

Chapter 10

The Literature Review



One can measure the importance of a scientific work by the number of earlier publications rendered superfluous by it.
David Hilbert (1862–1943), German mathematician

The whole body of writings on a particular subject produced by scholars is broadly called its *literature*. A ‘review of literature’ is a critical and evaluative description of publications on a chosen topic. Literature reviews are integral parts of research proposals, theses, and research papers. Exclusive literature reviews are also published in review series of publications such as annual reviews of reputed publishers. Sometimes, one or two review articles, mostly invited, may find a place in primary journals too. In a thesis, literature review is an important chapter, providing the background and justification for the research undertaken. A good review should show the knowledge that exists and the gaps in knowledge related to the research work undertaken. Research students should master the art of reviewing the literature critically and objectively.

A literature review is different from an *annotated bibliography*. An annotated bibliography is a bibliography giving the summary of different sources. An *annotation* is a short explanatory note about the contents of a source, and it gives the reader a summary along with an evaluation of the source. At the same time, a literature review provides a narrative using the references in the annotated bibliography. A literature review is organized around ideas and not the sources themselves in contrast to an annotated bibliography.

10.1 Importance of the Literature Review

The literature review can be time consuming and demanding, but it is an essential part of the research process. The primary purpose of literature review is to demonstrate that the author has extensively surveyed the literature of a particular subject and critically evaluated its quality by classifying and summarizing the findings in comparison with previous research works and literature reviews.

A critical review of literature is essential before embarking on a research project because the process of reviewing the literature helps you to understand the subject area better. The literature survey plays an important role in shaping your research problem. It helps you to find out whether it has already been done by somebody; and if so, to what extent it was successful. Sometimes, only a part of a broader subject area may have been investigated, and there may still have several unexplored areas. The review also helps you to acquaint with the methodologies used by peers in the same field and the problems or pitfalls, if any, while using those methodologies. Thus, reviewing the literature brings clarity and focus to your research problem, improves your methodology, and broadens your knowledge base. This is the main reason of compulsory inclusion of a chapter titled 'Review of Literature' in theses and dissertations. You have to continue the literature survey started before finalizing the research problem until the report is finished. This is important to properly 'discuss' your results.

While writing a literature review, it is not enough to narrate simply what others have discovered, invented, or explained. The works should be reviewed with a critical mind, and it must show the facts and ideas so far generated in a subject along with their strengths and weaknesses. A good review must have a clear focus, and be presented in a logical and well-organized style. The objectives of conducting a literature survey can be summarized as follows (Hartley 2008; Randolph 2009; Kumar 2011):

1. to understand the current level of knowledge on the chosen subject
2. to identify seminal works in the proposed subject area
3. to identify shortcomings in the existing knowledge base on a subject
4. to see whether the work has already been investigated
5. to identify opposing views
6. to carry on from where others have already reached
7. to identify other scientists working in the same field
8. to find out how a research project is related to the works already done by others
9. to identify the methodologies and research techniques that have been used
10. to relate new findings to previous findings in the discussion section of a thesis or research paper.

These objectives can be fulfilled only by reading as much as you can! Find and read on all the information sources related to the proposed research topics. The preliminary review of literature concentrates more on general textbooks and existing reviews of previous works that summarize the state of knowledge on a particular topic. Textbooks and reviews are useful as they combine information from many primary sources into a single book. If the literature review is part of a thesis, the review must be comprehensive covering all the research works done on the topic. When it forms part of a research paper, it must cover all the recent major works that has been done on the topic, but it is not necessary to include all the research works on the subject.

10.2 Planning a Literature Search

Identifying and locating relevant literature for writing a review is a formidable task. You may use indexes, abstracts, databases, online sources, and many other devices to identify suitable and appropriate literature. Researchers should develop a search strategy to locate relevant literature in their subject of interest. Consider the following aspects before finalizing a search strategy.

Determine the Scope of Review

Before you start searching for the literature, define your research question appropriately. It is important to assess what you already know about the area of search. The search is influenced by the purpose. Sometimes, the information may be a central element of the topic or background information, for example, for writing the 'introduction' part of a research paper or thesis or just additional information to carry on the research. If the search is for writing a review paper, you have to undertake the search on a wider platform. You must have clarity on what you want to study and review.

