MANUAL for PROJECT RESEARCH

for College and University Students

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PREFACE

Manual for Project Research - for College and University Students is intended as both a classroom text and a reference tool. It is a guide to the methods and materials of research. This Manual is compiled specifically for those who are undertaking research for the first time.

The contents of this Manual are presented in a very compact form. The reader is refered to the standard textbooks for greater detail and for expanded explanations. Attempts were made to offer materials in the Manual that would be applicable to any field. There are, of course, special research tools which have to be utilized in specific fields of specialization. The author felt that it would not be appropriate to include them here.

The reference sources listed in the Bibliography at the end of this Manual are recommended for further reading.

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Chapter One

RESEARCH – WHAT IT IS

Research is like a crossword puzzle. It is meaningless until the various pieces begin to fall neatly into place. When the overall pattern or picture becomes visible, certain creative satisfactions result.

Research is a disciplined process of investigating and seeking facts that will ultimately lead a research student to discover the truth about something. This truth is usually stated as the research student's thesis, and is a result of the facts the student has discovered. Generally, this truth must be proved conclusively to the reader by the facts obtained. The thesis should not be a mere statement of a preconceived opinion or prejudice, nor may the research report be a mere stringing together of related quotations and a collection of footnotes.

The research report is a formal presentation of discovered facts. It provides the evidence the research student needs to defend the opinion expressed as the thesis. As a consequence, the research student must state how and where his facts were found. If they were discovered from what other investigators have said or reported, the research student is under obligation to reveal who said them and where they were said or reported so that the reader could find these facts too. If the facts were discovered by direct observations, the research student must describe this experience in order that the reader could repeat it and observe the same phenomena of facts.

The research student's findings, the analysis of all the data gathered, and the conclusions he draws from the collected materials are the most important parts of his final research report. These are carefully documented and presented in the report.

Research reports are now standard requirements in many university and college courses. They serve a manifold purpose. Generally, research reports

(a) promote the development of logical habits of thinking and organization,

(b) provide a beginning in independent study, and

(c) liberate the student, in some measure, from the domination of a single textbook and the viewpoint of one instructor.

DEFINITIONS

There are several definitions of the word "research." Two common definitions given by the dictionary are:

1. Research is a careful or diligent search.
2. Research is an investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories, principles or laws in the light of new facts.

The first definition is the commonly accepted one. It describes the investigative work of researchers. It is the kind of research done by students in the preparation of term papers. Library research is an example of this.

The second definition applies to the studies expected of bachelor's degree graduation exercises, master's theses, and doctorate dissertations. The research function here is primarily one of adding to human knowledge. The research student has the task of searching for undiscovered facts and principles. This amounts to far more than reading reference books and published articles on a particular subject and absorbing what others already know. It means adding something new, original, and important to the total body of information.

Expertness in any subject presumes a thorough understanding of the whole body of knowledge which has been gathered over the years. Nobody can be regarded as an expert who takes his knowledge second hand. The true researcher and expert must possess the skill and the intelligence to help contribute new and original ideas of his own. New ideas must be tested and carefully evaluated to become useful. Such testing is valid only when done carefully and accurately in a scientific manner. Research, therefore, provides the means for solving problems and for acquiring new and reliable knowledge.

To some extent, a piece of painstaking research can sometimes leave a kind of emotional scar tissue in a research student. The research may be strenuous but exciting. The research student, however, may spend an equal amount of time or longer in a mood alternating between enthusiasm and weary disgust as the research worms its exhausting course through planning, rough drafts, revision, checking and cross-checking, and compression for final typing.

RESEARCH "INGREDIENTS"

In any research undertaking it is necessary to look for interesting, significant, and relevant problems or topics. It is important for the research student to make sure that someone else has not solved the selected problems. The research student too must know what has been done with a particular problem or related problems.

Research always includes the following "ingredients":

1. a question in need of an answer, a problem in need of a solution, or a hypothesis needs to be tested;
2. evidence or data gathered by the research student having special pertinence to the research problem;
3. analysis and interpretation of data to determine their meaning; and
4. a conclusion based on the evidence which actually solves the problem raised or answers the questions posed.

