ATME College of Engineering

Department of EEE
Emitting Elite Energy

Module-2
Literature Review and Technical Reading

Course Code: **BRMK557**

Teaching Hours/Week (L:T:P: S) :1:2:0:0

Total Hours of Pedagogy :40

Credits :02

CIE Marks :50

SEE Marks :50

Total Marks :100

Exam Hours :03

Course Objectives:

CO1. To Understand the knowledge on basics of research and its types.

CO2. To Learn the concept of Literature Review, Technical Reading, Attributions and Citations.

CO3. To learn Ethics in Engineering Research.

CO4. To Discuss the concepts of Intellectual Property Rights in engineering.

Module-2(8 Hours)

Literature Review and Technical Reading, New and Existing Knowledge, Analysis and Synthesis of Prior Art Bibliographic Databases, Web of Science, Google and Google Scholar, Effective Search: The Way Forward Introduction to Technical Reading Conceptualizing Research, Critical and Creative Reading, Taking Notes While Reading, Reading Mathematics and Algorithms, Reading a Datasheet.

Attributions and Citations: Giving Credit Wherever Due, Citations: Functions and Attributes, Impact of Title and Keywords on Citations, Knowledge Flow through Citation, Citing Datasets, Styles for Citations, Acknowledgments and Attributions, What Should Be Acknowledged, Acknowledgments in, Books Dissertations, Dedication or Acknowledgments.

Literature Review and Technical Reading

- The primary goal of literature review is to know the use of content/ideas/approaches in the literature to correctly identify the problem.
- It is vaguely known beforehand, to advocate a specific approach adopted to understanding the problem, and to access the choice of methods used.
- It also helps the researcher understand clearly that the research to be undertaken would contribute something new and innovative.
- The quality of such review can be determined by evaluating if it includes appropriate breadth and depth of the area under study, clarity, rigor, consistency, effective analysis.

2.1 New and Existing Knowledge

Literature Review and Technical Reading

New and Existing Knowledge

1. Understanding the purpose of literature review and its research role.
2. Navigating sources of existing knowledge.
3. Effective strategies for conducting a comprehensive literature review.

Literature Review and Technical Reading

1. Understanding the purpose of literature review and its research role.
   1. **Purpose of literature review**: The main goal is to identify and understand the existing knowledge.
   2. **Problem Identification**: Helps in correcting identified research problems that might be unclear initially.
   3. **Advocating approaches:** Researchers use literature to advocate specific approaches to understanding the problems
   4. **Choice of methods**: It assists in comprehending the choice of research methods.

Literature Review and Technical Reading

2. Navigating sources of existing knowledge

1. Textbooks vs. Research paper: Textbooks provides established knowledge, while research paper offers recent developments
2. Complexity of research papers: Research papers are specialized and assume prior knowledge in the field
3. Building a strong foundation: Reading and learning from various sources help in constructing a solid foundation for research

Literature Review and Technical Reading

3. Effective strategies for conducting a comprehensive literature review.
   1. Conceptual focus:
   2. Expectations of Supervisors:
   3. Rules for effective review:
   4. Comprehensive Review:

Literature Review and Technical Reading

3. Effective strategies for conducting a comprehensive literature review.

1. **Conceptual focus:** A literature survey focus on concepts rather than just listing the authors, i.e. we must understand the concept behind their work.
2. Expectations of Supervisors:
3. Rules for effective review:
4. Comprehensive Review:

Literature Review and Technical Reading

3. Effective strategies for conducting a comprehensive literature review.

1. **Conceptual focus**
2. **Expectations of Supervisors:** A well-executed literature review impresses supervisors by showcasing a strong grasp of the field' s current state.
3. Rules for effective review:
4. Comprehensive Review:

Literature Review and Technical Reading

3. Effective strategies for conducting a comprehensive literature review.

1. **Conceptual focus**
2. **Expectations of Supervisors:**
3. **Rules for effective review:** there are guidelines for writing an effective literature review, including avoiding hasty conclusions and synthesizing information effectively.
4. Comprehensive Review:

Literature Review and Technical Reading

3. Effective strategies for conducting a comprehensive literature review.

1. **Conceptual focus**
2. **Expectations of Supervisors:**
3. **Rules for effective review:**
4. **Comprehensive Review:** A good literature survey involves systematically analyzing and synthesizing archived work.

2.2 Analysis and Synthesis of Prior Art

Literature Review and Technical Reading

Analyzing and synthesizing prior Art/Research:

1. Researchers process
2. Evaluating information sources for Research validity.

- After collecting articles for the literature review, researchers break them down and find useful information.
- They then put all the information together to see what conclusions they can draw from the articles as a group.

Literature Review and Technical Reading

A literature survey grid of N topics and M sources is shown below to help crystallize the information in different categories.

	Source 1	Source 2	…	Source M
Topic 1		✓		
Topic 2	✓			✓
⋮				
⋮				
Topic N	✓	✓		

Literature Review and Technical Reading

A researcher should analyze the relevant information ascertained in Table 2.1 by undertaking the following steps:

1. Understanding the hypothesis
2. Understanding the models and the experimental conditions used
3. Making connections
4. Comparing and contrasting the various information, and
5. Finding out the strong points and the loopholes.

Literature Review and Technical Reading

Researchers process-

Researchers need to :

1. Understand the main idea in each article.
2. Look at the models and experiments each.
3. Connect the different pieces of information.
4. Compare and contrast what they find.
5. Identify strengths and weakness.

Literature Review and Technical Reading

Researchers process-

- Its important to question **big claims** in the articles.
- If you believe everything you read, it can limit your own research and critical thinking.
- The goal of a literature review is to discover new things to study, point out problems in existing research and propose fresh ideas.

Literature Review and Technical Reading

Evaluating information sources for Research validity-

- No matter where you find information, you must evaluate it carefully before using it in your research.
- Checking articles published in reputable journals or granted patents is a good idea.

Literature Review and Technical Reading

Evaluating information sources for Research validity-

Here are some things to consider when evaluating information:

- **Authority-** Who is author, and where do they work?
- **Accuracy-** Does the information seem accurate and backed by other sources?
- **Scope-** Is the source at the right level of complexity for your research?

2.3 Bibliography & Its Databases

Literature Review and Technical Reading

Bibliography:

- A bibliography is a list of sources or references that an author or researcher has consulted and cited in their work
- The purpose of a bibliography is to provide readers with a comprehensive list of the sources used in the work, allowing them to locate and refer to those sources for further information or verification.
- A bibliography includes various types of sources, such as books, journal articles, websites, reports, and other materials.
- There are different citation styles, such as APA (American Psychological Association), MLA (Modern Language Association), Chicago/Turabian etc. With its own rules for formatting bibliographies.

Sample

Bibliography

Ahuga, Hira N., and Walter J. Campbell, Estimating: From Concept to Completion, Prentice-Hall, Englewood Cliffs, New Jersey, 1988.

