

Writing the Literature Review

Graduate Student Workshops

Science Faculty

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Specializations:

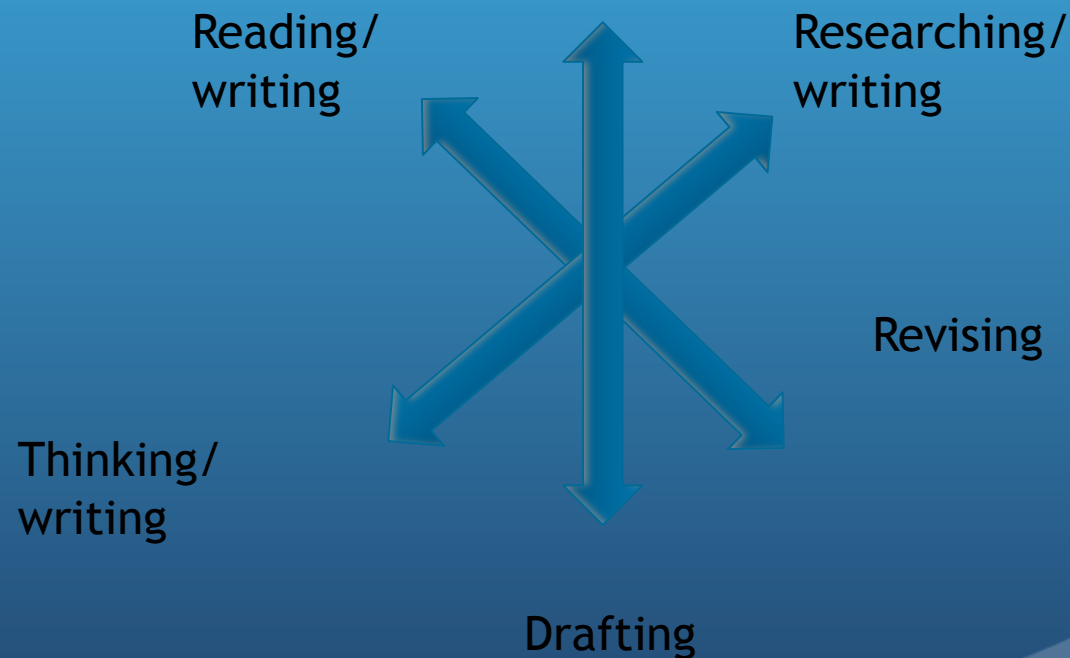
- Rhetoric of Science
- Academic writing for graduate students: SSHRC-funded project and new course (2009)
- Technical communication
- Business communication

What is writing?

- Writing is thinking
- Writing is researching
- Writing creates a particular representation of reality
- Writing is situated social practice
- Writing is social action

If you aren't "writing up" the results of your research, what are you doing?

- Reading/researching/thinking/writing
- Writing/drafting/revising



What is a literature review?

- What does “literature” imply about your task?
- What does “review” imply about your task?

How would you characterize a literature review?

- Write a metaphor or analogy that describes how you view the literature review for your thesis
- What would you compare the experience to?

Elements of Literature Review

- Citation
- Summary
- Argument

What is citation?

- “the attributing of a statement to another speaker” (Giltrow 32)
- Citation is associated with academic writing
- Are academics the only ones who use citation?
- Citation confers authority on statements

OTTAWA — Information Commissioner Robert Marleau says there are serious flaws in the administration of federal access-to-information law.

In a new report, Marleau gives six of 10 federal agencies poor grades on their compliance with the law that is supposed to give the Canadian public access to government files.

The information watchdog cites National Defence, Border Services, Foreign Affairs, Health Canada, Public Works and the RCMP for their lack of co-operation and efficiency in sharing information.

What do academics use citation for?

- To summarize the state of knowledge on a topic
- To assess the state of knowledge on a topic
- To identify a deficit or gap in the state of knowledge on that topic

The construction of all vertebrate retinas follows the same basic organizational design (Figure 1.2). At the far posterior of the eye, furthest from the cornea and incoming light, is the retinal pigment epithelium (RPE). The RPE lies between the outer segments of the photoreceptor cells and Bruch's membrane of the choroid and consists of a layer of cells that, in pigmented mammals, contain melanin [2]. Although the RPE is not directly involved in the neural events of vision, it is critical for normal photoreceptor cell function and survival [2, 5]. The RPE closely associates with the outer segments of the photoreceptor cells and functions in the maintenance of photoreceptor cells by phagocytosing the shed outer segments for photoreceptor renewal, regeneration of the bleached visual pigments caused by phototransduction, absorption of stray light by the melanin pigment in the RPE cell, and the scavenging of free radicals [5].

Function of Citation

- Take a position in relation to other voices
- Identify yourself as a member of a group collectively
- Construct knowledge
- Take a turn in the conversation

From Janet Giltrow, *Academic Writing*, 3rd ed., Peterborough: Broadview, 2002 (41).