In carrying out a research project, it is necessary to get at facts firsthand, at their source, and actively to go about doing certain things to stimulate the production of the desired information. The research student must first provide himself with a working hypothesis or guess as to the probable results. He then gets to work, to collect enough facts to prove or disprove his hypothesis. He sets up experimental procedures which he thinks will manipulate the persons or the materials concerned so as to bring forth the desired information or results. His experiments may be so designed that there is only one uncontrolled variable. There must also be control groups in which the same variable factor is influenced in different ways or not at all.

Briefly, a research project involves the following main steps:

Step 1 - Identifying the research problem

Step 2 - Reviewing revelant information related to the problem

Step 3 - Collecting the data

Step 4 - Analysing the data

Step 5 - Interpreting the data

Step 6 - Drawing conclusions

Generally, a research undertaking tries to go beyond fact-finding and reach for practical and applicable generalizations or principles. All research is directed to one or both of two ends: (a) the extension of knowledge, and (b) the solution of a problem.

TYPES OF RESEARCH

There is always more than one way of accomplishing any task, and doing research is no exception. There is always more than one type of research undertaking. The following are some of the more common types of research which the research student may be exposed to. Details of each type of research mentioned below are usually found in most books on evaluation, research methodology, and statistics. For the purpose of this manual, the very brief description of each type of research listed below is primarily to introduce the research student to some different types of research possibilities.

Basic research and applied research - A distinction is usually made between basic research and applied research. Basic research and applied research are not differentiated by complexity or value, but by their goals or purposes. They should not be differentiated by a hierarchy of value judgments.

Basic research - Basic or pure research refers to any research undetaken to determine true facts or to examine and to verify theories. Generally, this type of research is carried out without regard to any immediate application.

Studies of this kind involve the search for knowledge largely for its own sake. Basic research therefore adds to the existing body of knowledge in the discipline - it is supplemental. It does not necessarily provide results of immediate, practical use although such a possibility is not ruled out. An example of basic research would be conducting an experiment concerning language learning and teaching in a laboratory setting. Basic or pure research is not normally expected of bachelor's degree graduation exercises.

Applied research - Applied research, in contrast to pure or basic research, aims at finding a solution to some practical difficulty in a specific situation. The purpose of applied research is therefore to solve an immediate practical problem. Applied research normally attempts to invoke specific action or procedure which should be taken in dealing with any practical problem. Applied research is frequently referred to as "action" research. It generally produces solution to a specific problem, and it is very often applied in large-scale projects. For that reason, applied research is also referred to as "developmental research."

An example of applied research would be a project conducted to determine school teachers' preferences for several available reading programmes. This type of research is typical of the work of university undergraduates and graduates.

Theory-testing research - A theory-testing research is directed toward seeking evidence which may support or reject a hypothesis or a specific theory that has been formulated by the researcher.

Experimental research - This research approach examines the effects of experimental variables. At least one variable is deliberately manipulated by the researcher in order to study the effects of the variation.

Ex post facto research - In this type of research the relationships and all possible effects among the variables are examined. These variables are not manipulated. The research is usually a systematic empirical enquiry that is scientific in nature.

Historical research - This research is an integrated documentation of past events of facts written in the spirit of critical enquiry.

Survey research - In this type of research the characteristics of all variables are usually examined. The distribution and interrelationships of the variables are studied for their implications and interpretations.

Problem-solving research - This is research directed toward an applied goal, generally with the aim of seeking solution to a specific problem. It is not performed to develop or to test theories. In English teaching and learning, problem-solving research is usually associated with instructional programmes in the classroom. This is often referred to as classroom research. Eggleston, Galton, and Jones (1975) have classified classroom research studies, according to their purposes, as

a. inductive studies which are by their nature exploratory, they involve the collection of a more comprehensive array of data than most other types of study and are rarely concerned with measuring the growth of student learning;

b. prescriptive studies that are concerned with what the classroom teacher should be doing and these studies are recorded according to value-laden criteria;

c. reflective studies which are concerned with what the teachers can find out about what they are doing;

d. matching studies which seek to relate curriculum project aims and methods to actual classroom events; and

e. process-product studies which link teaching processes and learning through pre and post tests of attainment.

During the research process, the research student learns to select, evaluate, and analyse facts and data. He has to discipline his habits of thought and work, and most important, to think - to create a new angle of vision. In this sense the research undertaking is an original effort; but it is important enough in itself to justify the work involved in its creation. The final research report is a valid criterion for judging the disciplined work habits and the intellectual maturity of the research student. This report very often clearly reveals the true quality and merit of the research student's mind.