Atcheson, Daniel, Estimating Earthwork Quantities, Norseman Publishing Company, Lubbock, Texas, 1986.

Avery, Craig, (ed.), Concrete Construction & Estimating, Craftsman Book Company, Carlsbad, California, 1975.

Barrie, Donald S., and Boyd C. Paulson, Professional Construction Management, 2nd ed., McGraw-Hill, New York, 1984.

Bernold, Leonard E., and John F. Tresular "Vendor Analysis for Best Buy in Construction," ASCE Journal of Construction Engineering and Management, (Vol. 117, No. 4), pp. 645-658, December, 1991.

Bourges, G. Patrick, *et al.*, Walker's Quantity Surveying and Basic Construction Estimating, Frank R. Walker Company, Chicago, Illinois, 1981.

Carr, Robert, "Cost Estimating Principles," ASCE Journal of Construction Engineering and Management, (Vol. 115, No. 4), pp. 545,-551 December, 1989.

Chick, David, "The Changing Role of the Estimator," Cost Engineering, (Vol. 34, No. 7), July, 1992.

Clark, John E., Structural Concrete Cost Estimating, McGraw-Hill Book Company, New York, 1983.

Cleveland, Allan B., (ed.), Means' Man-hour Standards, R.S. Means Company, Inc., Kingston, Massachusetts, 1983.

Clough, Richard H., Construction Contracting, 2nd ed., Wiley - Interscience, New York, 1969.

Construction Dictionary, 6th ed., Greater Phoenix, Arizona Chapter, National Association of Women in Construction, Phoenix, Arizona, 1985.

Construction Industry Cost Effectiveness Report, (Vol. 23), The Business Roundtable, New York, 1980-1982.

"Contractor Survey Finds That Specs Don't Measure up: Language Barriers, Shrinking Fees, and Pace of Change Cited as Reasons for the Problems," Engineering - News Record, June 17, 1991.

Cook, Paul J., Bidding for the General Contractor, R.S. Means Company, Inc., Kingston, Massachusetts, 1985.

Bibliography:

APA STYLE Formatting: Author's name, title of the work, publication date, publisher, and relevant page numbers

1. **Books:**
   1. Smith, J. A. (Year). *Introduction to Electrical Engineering Principles*. Publisher.
   2. Jones, R. B. (Year). *Advanced Circuits and Systems Design*. Another Publisher.

2. **Journal Articles:**
   1. Wang, Y., & Chen, L. (Year). "Optimization Techniques for Power Distribution Networks." *IEEE Transactions on Power Systems, 30*(2), 123-145. DOI: 10.1109/TPWRS.20XX.XXXXXXX
   2. Patel, S., & Gupta, M. (Year). "Machine Learning Applications in Signal Processing for Electrical Grids." *IEEE Transactions on Smart Grid, 15*(4), 678-689. DOI: 10.1109/TSG.20XX.XXXXXXX

Bibliography:

APA STYLE Formatting: Author's name, title of the work, publication date, publisher, and relevant page numbers

3. Websites:

1. National Renewable Energy Laboratory. (Year). *Power Electronics for Renewable Energy Systems.* Retrieved from https://www.nrel.gov/research/power-electronics.html
2. Institute of Electrical and Electronics Engineers (IEEE). (Year). *IEEE Xplore Digital Library.* Retrieved from https://ieeexplore.ieee.org/

4. Reports:

1. U.S. Department of Energy. (Year). *Smart Grid System Report.* DOE/NETL-XXXX/XXXX. Retrieved from https://www.energy.gov/oe/downloads/smart-grid-system-report
2. International Energy Agency (IEA). (Year). *Digitalization & Energy.* IEA Publications. Retrieved from https://www.iea.org/reports/digitalization-and-energy

5. Conference Proceedings:

1. Chen, H., & Li, W. (Year). "Recent Advances in Power Electronics." In *Proceedings of the International Conference on Electrical Engineering* (pp. 45-56). Publisher.

Bibliographic Databases- It refers to "Abstracting and indexing services".

1. **Serve as Extensive repositories**

- They serve as storage place in computer cloud for the academic/research articles that are genuine.
- They also provide us features like citations.
- They are digital libraries that stores vast information.
- They provide the centralized platform for the researchers to access the academic articles and source of information

2. **Vital for accessing academic articles**

They provide the systematic way of accessing the academic articles/ research articles that are crucial for the work.

2.3 Bibliographic Databases

- Web of Science
- Google and Google Scholar

Bibliographic Databases

These are the organized collections of references to published literature, often providing tools for searching, organizing, and managing citations.

- Web of Science (WoS):
  - The Web of Science is a bibliographic database of scholarly articles from 22,000 peer-reviewed journals worldwide
  - It allows targeted searches.
  - Enables refining search results based on citation frequency.
  - For rigorous research, this databases offer more reliable and focused results

Platform to access: Clarivate

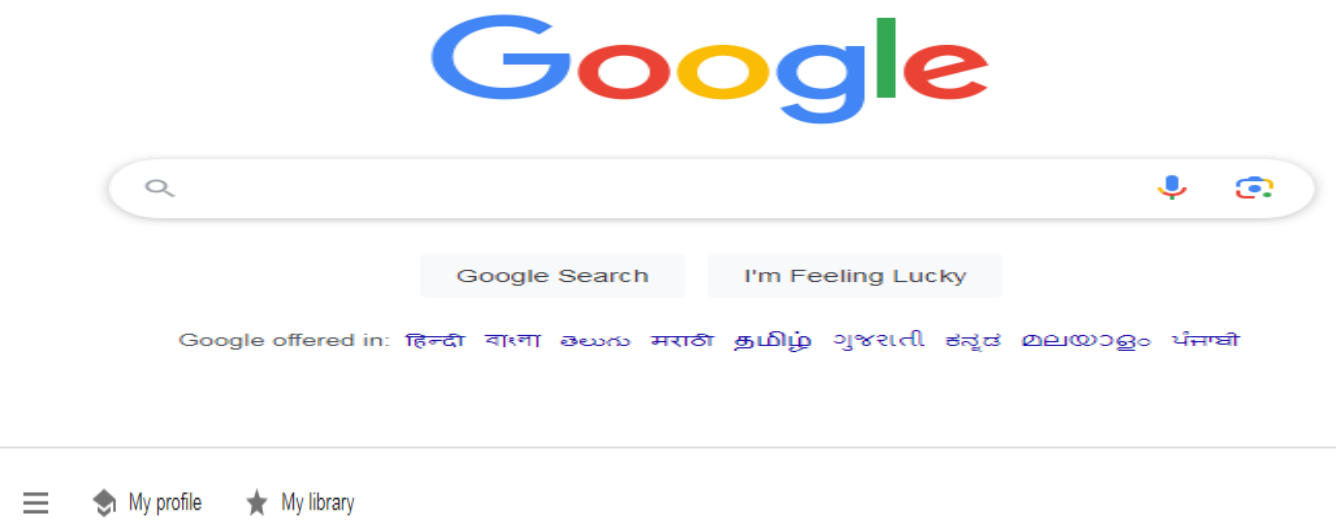
WEB OF SCIENCE

Literature Review and Technical Reading

Google and Google Scholar:

Google:

- Google is a widely used search engine that indexes web pages, including academic content.
- Though It is not a dedicated bibliographic database, it can still be a valuable tool for discovering a broad range of sources.