Decide the Period to be Covered

Most researchers and students try to access a wide range of literature in their area of concern. It is also important that the references should reflect recent findings and developments in one's field of interest. Therefore, before embarking on the search, decide whether you need everything ever written on the topic or in the last 20 years, or just the last 5 years, or a similar period. If your intention is model building or forecast, you may probably need to look back over a long period.

Settle on the Range

You may be trying to gather information pertaining to a local practice or with an international appeal. Appraise yourself whether the information needed is of regional, national, or international importance. You have to fine-tune your search strategy based on the range. For national or internationally important information, the search has to be broadened, especially concentrating on sources from international publishers.

Identify the Key Concepts and Key Words

Identifying the key concepts involved in the study is an important step. Similarly, keywords are the basic units of any literature search. Using a list of keywords or key phrases, you will be able to search the literature easily and effectively (Hartley 2008). If you are clear about the concepts, you can easily find out the major key words. Check for other words such as synonyms and variations in spelling, which could be used as alternate key words. You may also try alternative phrases for concepts and ideas.

Use the Library Effectively

For a good literature review, you should know how to use the library effectively (Chap. 8). Your efforts as a reviewer should be to develop the skill needed to conduct

exhaustive bibliographic searches, especially by using various reference resources, indexes, and abstracts. You should also have the ability to organize the collected information meaningfully to describe, critique and relate each source to the subject of the inquiry; to present the organized review logically; and to cite correctly all sources mentioned using the recommended style of reference citation (Chap. 15).

Use Various Types of Information

You can access several kinds of information sources in both print form and electronic form. Determine the type of publications (e.g., journals, books, government documents, directories, magazines, and websites) required for information retrieval. You may find it helpful to consult a subject dictionary, encyclopaedia, or glossary for the common terms coming under the subject area. The use of a thesaurus is also advisable to define useful terms. For general theoretical information, you may consult textbooks; for current analysis and comments, journals; and for names of contacts, directories.

In the category of *books*, several secondary sources of information are included. Textbooks, handbooks, subject review books, manuals, monographs, treatises, and yearbook are important examples of books. *Reference books* such as dictionary, encyclopaedia, directory, and gazetteer are also books. Often, books are more accessible to the reader than journals and magazines. However, books may not include recent developments, because of the long preparation time involved in its making. Reliability of books is another issue. This is especially so with the books written by lobbyists and activists who are actually not real experts in the fields. For certain post-modern movements, peer-reviewed research reports may be hardly available. However, you may find umpteen number of books based on anecdotes and invalid proofs. Sometimes, the book could be sensationalized to enhance the sale volume.

The category of sources of information called *journals* is subject-specific periodicals brought out frequently. Journals that publish the results of original research are often called *primary journals*. Since primary journals are published periodically, they could provide information that is more recent compared to textbooks or reviews. They carry the latest and often very specific account of current research work, new techniques, and unusual and interesting cases. Before a paper is accepted for publication in a journal, it should go through a rigorous process of quality evaluation, called *peer reviewing*. Peer reviewing ensures that the paper is read, analyzed, commented, and judged by more than one expert in the field of study for appropriateness in the subject and quality. Research papers published through journals are well respected because of the reviewing process. Since the papers contain extensive cross-referencing, they serve as an excellent introduction to other references that you may not have come across.

The journals that concentrate on publishing review articles or teaching articles are usually called *secondary journals*. Annual review series being published by many organizations are very helpful in this regard. They usually cover up-to-date work in

a new perspective. Reading good reviews strengthens one's broad areas of interest. They also serve as an excellent introduction to other references in the field.

Use Online Databases Efficiently

There are several sources designed to make your search for articles, and these can save valuable time. These include indexing journals, abstracting journals, citation indexes, and several web-based sources including search engines. All these can be accessed online now. For a comprehensive account on information sources and website addresses, refer Chap. 9.

10.3 Locating Relevant Literature

Information available in a number of formats can be accessed from different sources. However, it is important to understand the significance of various formats so that researchers know what is more suited to their information requirements.

When you plan, you should aim for a comprehensive literature search.

Select Appropriate Tools

There are several methods for locating relevant literature. These include searching through library catalogues, abstracts, indexes, general subject guides, CD-ROM databases, search engines, online databases such as CAB Direct and PubMed, checking library links on the web, and consulting many other Internet resources (more details in Chaps. 8 and 9).

