

## **Where do engineering students really get their information? : using reference list analysis to improve information literacy programs**

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### **BACKGROUND**

An understanding of the resources which engineering students use to write their academic papers provides information about student behaviour as well as the effectiveness of information literacy programs designed for engineering students. One of the most informative sources of information which can be used to determine the nature of the material that students use is the bibliography at the end of the students' papers. While reference list analysis has been utilised in other disciplines, few studies have focussed on engineering students or used the results to improve the effectiveness of information literacy programs. Gadd, Baldwin and Norris (2010) found that civil engineering students undertaking a final-year research project cited journal articles more than other types of material, followed by books and reports, with web sites ranked fourth. Several studies, however, have shown that in their first year at least, most students prefer to use Internet search engines (Ellis & Salisbury, 2004; Wilkes & Gurney, 2009).

### **PURPOSE**

The aim of this study was to find out exactly what resources undergraduate students studying civil engineering at La Trobe University were using, and in particular, the extent to which students were utilising the scholarly resources paid for by the library. A secondary purpose of the research was to ascertain whether information literacy sessions delivered to those students had any influence on the resources used, and to investigate ways in which the information literacy component of the unit can be improved to encourage students to make better use of the resources purchased by the Library to support their research.

### **DESIGN/METHOD**

The study examined student bibliographies for three civil engineering group projects at the Bendigo Campus of La Trobe University over a two-year period, including two first-year units (CIV1EP – Engineering Practice) and one-second year unit (CIV2GR – Engineering Group Research). All units included a mandatory library session at the start of the project where student groups were required to meet with the relevant faculty librarian for guidance. In each case, the Faculty Librarian highlighted specific resources relevant to the topic, including books, e-books, video recordings, websites and internet documents. The students were also shown tips for searching the Library catalogue, Google Scholar, LibSearch (the LTU Library's research and discovery tool) and ProQuest Central. Subject-specific databases for civil engineering and science were also referred to. After the final reports for each project had been submitted and assessed, the Faculty Librarian contacted the lecturer responsible for the unit, requesting copies of the student bibliographies for each group. References for each bibliography were then entered into EndNote. The Faculty Librarian grouped them according to various facets, including the name of the unit and the group within the unit; the material type of the item being referenced; and whether the item required a Library subscription to access it. A total of 58 references were collated for the 2010 CIV1EP unit; 237 references for the 2010 CIV2GR unit; and 225 references for the 2011 CIV1EP unit.

## **INTERIM FINDINGS**

The initial findings showed that student bibliographies for the three group projects were primarily made up of freely available internet resources which required no library subscription. For the 2010 CIV1EP unit, all 58 resources used were freely available on the Internet. For the 2011 CIV1EP unit, 28 of the 225 resources used (12.44%) required a Library subscription or purchase for access, while the second-year students (CIV2GR) used a greater variety of resources, with 71 of the 237 resources used (29.96%) requiring a Library subscription or purchase for access. The results suggest that the library sessions had little or no influence on the 2010 CIV1EP group, but the sessions may have assisted students in the 2011 CIV1EP and 2010 CIV2GR groups to find books, journal articles and conference papers, which were all represented in their bibliographies.

## **FURTHER RESEARCH**

The next step in the research is to investigate ways to increase the representation of scholarly references (found by resources other than Google) in student bibliographies. It is anticipated that such a change would lead to an overall improvement in the quality of the student papers. One way of achieving this would be to make it mandatory for students to include a specified number of journal articles, conference papers, or scholarly books in their bibliographies. It is also anticipated that embedding La Trobe University's Inquiry/Research Quiz (IRQ) using a constructively aligned approach will further enhance the students' research skills and increase their ability to find suitable scholarly material which relates to their topic. This has already been done successfully (Salisbury, Yager, & Kirkman, 2012).

## **CONCLUSIONS & CHALLENGES**

The study shows that most students rely heavily on the free Internet for information. Students don't naturally use Library databases or scholarly resources such as Google Scholar to find information, without encouragement from their teachers, tutors and/or librarians. It is acknowledged that the use of scholarly resources doesn't automatically lead to a high quality paper. Resources must be used appropriately and students also need to have the skills to identify and synthesise key findings in the existing literature and relate these to their own paper. Ideally, students should be able to see the benefit of using scholarly resources in their papers, and continue to seek these out even when it's not a specific assessment requirement, though it can't be assumed that this will be the outcome.

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## **KEYWORDS**

Citation Analysis, Civil Engineering Students, Information Literacy.

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