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BIBLIOGRAPHIC INSTRUCTION FOR THE GEOSCIENCE UNDERGRADUATE: A DIGITAL WONDERLAND OR LOST IN SPACE?

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Abstract -- Technology has not only changed the format in which students access information, it has also changed the pedagogy of bibliographic instruction. Today, bibliographic instruction takes place in high-tech classrooms where librarians are teaching students computer skills, online search techniques, and most importantly how to determine what is appropriate for their research in a Web environment. This paper will demonstrate how library research has changed from the past to the present by reconstructing the search for sources used in the bibliography of a paper written by an undergraduate in the 1980's.

INTRODUCTION

In the past, introducing Geology students to the academic library was relatively simple and straightforward. There was the card catalog, the journal indexes, the map room and the book stacks. Bibliographic instruction consisted of a simple tour, some basic instruction on how to use the card catalog and where to find the *Bibliography and Index to Geology*. Today, bibliographic instruction has become much more complex. Students not only need to know how to evaluate and find information pertinent to their needs but they must also have the computer skills to retrieve it.

DO WE STILL NEED BIBLIOGRAPHIC INSTRUCTION?

Technology has brought on a proliferation of information giving instantaneous results to thousand of resources. Today, students access the "card catalog," citation indexes, full text journal articles, and maps, all from their computer. The library is open 24/7 from anywhere that has an Internet connection and students expect immediate gratification. Without a well-developed search strategy the results may be overwhelming and insignificant to the researcher's goals.

Research shows that the demand for reference assistance and bibliographic instruction has significantly increased with the onset of electronic information. Carol Tenopir and Lisa Ennis surveyed 68 academic librarians in 1991 and again in 1997 (Tenopir and Ennis 1998). In

the 1991 survey, several librarians predicted the end of library instruction. They saw new, more user-friendly services emerging and the computer skills of students increasing. However, by 1997 the same librarians emphasized the need for more instruction due to the proliferation of resources. They indicated that instruction must include the evaluation of Web content, search strategies for Boolean logic and relevance ranking systems, and the ability to work with a variety of databases (Tenopir, 1999). Another survey, conducted by Wen-Hua Ren, of 85 students before and after library instruction, found that student's electronic information searching improve after library instruction. This survey also indicated the need for these skills was required curriculum wide, and that university faculty expected the library to teach them (Ren, 2000).

THE CARD CATALOG? – WHAT'S THAT?

To demonstrate the importance of learning search skills, an unpublished paper titled "The Rejection of Alfred Wegener's Continental Drift Theory" (Fleming 1987), written by an undergraduate geology student in the mid-eighties, was selected for this project. The search strategy, based on the bibliography from the paper, was reproduced both in the paper environment that existed then and in the electronic environment that exists now.

The original paper included 20 monographs and 4 periodicals. The author searched the Library of Congress subject classification headings and selected "Continental Drift" as a search term.