Google Scholar:

- Google Scholar is a specialized search engine focused on scholarly literature, including articles, theses, books, conference papers, and patents.

2.4 Effective Search: The Way Forward

Effective Information retrieval: Tools, Strategies, and ongoing Learning.

- Provides practical knowledge and insights available in accessible formats like magazines.
- Utilize various **search tools and platforms** for a comprehensive information spectrum.

Search tools and platforms

1. Google Scholar – Google Scholar is a search engine for scholarly literature, including articles, theses, books, and conference papers.

2. JSTOR – JSTOR is a digital library of academic journals, books, and primary sources.

3.PubMed – PubMed is a free search engine accessing primarily the MEDLINE database of references and abstracts on life sciences and biomedical topics.

4. Web of Science: Web of Science is a citation index that allows you to search for articles, conference proceedings, and books across various scientific disciplines.

5. Scopus – Scopus citation database that covers scientific, technical, medical, and social sciences literature.

6. Zotero: Zotero is a free, open-source citation management tool that helps you organize your research sources, create bibliographies, and collaborate with others.

Search tools and platforms

7. Mendeley – Mendeley is a reference management software that allows you to organize and share your research papers and collaborate with others.

8. EndNote – EndNoted is a software tool for managing bibliographies, citations, and references on the Windows and macOS operating systems.

9. RefWorks – RefWorks is a web-based reference management tool that allows you to create and organize a personal database of references and generate citations and bibliographies.

10. Evernote – Evernote is a digital notebook that allows you to capture and organize your research notes, web clippings, and documents.

11. SPSS – SPSS is a statistical software package used for data analysis, data mining, and forecasting.

12. R – R is a free, open-source software environment for statistical computing and graphics.

13. Stata – Stata is a statistical software package that provides a suite of applications for data management and statistical analysis.

Search Tools and platforms

14. Excel – Excel is spreadsheet software used for organizing, analyzing, and presenting data.

15. Tableau – Tableau is a data visualization software that allows you to create interactive visualizations and dashboards.

16. NVivo – Nviva is a software tool for qualitative research and data analysis.

17. Slack – Slack is a messaging platform for team communication and collaboration.

18. Zoom – Zoom is a video conferencing software that allows you to conduct virtual meetings and webinars.

19. Microsoft Teams – Microsoft Teams is a collaboration platform that allows you to chat, share files, and collaborate with your team.

20. Qualtrics – Qualtrics is an online survey platform that allows researchers to design and distribute surveys, collect and analyze data, and generate reports.

Effective Information retrieval: Strategies

1. Carefully consider the type and likely sources of information needed.
2. Iterative search process: Searching is an iterative process
   - Experiment with different keywords and operators;
   - Evaluate and assess results, use filters;
   - Modify the search as needed; and
   - When relevant articles are found, look at their citations and references.
3. Reading and synthesizing:
   - After the search is complete, the researcher needs to engage in critical and thorough reading, making observation of the salient points in those sources, and summarize the findings.
   - A detailed comparison and contrast of the findings is also required to be done.
4. Process may need repetition for a comprehensive understanding.

Effective Information retrieval: Ongoing Learning

5. Developing Reading Skills.

- Efficiency in reading complex articles requires practice and refinement.
- Improvement over time with gained experience.

6. Active reading and consideration

- Information retrieval in the initial stages.
- Invest time in developing personal ideas and insights

2.5 Introduction to Technical Reading

Literature Review and Technical Reading

Introduction to Technical Reading:

- Any active researcher must make sure they stay up to date on research findings related to their area of interest.
- The objective of reading an engineering research paper is to comprehend the author's technical contributions.
- Considering the volume of journal papers available, it is beneficial to read these manuscripts quickly, intentionally, and practically

Introduction to Technical Reading:

- The title and keywords should be read first
- To determine whether the paper is relevant to the intended purpose, one should skip most of the paper and jump straight to the conclusions if the abstract piques one's interest.
- If the article has been interesting so far, it's time to read the Introduction section to learn more about the work's history.
- The next sections to read are the Results and Discussion sections which is really the heart of the paper.
- One should really read further sections like the Experimental Setup/Modeling, etc., only if one is really interested and wishes

2.6 Conceptualizing Research

Conceptualizing Research

- The characteristics of a research objective are that it must have new knowledge at the center, and that it must be accepted by the community of other researchers and recognized as significant.
- Coming up with a good research objective, conceptualizing the research that meets all of these requirements is a tough thing to do.

Literature Review and Technical Reading

Conceptualizing Research

One needs to be continued, to read the literature so as to bring together the three important parts:

(i) Significant problem,

(ii) The knowledge that will address it, and

(iii) A possible way to make that new knowledge.

2.7 Critical and Creative Reading

Literature Review and Technical Reading

Critical and Creative Reading

Reading a research paper is a critical process.

- The reader should not be under the assumption that reported results or arguments are correct.
- Rather, being suspicious and asking appropriate questions is in fact a good thing.
  - ✓Have the authors attempted to solve the right problem?
  - ✓Are there simpler solutions that have not been considered? What are the limitations (both stated and ignored) of the solution and are there any missing links?
  - ✓Are the assumptions that were made reasonable?
  - ✓Is there a logical flow to the paper or is there a flaw in the reasoning?
- These need to be ascertained apart from the relevance and the importance of the work, by careful reading.

Critical and Creative Reading

- While reading, one must approach reading with discernment and boldness.
- The ability to let go of past incorrect assessments is also essential.
- Furthermore, determining whether the data in the study is accurate data to support the point stated in the paper and whether the data was collected and evaluated correctly are crucial.
- Determining whether a different dataset would have been more appealing is also crucial.

Literature Review and Technical Reading

Critical and Creative Reading

- Reading critically is not that difficult.
- Comparatively speaking, it is simpler to critically examine a document to identify errors than it is to read it to identify its strong points.
- It's more difficult to read creatively, and it calls for an optimistic search strategy.
- The goal of creative reading is to actively seek out additional uses, intriguing generalizations, or extended works that the writers may have overlooked.

