evaluation checklist was included at the end of the eLearning Research Skills course with links to further help, advice and resources if students were still unsure of the material.

However, because students were allowed unlimited attempts to complete the multiple choice quizzes, it was difficult to gauge the learning progress of students from the eLearning Research Skills course alone.

## **Results and Discussion**

Staff interviews and student feedback indicated that the move from face-to-face to blended delivery maintained student performance. By using the final self-evaluation checklist at the end of the eLearning Research Skills course, students self-assessed their performance and learning, noting improvements in finding resources, writing and retaining information. However, comments from assignment markers and the course coordinator at the end of semester were more revealing, showing that although improved, issues in writing and referencing still persisted. Therefore, there is still room for improvement in the writing and referencing modules of the eLearning Research Skills course.

Students provided feedback via an optional online feedback form. Students commented that they liked the self-tests and videos used throughout the eLearning Research Skills course. Students also commented that the eLearning Research Skills course was too long and that the videos could be improved with the addition of background music; further areas for development.

Some improvements have been noticed in the sustainability of delivery and accessibility of the content. Content is able to be delivered more sustainably in the context of staff hours to 850+ students by using Canvas. The previous mode of content delivery used face-to-face workshops and library tours and took approximately 106 staff hours each semester to deliver. Delivering the content via Canvas takes one staff member approximately five hours to load the content and set up the multi choice quizzes.

Sustainability in delivery of the eLearning Research Skills course was improved by moving to a blended mode of delivery. However, a significant investment of time was still required to develop the e-Learning Research Skills course. Thus, library staff time requirements have moved from delivery to development, with a concomitant improvement in resource quality.

Accessibility of content has been greatly improved for students. The previous mode of content delivery meant that students could only attend at set times and made no allowances for timetable clashes, unavailability or forgetfulness on the part of the student. By making the content available online 24/7, students can access it when and wherever they like, at point of need.

The authors have found that an eLearning approach allows for consistency of content delivery and for pedagogy to be improved. The e-Learning Research skills course provides a good foundation for student research and writing skills and supports students through subsequent course work requirements in their degree.

## **Conclusion and Recommendations**

Investigating ways to assess and measure the effectiveness of eLearning is a common research theme in this area. Findings of previous studies are the same or similar; there are distinct benefits to learners who participate in eLearning with those benefits furthered for learners participating in blended learning (Liaw, 2008; Shittu, Olufunmilola, & Osunlade, 2016; Wong & Ng, 2016).

Evaluation methodologies that could be used to evaluate the effectiveness of the eLearning Research Skills could be adapted from those used in a real-life engineering case study of an online library tutorial (Hulse et al., 2011). Methodologies included direct observation, online feedback, test results, and a qualitative questionnaire, ideally these would be applied with before-and-after course assessment. The assessment of effectiveness of the eLearning Research Skills course remains problematic without within-cohort measures of improvement. Further research is required to explore methodologies to evaluate the effectiveness of the blended learning approach.

## **Appendix 1 - Example scenario question**

You have just received your assignment topic and need to start looking for information. This is difficult as you don't fully understand the topic yet. You need to get a good overview of the topic so you try the following sources. Which one is the best choice in this situation?

A. A newspaper

Incorrect. While a newspaper is good for later in your assignment it is not a good starting point for a basic overview.

B. A blog

Incorrect. While a blog may contain useful information about your topic, it is not a good starting point for a basic overview.

#### C. An encyclopaedia

Correct. An encyclopaedia entry is both peer reviewed and provides an overview of your topic, allowing you to find out where your assignment question fits in to the wider context. Use encyclopaedias to discover key terms, dates, people and themes relating to your topic, prior to searching for more specific information.

#### D. A journal article

Incorrect. Journal articles can be very specific and concentrate on narrow subtopics within the broader subject area so are not a good starting point for a basic overview.

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