Engineering and Information: Research Skills for Engineers

ENGINEERING AND INFORMATION: RESEARCH SKILLS FOR ENGINEERS

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INTRODUCTION

In a rapidly changing world, universities are preparing students by developing learner-centered experiential learning programs. Experiential learning (EL) courses are developed to build a foundation for undergraduate engineering students to become lifelong learners. EL programs are successful in training students with well-defined technical and analytical skills. However, all too often, the assumption is non-technical skills, such as research and communication, are acquired automatically during a degree, which is not true. As with other areas of competence, students need to be actively taught these skills and given opportunities to develop and practice them until they can be used easily and competently.

In response to the training gap in the engineering experiential learning curriculum, a team at McMaster University has created a series of online modules in the format of this Pressbook that focuses on the development of essential skills for success in experiential learning programs.

This book, *Engineering and Information: Research Skills for Engineers*, is intended to expand experiential learning course offerings for undergraduate students through a series of interactive modules. The developed resource includes seven independent modules that focus on essential skills for engineering including how to find, understand, evaluate, and document information sources that are commonly used by engineers such as journal articles, patents, standards/guidelines, books, and webpages.

The resource has been created as a series of self-learning modules to support all undergraduate engineering students, regardless of their level of study. The resource can also serve as supplementary training modules for instructors to ensure that there is proper assessment and evaluation of student assignments. Since each online module focuses on building different skills, they can be used in combination or individually. Educators can incorporate the modules at different points in their programs.

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EVIDENCE-BASED PRACTICE

Introduction

When you think of the idea of "evidence," you might think about evidence used in a court case or to solve a crime. In a legal sense, evidence refers to the information that helps establish certain facts in a case. But, what do we mean when we refer to "evidence" in engineering research? In this module, we'll introduce the concepts of scientific evidence and evidence-based practice and consider why they are important. Then, we'll identify some of the different types of information sources you can use to find scientific evidence and inform your academic and professional work in engineering.

Modes of Learning

In this module, students will use the following modes of learning:

- Videos and short assessments

This module will take approximately 15 minutes to complete.

Intended Learning Outcomes

By the end of this module, students will be able to...

- Recognize the importance of using evidence to inform their work
- Identify some important sources of information for engineers

Key Terms & Concepts

- Scientific evidence
- Evidence-based practice

★ Topic 1: Introduction to Evidence-Based Practice

This video will introduce the term 'evidence-based practice' and explain how and why it is important in engineering contexts.

Watch Introduction to Evidence-Based Practice in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=111#h5p-20

★ Topic 2: Information Sources in Engineering

This next video explores information sources in engineering and the most common types of sources engineers use.

Watch Information Sources in Engineering in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=111#h5p-21

Summary

In this module, you discovered how evidence-based practice can be applied to inform your decisions, and

you learned about some of the information sources that you might use as an engineering student and in your professionalcareer.

References

[1] G. Guyatt et al., "Evidence-Based Medicine: A New Approach to Teaching the Practice of Medicine," JAMA, vol. 268, no. 17, pp. 2420–2425, Nov. 1992, doi: 10.1001/jama.1992.03490170092032.

[2] B.A. Kitchenham, D. Budgen, and P. Brereton,Evidence-Based Software Engineering and Systematic Reviews. Boca Raton, FL, USA: CRC Press, 2016.[Online]. Available: https://learning.oreilly.com/library/view/evidence-based-software-engineering/9781482228663/

[3] J. Kaufman, C. Tenopir, and L. Christian, "Does workplace matter? How engineers use and access information resources in academic and non-academic settings," Science & Technology Libraries, vol. 38, no. 3, pp. 288-308, Jul. 2019, doi: 10.1080/0194262X.2019.1637806.

BOOKS

Introduction

When you start a new research project, there are a lot of different places you might look for information to help you learn about your topic. A good place to start is with a book. In this module, we will explore the different types of books and their uses, from textbooks to scholarly books and reference books. You'll learn how you might use these different types of books in your research and how to find books on your topic at the university library.

Modes of Learning

In this module, students will use the following modes of learning:

- Videos and short assessments

This module will take approximately 15 minutes to complete.