2.8 Taking Notes While Reading

Taking Notes While Reading

- A researcher reads to write and writes well only if the reading skills are good.
- The bridge between reading and actually writing a paper is the act of taking notes during and shortly after the process of reading.
- In each research paper, there are a lot of things that one might like to highlight for later use such as definitions, explanations, and concepts.
- If there are questions of criticisms, these need to be written down so as to avoid being forgotten later on.

Taking Notes While Reading

- On completing a thorough reading, a good technical reading should end with a summary of the paper in a few sentences describing the contributions.
- A thorough reading should bring out whether there are new ideas in the paper, or if existing ideas were implemented through experiments or in a new application, or if different existing ideas were brought together under a novel framework.

2.9 Reading Mathematics and Algorithms

Reading Mathematics and Algorithms

- Mathematics is often the foundation of new advances, for evolution and development of engineering research and practice.
- An engineering researcher generally cannot avoid mathematical derivations or proofs as part of research work.
- In fact, these are the heart of any technical paper. Therefore, one should avoid skimming them.
- By meticulous reading of the proofs or algorithms, after having identified the relevance of the paper, one can develop sound understanding about the problem that the authors have attempted to solve.

2.10 Reading a Datasheet

Literature Review and Technical Reading

Reading a Datasheet

- Researchers in the field of electronics need to read datasheets.
- Datasheets are instruction manuals for electronic components, which (hopefully) details what a component does and how one may use it.
- Datasheets enable a researcher (or a working professional) to design a circuit or debug any given circuit with that component.
- When working with a new part, or when deciding which part to use in the research work, it is recommended to carefully read that part's datasheet to come up with a bit of shortcut that may potentially save many hours later on.

Q&As

1. Describe the importance of performing a thorough literature review in engineering research, while also illustrating how a proficiently executed literature review aids in showcasing originality in research.

- CO2,RBTL2, 10M

Answer Key:

1. Understanding the purpose of literature review and its research role.
2. Navigating sources of existing knowledge.
3. Effective strategies for conducting a comprehensive literature review.
4. Analyzing and synthesizing prior Research: Researchers process evaluating Information sources for Research validity.

2. Describe the significance of Bibliographic databases like Web of Science and their role in adding researchers to across scholarly articles efficiently, while highlighting the importance of search engines like Google Scholar in the academic context.

CO2, RBTL 3, 10Marks

Answer Key:

1. Bibliographic Databases
2. Web of Science
3. Google and Google Scholar
4. Navigating Scholarly Publications
5. Effective Information Retrieval: Tools, Strategies and Ongoing Learning.

Thank You

Module-2(5 Hours)

Literature Review and Technical Reading, New and Existing Knowledge, Analysis and Synthesis of Prior Art Bibliographic Databases, Web of Science, Google and Google Scholar, Effective Search: The Way Forward Introduction to Technical Reading Conceptualizing Research, Critical and Creative Reading, Taking Notes While Reading, Reading Mathematics and Algorithms, Reading a Datasheet.

Attributions and Citations: Giving Credit Wherever Due, Citations: Functions and Attributes, Impact of Title and Keywords on Citations, Knowledge Flow through Citation, Citing Datasets, Styles for Citations, Acknowledgments and Attributions, What Should Be Acknowledged, Acknowledgments in, Books Dissertations, Dedication or Acknowledgments.

Attribution and Citations: Giving Credit Wherever Due

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Attribution and Citations:

Giving Credit Wherever Due

- Attribution is about "giving credit where credit is due." By acknowledging where information comes from, you show respect for the intellectual work of those who came before.
- An example of attribution is a citation.
- Citations provide credibility to your work and build a firm foundation on which to put your new arguments and ideas.
- If scholarship is a chain of connected authors, citations are the links that allow you to follow the conversation.

Attribution and Citations:

Giving Credit Wherever Due

In this chapter, we highlight the importance of expanding attributions and acknowledgments to roles and responsibilities beyond primary authors of journal articles or principal investigators of grant proposal documents. This would be applicable especially to scientific research projects that involved diverse skill sets and expertise.

Attribution and Citations:

Giving Credit Wherever Due

Academic writing needs to adhere to specific guidelines and traditions.

The most important of these are *citing, referencing, attributing, and acknowledging* the works of others.

Citing is the practice of quoting from, referring to other authors' works and ideas in the text of our work in such a way that the context is clear to the reader.

Referencing is the process of providing readers with background information by stating all of the publication data of a published work that is mentioned.

Acknowledgment in research publications indicates contributions to scientific work. Acknowledgment is arguably more personal, singular, and simply an expression of appreciations and contribution.

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Attribution and Citations:

Giving Credit Wherever Due

3.1 Citations: Functions and Attributes

Citations: Functions and Attributes

Citations (references) credit others for their work, while allowing the readers to trace the source publication if needed. Any portion of someone else's work or ideas in papers, patents, or presentations must be used in any new document only by clearly citing the source.

This applies to all forms of written sources in the form of texts, images, sounds, etc. and failure to do may be considered plagiarism.

Example:

Researcher A being "cited by" Researcher B means that Researcher B has Researcher A's article as an entry on his/her References, Works Cited, or bibliography. It means Researcher B is developing, building upon, critiquing or otherwise referencing the work of Researcher A.

Attribution and Citations:

Giving Credit Wherever Due

- The growth of knowledge in any field of study, especially in technological fields, is primarily incremental and a researcher invariably and naturally builds upon prior information.
- A research needs to leverage the prior art in the area of research interest so as to make further development, at the same time it is important to ensure that credit for that existing knowledge is suitably acknowledged.
- When a bibliography of previously published patents or papers is placed in the new works of a researcher, a connection is established between the new and previous work.
- Citations help the readers to verify the quality and importance of the new work and justification of the findings.

Attribution and Citations:

Giving Credit Wherever Due

- Preferably, citations should be given at the end of a sentence or the end of a paragraph as can be seen even in this particular paragraph. Citation must contain enough details so that readers can easily find the referenced material.
- A researcher needs to cite each source twice:
  - (i) in-text citation, in the text of the article exactly where the source is quoted or paraphrased, and
  - (ii) a second time in the references, typically at the end of the chapter or a book or at the end of a research article.
- The citation elements differ and so what is to be recorded can differ from one source to another.

Attribution and Citations:

Giving Credit Wherever Due

Example:

- LaTeX, a document preparation system often used by engineering researchers to automatically format documents that comply with standard formatting needs, is very effective to track and update citations.
- LaTeX has a steep learning curve and will be repeatedly used in this book to address different issues pertaining to technical writing which is intimately linked with research for engineers.

Attribution and Citations:

Giving Credit Wherever Due

There are three main functions of citation:

1. **Verification function**:

2. **Acknowledgment function**:

3. **Documentation function:**

Attribution and Citations:

Giving Credit Wherever Due

There are three main functions of citation:

1. **Verification function**: Authors have a scope for finding intentional or unintentional distortion of research or misleading statements. Citation offers the readers a chance to ascertain if the original source is justified or not, and if that assertion is properly described in the present work .

