

Technical Research

CHAPTER: 9

3. Possible sources:

- Memos, reports, and other M-Global documents related to the use of hybrid cars in the organization's Asian offices
- Directories (of periodicals, newsletters, newspapers, electronic journals, organizations)
- Journal and newspaper articles found in indexes, abstracts, and electronic databases
- Bibliographies and literature reviews
- Government documents
- Books
- Web sites
- Surveys
- Interviews

Features	Writing prompt	Purpose	Audience	Sources	Publication format
Academic writing	General topic assigned by the teacher	Communicating what the student knows about the topic, to earn a high grade	The teacher who assigned the project	Secondary sources, for the most part	Academic papers Presentations and posters at academic conferences
Workplace writing	Specific workplace situation, question, or problem raised by the writer or by a supervisor	Providing information needed to answer a question or make a decision	Often several people with differing professional backgrounds	Secondary sources serve as foundation for primary research	Reports Proposals Workplace presentations Presentations and posters at professional conferences

Before starting your research, you ask yourself the following questions, to give direction to your work:

- What questions must be answered during the research phase?
- What information might be most useful?
- What print and electronic sources would be most appropriate?
- What format must be used to document material borrowed from sources?

Secondary sources

Information about a topic that has been shared through print, recorded media, or presentations. Secondary sources provide researchers and readers with the background information they need by establishing the professional and intellectual context for an issue or problem.

Using **Resources**

- What are the author's academic or professional qualifications?
- Who is the publisher, and what is its reputation?
- What are the scope and content of the work?
- How does this information fit in with what you know about this topic?
- What are the trends in information on this topic, and how does this book, article, journal, or Web site fit in?
- How current is this information?

Online Search

- Author or Title Search
- Subject Search
- Keyword Search

Library Resources

- Books
- Periodicals
- Newspapers
- Company Directories
- Dictionaries, Encyclopedias, and Other General References

Conducting **Primary Research**

- Interviews
- Focus groups
- Surveys/Questionnaires
- Laboratory experiments, or field observations
- Original works such as diaries, company reports, and correspondence, as well as documents that are the subject of analysis, such as user's manuals and Web sites.

Quantitative Research

- In technical communication, this step often involves answering questions about how long it takes to perform a task. Technical communicators may also collect and analyze statistics from surveys and interviews. Quantitative research is judged by validity and reliability.
- Research is valid if it measures what it was designed to measure.
- Research is reliable if it can be repeated with the same results.
- Quantitative research collects data that can be represented in numbers.

Information Gathered Through

► Surveys

► Questionnaires

Qualitative Research

- Qualitative research is common in technical communication. Qualitative data cannot be represented in numbers. Instead, qualitative research analyzes words, images, processes, or objects.

Information Gathered Through

- ▶ Interviews
- ▶ Focus Groups
- ▶ Field Observations
- ▶ Document Analysis

Using Questionnaire and Interviews

A part of your research may include collecting first hand information yourself, such as, questionnaires or personal interviews

Step 1: Designing a questionnaire:

1. Keeping reader's need while preparing the questionnaire

It benefits them personally or professionally/it is easy to fill out and return

2. Write a precise purpose statement

E.g. "The purpose of this survey is to find out ways in which....."

3. Limit the number of questions

Every question must serve the purpose/ resist the temptation to clutter questionnaire with irrelevant questions

4. Ask mostly objective questions

So that the questions are easy to answer and responses are easy to compile

Types of Questions	Examples								
Either/Or Questions	Would you or your technical staff find it useful to receive a technical newsletter on acid rain? a. Yes b. No								
Multiple Choice Questions	If you answered “yes” to preceding question, what publication schedule would best meet your needs: a. Monthly b. Quarterly c. yearly								
Grade-Scale Questions	<table><tr><td colspan="4">Acid Rain is an issue that has strong impact on your day-to-day business:</td></tr><tr><td>Strongly Agree</td><td>Agree</td><td>Disagree</td><td>Strongly Disagree</td></tr></table>	Acid Rain is an issue that has strong impact on your day-to-day business:				Strongly Agree	Agree	Disagree	Strongly Disagree
Acid Rain is an issue that has strong impact on your day-to-day business:									
Strongly Agree	Agree	Disagree	Strongly Disagree						
Short-Answer Questions	List any environmental newsletters you already receive that you find helpful in business.								

Designing a questionnaire...

4. Provide clear questions that are easy to answer:

Avoid four common problems:

1. Biased in phrasing
 2. Use of undefined terms
 3. Use of more than one variable
 4. Questions that require too much homework
5. Include precise and concise instructions at the top of the form
 6. Test the questionnaire on a sample audience (Pilot)

Step 2: Conducting the Survey

1. Choose an appropriate audience
2. Introduce questionnaire with a clear, concise cover letter
3. Encourage a quick response

Step 3: Compiling the Results

INTERVIEWS

Besides questionnaires, interviews are another common way to gather primary research.