Trace Relevant Publications

Using the selected tools, search through the subject indexes to trace relevant articles. You may use appropriate key words for an effective search. Use synonyms and alternative terms of key words also. Try to find out as many reference sources as possible on the topic. However, if you find too many articles, use keywords that are more specific. If you are not able to find appreciable number of references, you have to change your search strategies. Broaden your search using more general terms. Still, if you are not able to trace out much information, the reason may be that you are using an inappropriate index or there are not many previous works on it. Sometimes, the topic selected may be so new that there has been no time for published research to appear in print.

Note Making

When you go through the sources, it is imperative that you record notes for future use. Note making is an active and focused activity where you understand the information from a source, be it a research paper or book, and note down what is relevant and important for you. In other words, note taking is almost verbatim recording from a book or lecture, and note making is a summary representation or comment in your own words on what you read, heard, or thought about something. Make good notes

including the details of all the relevant sources you found and read (Best and Kahn 1993; Walliman 2011). Refer Chap. 22 in this chapter for more details on note making with examples.

Keep Detailed Bibliographic Records of All the Sources

While you write notes, it is important to ensure that bibliographic details such as name of author/s, title of publication, name of publisher, and page numbers are accurately written for later use (Barrass 2002). There are slight variations in bibliographic details needed for correct citation depending on the type of sources. Refer Chap. 15 for a detailed treatment on referencing. Record all the bibliographic information on the note card itself. This is important to cite and list the sources accurately avoiding plagiarism (Chap. 24). Include the following bibliographic details in the case of books and research papers:

- Name of author/s, editor/s, or organization
- Title of article, book, or chapter (if it is an edited book)
- Volume and issue numbers (for journals)
- Edition and reprint (for books)
- Name of publisher (for books)
- Place of publication (for books)
- Year of publication
- Inclusive page numbers (for articles and chapter articles)
- Total pages (for books)

In the case of electronic publications, especially online publications, the details required are different. Note down the following details:

- Name of author/s, editor/s, or organization
- Title of the article
- Title of the site (i.e. homepage)
- Date of creation of the site
- Date, last modified or updated
- Date of access
- Digital Object Identifier (DOI) or Full address of URL.

10.4 Managing Information

Collected information must be handled carefully. Follow an organized system to keep track of references. When you locate a reference source, you can put the bibliographic details of the source directly into your referencing system. The following methods are commonly used to keep track of references:

Index cards: Using index cards is an old but still popular filing and management system of bibliographic information. Bibliographic information is collected on index cards (also called reference cards) along with pertinent details.

Reference management software: The easiest method of managing information at present is to use any of the popular reference management software. You can use either priced or free bibliographic software such as Mendeley, CiteULike, Refbase, and Zotero (Sect. 15.10).

Electronic card files: You can also use a computer application such as an electronic card file or database programme for managing information.

10.5 Reliability of a Source

All the sources you come across cannot be taken for granted. You have to assess the trustworthiness of the sources. A thorough evaluation of identified literature materials is needed before using them. Read critically and actively, and it is important to keep your purpose for reading in mind while you read. To present a critical review of literature, ask some critical questions yourselves and sift through information. You may consider the following questions and reflect on all possible aspects that may affect your assessment. Having done this assessment, you can use the source for your work.

Who Are the Authors?

When you assess the credibility of a source, it is important to determine how believable it is. For this, the first thing you must do is to check the credentials and background of the author. In general, authors who have advanced degrees in their fields; those who have specialized training; those who work for reputed organizations such as renowned universities, government agencies, and international organizations such as the UNO; or those who have published books or articles previously are likely to be more reliable and credible than authors who lack any of these credentials. In other words, qualifications provide some justification that the source is correct and trustworthy. Still, experts are liable to make mistakes, and you should never accept at face value an author's words without documented evidence. Books and propaganda materials of experts from the Non-Governmental Organization (NGO) and private sector must be subjected to greater scrutiny. Check whether they are real experts and determine whether the material is a fact, interpretation, imagination, or simply opinion. Verify the facts with other sources to see how accurate or how trustworthy the source is. If you are unable to verify such a dubious source, never use it. If available, author impact factors such as the *h*-index or the *g*-index are good indices to assess the scientific value of a given researcher or author (Sect. 9.6).

Who Are the Publishers?

When assessing trustworthiness of a publication, assessing who is the publisher is also important. When you consider who wrote the material, you might also check where and when this work was published. Well-known national and international publishers, especially those affiliated to reputed universities and those who have a long tradition of publishing, are likely to be more reliable because they have reputations to uphold.