Intended Learning Outcomes

By the end of this module, students will be able to...

- Recognize the value of using books in their research
- Identify the characteristics of different types of books and apply this understanding to classify books by type
- Use library resources to find books related to a topic

Key Terms & Concepts

- Scholarly book
- Reference book
- Textbook

★ Topic 1: Using Books in Your Research

This first video is an introduction to books. You will learn about what kind of information you can find in a book, when to use a book, how to use a book, and some of the differences between types of books.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=86

Watch Using Books in Your Research in full screen.

Quiz

Based on the titles of the books listed below, determine if each is a scholarly book, popular book, or reference book. If you find it difficult to determine which type of book each is based on their title, do a quick search to find out more about the book.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=86#h5p-15

★ Topic 2: Finding Books

In this video, you will learn about how to search for books through the library as well as about some common engineering e-book collections.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=86

Watch Finding Books in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=86#h5p-16

Summary

In this module, you learned about the different types of books that exist and how you can use them to support your research. You also learned how to find engineering e-books through the university library.

References

[1] McMaster University Library. “Scholarly vs. popular sources.” https://library.mcmaster.ca/research/scholarly-vs-popular-sources#tab-definition (accessed Oct.22, 2021).

WEB INFORMATION

Introduction

The internet has changed the way that students and professionals do research. There is an enormous amount of information available at our fingertips that we can access any time through our computers and phones. But, how can we make use of all this information when we are conducting research? How can we make sure that the information we are finding is appropriate and credible? This module will help you become better at finding and evaluating information online.

Modes of Learning

In this module, students will use the following modes of learning:

- Videos and short assessments

This module will take approximately 25 minutes to complete.

Intended Learning Outcomes

By the end of this module, you will be able to...

- Recognize some of the types of information that you can find on the web
- Identify and apply some advanced web searching techniques
- Evaluate web information using the RADAR criteria

Key Terms & Concepts

- Grey literature
- RADAR

★ Topic 1: Web Information

In this video you will be introduced to web information. You will consider the qualities of an effective research question and the types of sources that are available on the web.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=118

Watch Web Information in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=118#h5p-22

★ Topic 2: Advanced Web Searching Techniques

In this next video, you will learn about advanced web searching techniques and some strategies to find relevant and credible sources related to your research question.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=118

Watch Advanced Web Searching Techniques in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=118#h5p-23

★ Topic 3: Evaluating Web Information

In this video, you will learn about why it is important to evaluate sources before you use them. You will be introduced to the RADAR framework as a way to check the credibility of sources.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=118

Watch Evaluating Web Information in full screen.

Quiz

Use Reasons why people become engineers to answer the questions in the quiz below.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=118#h5p-24

Summary

In this module, you learned new strategies for using a familiar tool: the web search engine. You considered what types of information you can find online, explored the options available for using an Advanced Search tool to focus your search, and learned how to use the five RADAR criteria to evaluate your sources.

References

[1] Government of Canada, "Computer Software Engineer in Canada." https://www.jobbank.gc.ca/marketreport/outlook-occupation/5485/ca (accessed Nov. 12, 2021).

Additional Resources

- Evaluating Sources
- Google Advanced Search
- Grey literature: What it is & how to find it

JOURNAL ARTICLES

Introduction

Among the first journals on record is the *Philosophical Transactions of the Royal Society*. This journal, established in 1665, shared research and findings about science. Today, many journals exist across all disciplines. They are a common way for new research to be published, so it's critical that engineering students and professionals are able to use them effectively. In this module, you'll learn about journal articles – what they are, how to read them, where you can find them, and how to search for them.

Modes of Learning

In this module, students will use the following modes of learning:

- Videos and short assessments
- An activity in which you practice developing a search strategy

This module will take approximately 35 minutes to complete.

Intended Learning Outcomes

By the end of this module, you will be able to...