Chapter Two

SELECTING A RESEARCH TOPIC

Research on any subject presupposes a thorough knowledge of the field. Mastery of known information will assist a research student to choose a relevant problem or a research topic. If the student knows the field well, he will recognise its gaps. The first step in research is to find an interesting, significant and relevant topic or problem.

CHOICE OF A TOPIC

It is practical to select a problem or a research topic limited in scope and suitable for objective investigation. It is also important to be sure that someone else has not solved the problem or thoroughly researched the topic.

A student working on a research problem needs to produce definite results in a limited time. The particular result of whatever research he does is supposed to be a substantial and coherent thesis. The first task, therefore, is to select a research topic or a problem that the student can profitably treat within the time and with the materials at his disposal. Obviously, the research student will avoid those research topics for which he is completely unprepared. For instance, recent developments in the natural sciences or in computer science make interesting research topics but most of them call for a knowledge of mathematics, physics or statistics that many researchers do not have. If it is possible, a student should start from a foothold of previously acquired knowledge.

A research undertaking will give the research student a chance to focus on a familiar idea and to assess its validity or significance. For instance, he might trace the concept of communicative language teaching in the works of Henry Widdowson and John Munby. Or he might compare Ron Mackay's concept of English for Specific Purposes with that of R.A. Wilson's.

BASIC REQUIREMENTS

A selected research topic should allow the research student to

observe a number of basic requirements for a successful research. There are three requirements.

1. The research should centre on one limited aspect of a general subject. If it is designed to establish a thesis, it should concentrate on establishing one or two main points. It is wise to avoid subjects that would lead a research student to compile miscellaneous information. Many research projects and research papers are unsuccessful because they cover too much ground. They are usually either too broad in scope, or too shallow in treatment. It is advisable to restrict one's investigation to a general research area until one arrives at something that can be explored in detail. "The early history of Malaysian universities" is a general subject area; "the training of English as a Second Language teachers in Universiti Kebangsaan Malaysia" is a specific subject.

2. The research should show that the research student has made detailed use of several different sources. In view of this, the research student has to try to avoid subjects that would tempt him to summarize pre-assembled information from a single source. Similarly, it is advisable to avoid subjects that are conclusively and satisfactorily treated in a textbook or in an encyclopaedia or in a published article. By definition, a research report is more than a condensation or extractions of easily accessible sources, it is more than comparing of evidence from different, and possibly conflicting, sources.

3. The interpretation of results and the conclusions elaborated in the research report or thesis should stay close to the evidence actually presented. It becomes necessary then to avoid topics whose discussion might bring into play a large measure of partisan allegiance or personal preference.

The time available for a research student to conduct research work is usually limited. At the undergraduate level of eduation, research assignments are given to students as much for the inherent training and practice as for the actual achievement of research undertaking. In most cases, a student's own supervisor will suggest the topic on which the student is desired to work on, or the supervisor will give a list of suggested research topics for the student to choose from.

The research student's task, nevertheless, will involve having to limit, expand or otherwise alter the suggested topic in order to meet the requirements laid down. When the choice is left to the student, it is necessary to try to tie the general subject in with some phase of personal interests. In the final selection of a research topic the student has to set its boundaries so that he can successfully complete a full, thorough, and accurate research project within the limits of the time available and the requirements concerning length. It is important to remember: DO NOT TRY TO DO TOO MUCH !

It is equally important too to remember that, in general, a student is undertaking a research as a partial satisfaction of the requirements for a diploma or a degree programme. It is necessary to bear in mind that the final title of the research report probably will not be the same as the original designation of the topic. The selecting and wording of the title are among the last things a research student will do. The final title, in so far as it is possible, should be chosen so as to precisely present the exact nature and extent of the contents of the research report.

GENERAL AREAS FOR RESEARCH

The following is not an exhaustive list. It serves merely to highlight some examples of the general areas for research. Other examples can usually be found at the end of completed theses and research reports or academic articles.