Most established publishers have expert editors and have a peer review system to upkeep the quality of their products.

Consider the Impact Factor or Rating

In the case of journals, the impact factor gives you some idea about the credibility of journals. The first thing you have to confirm is whether the journal is following a peer reviewing system. Peer-reviewed journals are assessed based on their impact factor or a rating system, for example, NAAS rating followed in India (Sect. 9.6). A journal with high impact factor is supposed to be of good quality and standard. The articles published in such journals also get that esteem.

Identify the Purpose of the Publication

Before you start taking notes, think for a while, and identify why and for whom the material was written. What was the author trying to find out and why is this work important? You will be able to understand easily, if it is a propaganda material.

The significance of the article or book must be clearly established.

The Subject Matter Coverage

Assess whether the literature has been presented and evaluated clearly and objectively. Read the material critically and find out the focal point of the article. The supporting information must be well researched and accurate. In the case of an article or thesis, have an objective assessment about the aspects included or omitted both from literature review and from the results and discussion sections. The findings, discussions, and conclusions must be logically arranged. It is important to understand how the perspective presented in the publication differs from other sources and how the information given in the source is relevant to your own work.

The Treatment Given to the Content

Try to find out the theoretical perspective of the author and check whether this differs from the current belief prevalent among the research workers about the topic. The concern and the philosophy that influenced the writer's perspective and how the author developed ideas are important. You should be able to observe any biases or inconsistencies in the information presented. Observe whether the author evaluated the literature relevant to the problem or issue. Partiality of the author is another problem. Check whether the author has included any literature taking positions s/he does not agree with.

The Structure Followed

The structure of the source must be evaluated. If the source is a research paper, it should be presented in the IMRAD format with the sections such as Introduction, Materials and Methods, Results, and Discussion (Sect. 11.1). A logical relation must be there between the sections that affects the overall discussion. The article should evaluate the designs and methodological issues sufficiently well as discussed in Chap. 11. You may also assess whether the author uses appeals to emotion, one-sided examples, or rhetorically charged language and tone, especially in materials

written for a popular readership. Conflicting and complementary ideas should be presented and discussed. There must be an objective basis to the reasoning. Beware of authors who merely reiterate or try to prove what s/he already believes.

Avoid Biased Sources

Avoid sources that appear biased such as those from lobbyists and advocacy groups, which tend to present only evidences that support one interpretation. You may also evaluate the reasoning in a source's argument. Beware of sources that depend upon logical fallacies or false arguments that tend to divert or mislead readers instead of material evidence or logical reasoning (Chap. 14). Consider timeliness of publications too. Current literature, including those published recently, is likely to be more reliable and convincing than older sources. As new knowledge gradually becomes available to all, researchers will be able to ascertain their reliability. Therefore, prospective authors may not like to take a risk by presenting unreliable information. You also want to look for publications or other sources whose authors may have considered various explanations and interpretations.

Maintain Extra Vigil on Electronic Sources

Presently, you may come across innumerable web-based resources, which are relatively easy to access. Most often, this information can be accessed free; therefore, researchers, students, and the public are increasingly searching these sites to obtain information. Everybody agrees that it is easier to publish materials on the Internet than to publish in a reputed print journal. Remember that most journals accept articles for publication based on the preview comments from peer reviewers. Therefore, print sources tend to be more credible than sources you find on the Internet. When you use Internet resources for research, you must be extremely careful about spurious and unreliable websites. Rely only on websites sponsored by universities and reputed organizations. When you are using an electronic source, you have to be more careful and critical about the validity of the information, which it conveys. Check the authors, their credentials, and perspective, and avoid articles that have no author's name or date of creation or revision attached to them.

The above critical questions for evaluating a source material are not comprehensive. An assessment of the above aspects will help you to form a good basis for your written review. You may probably think that considering these aspects as you read will impede your reading process, but starting this analysis early will make the process of writing a review much easier. If you are able to take notes in your own words as you read and think, you may have already completed most of your work before you start to write the review. If that were the case, the final writing part would not be a problem at all.

