Academic Writing Help Centre
Graduate Student Writing

Information Management for a Research Project

Information management is...

Information management is the organization of information that is compiled during research.

Much of your research, and therefore information management, may be geared towards writing a literature review. However, the same skills can be applied to thesis research in general and to other types of academic work.

When writing about your research, you will use the sources of information on a topic as well as the information itself. Therefore, information management comprises two distinct ideas:
- organization of **sources**
- organization of **information**

Importance of information management

When you do research, you will have many bits of information that you will want to remember, so you should have a way of storing such information so that you can
- focus on other ideas without worrying about losing previous ones;
- retrieve stored information quickly.

Information management also helps you to
- remember where ideas came from;
- provide the correct reference information for material or ideas that you use;
- categorize information so that you can analyze it.

When to use information management

Information management is vital throughout the research process. You should begin organizing the material you gather, as well as your own ideas, from the very start of your research. Also, you will probably continue retrieving information you've recorded up until the very end of the writing process. At different points during your research, you will use different **stages of information management**:

1. Gathering information
2. Classifying/categorizing information
3. Synthesizing information
4. Evaluating information

Each of these stages requires a different way of looking at the material. In this handout, grids are used to illustrate the basic principles of information management. However, you may develop another system that suits your learning and thinking style.

1. Gathering information

As you begin to gather and read your literature, you can guide your search by identifying your main research question or the goal of your research (or literature review). For each source, you should determine what information you are hoping to gain from it.
- To provide an overview of a field of research.
- To identify questions left unanswered in the literature.
- To answer a specific question.

From the very beginning of your research you should **keep track of your sources** by starting a **master bibliographic list**.

A master bibliographic list

Full bibliographic entry for each work	Some preliminary notes (is it available in the library, have you looked at it yet, date of acquisition, call number, etc.)
Martynovwych, O.T. (1991). *Ukrainians in Canada: The formative period, 1891-1924*. Edmonton, AB: University of Alberta.	book – MRT – due 05/24/2007 FC 106.U5 M33
Pelech, O.A. (1979). Attitudinal differences among first and second generation Ukrainian community leaders. *Journal of Baltic Studies*, 10 (1). 34-42.	article http://dx.doi.org/10.1080/01629777900000061 saved as *Pelech 1979 generational*
...	...

You should also **keep track of ideas** as you read. One highly effective way is a **reading journal** or **index cards**. For each work that you read, create a card or journal entry that contains the following elements:
- source information (author, year, page numbers, etc.)
- main idea(s) of the work
- significance of the work relative to your research
- any ideas or questions that you had while reading
- key words

Taking some time to **write about what you read** is helpful in several ways:
- It helps you to engage in the literature immediately.
- It will make it easy to compare different sources on ideas/methodology/results, etc.
- Reviewing the journal or cards later will remind you of ideas that you read or had while reading.

It is also important to get into a habit of **taking notes as you read**. You will likely read sources several times, but if you have a way of marking relevant information from the very beginning, you will find that you spend less time rereading. Here are a few strategies to consider:
- Make notes in the sources (sticky notes, margins of photocopies) and in separate files.
- Limit direct quotes by paraphrasing key ideas.
- Always write down the page number, even when paraphrasing.
- Devise a system for organizing your sources (labelling them according to a key word, etc.).

2. Classifying/categorizing information

As you gather **information**, you can begin to classify it based on key words or ideas that are relevant to your research question.
- Before you begin reading, try to foresee categories, themes, or key words by which you can classify the literature.

- As you read, take note of categories or themes that emerge as you read.
- If you see that several sources comment on the same idea, make note of this. The idea may not seem important at the time, but it often becomes important later as your understanding of the topic increases.

You will need to analyze your information in different ways during your research. The following example grids present different ways of organizing information for the same research project.

Table 1: Classification of literature by categories

	5 Categories				
	Research question	Theoretical framework	Methodology	Results	Conclusions
Source 1					
Source 2					
…					

A grid with several different categories can be used to get a sense of how other authors perceived the topic by identifying key elements of each work.

Table 2: Classification of literature by theme

Theme	
Idea/Information	Reference
Idea/Information	Reference

A grid concentrating on one theme or main idea can be useful to record the many comments and ideas made on a particular theme or subject in the literature. Notice that the source information for an idea is always written down as well!