- Recognize the importance of journal articles in engineering research
- Identify strategies for reading a journal article
- Use different approaches to finding journal articles such as through a journal website, Google Scholar, or a library database
- Conduct a search for articles using Engineering Village

Key Terms & Concepts

- Journal
- Peer review

- Database
- IMRAD
- Search strategy
- Main concept
- Boolean operator

★ Topic 1: Introduction to Journal Articles

This video will introduce journal articles. You will learn about what a journal is, what peer review means, and why journal articles are important for engineering research.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=61

Watch Introduction to Journal Articles in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=61#h5p-5

★ Topic 2: Reading Journal Articles

In this next video, you will learn about how to read a journal article. More specifically, you will learn about IMRAD structure and how to use the three-pass approach as a strategy for reading journal articles.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=61

Watch Reading Journal Articles in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=61#h5p-6

★ Topic 3: Finding Journal Articles

Now you will learn about how to find journal articles; specifically, you will learn how to use a journal to find articles, how to use Google Scholar, and how to use databases.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=61

Watch Finding Journal Articles in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=61#h5p-7

★ Topic 4: Building a Search Strategy

In the following video, you will learn how to build effective search strategies. This involves choosing search terms and using Boolean operators.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=61

Watch Building a Search Strategy in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=61#h5p-8

★ Topic 5: Searching in Engineering Village

In this final video, you will learn about Engineering Village, including an overview of its content and search features. You will also watch a demonstration of a search and learn how to modify a search by using filters.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=61

Watch Searching in Engineering Village in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=61#h5p-9

Summary

In this module, you learned why journal articles are an important source of information for engineering research. You acquired strategies for reading a journal article using your understanding of the typical structure of an article and using a three-pass approach. You also learned where you can find articles, how to build a search strategy, and how to search using Engineering Village. Now you're ready to start exploring the journal literature and discovering the exciting research that's being done.

References

[1] S. Keshav, "How to read a paper," SIGCOMM Comput. Commun. Rev., vol. 37, no. 3, pp. 83–84, Jul. 2007, doi: 10.1145/1273445.1273458.

[2] Elsevier. "Ei Compendex" https://www.elsevier.com/solutions/engineering-village/content/compendex (accessed Oct. 7, 2021)

[3] Elsevier. "Inspec: Engineering Research Database" https://www.elsevier.com/solutions/engineering-village/content/inspec (accessed Oct. 7, 2021).

+ Additional Resources

- How to read a paper

PATENTS

Introduction

Patent research is an exciting way to learn about recent inventions and cutting-edge technologies. In this module, you will learn what patents are, how to read patents, and how to find information in them. You will also acquire strategies to search for patents and understand why and how you can use patent classification schemes for patent searching.

Modes of Learning

In this module, you will use the following modes of learning:

- Videos and short assessments
- An activity in which you practice locating information in a patent
- An activity in which you practice searching for patents

This module will take approximately 35 minutes to complete.

Intended Learning Outcomes

By the end of this module, you will be able to...

- Describe what a patent is and how patents can be used in engineering research
- Locate needed information in a patent
- Employ strategies for searching for patents using a patent search tool
- Explain the value of using patent classification schemes to search for patents

Key Terms & Concepts

- Intellectual property
- Patent
- Inventor

- Assignee or owner
- Drawings
- Claims
- Specification
- Patent search
- Patent classification

★ Topic 1: Introduction to Patents

This first video is an introduction to patents. You will learn about what intellectual property is, what patents are, criteria for patentability in Canada, and some of the ways patents can help researchers.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=5

Watch Introduction to Patents in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=5#h5p-1

★ Topic 2: Reading a Patent

In this next video, you will learn about the different parts of a patent and how to read one.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=5

Watch Reading a Patent in full screen.

Quiz

Use US 9,197,091 B2, a patent for Charge Rate Optimization, to answer the questions below.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=5#h5p-3

★ Topic 3: Searching for Patents

In this third video, you will learn how to search for patents. You will be introduced to various patent offices and tools for conducting searches. You will also learn how to use various strategies to search for patents.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=5

Watch Searching for Patents in full screen.

Quiz

Use PatentScope to conduct searches for the questions below.

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=5#h5p-2

★ Topic 4: Patent Classification

In this video, you will learn about patent classification and how patents are organized so that they can be easily found by patent offices, researchers, companies, and the general public.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=5

Watch Patent Classification in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=5#h5p-4

Summary

This module introduced you to patents as a form of intellectual property and a useful source for engineering research. You practiced reading a patent and finding needed information. You also learned about some different tools you can use to search for patents, and some approaches to searching for patents such as keyword searching, searching by title, patent number, inventor, or owner, and searching with patent classification codes.