10.6 Writing a Review

For writing a literature review, it is imperative that you located and read a wide range of reference materials on the topic. When you exhausted all the sources and made notes on selected sources, you have to compile the information in an appropriate manner. Develop a broad plan for the review outlining headings and subheadings. One of the difficult aspects of writing a literature review is to decide when to stop searching and reading and start writing the review. It is incorrect and meaningless to simply listing sources by describing or summarizing one source after another. Do not try to list all the materials published, but synthesize and evaluate them according to the guiding concept of the thesis or research question.

Some authors start every paragraph with the name of an author giving the review a monotonous and boring look. A better approach is to organize the literature review into various sections, with headings and sub-headings, presenting themes or trends including relevant theory. It is a good idea to group items into sections, which helps to indicate comparisons and relationships. If it is a lengthy literature review, it is always recommended that you arrange the review under headings and subheadings.

A literature review is usually written in a narrative form or as a discussion. The review can have three parts—an introduction, the body of review and a conclusion. Use an overall introduction to state the scope of the literature search and to formulate the problems or concepts related to the chosen topic. In the conclusion part, you can provide a summary of your review along with your final comments. As writing a review is part of the whole process of your study, you should begin writing as soon as you have a basic understanding of your topic area. By doing so, you can assess the need for further reading, if any. Regularly review your drafts, and add comments, questions, and ideas. If your sources are from a long period, it is meaningful to compare and show connections between different articles.

Review Formats

There are many ways to organize a literature review. An *essay-based* review is readable and comprehensible, as it tells a story referring to other works during the process. This requires some expertise to do it in a meaningful way. A *bibliography-based* review lists the literature found on the subject and says something about each one. It starts with the earliest work on the topic and moves through to the latest. The review is organized chronologically. A *theme-* or *topic-*based review divides the literature into certain broad topic areas related to the work. For theses, theme-based review is often followed. In thematic format, a broad range of loosely associated literature is grouped into a set of common subject areas or themes. Arranging the material around issues and findings relevant to your work not only provide a framework but also reinforces its importance.

A good literature review will have a good flow of arguments based on materials of others with appropriate citations. Your opinion on the literature also matters. Simply listing them without saying any thing is not correct. You are not expected to write everything related to your topic but you are supposed to create a story that leads to

your specific study. You should also maintain a sense of balance between your ideas with the idea of others. Therefore, make use of all those critical comments made while reading notes to express an academic opinion. Make sure that examples, citations, and quotations are used wherever appropriate connecting each section of the review. Correct documentation of all bibliographic details is also essential. Remember that both in-text citation and accurate listing of references are important for a good review (see Chap. 15).

Review Papers

Sometimes, review papers are published in secondary journals specifically intended for that purpose. A *review paper* is an exhaustive review of literature in which the reviewer attempts to trace out all the possible information on a certain topic. It is usually written as a survey of primary literature over a given period indicating the developments and trends in the concerned period. Before attempting an exhaustive review, try to define the scope of the review in such a way that it is within bounds, and the number of articles to review is manageable. The main objective of writing a review paper is to appraise previously published literature and to put them into some kind of perspective. An exhaustive list of references at the end of review serves as a good bibliography on the topic.

While writing reviews, remember that the intended audience for review papers and primary papers is different. The primary paper is highly specialized, and its audience consists of peers of the authors. Ordinarily, a review paper is long, ranging from 10 to 50 printed pages (Day and Gastel 2006). The subject would be general in scope unlike original research papers. A good review paper offers critical evaluation of the published literature, and often provides important conclusions based on the literature. The organization of review is also different. There will not be sections as “Materials and methods”, “Results”, and “Discussion”. Prepare an outline first, similar to a term paper or assignment before you start writing. While writing, slight modifications can be made in the outline. Many review journals give an outline of review at the beginning of the paper where it serves as a convenient “Table of contents” for prospective readers.

Some review journals demand critical evaluation of the literature, while some others are more concerned with bibliographic completeness. Based on the requirement of the journal, you decide the strategy. Most annual review journals publish reviews designed to compile and annotate the papers published on a particular subject during a defined period. Most professional societies of repute publish exclusive review publications, and these are usually identifiable from their titles such as ‘*Advances in ...*’, ‘*Yearbook of ...*’, and ‘*Annual Review of ...*’. Examples include ‘*Advances in Agronomy*’, ‘*Advances in Soil Science*’, and ‘*Annual Review of Plant Physiology*’. Occasionally, primary journals and abstracting journals also carry review papers on certain chosen subjects. A thesis will also contain a comprehensive review on the researchable topic indicating the past and present status of the problem.

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