2. **Acknowledgment function**:

3. **Documentation function:**

Attribution and Citations:

Giving Credit Wherever Due

There are three main functions of citation:

1. **Verification function**:
2. **Acknowledgment Function**: Researchers primarily receive credit for their work through citations. Citations play crucial role in promotion of individual researchers and their continued employment. Many reputed organizations and institutes provide research funding based on the reputations of the researchers. Citations help all researchers to enhance their reputation and provide detailed background of the research work.
3. **Documentation function:**

Attribution and Citations:

Giving Credit Wherever Due

There are three main functions of citation:

1. **Verification function**:
2. **Acknowledgment function**:
3. **Documentation function:** Citations are also used to document scientific concepts and historical progress of any particular technology over the years.

Attribution and Citations:

Giving Credit Wherever Due

- Citations are the currency that authors would wish to accumulate and the technical community gives them credit for these contributions.
- Authors should cite sources to indicate significance of the work to the reader.

Attribution and Citations:

Giving Credit Wherever Due

There are certain cases when references do not fulfill the actual goal of citations and acknowledgments, and thus do not benefit the reader.

Attribution and Citations:

Giving Credit Wherever Due

- Spurious citations: In certain cases, when citation is not required or an appropriate one is not found, if the author nevertheless goes ahead with including one anyways, it would be considered as a spurious citation.
- Biased Citations: When authors cite the work of their friends or colleagues despite there being no significant connection between the two works, or when they do not cite work of genuine significance because they do not wish to give credit in the form of citation to certain individuals, then such actions can be classified as biased citations. Neglect of citations to prior work whose conclusions or data contradict the current work is also biased.

Attribution and Citations:

Giving Credit Wherever Due

- Self-citations: Self-citation of prior papers is natural because the latest paper is often a part of a larger research project which is ongoing. Sometimes, it is also advantageous for the reader because citations of all the related works of the same author are given in one paper and this may reduce the effort of the reader in trying to find the full versions of those papers.

Attribution and Citations:

Giving Credit Wherever Due

From the above discussions, it is clear that the author(s) must maintain a balance between too few and too many citations.

At the same time, author(s) must give credit whenever due even if it is their own work.

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Attribution and Citations:

Giving Credit Wherever Due

3.2 Impact of Title and Keywords on Citations

Attribution and Citations:

Giving Credit Wherever Due

- The citation rate of any research paper depends on various factors including significance and availability of the journal, publication types, research area, and importance of the published research work.
- Other factors like length of the title, type of the title, and selected keywords also impact the citation count.

Attribution and Citations:

Giving Credit Wherever Due

TITLE:

- Title is the most important attribute of any research paper. It is the main indication of the research area or subject and is used by researcher as a source of information during literature survey.
- Title plays important role in marketing and makes research papers traceable.
- A good title is informative, represents a paper effectively to readers, and gains their attention.
- Some titles are informative but do not capture attention of readers, some titles are attractive but not informative or related to the readers' research area.
- The download count and citation of a research paper might be influenced by title.
- Title length positively affects the number of citations.
- The highly amusing titles have fewer citations and pleasant titles have no significant relation with citations.

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Attribution and Citations:

Giving Credit Wherever Due

TITLE:

- The articles with question-type titles are downloaded more but poorly cited compared to the descriptive or declarative titles.
- Declarative titles are downloaded and cited less than descriptive titles but difference is not much.
- Longer titles are strongly associated with higher citation rates. Longer titles mainly include the study methodology and/or results in more detail, and so attracts more attention and citations.
- The titles containing a question mark, colon, and reference to a specific geographical region are associated with lower citation rates, also result-describing titles usually get citations than method-describing titles.
- The review articles and original articles usually receive more citations than short communication articles. At least two keywords in the title can increase the chance of finding and reading the article as well as get more citations.

Attribution and Citations:

Giving Credit Wherever Due

KEYWORDS:

- Keywords represent essential information as well as main content of the article, which are relevant to the area of research.
- Search engines, journal, digital libraries, and indexing services use keywords for categorization of the research topic and to direct the work to the relevant audience.
- Keywords are important to ensure that readers are aware about research articles and their content.
- If maximum number of allowable keywords are used, then the chance of the article being found increases and so does the probability of citation count of the article.
- Usage of new keywords should be minimal as such keywords may not be well known to the research community and so may lead to low visibility of the article.

Attribution and Citations:

Giving Credit Wherever Due

3.3 Knowledge Flow Through Citation

Knowledge Flow Through Citation

- Knowledge flows through verbal communications, books, documents, video, audio, and images, which plays a powerful role in research community in promoting the formulation of new knowledge.
- In engineering research, knowledge flow is primarily in the form of books, thesis, articles, patents, and reports.
- Citing a source is important for transmission of knowledge from previous work to an innovation.
- Production of knowledge can be related to the citation network.
- Knowledge flow happens between co-authors during research collaboration, among other researchers through their paper citation network, and also between institutions, departments, research fields or topics, and elements of research

Attribution and Citations:

Giving Credit Wherever Due

Figure 3.1 shows the relationship between citations, knowledge flow, and elements such as researchers, papers, journal publications or conferences, and institutions.

If paper A is cited by paper B, then knowledge flows through citation networks across institutions.