Summary: What is it?

- Citations are short summaries presenting the gist of what a researcher has said on a topic
- Only the information relevant to the writer's point is used in a citation summary
- Summaries can be one sentence or much longer.

Summary of relevant information: Excerpt 1.1

Example that Undercuts Writer's Authority and Emphasizes the Citation:

“**Jones et al** note that these large molecules are problematic for biological transformation. They show that transformation rates are limited by the mass transfer of target molecules to the biocatalyst and, in the case of whole cells, across the cell membrane [19]. **I think** that interfacial mass transfer can be improved through emulsification, increasing the interfacial contact area; however, emulsification is of limited value in overcoming the barrier of transport into biological cells unless appropriate uptake mechanisms are available. Despite these difficulties, **I have found evidence in the literature that some researchers have made successful use** of bacterial transformation of complex, high molecular weight substrates (some of which are discussed in Section 2.2.3).

Example that Highlights the Information and Deemphasizes the Writer & Citation:

“These large molecules are problematic for biological transformation. Transformation rates are limited by the mass transfer of target molecules to the biocatalyst and, in the case of whole cells, across the cell membrane **(reviewed in [19]).** Interfacial mass transfer can be improved through emulsification, increasing the interfacial contact area; however, emulsification is of limited value in overcoming the barrier of transport into biological cells unless appropriate uptake mechanisms are available. Despite these difficulties, there is **evidence in the literature for bacterial transformation of complex, high molecular weight substrates** (some of which are discussed in Section 2.2.3).”

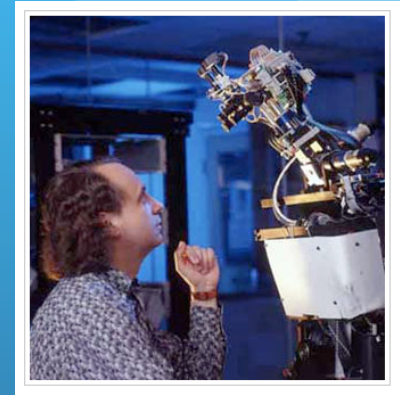
Kathlyn Kirkwood, *Bacterial Attack on Aliphatic Sulfides and Related Compounds Representing the Sulfur Groups in Heavy Crude Oil*, Spring 2006.

Method of De-emphasizing Writer

- Read Sample 1 on the handout, and as you read, think about **how** the writer has begun his thesis.
- What strategy(ies) has he used to describe his own contributions to the field?
- What use has he made of other researchers' work to help authorize the technique he describes?
- Why is this writer's reference to himself acceptable but the locution or linguistic construction in Excerpt 1.1 not acceptable (in a science-related thesis)?

The function of summary

- Allows writers to join a scholarly conversation
- After the summary, writers take their turn
- Summary prepares a new version of what has been said by someone else
- Your summary will put a **new spin** on a researcher's subject to make it fit what you want to say



web.mit.edu/museum/visit/contact.html

Your spin on the research: Excerpt 1.2

“Efficiencies of CdTe devices are slightly lower than those of CIGS [Copper Indium Gallium Silicon Selenium] devices, with a record cell efficiency of 16.5%, and average module efficiencies in the range of 7-9%.⁵ However, despite lower efficiencies, CdTe cells have been adopted for commercialization, in part due to the **robust nature** of CdTe and its **amenability to high throughput deposition**.^{6,23} When considering scale-up to hundreds of megawatts of production, the rapid rate at which CdTe can be deposited makes it one of the **most promising solar technologies**.⁶ Some material challenges associated with the use of CdTe include the fact that **p-type doping is difficult**, and that the high work function of CdTe (5.8 eV) makes fabrication of a stable back contact a challenge, since there is no suitable metal with a work function higher than that of CdTe (a property required for formation of an ohmic contact).²⁴ A final concern with Cd Te is the **toxicity** of the material, which presents some environmental and safety issues; however, extensive studies indicate that the risk is minimal, and that any concerns can be mitigated by the **use of appropriate packaging and recycling programs**.^{6”}

Nathan Gerein, *Cost-Effective and Scalable Solutions to Materials Science Problems –Novel Thin Film Semiconductors for Photovoltaic Applications and Template Directed Synthesis of Copper Nanowires*, Spring 1007.

The Writer's Spin on the Research

- Review Sample 1 on the handout again.
- How does the writer in Sample 1 put his own spin on the the source that he cites?
- What use does he make of existing techniques for measuring intergalactic distance in relation to his own work?

