



MODULE: FINDING RESEARCH ARTICLES

OVERVIEW

Learning Objectives

At the conclusion of this module, you will be able to:

- [Interpretation] Describe different types of research articles, including Experimental Articles, Meta-Analysis Articles, and Review Articles
- [Evaluation] Choose an article to satisfy research needs identified by your mentor
- [Analysis] Compare different types of articles to determine which is appropriate for various needs
- [Analysis] Compare and contrast different types of sources and explain which sources are appropriate in different contexts
- [Evaluation] Evaluate various articles in terms of type, trustworthiness, freshness, and cost; explain the pros and cons associated with different sources
- [Application] Locate library resources at your institution
- [Application] Review your institution's library website to determine valuable methods for your research needs

Materials for this Module

- Handout 1: Types and Sources of Research Articles
- On-Campus Library Resources

Introduction

As the figure illustrates, being able to find good research articles will be one of the most beneficial things to improving yourself as a researcher. The figure highlights how the work of many others supports your work. We will explore the variety of information sources available to you. There are three general factors you should consider about sources of information: trustworthiness, cost, and age of material. Some common sources of information you will use:

- Textbook - explains well established ideas and facts
- Thesis or Dissertation – graduate student's report of cutting-edge results and ideas
- Conference Presentation/Abstract – early phase reporting of emerging thoughts and ideas

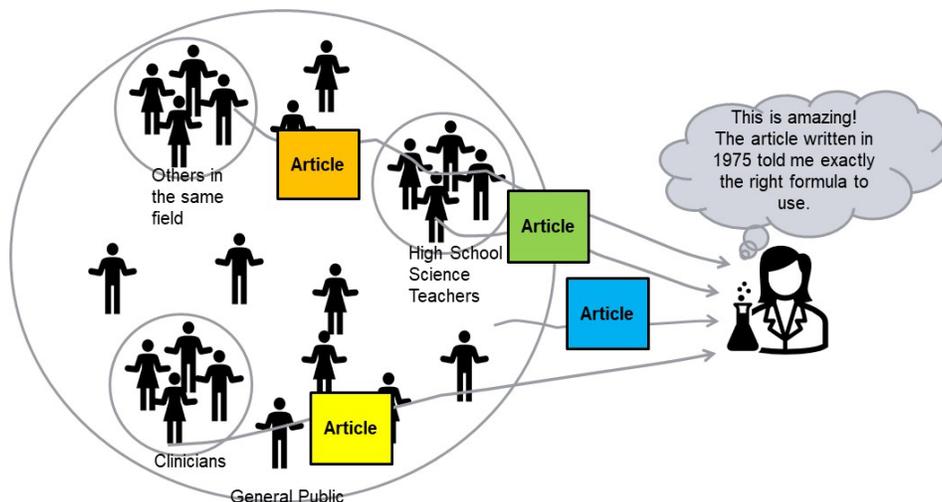


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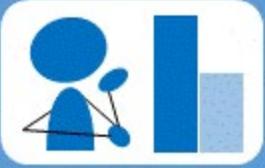
- Journal Article - peer reviewed to ensure correctness.



Types of Research Articles:

There are three main types of research articles:

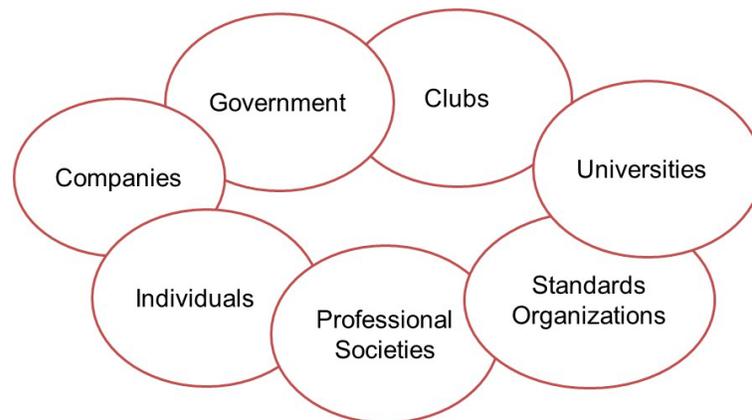
- **Experimental Articles - scientific communication about experiments and results**
 - Experimental testing
 - Scientific communication about personal/lab group experiments
 - Experimental methodology
- **Meta-Analysis Articles - secondary data analysis to find themes, trends in previously published work**
 - Combination of multiple experimental results
 - Commonly from different groups/labs
 - Secondary data analysis to find trends
- **Review Articles - - summary of research data from a particular topic**
 - Scientific communication analyzing others' experiments
 - Meant to provide reader general overview of "state-of-the-field"
 - Can serve as starting point for exploring literature
 - Meant to give big picture of research area, may exclude some details
 - Components
 - Abstract
 - Introduction including statement of purpose
 - Relevance of particular research area
 - Breakdown of specific research questions
 - Figures that are examples of representative work
 - Discussion/future directions of research area
 - References
 - Why do we need review articles?
 - Reviews help us to avoid having to reinvent the wheel



- Can be used as a map through many experimental articles that can be found on a subject
- Help point to “holes” in the literature—areas for improvement

Trustworthiness - Who Creates and Organizes Information?

Many organizations create and publish information. The trustworthiness of an article or publication is related to trust in the organization and how they select, share, and publish information. As the figure shows, many organizations create and publish information. The trustworthiness of an article or publication is related to trust in the organization and how the sources distribute “products”.



A particularly important source of information is technical society. A technical society comprises members in a particular field who work together to share information. You may already belong to the student chapter of a technical society.





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Most organizations share and publish information in different formats such as journals, websites, or books. The trustworthiness of an article or publication is related to trust in the organization AND the process that organization has undergone to validate, clarify, and fact check the article or publication. The figure below shows some common products and how to evaluate the organizations efforts to providing trustworthy information.

- Journal (?)
 - Peer review, 4-5 experts attempt to find errors and challenge results
- Trade Magazine (??)
 - Editor review, sometimes another expert reviews
- Wikipedia (???)
 - Peer review, anyone can review
- Website (????)
 - Publisher or content owner review, likely no independent review



Sources such as Wikipedia and other websites are (at least superficially) the least trustworthy because they are not guaranteed to be reviewed by experts to ensure the information is accurate. Websites may only be reviewed by the content owner or publisher, and Wikipedia can be reviewed by anyone!

Freshness - How Current is the Information?

The publication cycle for a product determines expectations for timeliness of the content. Some products like books are often revised every five years with the original organization dating back decades. Other products like conference posters or presentations represent work the author was doing over the past year.

- Conference Proceedings 
 - Information < 1 year old
- Technical Magazines
 - Information < 2-3 years old
- Journals
 - Information < 2 years old
- Books
 - Information > 3-4 years old
- Handbooks
 - Information > 3-4 years old



Cost - Who Pays?

There are two models for how articles can be published: the publisher model and open access model. With open access, the burden of payment is shifted from the reader to the author. Authors can expect to pay

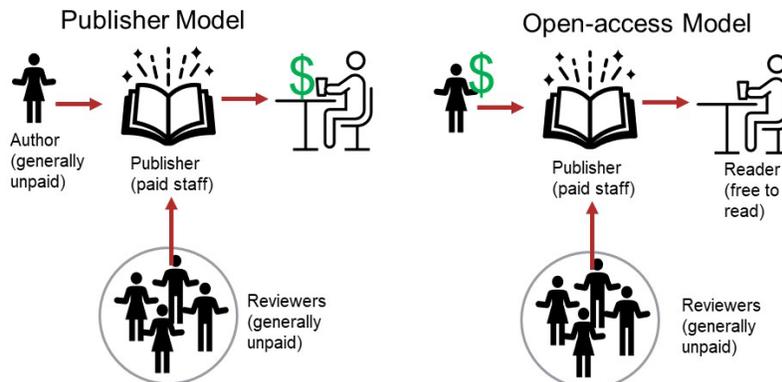


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anywhere from \$500-\$10,000. This allows their material to be accessed for free by their readers. With the publisher model, readers have to pay a subscription for or a fee to access the material; an example of this could be a medical journal magazine, such as The American Journal of Medicine. Readers can access this material at no cost if they are a member of a society or institution that pays these fees.



