



Effective methods for teaching information literacy skills to undergraduate students: what does the library research literature reveal?

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Study Objective

Information literacy is an area of lively discussion among academic librarians. Librarians are constantly looking to improve the methods by which they teach information skills to undergraduate students. Most librarians have their own stories of teaching successes and failures which they pass on to others. In an attempt to move beyond conjecture with respect to the most effective methods of teaching information literacy skills, the author conducted a systematic review of the library research literature. The objective of this review was to assess which library instruction methods are most effective for improving the information skills of students at an introductory, undergraduate level, based upon cognitive outcomes.

Methods

Fifteen databases (LISA, Library Literature, ERIC, Inspec, Academic Search Premier, Educational Research Abstracts, CINAHL, Web of Science, Dissertation Abstracts, Conference Papers Index, SIGLE, CERUK, Education-Line, British Education Index and Australian Education Index) were searched for relevant articles, with searches last updated in May 2005. Related bibliographies, literature reviews and references from included articles were also checked. 4356 potentially relevant citations were retrieved and reviewed for significance. Of those, 282 full articles were considered in-depth via an inclusion/exclusion process.

For a study to be included in the systematic review, it had to meet the following criteria: 1) instruction had to be librarian or library assistant led (or as part of a teaching team) for a class or stand-alone session, any method; 2) the population had to be undergraduate students at a post-secondary academic institution; and, 3) the research study had to have an evaluative component that measured the cognitive outcome effect of instruction on student learning via some test of information literacy (e.g. pre- and post-tests, grading of papers or bibliographies). Included studies were not limited by publication date but were limited to the English language, due to time constraints and limited resources of the researcher.

122 unique studies (125 articles; three studies had results published in two sources) met the inclusion requirements and underwent an extensive data extraction and critical appraisal process. Data extraction elements for each study included: study objective; population; teaching methods used; instructional topic; learning objective; evaluation period; contact time; performance indicators from the Association of College & Research Libraries' *Information Literacy Competency Standards for Higher Education* document (2000) that were addressed by the study's research outcomes; the level of cognitive learning assessed, based upon Bloom's taxonomy (revised by Anderson and Krathwohl, 2001); research methods used; research results;

and reported outcomes. Critical appraisal elements were based upon the checklist developed by Morrison, et al. (1999) with additional appraisal related to validity and reliability.

Preliminary results

The majority (78.4%) of included studies were published as journal articles (see table 1), with large numbers coming from three main journals, *College & Research Libraries*, *Research Strategies*, and *Journal of Academic Librarianship*. Publications were spread over a time period spanning from 1963 to 2005, with most publications coming from the current decade (44/125). The 1980s produced a sizeable amount of research on the topic (41/125), which then diminished in the 1990s (26/125) before resurging in the present decade.