References

[1] Government of Canada, "Archived – A guide to patents – Canadian Intellectual Property Office." https://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/h_wr03652.html (accessed Aug. 11, 2021).

[2] Government of Canada, "What is a patent?" https://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/wr03716.html (accessed Aug. 11, 2021).

[3] *Recommendation concerning bibliographic data on and relating to patents and SPCS,* ST.9, World Intellectual Property Office, June 2013. [Online.] Available: *https://www.wipo.int/export/sites/www/standards/en/pdf/03-09-01.pdf*

[4] World Intellectual Property Office. "Guide to the International Patent Classification." https://www.wipo.int/edocs/pubdocs/en/wipo_guide_ipc_2020.pdf (accessed Aug. 11, 2021).

[5] World Intellectual Property Office. "What is intellectual property?" https://www.wipo.int/edocs/pubdocs/en/wipo_pub_450_2020.pdf (accessed Aug. 11, 2021).

[6] World Intellectual Property Office. "WIPO Guide to Using Patent Information." https://www.wipo.int/edocs/pubdocs/en/wipo_pub_l434_3.pdf (accessed Aug. 11, 2021).

Additional Resources

Understanding Patents

- What is a Patent?
- How to Read a U.S. Patent
- International Patent Classification

Patent Search Tools

- Espacenet
- Free Patents Online
- Google Patents
- PatentScope
- The Lens

STANDARDS

Introduction

How can we be sure that the homes we live in, the vehicles we travel in, and the water we drink are safe? In all these aspects of our lives, we are protected by technical standards. It's important that all engineers have a strong understanding of technical standards so that they can abide by them in their work. In this module, you'll learn about what standards are and how they are developed. You'll explore an example standard and think about how this document is useful to engineers and society. Finally, you'll learn about where to find standards and how to access them.

Modes of Learning

In this module, students will use the following modes of learning:

- Videos
- An activity in which you explore a standard

This module will take approximately 25 minutes to complete.

Intended Learning Outcomes

By the end of this module, you will be able to...

- Recognize what a standard is and its value to society
- Locate needed information in a standard
- Identify sources for finding standards

Key Terms & Concepts

- Standard
- Regulation
- Code

- Guideline
- Specification

★ Topic 1: Introduction to Standards

This video covers what a standard is, how they are developed and who develops them, and specific vocabulary and terminology related to standards.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=76

Watch Introduction to Standards in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=76#h5p-10

★ Topic 2: Reading a Standard

In this video, we will look at an example of a standard and learn how to read one.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=76

Watch Reading a Standard in full screen.

Quiz

Use the Ontario Drinking Water Quality Standards to answer the questions below.

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=76#h5p-11

★ Topic 3: Finding Standards

In this video, you will learn how to search for and find standards through your academic library. You will also be introduced to search strategies to help you find standards easily.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=76

Watch Finding Standards in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=76#h5p-12

Summary

In this module on technical standards, you learned what standards are, how they are developed, and why they are important to engineers and society. You practiced reading and interpreting information in a standard through an activity using the Ontario Drinking Water Quality Standards. You also learned about standards organizations and standards databases and how you might interact with each of these to access standards.

References

International Electrotechnical Commission, "Understanding Standards." https://www.iec.ch/understanding-standards (accessed Oct. 6, 2021).

Additional Resources

- What are standards?
- How do I find standards?

CITATION

Introduction

When you write something excellent, you want to be sure that readers know that it's yours. This is why citation is an important practice. It helps your readers understand which sources you've used and gives credit to other researchers, while allowing readers to see which are your original ideas. In this module, you will learn how to cite your sources in IEEE style (the citation style used by the Institute of Electrical and Electronics Engineers), and you will practice writing references. You will explore the use of a citation manager to help you to organize your sources and automatically generate in-text citations and reference lists to make citation quick and easy.

Modes of Learning

In this module, students will use the following modes of learning:

- Videos and short assessments
- An activity in which you practice creating references in IEEE style

This module will take approximately 30 minutes to complete.