Characteristics of a good summary

- It represents the content accurately
- It attributes the statements as originating with another writer
- It characterizes the action of the original
- It describes the development of the discussion

Objective Argument in Science

- Summarizes citations to highlight aspects pertinent to your topic
- Create an objective description of citation
- **Point out gap** in this citation (what it does not examine)
- Build a case for the need for your study through pointing out what has not been studied

Pointing out a gap in literature: Excerpt 1.4

“Particularly worrisome has been the increase in adolescent gang membership. A subset of the offending population, estimated at 68% of institutionalized youth, are affiliated with a gang, yet **little research has been done to distinguish gang members from other types of young offenders** (Kratcoski & Kratcoski, 1996); Richter-White, 2003). It may be that young people are turning to gangs for protection from other gangs, as a way to gain respect, to escape from troubled homes, because their friends are doing it, peer pressure, or as a way to earn a living through drug trafficking, illegal weapons sales, robbery, and theft (Lloyd, 2002). However, **the reasons why adolescents choose to join a gang remain understudied with no clear answers.**

-Nicole Kostiuk, *Attachment in Incarcerated Adolescent Gang Members*, 2007.

Pointing out gaps in the literature

- Read Sample 2 on the handout, “Many ideas have ...”
- To what uses does the writer put citation in this sample?
- What is the writer’s attitude towards earlier work applying game theoretical modeling to questions of animal communication?
- What strategies does the writer use to signal to readers his assessment of this earlier work?

Cite Sources that Support your Methods

“Vaccinia virus (VV) is considered the prototypic poxvirus, and is amenable to **genetic manipulation** through a multitude of available DNA recombination tools (450). VV has also been used extensively as a **gene delivery mechanism**, as its large DNA genome makes it relatively easy to insert foreign DNA sequences for protein expression in mammalian cells (50, 100). Despite the fact that the natural host for VV is unknown, **VV remains an excellent model in which to study virus:host interactions due to its complex genome and vast array of anti-immune mechanisms** (169). In response to the selective pressures initiated by the host immune system, poxviruses such as vaccinia virus encode a vast array of proteins which modulate both innate and adaptive immune responses (Table 1.2) (21, 105).”

John Taylor, *The inhibition of apoptosis and Bax activation by mitochondrial antiapoptotic proteins encoded by vaccinia virus and ectomelia virus*, Fall 2007. (bolding added)

Cite Sources to Support Your Methods

- Read the text reproduced in Sample 3, “The Middle Eocene Princeton Chert locality. . .”
- How does the writer use citation in this excerpt to build a case for the need for her study?
- How does this writer use objective description to illustrate the significance of her work?

How to persuade readers

- Summarize citations effectively to highlight details relevant to your study
- Use citations to validate your methodological choices, etc.
- Point out gaps in a specific citation
- Point out gaps in the literature generally
- Build an **inductive argument**, constructed of telling details drawn from the published research
- The culmination of your argument is the reader's realization that your study is essential
- All of these strategies warrant your study

Use description to build an inductive argument

- Read Sample 4, “The concept of chirality has significant. . .”
- What is the writer’s purpose in explaining these technical concepts (e.g., chiral compounds, enantiomers)?
- Where do you conjecture the argument will eventually end up?

Sources to create explicit argument

“As a general class, stochastic imperfect information games with partial observability are among the hardest problems known in theoretical computer science. This class includes many problems that are easy to express but are computationally undecidable [20, 38].

In practice, writing a program to play a legal game of poker is trivial, but **designing and implementing a competent poker player** (for example, the strength of an intermediate human player) **is a challenging task**. Writing a program that also adapts smoothly to exploit each opponent’s particular playing style, betting patterns, biases and tendencies is a **difficult learning problem**.”

Darse Billings, *Algorithms and Assessment in Computer Poker*, Fall, 2006, pp. 17 - 19.

How to persuade readers

- Call their attention to the need for your study
- Present an “objective” picture of the field
- Be objective by describing rather than evaluating
- Provide readers with all the information needed to convince **themselves** that your project is important and significant

Tips for Adapting Your Literature Review

- Look at samples from graduating students in your program (available through the Library Database of Theses and Dissertations—full text copies available online [no excuses])
- Ask your supervisor to recommend well-written theses you can use as a model
- Examine the literature reviews closely and identify strategies that you can adapt to your situation

What should a literature review accomplish?

- Sketch out the nature of the field or fields relevant to the inquiry (often including some history)
- Identify major debates and define contentious terms
- Establish which studies, ideas, and/or methods are most pertinent to the study
- Locate gaps in the field
- Create the warrant for the study in question
- Identify the contribution the study will make

What is your argument?

- Outline the argument that you intend to make in the literature review of your thesis
- Don't worry about maintaining an objective style at this point
- Even if you don't have all the details worked out, get down as much as you can to sketch out where you want your argument to go

Write an abstract of your thesis

- Draft an abstract of your thesis (or planned thesis).
- Include one or two sentences summarizing the essential background concepts
- Identify the gap(s) in the literature that your project will fill
- Include one sentence identifying your methodology (two sentences if it is complex)
- Identify why your work is important and what it contributes to knowledge in the area identified above