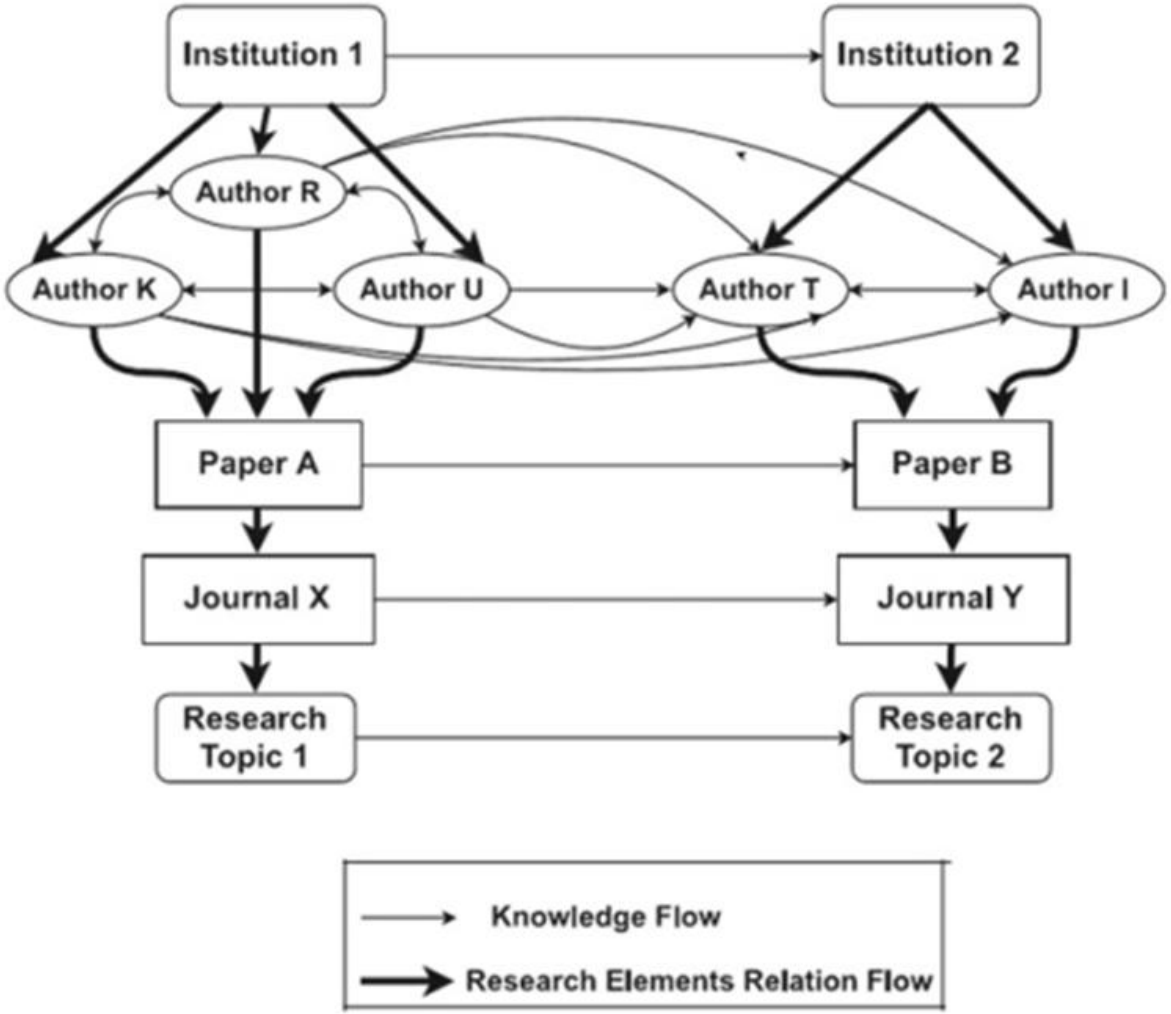

Fig. 3.1 Citation-based knowledge flow [17]

Attribution and Citations:

Giving Credit Wherever Due

- The co-authored publications had more citations than single author paper and there was a positive co-relation between number of authors and the number of citations
- Figure 3.2 shows a relationship between co-authorship and different types of citations.

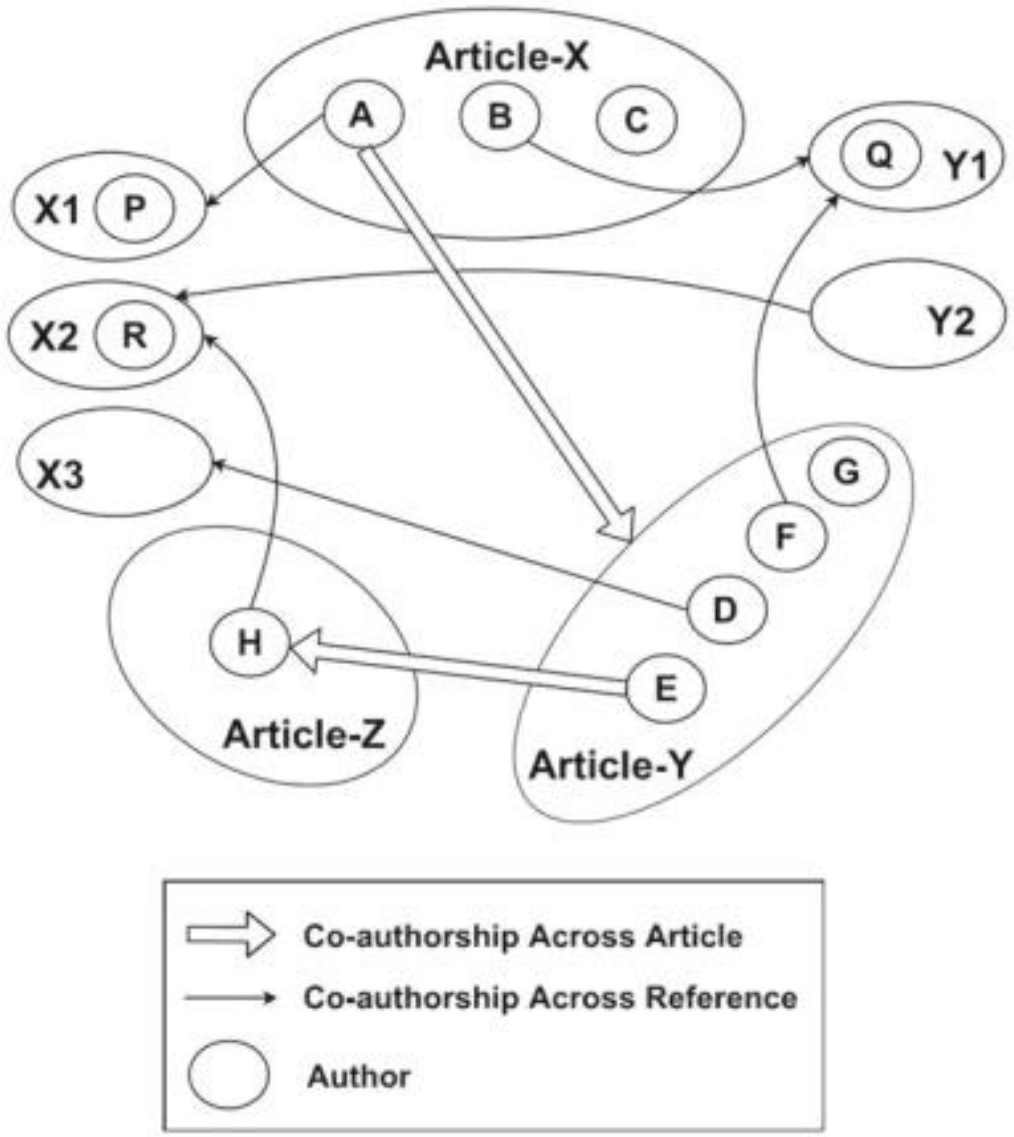

Fig. 3.2 Co-authorship network [19]

Attribution and Citations:

Giving Credit Wherever Due

Three articles (X, Y, and Z) and five references (X1, X2, X3, Y1, and Y2) of article X and Y, respectively, are considered.

A, B, and C are authors of article X, and D, E, F, G, and also A are authors of article Y.

Article Z has two authors H and E.

References X1, X2, X3, Y1, and Y2 have authors (A, P), (H, R), (D), (Q, B, F), and (R), respectively.