Know Your Library:

Learning to find good articles and knowing your institution's available resources will make your life much easier. Resources and services available at most universities include:

- Holdings
- Online access to paid subscriptions
- Databases for finding articles (beyond Google Scholar)
- Reference Managers
- Study spaces
- Events
- Interlibrary Loan
- Software, such as LibKey Nomad, to get Open Access and university licensed full-text.
- Librarians, one of the best resources you have. They spend much of their time helping students search for articles and finding articles that are difficult to discover. They can help you improve your knowledge of how to search for articles and provide you with an excellent resource when your literature search isn't going as you had planned.

Assignment(s) for this Module

Library Activity:

Your job is to be familiar with your school library and resources. The university library webpage should list the available resources. Review the website to help answer the following questions (so be sure to talk about these topics in your meeting).

1. What is a database? How are they different from a Google Scholar search? What are some of the search engines related to your research?



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2. What key words do you think would help you locate good research articles in your mentor's field?
3. What reference management platforms are supported by your university?

Deliverable 1: Document your responses to the Library Activity.

Five-Minute Reflection:

1. Come up with one question to discuss with your mentor (maybe a concept you are unclear on, something you found interesting, etc.).
2. What information did you feel was the most informative? Least?
3. What reference management platform will you use to file research articles once you find them and why?

Deliverable 2: Document your responses to the Five-Minute Reflection.

Mentee Deliverables:

1. **Deliverable 1: Responses to the Library Activity (Overview).**
2. **Deliverable 2: Responses to the Five-Minute Reflection (Overview).**

Discussion with mentor:

1. University research paper availability
2. Cost of research articles – who pays? Considerations when applying to journal.
3. Five-Minute Reflection

Summary

- Three factors you should consider about the source of information:
 - Trustworthiness - Information on the internet can be pulled from any source and can be written by anyone. It's important to know where your information is coming from, and how trustworthy it is.
 - Cost - Some information is valuable and worth buying.
 - Age of material – different formats of information have more or less timely information.
- There are three different types of research articles (experimental, meta-analysis, and review); each serves a different purpose.
- Learning to find good articles and knowing your institution's available resources will make your life much easier.



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Type and Content	Trustworthiness	Potential Freshness	Cost
Handbook – summary of technical facts		Information > 3-4 years old	Access through library or purchase.
Book - written to explain a new topic		Information > 3-4 years old	Access through library or purchase.
Standard – commercial, how to do something or what something must do. Example: USB standard so that all USB ports work the same.	Manufacturers or users follow these documents for design or measurement.	Information > 3 year old	Purchase
Journal - highly technical description of a very narrow subject. Main source of research articles.	Peer Reviewed, 4-5 expects attempt to find errors and challenge results.	Information < 2 years old	Access through library or personal subscription.
Thesis and Dissertation – summary of technical work of a masters (thesis) or doctoral (dissertation) student		Information > 2 years old	Access through library or request from author
Patent - a government document describing an invention and giving the inventor rights to exclude others from making, using, or selling an invention	Review by patent examiner does not ensure that idea is technically correct.	Information > 1 year old	Free online
Technical Magazine - overview of a technology		Information < 2-3 years old	Membership in a professional society
Conference Proceeding - short, highly technical, may be preliminary, with goal of sharing early phase reporting of emerging thoughts and ideas		Information < 1 year old	
Trade Magazine - technical content, often related to use of a commercial product	Editor, limited peer review. Goal is to sell advertising.	Information < 1 year old	Magazines free to qualified users.
Wikipedia	Peer curated - sometimes reviewed, sometimes not.	Immediate	Free online
Website	Based on the publisher or content owner	Immediate	Free online



Checklist:

Prior to meeting with mentor:

- Practice methods to locate research articles
- Complete Library Activity
- Locate a paper of relevant topic to mentor's research
- Complete the Five-Minute Reflection