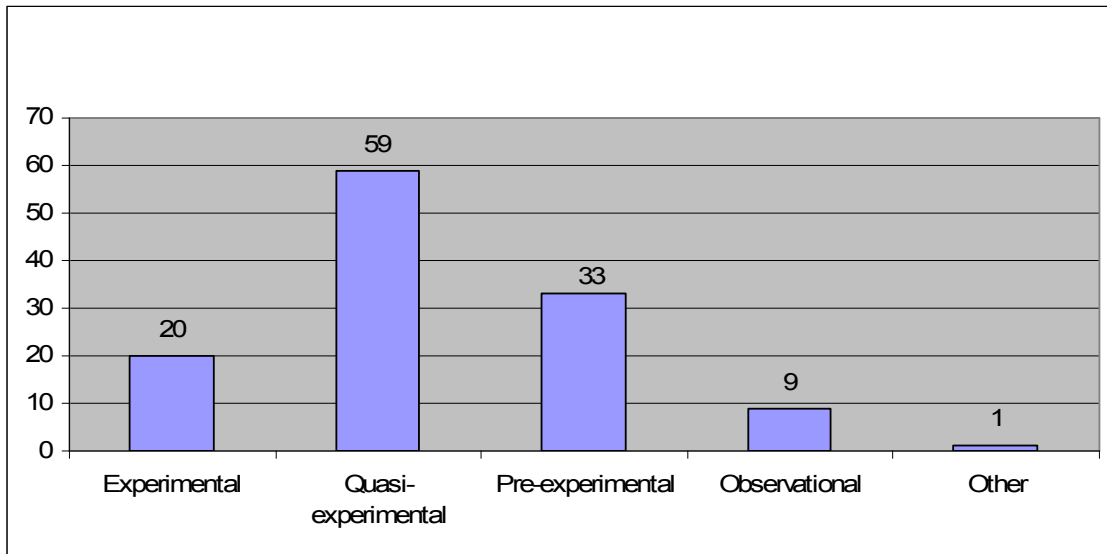
Table 1: Publication Types

Type of publication	Number included
Journal articles	98
College & Research Libraries	(20)
Research Strategies	(14)
Journal of Academic Librarianship	(11)
ERIC documents	19
Dissertations	8
Total Publications	125

The vast majority (87.7%) of studies (107/122) were conducted in the United States. Other countries included were Canada with eight studies, Australia with five, and the UK, and Trinidad and Tobago each had one study included.

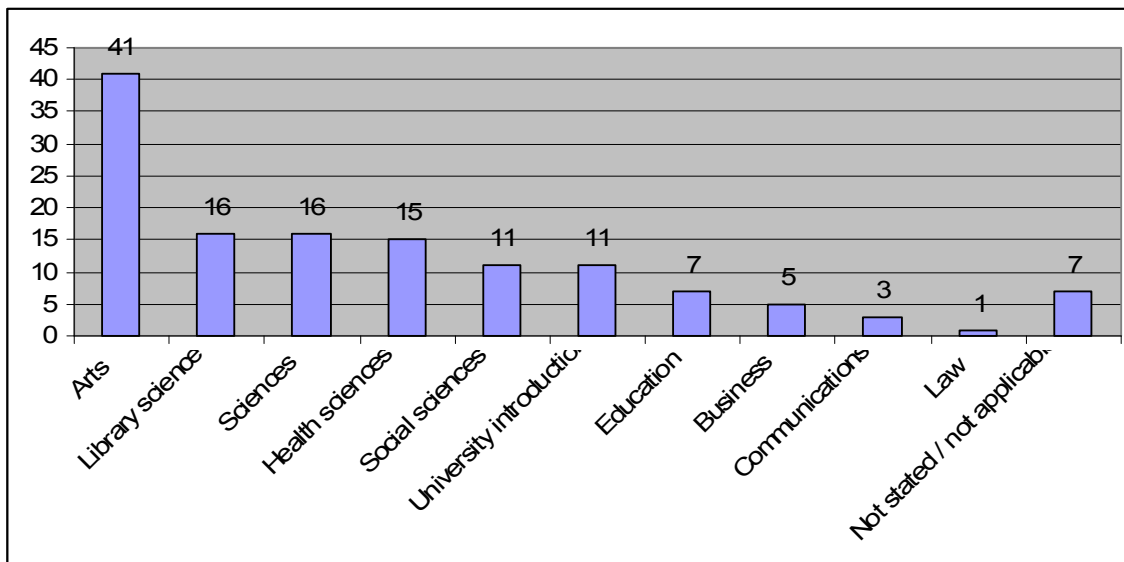
The research studies included in this systematic review used quantitative research methods, since one of the requirements for inclusion was the measure of cognitive outcomes. A general breakdown of study type is given in Figure 1. Most studies were quasi-experimental, employing a controlled study design, but without randomization. 59 of the 122 (48.4%) studies fit into this categorization, including controlled before-and-after studies, as well as studies that were post-intervention, single time point with a control group. 16.4% of the studies were experimental, employing randomization and controls. The majority of these used cluster randomization since educational groups may have been pre-formed and the randomization of individuals was out of the researcher's control. Some studies were pre-experimental since they did not have a comparison or control group, and mainly focused on exploring the change in one group of students, primarily via before-and-after studies using a pre- and post-test.

Figure 1: Included study types



The 122 included studies represented a wide range of undergraduate subject areas. Most studies covered a single subject area, but others included more than one discipline. The highest percentage of studies came from instruction related to courses in English literature or composition (37/122). Another large area was in Library science, these mainly being courses taught by librarians for credit (16/122). Figure 2 gives a breakdown of the number of studies by broad subject discipline.