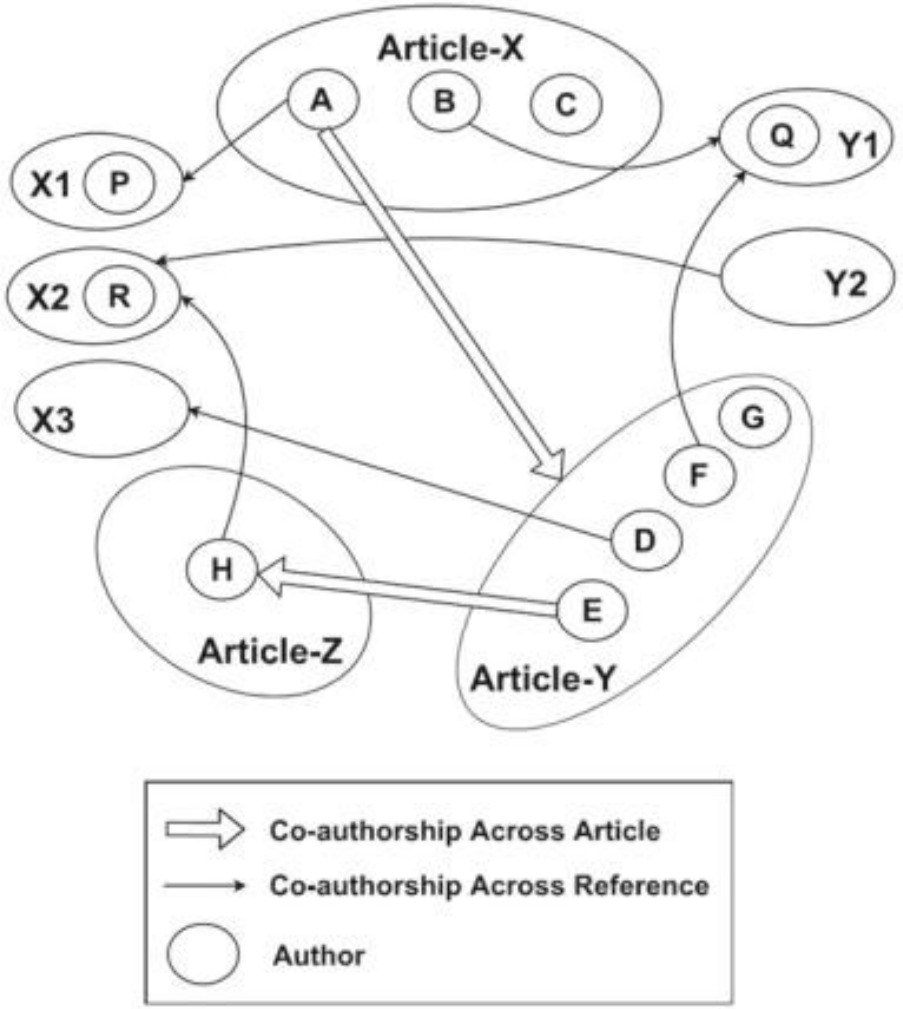

Fig. 3.2 Co-authorship network [19]

- Based on co-authorship citation network, references X1 and Y1 are considered self-citation
- Reference X3 is a level-1 co-author citation because author of article Y is direct collaborator of author A
- Reference X2 is a level-1 co-author network because author A is collaborator of E who collaborated with H.

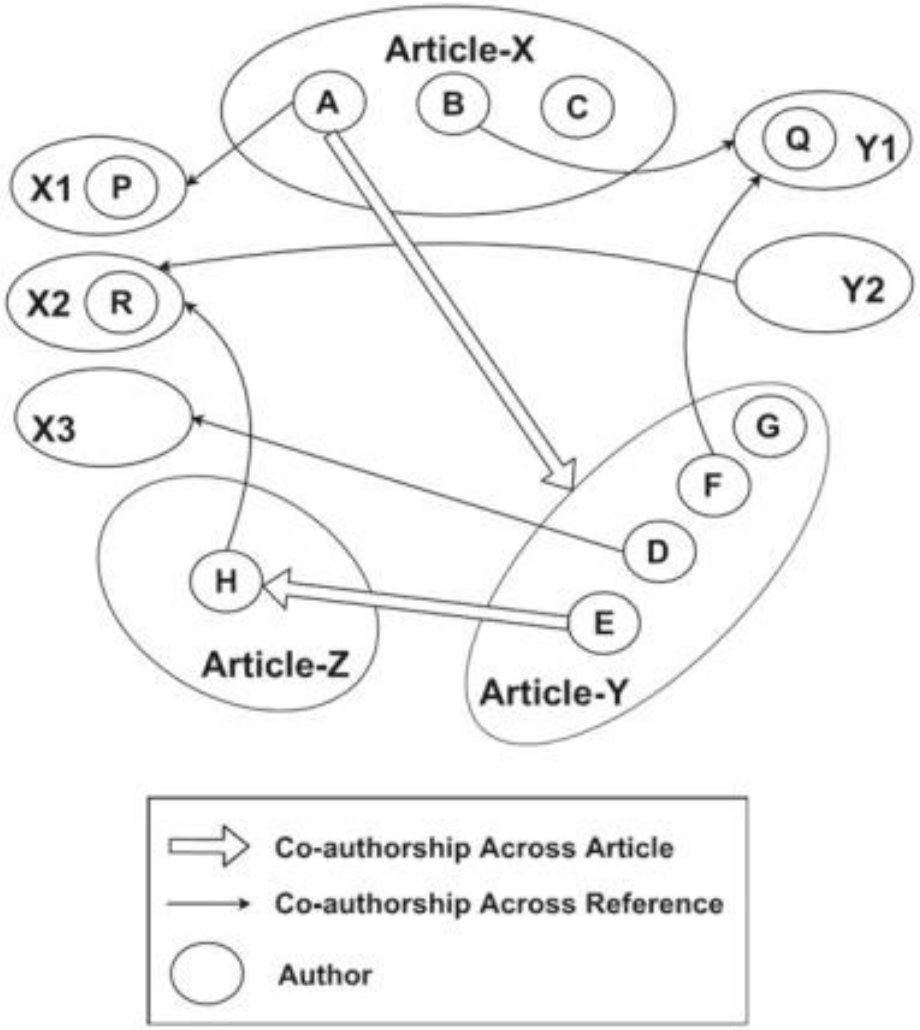

Fig. 3.2 Co-authorship network [19]

We conclude that papers which frequently cite collaborators will also often cite collaborators of collaborators.

Collaborations certainly impact citation counts.

Attribution and Citations:

Giving Credit Wherever Due

3.3.1 Citing Datasets

- Citations related to datasets should include enough information so that a reader could find the same dataset again in the future, even if the link provided no longer works.
- It is proper to include a mixture of general and specific information to enable a reader to be certain that the search result is the same dataset that was sought.