Number of Searches

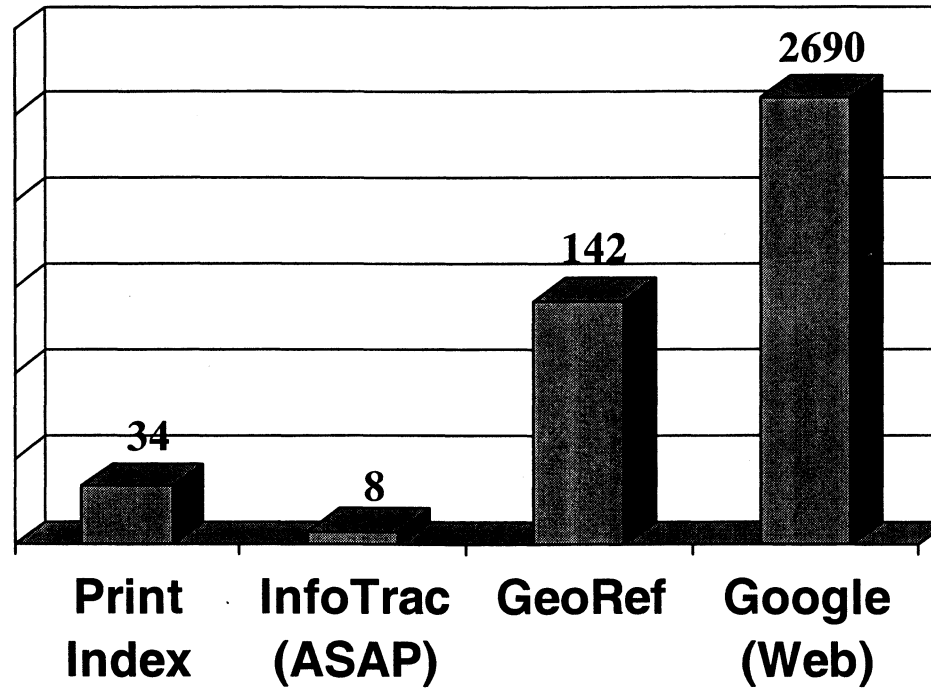


Figure 1: Results from searching for periodical articles electronically

The author then searched in the subject portion of the card catalog for books under this term as well as a subject and author search in the card catalog under "Alfred Wegener."

For the periodical references the author searched the subject index of the *Bibliography and Index to Geology* under the term "continental drift – concepts" for the years 1979-1986, selecting 4 references from the 34 unique titles found.

CYBERSPACE

Next, the paper was approached as if it was being written today. Not all the parameters could be the same but the attempt to use the same search terms and strategy was used.

The same subject headings were used in the online catalog for the library at the university where the paper was written. The search was limited by date to exclude records for books that would have been published after the paper was written. The results were not significantly different than those using the card catalog. "Continental drift" was also used as a word search, something that was not available in a paper card catalog, but again, no "missed" books were found that should have been referenced in the paper.

Results changed significantly when searching for periodical articles in the electronic environment (Figure 1 summarizes these results). No undergraduate is going to use a paper index, and search year by year for citations. Instead, they will go directly to their preferred electronic index, such as *Expanded Academic Index* by InfoTrac or another database that provides full text articles, and use the default settings.

In *Expanded Academic Index*, a favored full-text database, 3 citations were retrieved using the "subject guide" and searching "Alfred Wegener." If they had been published at the time the original paper was written, they would have been relevant to the paper and should have been included in the bibliography. Searching the term "Continental Drift" produced 237 articles, but only the 5 listed under the subtopic "history" were relevant to the topic and should have been included in the paper. These searches could not be limited to the time period that the paper was written, as the full text only covers the last few years. It is interesting to note that this database does not use the same search terms as the Library

of Congress or the *Bibliography and Index of Geology*, and if the student had searched the terms, "Alfred Wegener," or "Continental Drift" as "keyword searches" instead, the student would have had to sort through 66, and 378 articles respectively. Most of these articles were about geologic formations and sequences that reflect continental drift, instead of the theory of it.

The database *GeoRef* by WebSPIRS was also used. It covers the citations in the *Bibliography and Index to Geology*. It was necessary to use Boolean operators to make any kind of sensible search. The combined terms "Continental Drift AND Alfred Wegener" were searched, retrieving 142 citations compared to the original 34. Limiting the search by date to exclude any citations of works published after 1986, retrieved 124. Many of these were repetitive and referred to several chapters in the same book or books. Several of the citations could have been eliminated if the searcher had been aware of some of the advanced functions of WebSPIRS. Appropriate, additional references were found and would have contributed to the original paper providing the author had the patience to wade through all 124 citations, and that the journals cited were available in the author's library. Few undergraduates start their papers early enough to use interlibrary loan services.

The Web is another favorite information source for students. Searching "Alfred Wegener AND Continental Drift" produces 2690 hits using the Google search engine. Most of these were irrelevant and many are hitting on the "Alfred Wegener Institut" homepage, which though named after him, does not provide any information on his theories.

CONCLUSION

A student using the academic library today not only has more information resources to choose from, but also without any training in retrieval techniques, will produce so many results, that the process becomes meaningless. Confronted with these numbers, students will do one of two things: Take the first couple of references retrieved, regardless of their quality or how well they support the research, or worse yet, they will just give up and tell the professor, "I can't find anything." A successful bibliographic instruction class must teach students how to focus their search skills into producing meaningful results,

and how to evaluate what they retrieve in terms of relevancy and appropriateness to their research.

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