✓ Intended Learning Outcomes

By the end of this module, you will be able to...

- Recognize the roles of citation in academic and technical writing
- Apply IEEE style when creating in-text citations and reference lists
- Use a citation manager such as Zotero to organize references and create in-text citations and reference lists

Key Terms & Concepts

- Citation

- In-text citations
- Reference list

★ Topic 1: Understanding Citation

This video is an introduction to citations. The video will cover what a citation is, the purpose of citations in academic environments, and information on when you need to cite.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=98

Watch Understanding Citation in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=98#h5p-17

★ Topic 2: IEEE Style

In the following video, you will be introduced to IEEE, which is a common citation style in technical fields such as engineering.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=98

Watch IEEE Style in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=98#h5p-18

★ Topic 3: Citation Management

The next video serves as the final video for this module, and it introduces you to citation management. Following the quiz, however, is another video about how to use a specific citation management tool called Zotero.

One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=98

Watch Citation Management in full screen.

Quiz

An interactive H5P element has been excluded from this version of the text. You can view it online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=98#h5p-19

How to Use Zotero

This video is an overview of how to use the citation manager Zotero.

> *One or more interactive elements has been excluded from this version of the text. You can view them online here: https://ecampusontario.pressbooks.pub/engineeringandinformationresearchskillsforengineers/?p=98*

Watch How to Use Zotero in full screen.

Summary

In this module, you learned why it's important to cite your sources and when you should cite a source. You also learned about IEEE citation style and how to create in-text citations and a reference list. Finally, you learned how to use the citation manager Zotero to streamline your citation work.

References

[1] Yale Poorvu Center for Teaching and Learning. "Warning: When You Must Cite". https://poorvucenter.yale.edu/undergraduates/using-sources/understanding-and-avoiding-plagiarism/warning-when-you-must-cite (accessed Oct. 25, 2021).

[2] University of Pittsburgh Library System. "IEEE Style". https://pitt.libguides.com/citationhelp/ieee (accessed Oct. 25, 2021).

[3] L. Homol, "Web-based Citation Management Tools: Comparing the Accuracy of Their Electronic Journal Citations," The Journal of Academic Librarianship, vol. 40, no. 6, pp. 552–557, Nov. 2014, doi: 10.1016/j.acalib.2014.09.011.

[4] Queens University Library. “Citing and Citation Managers”. https://guides.library.queensu.ca/citing-and-citation-managers/citation-managers (accessed Oct. 25, 2021).

[5] Golden Gate University. “What is a Citation Manager?” https://ggu.libguides.com/citation_manager (accessed Oct. 25, 2021).

+ Additional Resources

- How to Cite References: IEEE Documentation Style
- IEEE Reference Guide
- Zotero

RESOURCES FOR INSTRUCTORS

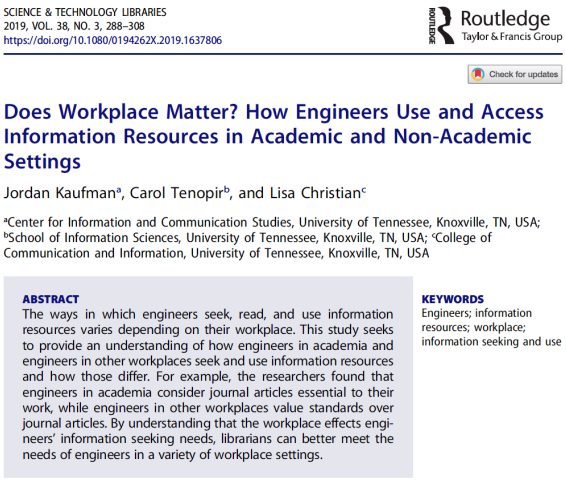
In order to support the instructors to create their own adapted course materials out of the provided modules, some of the source documents (tests & Images) are shared in this chapter as raw materials.

Please note that all videos are downloadable and the instructors are allowed to download and modify them in any way they prefer.

