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ABSTRACT
            Instruction for students in the use of libraries and
their resources has been neglected in engineering education.
Librarians can team teach courses on technical writing and introduce
students to the major information sources in their fields. They can
give presentations, publish handbooks, bibliographies, and
pathfinders on library resources, and present audiovisual programs
for library orientation. Engineering instructors and administrators
should realize that library resources are important, and that
librarians are willing to work with the instructor in developing
instructional programs to improve students' library skills.
Advantages of such instruction to students are: (1) they can collect
background information more efficiently; and (2) they have the
opportunity without undue dependence on a instructor's guidance. A
list of 13 hints on conducting a literature search, modified from
University of Nebraska at Omaha courses to be more universal, is
attached. (Author/KP)

LIBRARY-USE INSTRUCTION FOR ENGINEERING

STUDENTS

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ABSTRACT

Instructing engineering students in the use of
the libraries and their resources has been a neglected
part of engineering education. Currently, libraries
are instituting instructional programs to help
the students use libraries effectively. This paper lists
some hints to the engineering students in conducting
library searches.

In engineering education, library-use instruction is probably one of the most neglected areas. Instructors do not bother to teach students about the use of the library because they believe that it is either trivial or the students are expected to know without instruction. Many librarians (and to some extent even the instructors) know that this is not always true. Students usually stumble through the library and are reluctant to seek out the librarians to ask for assistance. This usually results in a loss of students' time and much wasted effort. In the same way a student needs training in the use of laboratory equipment, he or she needs training in the efficient use of the libraries. The more one knows about the resources of the libraries, the easier it would be to manipulate them to suit a need.

One way for students to learn to use libraries is through courses such as "technical writing" or by doing term papers. By insisting on a good bibliography, and by examining the manner in which the student collected the information in the library, faculty can make the students aware of the vast amount of information accessible within and without the library and how to go about finding it.

In conducting these courses, engineering educators should call upon the often underutilized source - librarians. Librarians, more than any one else, are aware of the students' lack of library-use skills, the time wasted

by them in the library because they are not fully aware
of the library's resources and the inferior methods they
use in collecting information. Librarians are making
every effort to make students and faculty aware of
this problem.

In many instances, librarians are willing to team
teach courses such as 'technical writing' and introduce
students to major sources of information in their fields
and the best methods of collecting the information.
Other techniques being used by librarians include giving
presentations to students at the invitation of the
classroom instructors, publication of handbooks,
bibliographies and other pamphlets on the resources of
their libraries, and slide/tape and other audio-visual
programs which orient the students to the library
resources. Some engineering libraries use point-of-use
instructional materials. For example, if a student
wants to know how to use the Engineering Index, there may be
an audio-cassette, or slides, or even a set of printed
instructions located by the side of the index. The
student may consult these instructions before using the
index. Similarly, librarians have devised 'pathfinder
exercises' which instruct students in systematically
locating major sources of information (such as indexes,
abstracts, bibliographies, handbooks, textbooks) on their
topics. Of course, almost all the libraries have

reference areas where librarians are available to give students individual attention and help them compile bibliographies for their papers or other assignments.

Engineering instructors and administrators should realize that their libraries are much more than collections of books and periodicals. Librarians are often willing to work with engineering instructors to develop suitable library-instructional programs for their students. Although librarians try to reach all the faculty members, it is impossible to personally contact every individual. Instructors should take initiative and contact the librarians for information on available programs and possibility of starting new ones.

The advantages of a library-use instruction to the students are: (1) students can collect background information for their term papers or laboratory experiments more efficiently; and (2) students will have an opportunity for self-instruction without unduly depending on the guidance of their teachers. Of course, it is hoped that they will be able to turn in better quality reports and papers.

Following is a set of suggestions which faculty
might present to their students who are compiling
bibliographies for term papers. These instructions were
originally prepared for the students of 'technical
writing' courses taught at the University of Nebraska at
Omaha, but were modified to make them more universal.

HINTS ON CONDUCTING A LITERATURE SEARCH

1. Clearly define the topic on which you are planning
   to write a paper. If you choose too narrow a topic,
   you may not find much material in your library. If
   you choose too broad a topic, you will have too much
   to cope with.

2. To get general ideas on your topic, first read textbooks
   and/or encyclopedia articles in the subject area. The
   McGraw-Hill Encyclopedia of Science and Technology
   is a good starting point. In addition, there are
   encyclopedias and handbooks in different areas of
   engineering (eg. Encyclopedia of Polymer Science and
   Technology and Civil Engineering Handbook) which
   provide background information on a given topic.