If you identify a theme early on, you can add other authors and their ideas as you continue your research. Also, as you gain more knowledge about a topic, you may find that a theme can be broken down into smaller key ideas.

A work in progress
You probably will not develop a solid system or classifying information from the very beginning. It is likely to come later as you **continue to define what information is relevant** for your work.

3. Synthesizing information

A research project requires a synthesis of the literature in which you will present patterns and common ideas that you have identified from the literature. To do this, you must look at both the information and the sources that you have been collecting and understand them in relation to each other.

There are two different questions that you could ask, one information-driven, one source-driven:
- **What** different things were said about this topic/this method/etc.?
- **Who/How many** sources mentioned this topic/used this method/etc.?

The preceding grids can be used to answer these questions. For example, by looking at Table 2, you can see what has been said on the theme (information), and you can see which authors have discussed that theme (sources).

You will want to group together works that share particular elements or ideas in common. An efficient way of doing this is to organize the information within a particular category or theme to reflect these similarities. You may find it helpful to rearrange the information in a new table (Table 3). Whether you do this or not, you should at the very least write down a brief summary of what you observe.

Table 3: Synthesis of information from Table 1

	Methodologies
Source 1	"qualitative – interviews and focus groups"
Source 2	"qualitative – questionnaire surveys of 100 different communities"
Source 3	"quantitative – statistical analysis of demographic data"
…	
Summary:	"Most studies used qualitative methods, but some used quantitative…"

Creating grids like this are helpful in several ways:
- You can distinguish the different viewpoints (or lack thereof) found in the literature.
- You can tell if one idea is common or rarely mentioned.
- You can easily identify the sources of ideas.

4. Evaluating information

Not every research project requires you to evaluate the literature. However, this step can encourage useful critical analysis of what you have read.

Evaluation means that you will critique the literature for its effectiveness or quality. The ways in which you do this will depend on what you are looking to do with the literature. Here are two examples:

a. If you are looking to answer a specific question, **a question-driven list** can be useful.

Question: What kinds of communities have been studied? [Southern US English accent]

Work	Answer	Evaluation
Walker 1975	Eastern Texas, 40 speakers, 20 from rural, 20 from small city. speakers all 50+ (p. 144)	balance rural/city, male/female (+) only older speakers, none born before 1950 (-)
Saltman 1987	SW Alabama. 2 small rural towns. ages 18-70+. all speakers born and raised in the town.	doesn't mention education, race, or gender (-) all speakers lived in area all life (++)
…		

b. If your goal is to provide an overview of a field of research, you might organize and evaluate your sources by theme. For this approach, **a source-driven list** may be helpful.

Source: Studies mentioning a relationship between hummingbirds and *Vanda coerulea*

Work	Type of work	Themes/Ideas	Evaluation
Smith et al. 2002	biological study done in Amazon	mutually beneficial relationship between orchids and birds	scientific study (+) focused more on other varieties of orchids(-)
Hampstead, 1995	research compilation on hummingbirds	symbiotic relationships, color of flower	mentions role of flower color (+) in attraction, has section on *Vanda* (+)
…			

It is often necessary to create **hierarchies**: Which sources are mentioned repeatedly by several authors? Are these the leading sources in the field? Are they the most recent sources? What source answers your question most effectively? Least effectively? Which sources answer the question most fully? Least fully? Which sources discuss the topic in specific? In general?

These grids show an example evaluation of **sources**. You can also evaluate **information** as well by adding to the grids you used during collecting information and synthesis.

Tools for Information Management:
There are many useful research and information management tools available. Here are just a few to consider:

Online:	Mind-mapping tools: Mindomo, FreeMind, Bubbl Reference/Bibliographic tools: RefWorks and Write-N-Cite (http://www.biblio.uottawa.ca)
Software:	Mind-mapping: NovaMind, MindManager Bibliographic tools: EndNote, NotaBene, Reference Manager Information/Reference Management: General Knowledge Base, Ibidem, RefViz, AskSam, FileMaker, Microsoft Access
Traditional:	highlighters, sticky notes, file folders, binders, notebooks, note cards, posters, etc.

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