Module 1: Evidence-Based Practice

Module Script: Module 1 scripts

Module Media:



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Does Workplace Matter? How Engineers Use and Access Information Resources in Academic and Non-Academic Settings

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ABSTRACT

The ways in which engineers seek, read, and use information resources varies depending on their workplace. This study seeks to provide an understanding of how engineers in academia and engineers in other workplaces seek and use information resources and how those differ. For example, the researchers found that engineers in academia consider journal articles essential to their work, while engineers in other workplaces value standards over journal articles. By understanding that the workplace effects engineers' information seeking needs, librarians can better meet the needs of engineers in a variety of workplace settings.

KEYWORDS

Engineers; information resources; workplace; information seeking and use

Research Brief

Prevalence and Correlates of Food Insecurity Among Students Attending a Midsize Rural University in Oregon

Megan M. Patton-López, PhD, RD[1]; Daniel F. López-Cevallos, PhD, MPH[2]; Doris I. Cancel-Tirado, PhD, MPH[3]; Leticia Vazquez, BS[3]

ABSTRACT

Objective: To examine the prevalence and identify correlates of food insecurity among students attending a rural university in Oregon.

Methods: Cross-sectional nonprobability survey of 354 students attending a midsize rural university in Oregon during May, 2011. The main outcome was food insecurity measured using the US Department of Agriculture Household Food Security Survey Module: 6-Item Short Form. Socioeconomic and demographic variables were included in multivariate logistic regression models.

Results: Over half of students (59%) were food insecure at some point during the previous year. Having fair/poor health (odds ratio [OR], 2.08; 95% confidence interval [CI], 1.07–4.63), being employed (OR, 1.73; 95% CI, 1.04–2.88), and having an income < $15,000/y (OR, 2.23; 95% CI, 1.07–4.63) were associated with food insecurity. In turn, good academic performance (grade point average of ≥ 3.1) was inversely associated with food insecurity.

Conclusions: Food insecurity seems to be a significant issue for college students. It is necessary to expand research on different campus settings and further strengthen support systems to increase access to nutritious foods for this population.

Key Words: food insecurity, college students, rural, Oregon (*J Nutr Educ Behav.* 2014;46:209-214.)

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INTRODUCTION

Household food insecurity is defined as the limited or uncertain availability of nutritionally adequate and safe foods, and limited or uncertain ability to acquire acceptable foods in socially acceptable ways.[1] As measured by the US Department of Agriculture Household Food Security Module,[2] food insecurity is a marker of economic hardship because it assesses the adequacy and stability of a household's food supply over the preceding 12 months for active, healthy living of all household members. The most recent national data in 2011 indicate that 14.9% of all households (17.9 million) were food insecure.[2] Furthermore, low-income households with incomes < 185% of the poverty threshold (34.5%) and households with children (20.6%) were higher than the national average.[2]

Previous research has observed that food insecurity can disrupt optimal development throughout the life cycle, from the prenatal period into the elder years.[3,4] A growing body of literature has documented the effects of food insecurity on cognitive, academic, and psychosocial development among school-aged and teenage students. These studies consistently observe that food insecurity is associated with lower academic performance, poor health, and decreased psychosocial function.[4,10,11]

Among college students, financial hardship can translate into budget demands that compete with food dollars (eg, tuition, textbooks, housing, utilities, health care).[12,13] Over the past 30 years, the price of higher education has steadily outpaced inflation, the cost of living, and medical expenses.[14] Recent changes to federal loan policies regarding the amount and duration of federal aid received, as well as how soon interest will begin to accrue after college, may exacerbate the financial challenges students face.[15] Food insecurity, as a potential consequence of the increasing cost of higher education, and its likely impact on student health, learning, and social outcomes should not be considered an accepted aspect of the impoverished student experience, but a major student health priority.[16]

College students face life-changing milestones during their transition to adulthood that may have long-lasting effects.[17,18] Food insecurity during these years can potentially affect college students' cognitive, academic, and psychosocial development.[4] However, little research has addressed this issue. Studies addressing food insecurity among college students suggest a higher prevalence of food insecurity compared with the general population.[19,20] A study in Hawai'i found that 45% of students were food