1. The evaluation of English language teaching programmes at the primary, secondary or tertiary level.
2. The past history and future prospects of English spelling; reasons for its irregularity; causes that led to standardization; attempts at spelling reform.
3. Analysis of the language needs of particular groups of learners in Malaysia.
4. Approaches in the teaching of English Literature in the ESL classroom in Malaysia.
5. The history of dictionary making; the principles and practices of lexicographers like Samuel Johnson or Noah Webster; the history of the Oxford English Dictionary; problems of lexicography.

6. The early history of the English language in Malaysia, the purposes, vocational or otherwise, for which the teaching of the English language was originally intended.

7. The application of linguistics in the teaching and learning of English as a Second Language in all Malaysian schools.

8. The education or the contributions of a prominent literary figure; books or works that influenced Somerset Maugham, Virginia Woolf, Henry James, Chin Kee Onn, or Washington Irving; the influence of the classics or of contemporary trends of thought.

9. The state of foreign - language teaching in Malaysia; arguments for and against the study of foreign languages; current trends toward studying foreign languages.

10. The present state of the English theater; the extent, quality, or reception of theatrical activities; the role of professional companies, amateur groups, drama festivals.

11. The development or standardization of instruments to measure language proficiency or communicative competence in Malaysian institutions of learning.

12. The need for an international language; the arguments for or against such projected languages as Esperanto or Interlingua; the obstacles encountered by advocates of an international language.

13. The history or the extent of the censorship of imaginative literature in Malaysia; standards applied by critics, courts of law, civic groups; legal means and indirect pressures at the disposal of would-be censors.

14. Development of instructional materials; authentic materials versus commercial materials; selection of appropriate materials for different levels of instruction.

15. Preparation of language test items in the ESL classroom; appropriacy of test materials.

THE SELECTION PROCESS

The process of selecting a research topic operates in the following manner:

Step 1: Carefully decide on the broad areas in the field that are of special interest.
Examples: syllabus design, evaluation, testing, methodology.

Step 2: Within these broad areas, determine what matters need further clarification and study.
Examples: evaluation of ESP program, testing in ESL, TESL methodology.

Step 3: Prepare a list of possible research problems relating to one of the matters chosen in Step 2. The list should have five or six of such problems. For a better understanding state each problem in question form.

Step 4: Rank the problems or research questions in the approximate order of research interest.

Step 5: Do a preliminary library search to establish feasibility and potential for study. The library search involves the development of a working bibliography.

Step 6: Eliminate all research questions that are not suitable.

Step 7: Rearrange the remaining research questions into a new order of research preference. Choose the highest ranking question as the focus for the research. Sometimes the research questions can be sub-divided into smaller and more specific units or some of them can be combined into larger questions.

Step 8: Finally, draw up a simple outline for the research topic. This can help to ensure that it has real potential for the investigative purpose that it is intended for.

THE RESEARCH PROBLEM

In selecting the research problem, the following questions should be asked.

1. **Am I curious to know the solution?** If you think you know the answer, the research may be perfunctory and subjective.
2. **Is this really a new problem?** If many professional studies have been performed in the past, yours may suffer by comparison. The reviewer is not likely to believe that you have done more than plagiarize.
3. **Will the solution add significantly to the body of existing knowledge?** A trivial problem would not be worth an investment of time and effort.
4. **Is the study feasible?** Some problems cannot be solved because no one has been able to devise methods for solving them.
5. **Is this a true problem?** Many students fall into the trap of telling about the marvelous, ingenious method they devised. A preliminary literature survey will uncover whether the problem exists unsolved.

Chapter Three

LITERATURE SEARCH

The proper selection of a topic for a research task necessitates sound thinking and a little intuition. A student, who prepares a research thesis as a part of the fulfilment of the requirements for a degree, is obligated to seek out some phase of a subject which will uncover a field of investigation not quite adequately examined previously. In order to do that, the student must first examine carefully all the available bibliographies of work already completed or still in progress, to ascertain that the topic he has in mind has not been satisfactorily investigated by someone esle. By doing so, he avoids needless duplication and waste of effort. A research student, therefore, needs to conduct a literature search of the proposed research topic so as to avoid "reinventing the wheel."

Once a research problem is identified, the next step in the research process, therefore, is a thorough literature search. No research student can ever learn too much about what he is investigating. A student who claims that he could find nothing in the literature on the topic or problem he is studying generally indicates his literature search has been superficial. The old saying that *"There is nothing new under the sun"*, may have some truth but the literature search is for the purpose of determining whether the student's solution to the problem might be new.