Figure 2: Subject areas covered by included studies

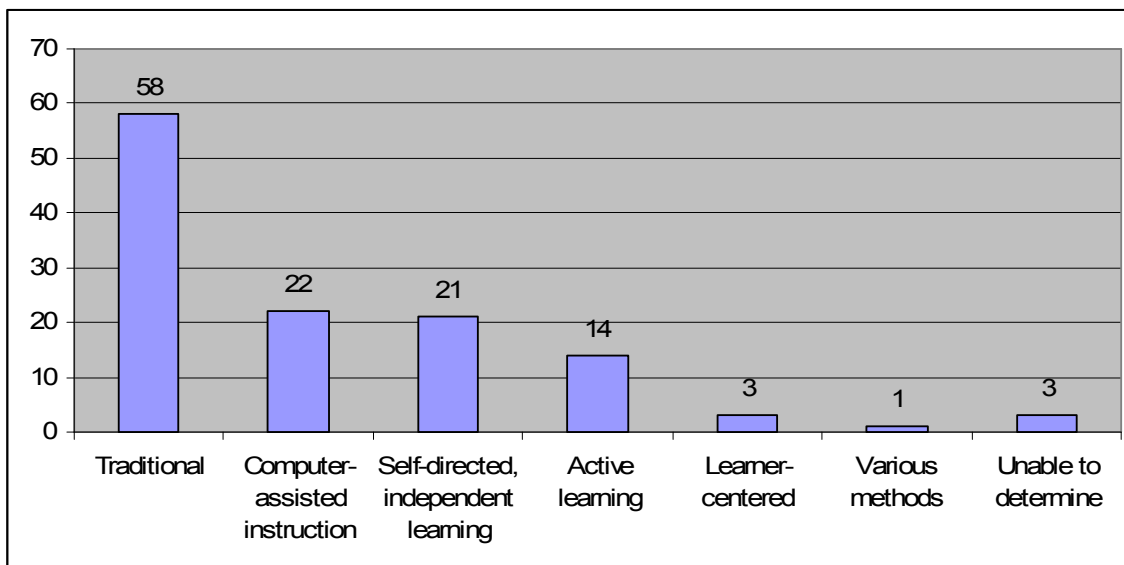


Most studies compared two or more teaching methods. 88 of the 122 studies (72.1%) were comparative, while the remaining 34 studies did not have a comparison group. These non-comparative studies were

generally evaluating one teaching method or new innovation to determine whether students' scores improved following the instruction.

The teaching methods studied covered several areas, with the majority looking at traditional methods of teaching (e.g. lecture, demonstration). Other teaching methods included computer-assisted instruction (e.g. web-based tutorials), self-directed, independent learning (e.g. workbooks), and active learning (e.g. PBL). Figure 3 details the different primary teaching methods studied, according to the method that acted as the intervention.

Figure 3: Teaching methods used in included studies



Conclusion

Since data analysis for this systematic review is currently being completed, further descriptive and inferential analysis will be conducted prior to presentation at the 3rd International Evidence Based Librarianship Conference, and results discussed at that time. Study variables such as number of contact hours, partnership with faculty, tie to student need, and subject-based course integration, will be evaluated to determine their influence upon positive learning outcomes. An overall determination of whether the research literature is sufficient to determine the most effective methods for teaching information literacy skills to undergraduate students will be made.

It is hoped that this research will aid librarians who teach information literacy skills to undergraduate students at academic institutions make more informed decisions about their teaching methods. This systematic review entails one piece of the complex puzzle related to information literacy, based upon cognitive outcomes.

Bibliography

Information literacy competency standards for higher education. (2000). Retrieved 30-08-2005 from <http://www.ala.org/ala/acrl/acrlstandards/informationliteracycompetency.htm>

Anderson, L.W., & Krathwohl (Eds.). (2001). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman.

Morrison, J.M., Sullivan, F., Murray, E. & Jolly, B. (1999). Evidence-based education: development of an instrument to critically appraise reports of educational interventions. *Medical Education*, 33, 890-893.