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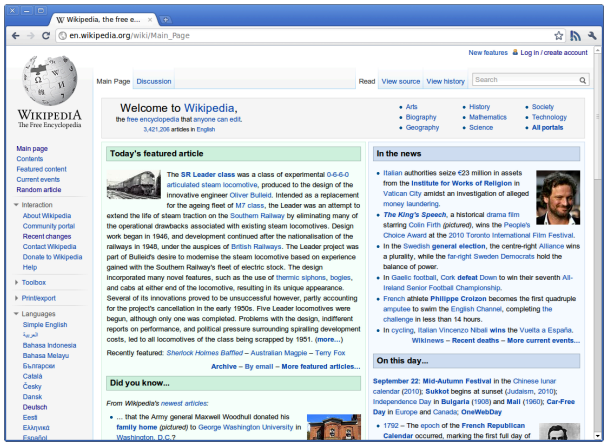
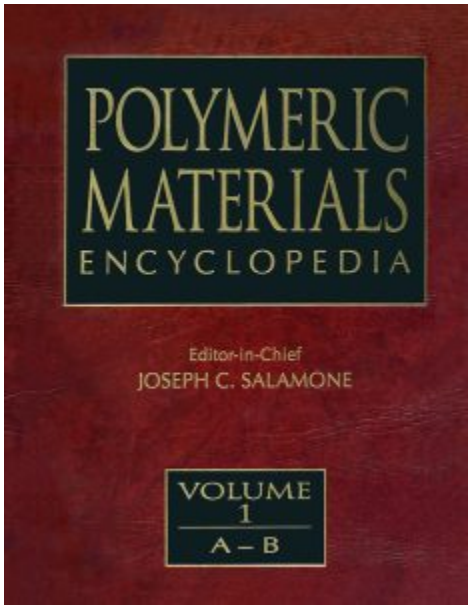
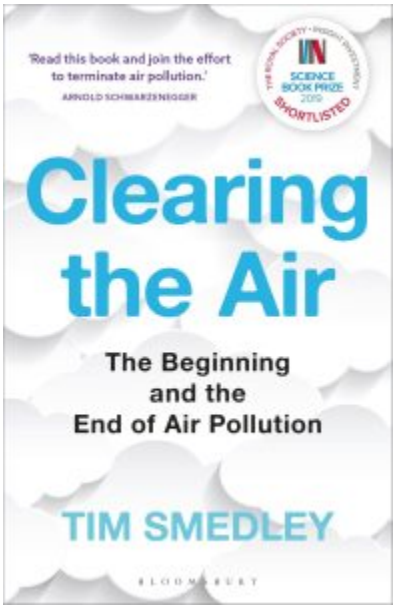


Module 2: Books

Module Script: Module 2 – Scripts

Module Media:

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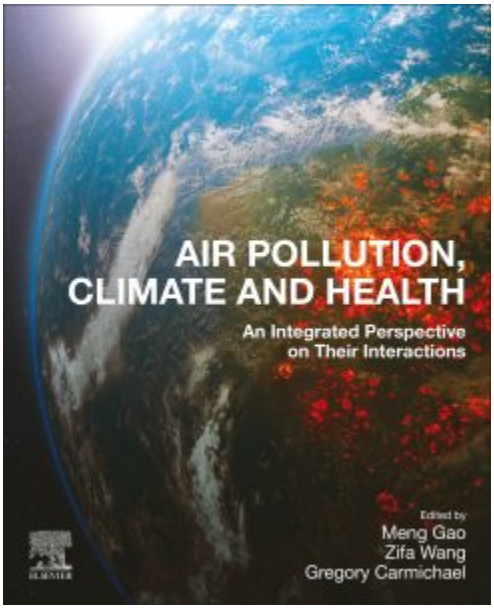
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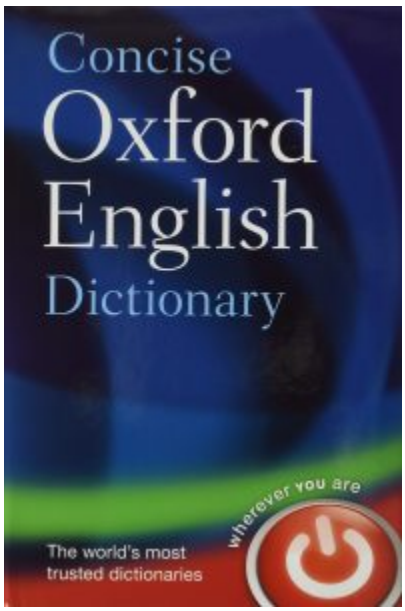
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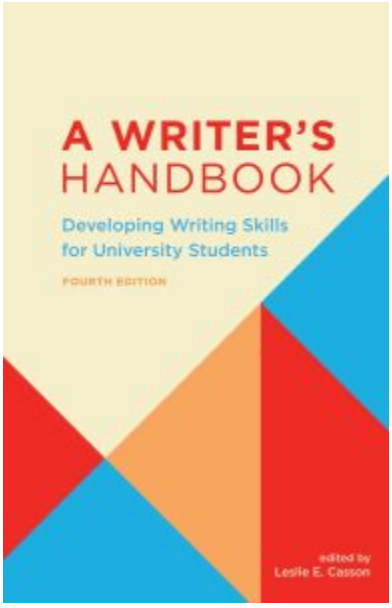
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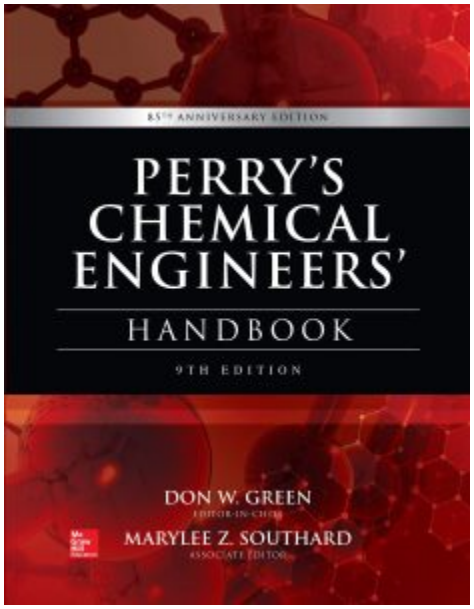
FOURTH EDITION
edited by
Leslie E. Casson



Both my parents were born in 1952. My maternal grandfather, Selwyn Bate, was a local solicitor in Tamworth, my home town, and a lecturer at Birmingham Law School. On occasion – and despite his best efforts to avoid it – he had to travel into London. My aunt Claire remembers him once having to take the train to London carrying an Elizabethan legal charter, written on sheep's hide, to settle a dispute in the High Court. He hated the capital. Too many people and too dirty. He would wash as soon as he returned home. I used to assume when hearing these stories that it was down to a kind of inverse snobbery. As a Lancastrian, he perhaps considered Tamworth – in the Midlands – to be as far south as he wanted to go. Then I learned of the Great Smog of 1952, and suddenly, the fact that Grandpa Bate avoided London like the plague made a lot of sense.

As early as the year of 1979, by the First World Climate Conference (FWCC), alerts were initially brought to international attention about long-term global climate change caused by anthropogenic activities. With the development of atmosphere modeling and improved monitoring and detection techniques, the evidence of global warming, on the one hand, grew in scientific communities, and on the other hand, the concept of "greenhouse effect" had reached every villager of the "Earth village." The effects of climate change are more pronounced today, with increased frequency of extreme weather events, heat stress, floods, drought, as well as other indirect health consequences, for example, food shortage, undernutrition, and increased vector-mediated diseases. In fact, from the birth of the earth, the climate system has been going through a constant natural variability which was associated with changes in the earth's orbit and the onset and recession of the great ice ages. However, the ongoing trend of global warming, which was mainly due to anthropogenic emission of greenhouse gases (CO_2, CH_4, N_2O, HO_2, etc.), has shown and will continue to pose even more catastrophic risk to human health. Not only economic activities, but also human health and wellbeing are vulnerable to climate change, with no region being immune from the negative consequences (Smith et al., 2014).

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Module 3: Web Information

Module Script: Module 3 scripts

Module 4: Journal Articles

Module Script: Module 4 Scripts

Module 5: Patents

Module Script: Module 5 Scripts

Module 5 – Lightboard

Storyboard – Patents

Storyboard – Scene Collections

Module 6: Standards

Module Script: Module 6 scripts

Module 7: Citations

Module Script: Module 7 Script