In a literature search the bibliographic sources may be divided into primary and secondary sources. Primary sources are reports of previous research and the original works of the experts on the problem selected for investigation. Primary sources are usually best as background material for the research study and particularly for the finding of related problems. Secondary sources would include critiques, historical background, interpretative and analytic texts, and similar material related to the research topic. Generally, secondary sources are necessary for the study itself but may be of little use in selecting a research problem.

PURPOSES OF A LITERATURE SEARCH

It is necessary for the research student to do a literature search

before he begins his investigation. The purposes of a literature search are :

1. to become familiar with past studies about the selected research topic to learn what is already known or investigated,
2. to obtain up-to-date information about closely related studies,
3. to develop a theoretical understanding of the chosen topic, and
4. to become familiar with all relevant methods and instruments used in past studies on the selected research topic or related aspects of the topic.

Nearly all public and academic libraries have desks staffed by professional reference librarians who can help a research student in locating information. Among the available libraries, the student should locate those containing the largest and best collections of materials in his field. Although reference librarians are well trained in the art of locating special materials, it is an imposition to ask them to seek out items that a student should be able to find for himself.

All research students should learn to use the central card or filmed catalog of any library and become familiar with the two systems of classification most frequently used: The Library of Congress and Dewey Decimal systems.

THE LIBRARY OF CONGRESS CLASSIFICATION SYSTEM

The Library of Congress Classification System divides all branches of knowledge into twenty-one main groups which are designated by letters of the alphabet. Each of the branches is then further divided by the addition of letters and Arabic numerals, permitting endless combinations. The twenty-one main groups are:

A: General works – polygraphy

B: Philosophy – religion

C: History – auxiliary sciences

D:	History – topography (except America)
E-F:	American History and topography
G:	Geography – anthropology
H:	Social sciences
J:	Political science
K:	Law
L:	Education
M:	Music
N:	Fine arts
P:	Language and literature
Q:	Science
R:	Medicine
S:	Agriculture – plant and animal husbandry
T:	Technology
U:	Military science
V:	Naval science
Z:	Bibliography and library science

To illustrate the sub-divisions of an area of knowledge, "P" designates the Language and literature category which sub-divides into:

P:	Philology and linguistics - general
PA:	Greek and Latin Philology and literature
PB:	Celtic language and literature
PC:	Romance language (French, Spanish, Italian)
PD:	Germanic languages

THE DEWEY DECIMAL CLASSIFICATION SYSTEM

The Dewey Decimal Classification System divides the whole

field of knowledge into ten main classes and assigns to each class one hundred numbers, as follows:

000-099	General works (encyclopedia, periodicals, etc.)
100-199	Philosophy, psychology, ethics, etc.
200-299	Religion and mythology
300-399	Social sciences, economics, government, law, etc.
400-499	Language (includes dictionaries and grammar)
500-599	Pure science (includes mathematics, chemistry, physics, etc.)
600-699	Technology (includes agriculture, engineering, etc.)
700-799	The arts (includes painting, music, etc.)
800-899	Literature (includes poetry, plays, etc.)
900-999	History (includes geography, travel, and biography)

Each class of one hundred numbers is further divided into narrower subjects. For example, 973 is the number for United States history. The addition of decimals gives additional subdivisions. Examples: 973.1 is history dealing with the discovery of America, 973.2 is history dealing with the colonial period in America.

Check every item listed in the initial search to eliminate those that have no relevancy. Examine the bibliography in each of the remaining references and make a list of these. Go through each one of these to eliminate the unrelated ones. Continue the process with the bibliographies in these references. Eventually a substantial bibliography will result.

DEVELOPING THE BIBLIOGRAPHY

Preparing a working bibliography, based on a literature search, requires (a) knowledge of library resources, (b) an ability to locate and identify relevant references, (c) a system for recording pertinent sources of information, and (d) a continuous evaluation of

references. It is practical and highly recommended that "bibliography cards" (3" x 5" index cards) be used to record those references which appear to be relevant to the selected research topic. One card should be used for one particular reference source. The usual elements of a library catalog card should be written on the bibliography card and these are: name of author, title of the reference, the place and date of publication, name of publisher (if known), the number of pages, and a brief description of the subject matter.