Step 1: Preparing for the interview

1. Develop a list of specific objectives for the interview

Know exactly what you want to accomplish

2. Make clear your main objectives when you contact for the interview

1. Stress the importance of the person's contribution
2. Put him or her at ease with your goals and general content of proposed discussion
3. Set a starting time and approximate length for the interview

3. Prepare an interview outline

It includes:

1. A sequential list of topics you want to cover
2. Specific questions you plan to ask

4. Show that you value your interviewee's time

Showing up early to begin on time/staying on track and ending on time

Step 2: Conducting the Interview

1. Ask open questions

Questions that require your respondent to say something other than “yes” or “no”

2. Ask closed-ended questions when you need to nail down an answer

3. Use summaries throughout the interview

It helps in clarification and recording the interview accurately

Results

Questionnaire

- Percentages
- Statistical Tests (for significance)
- **Presented through**
 - Tables
 - Graphs

Interviews

- Themes
- Presented in the written form (Paragraph/s)

Documenting Sources

Avoiding Plagiarism

With the exception of common knowledge, you should cite sources for all borrowed information used in your final document, including quotations, paraphrases, and summaries.

- In-text Citation
- Reference List

You must document a source, when:

- Use facts or statistics
- Refer to ideas and information by other writers (paraphrase or summary)
- Cite tables, charts or graphs

You do not need to document these types of information:

- Your own observation, experiences, ideas
- Factual information available in a number of reference works (known as “common knowledge”)
- Proverbs, saying, and familiar quotations

- A reference to the source of borrowed information is called a **citation**.
- There are two components of documentation:
 1. In-text-citation
 2. List of works cited

IN-TEXT CITATION

SUMMARY OR PARAPHRASE

- A trenchcoat and mask can easily disguise a few owls as a human, as experimentally shown by Smith [1], [2].
- Italian owls are suspicious of outsiders, as noted in [3]–[5].
- This is disputed by Civetta [6] and Strix [7], who are not owls in masks.
- The city of Florence is under an ancient curse, as repeatedly and exhaustively described in [8], [10], [13]–[17], [20].

SHORT QUOTATIONS

- “... as shown by Brown [4], as previously stated.”
“The theory was first put forward in 1987 [1].”
- “For example, see [7].” “Several recent studies [3, 4, 15, 16] have suggested that...”
- The example above may also be formatted as:
“Several recent studies [3], [4], [15], [16] have suggested that...”].

Citations/references with Multiple

Authors

- During their research, Fan, et al. [4] discuss lasers in detail.
- However, in general you do not need to mention the authors by name, just use the numeric citation in square brackets.
- In full reference list at the end however, you always give the authors' names. In the reference list you can only abbreviate these using 'et al.' if there are six or more authors.

Reference List

In IEEE style your reference list should be formatted in the following way:

- Align references left Single-space each entry, double-space between every new entry
- Place number of entry at left margin, enclose in square brackets Indent text of entries

- Your reference list should appear at the end of your paper.
- It provides the information necessary for a reader to locate and retrieve any source you cite in the body of the paper.
- Each source you cite in the paper must appear in your reference list; likewise, each entry in the reference list must be cited in your text.

Book	<p>[Ref number] Author's initials. Author's Surname, Book Title, edition (if not first). Place of publication: Publisher, Year.</p> <p>[1] I.A. Glover and P.M. Grant, Digital Communications, 3rd ed. Harlow: Prentice Hall, 2009.</p>
Journal Article	<p>[Ref number] Author's initials. Author's Surname, "Title of article," Title of journal abbreviated in Italics, vol. number, issue number, page numbers, Abbreviated Month Year.</p> <p>[4] F. Yan, Y. Gu, Y. Wang, C. M. Wang, X. Y. Hu, H. X. Peng, et al., "Study on the interaction mechanism between laser and rock during perforation," Optics and Laser Technology, vol. 54, pp. 303-308, Dec 2013.</p>
E-Journal Article	<p>[Ref number] [5] Author's initials. Author's Surname. (Year, Month). "Title of article." Journal Title [type of medium]. volume number, issue number, page numbers if given. Available: URL</p> <p>M. Semilof. (1996, July). "Driving commerce to the web-corporate intranets and the internet: lines blur". Communication Week [Online]. vol. 6, issue 19. Available: http://www.techweb.com/se/directlinkcgi?CWK19960715S0005</p>

- **IEEE General Format**

https://owl.purdue.edu/owl/research_and_citation/ieee_style/ieee_general_format.html