3. As you go through the encyclopedia article or a textbook
   chapter, you can do two things. You can build a
   vocabulary of terms used in connection with the topic.
   (Note the variations in spelling, synonyms, broader
   terms, narrower terms and other variations in terminology.)

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Searching the card catalog, periodical indexes, abstract
journals will be easier if you have a good control of
the vocabulary. Secondly, you can scan the references
cited and choose those which are useful for your topic
for further examination.

4. (a) Next, find out what books your library has on your
subject. From the previous step, you may know the
names of some authors and the titles of their books.
See if they are listed in your library's catalog.
Do not stop here. Go to the subject card catalog
to find if there are more books on your topic. First
check under the most specific term or terms and then
gradually broaden the search. For example, if you are
searching for information on 'Airport lighting,'
check to see if there is such a heading in the subject
catalog. If there is none, check under its variation,
eg. 'Airports-Lighting.' Information on this topic may be
found under the related headings such as: Airports;
Airports-contracts and specifications; Airports-Design
and construction; Airports-Equipment and supplies;
Airports-Laws and regulations; Airports-Runways;
Airways-Lighting; Landing aids (Aeronautics): Runway
localizing beacons; Beacons; Lighting; Electric
lighting. Of course, as you go from a specific to a
broader heading, you will find less and less detailed
information on your topic. (Also the number of

headings you decide to look under depends on the

length of the paper required, time available,

type of your library, etc.)

(b) To help you choose the appropriate headings, many

libraries display the book <u>Library of Congress Subject</u>

<u>Headings</u> at the catalog. There are also thesauri of

engineering terms which are useful in building an

engineering vocabulary.

(c) In a typical college library, books are scattered

in a number of locations - eg. reserve, reference,

oversized books. Familiarize yourself with your library.

5. Check to see if there are any bibliographies on your topic.

A good recent bibliography will reduce the time you

have to spend in searching the literature. Book-length

bibliographies will be listed in the card catalog under

the subjects such as 'Engineering-Bibliography;'

'Building-Bibliography.' Other bibliographies can be

located through sources such as <u>Bibliographic Index</u>.

6. Many sources of information are not accessible through

the card catalog. One such example is periodical

articles. In many libraries, publications issued by

United States government are housed separately and may

not be listed in the catalog. Check with the reference

librarian for information on such special collections and

pamphlet files.

7.(a) References to engineering journal articles on your
topic can be collected by using periodical indexes and
abstract journals. For engineers, <u>Engineering Index</u>,
and <u>Applied Science and Technology Index</u> are
excellent starting points.

(b) Information in recent periodicals may not be
reported in indexes and abstracts. Browse through
the current issues of the periodicals in your
subject area.

8. (a) Many federal agencies publish engineering
information and their output varies from tips for
consumers to professional publications. The major
source for finding out what has been published by
the federal government is the <u>Monthly Catalog of
United States Government Publications</u>.

(b) Technical reports are another type of federal
publications. These are research reports released
by the federal agencies, contractors and grantees.
The information provided in them may not appear
elsewhere. Many engineering libraries will have a
collection of these reports. If your library does not
have them, your librarian will suggest how to get hold
of them. In any case, these technical reports are
listed in the <u>Government Reports Announcements & Index</u>.

9. You may also be interested in finding out if anybody
has written a doctoral thesis on your topic. If you are,
check the <u>Dissertations Abstracts International</u>. Its
Section B lists science and engineering theses.

10. Check if your library has access to computer data bases. Many of these data bases are supplied by Lockheed and Systems Development Corporation. Searching these computer data bases will make compiling a bibliography much easier.

11. It is likely that your library may not have some of the books, articles, government documents, etc. which you want to consult. In such a case, you may get them through your library's Interlibrary Loan Department.

12. Finally, personal communication plays an important part in collecting scientific and technical information. It may be worthwhile to contact companies, government agencies, teachers and practicing engineers. It is also a good idea to maintain a personal file of reprints of articles whcih have appeared in professional and trade journals and to keep track of papers read in conferences.

13. The above steps are general guidelines for conducting a library search on an engineering topic. In the actual search, you may have to skip some steps and modify others, depending on your knowledge of the subject and the amount of information you need. The best thing is to make an appointment to talk with a reference librarian before undertaking the library search. He or she will suggest the most appropriate steps to follow for your topic.