There are a number of ways to conduct a literature search in college and university libraries. One may begin (1) in the card catalog, (2) in periodical indexes and abstracts, (3) with a computer search service through the batch system, and (4) with interactive (on-line) computer search services. A librarian should be consulted about the availability and the cost of the third and fourth approaches.

To begin a literature search using any of the four approaches, one should first compile a list of descriptors, the key words used in looking for references. A librarian may be consulted to determine whether a thesaurus (a list of descriptors) is available for a particular subject area, and the librarian can also assist in compiling descriptors. A careful and parsimonious selection of descriptors is crucial, especially in a computer literature search, in order to minimize expenses and obtain the maximum results.

CARD CATALOG

Generally, research begins with the card (or filmed) catalog in the library. The card catalog lists books by authors, titles, and subjects. Even books that are closely related to the chosen topic may include references to the topic. Using the list of compiled descriptors, the researcher should check through the indexes of books. Books may be major sources for the theoretical framework of research, and they will often lead to other sources on the topic which, in turn, reveal more references. This approach is adequate for a preliminary study of references, but the research student cannot assume that everything has been covered. It is important, therefore, to fully understand the card catalog system of the library where the literature search is being undertaken.

The key to any library is the index of all its holdings in the form of an alphabetically arranged card catalog. With few exceptions, each book or work will have an author card, a title card, and one or more subject cards. The files may also contain additional cards for editors, compilers, joint authors, translators, pseudonyms of authors, titles of series, and the like. A work dealing with several subjects will have a separate card for each one. For works published anonymously, there may be either (1) no author card, or (2) a card listing the author as "anonymous." Certain works issued by societies, associations, institutions, or governmental agencies may not specify an individual author or authors. For these, the organization itself may be listed as "corporate author". Catalog cards for any work show, in addition to author and title, the place and date of publication, the name of the publisher (if known), the number of pages, and (in some cases), a description of the subject matter. Contents are sometimes listed. The card also carries a library call number by which the item's location in the stacks may be determined. Whether the Dewey Decimal, Library of Congress, or some other system of classification and numbering is employed, the library call number is of utmost importance for locating a desired material.

In developing the bibliography for the study, the card catalog is used to locate references by subject and by author (usually a known authority on the subject). One should list the call numbers for all sources that can be found on the cards even if they appear only remotely related to the research topic. This list should be supplemented by scanning the book shelves for the areas most likely to contain references for the topic under study.

PERIODICAL INDEXES AND ABSTRACTS

Periodical indexes and periodical abstract publications list publications in a number of periodicals with the names of authors, the titles, and publishers. Additionally, periodical abstract publications include a short abstract for each listed publication. Faculty members or librarians can assist in identifying indexes and abstract publications in a particular field. Here again, a list of descriptors is necessary to search through an index or an abstract.

The following major indexes and abstract publications are likely to be found in most university and college libraries:

Periodical indexes

Current Index to Journals in Education
Education Index
Engineering Index
Government Reports Index
Index Medicus
Research in Education
Science Citation Index
Social Sciences Citation Index

Periodical abstracts

Abstracts in Anthropology
Biological Abstracts
Chemical Abstracts
Dissertation Abstracts International
Physics Abstracts
Psychological Abstracts
Sociological Abstracts

University Microfilms may also be a good source for abstracts.

If a journal article listed in an index or an abstract publication cannot be located in the library, the librarian can assist in arranging an interlibrary loan from another library.

COMPUTER SEARCH SERVICE

Many university and college libraries provide computer search services for periodical materials. The cost of a computer literature search depends on the number of indexes and abstract publications (databases) on the number of articles compiled in a list. In general, a compiled search requires that one consult with a librarian. Before consulting a librarian, the research student must have a clear idea as to what types of information he is looking for in periodicals and a tentative list of descriptors, which will be modified with the help of the librarian for the purpose of the computer literature search. The research student should also decide on the period of time covered by the computer search. That is: should it cover from 1965 to the present or should it be limited to only the most recent articles in a database?

ON-LINE COMPUTER SEARCH

An on-line computer search is an interactive computer search relatively new to most campuses. This approach is fast and efficient since the researcher receives the results in a matter of seconds, thus permitting modification of descriptors as he narrows his selection of periodicals. This type of search will also require the assistance of a librarian.

Database computer searches (on-line or batch) are often accompanied by a delivery system through which the full text of the cited paper or report can be provided to the user. A comprehensive listing of databases is found in the following publication:

> Williams, M.E. 1992. Computer-readable data bases: A directory and source book. Washington, D.C. U.S.A.: American Society of Information Science.

This contains the names and producers of more than 700 databases worldwide, totaling more than 80 million references.

Computer search services are available through most large college and university libraries. Additionally, a growing number of private information service firms specialize in computer search and document delivery systems, and university libraries often purchase services from them.

Some local libraries may already be utilizing the computer literature search services provided by western libraries. Well-known computer search services include:

1. **BLAISE LINE/BLAISE-LINK** (British Library Automated Information Service)
   Address: British Library, 2 Sheraton Street,
   London, United Kingdom, WIL 4BH.

2. **BRS** (Bibliographic Retrieval Services)
   Address: Bibliographic Retrieval Services, Incorporated,
   1462 Erie Boulevard, Schnectady,
   New York 12305, U.S.A.

3. **DIALOG**
   Address: 3460 Hillview Ave., Palo Alto, California 94304, U.S.A.

4. **ORBIT** (On-line Retrieval of Bibliographic Information Time-Shared)
   Address: SDC Search Service, System Development Corp., Colorado Ave., Santa Monica, California 90406 U.S.A.

SIFTING EVIDENCE

Every research student must learn to assemble, discriminate, interpret, and compile relevant materials from a variety of sources in a library. He must not only learn to use the reference tools available to every investigator but he should be fully aware of what these tools can provide him with. The research student, for example, has to know that a general encyclopedia is a survey of reliable information in every field of study and that bibliographies, at the end of published books and articles, provide a listing of important works and sources of information.

Whether it is an index or a bibliography or a reference source that is used, it is necessary to read through its introductory pages and study its list of abbreviations. It is important to study, for example, the list of the periodicals indexed; it may not include a journal or a magazine that has been mentioned elsewhere and that is known to be important. The student should look at sample entries to study the listing of individual articles, usually by subject, and the system of cross references.

A research student must also learn to utilize the reference tools of his specialized area of study. Every major area, such as education, language teaching and learning, history, or art, has its own specialized reference guides: yearbooks, dictionaries of names and technical terms, general bibliographies, specialized encyclopaedias, professional journals.

In the process of developing his review of literature on the selected research topic, the student must learn to evaluate conflicting evidence. He must learn to avoid an uncritical acceptance of other writer's views. An inexperienced writer often

tends to accept statements as factual or true on the "say-so" of a single source: "The teaching of English grammar has no appreciable effect on an ESL student's writing" (because Professor A says so). A critical student will accept such a conclusion only after comparing the evidence offered by different authoritative sources. He is likely to consider such points as the following:

1. **Is the author an authority on his subject or merely a casual observer?** If it is possible, the research student should find out whether a book was written by a professor whose specialty is TESL methodology or by a columnist who spent four weeks surveying English language teaching from the back of a language classroom.

2. **Does the author have an established reputation in his field?** The research student should keep his eyes and ears open for comments on the background and the scholarly competence of the author he is reading, or on the reputation of the institution and other organizations with which the author is connected.

3. **Does the publisher of the book or journal represent a tradition of scholarly and serious work? Does he have a reputation to maintain?** It is advisable for a research student to question whether the material comes from a university press or from a popular book club, from a professional journal or from a mass-circulation magazine.

4. **Regardless of the reputation of the author and the publisher, is the present work a thorough and carefully documented study or a sketchy, improvised survey of the topic?** Is it short on opinion and long on evidence, or vice versa? Does it weigh the findings of other authorities, or simply ignore them?

5. **Does the author settle important questions by referring to primary sources, that is, legal documents, letters, diaries, eyewitness reports, transcripts of speeches and interviews?** Does the author report on secondary sources, such as other authors' accounts and interpretations or research data?

6. **Is the work recent enough to have profited from current scholarship?** If it was originally published ten or twenty

years ago, is the current version a revised edition? The research student should consider the possibility that an author's views may have been invalidated by new findings and changing theories in a rapidly expanding field of study.