Attribution and Citations:

Giving Credit Wherever Due

Examples:

1. Historical Data, Sotavento (Wind Farm), Corunna, Spain (July 2016): [Accessed: 4 Oct, 2016] Retrieved from http://www.sotaventogalicia.com/en/real-time-data/historical
2. Deb, D (2016). [Personnel survey]. Unpublished raw data.

Attribution and Citations:

Giving Credit Wherever Due

3.3.2 Styles for Citations

Citation styles differ primarily in the order, and syntax of information about references, depending on difference in priorities attributed to concision, readability, dates, authors, and publications.

Some of the most common styles for citation used by engineers are as follows:

1. ASCE style (American Society of Civil Engineers)[2]

   (a) Reference list: This part is to be placed in the bibliography or references at the end of the article or report. A template with example for the same is given below:

Template for books:
Author Surname, Author Initial. (Year Published). Title. Publisher, City, Pages Used.

Example:
Wearstler, K., and Bogart, J. (2004). Modern glamour. Regan Books, NY.

Template for websites:
Author Credentials / Company Name (Year Published). 'Title'. http://Website URL (Oct. 10, 2013).

Example:
Blade cleaning services (2015): http://www.bladecleaning.com/problematica (29 Oct, 2016).

Template for journal publications:
Author Surname, Author Initial. (Year Published). 'Title'. Publication Title, Volume number(Issue number), Pages Used.

Example:
Johnston, L. (2014). "How an Inconvenient Truth Expanded The Climate Change Dialogue abd Reignited An Ethical Purpose in The United States". 1–160.

Attribution and Citations:

Giving Credit Wherever Due

(b) In-text citation for journals or books: The following part is to be placed right after the reference to the source of the citation assignment:

Template

(Author Surname/Website URL Year Published)

Examples:

i. Citation is a very important part of technical writing. (Deb 2016)

ii. Engineers create devices to monitor mountains so that nearby inhabitants can be warned of impending eruptions. (Teachengineering.org 2014)

Attribution and Citations:

Giving Credit Wherever Due

2. IEEE style (Institute of Electrical and Electronics Engineers)[3] IEEE style is standard for all IEEE journals and magazines, and is frequently used for papers and articles in the fields of electrical engineering and computer science. The IEEE style requires endnotes and that references be cited numerically in the text.

   Those submitting to an IEEE publication should see guidelines for the specific journal or magazine and may also refer to the complete IEEE editorial style manual. Some examples of IEEE styles of citations for different types of sources are enumerated below: IEEE

Chapter in an edited book
[1] A. Rezi and M. Allam, "Techniques in array processing by means of transformations," in Control and Dynamic Systems, Vol. 69, Multidimensional Systems, C. T. Leondes, Ed. San Diego: Academic Press, 1995, pp. 133–180.

3. ASME style (The Association of Mechanical Engineers)[4]

   ASME style

Attribution and Citations:

Giving Credit Wherever Due

3.4 Acknowledgments and Attributions

Attribution and Citations:

Giving Credit Wherever Due

- Acknowledgment section is a place to provide a brief appreciation of the contribution of someone or an organization or funding body to the present work.
- Acknowledgment is a common practice to recognize persons or agencies for being responsible in some form or other for completion of a publishable research outcome.
- Acknowledgment displays a relationship among people, agencies, institutions, and research.
- As a sign of gratitude, such contributions should be acknowledged.

Attribution and Citations:

Giving Credit Wherever Due

Classification of acknowledgment-

Acknowledgment can be classified into six different categories like

1. Moral
2. Financial
3. Editorial
4. Institutional or technical, and
5. Conceptual support.

Attribution and Citations:

Giving Credit Wherever Due

Acknowledgments and attributions are also very important in the publications of journal or conference papers.

Giving proper credit wherever it is due is very important and even if the contribution is minor, it should not be neglected.

Attribution and Citations:

Giving Credit Wherever Due

In engineering research, acknowledgments are meant for participating technicians, students, funding agency, grant number, institution, or anyone who provide scientific inputs, shared unpublished results, provided equipment, or participated in discussions.

Attribution and Citations:

Giving Credit Wherever Due

3.4.1. What Should Be Acknowledged?

Attribution and Citations:

Giving Credit Wherever Due

- Every author should know that what should/should not be acknowledged.

- Author should acknowledge quotation, ideas, facts, paraphrasing, funding organization, oral discussion or support, laboratory, and computer work.

Attribution and Citations:

Giving Credit Wherever Due

(i) Quotation: In technical writing such as in the field of engineering, quotes are used very rarely.

Quotations are of two types:

- Direct quotations are used when author use actual words or sentences in the same order as the original one. Author should use quotation marks for the words or sentences with proper acknowledgment.
- Indirect quotation summarizes or paraphrases the actual quote. In such cases, it is important to acknowledge with proper name and date.

Attribution and Citations:

Giving Credit Wherever Due

ii) Authors should acknowledge people who give appropriate contribution in their research work.

Non-research work contributions are not generally acknowledged in a scientific paper but it may be in a thesis.

Persons must be acknowledged by authors, who gave a scientific or technical guidance, take part in some discussions, or shared information to author.

Authors should acknowledge assistants, students, or technicians, who helped experimentally and theoretically during the research work.

Attribution and Citations:

Giving Credit Wherever Due

iii) If the researcher received grant from a funding agency and if those funds were used in the work reported in the publication, then such support should always be acknowledged by providing full details of the funding program and grant number in the acknowledgment section.

The authors should also gratefully acknowledge use of the services and facilities of any center or organization with which they are not formally affiliated to.

Attribution and Citations:

Giving Credit Wherever Due

An example of acknowledgment of grant received is as follows:

> **Acknowledgments:**
> This research work was funded in part by the Extra Mural Research Funding 2014–17 (Individual Centric) of the Department of Science and Technology (DST), Govt. of India.

If there are any concerns that the provision of the information provided in acknowledgment may compromise the anonymity dependent on the peer review policy of a particular journal or conference proceedings, the author(s) may withhold the acknowledgment information until the submission of the final accepted manuscript.

Attribution and Citations:

Giving Credit Wherever Due

(iv) Acknowledging that results have been presented elsewhere: If the results were presented as an abstract in a journal, then there should be a suitable citation.

If the results were presented as part of scientific meeting, symposium, or other gathering, then some relevant information should be provided.

At the very least, the name of the gathering and year should be cited. Other helpful items include the location of the gathering (city and state or country) and the full date of the occasion.

Attribution and Citations:

Giving Credit Wherever Due

Importance of Acknowledgment:

- By acknowledging all help received in one's research work, the author(s) demonstrate integrity as a researcher, which in turn encourages continued collaboration from those who helped out in different ways.
- Acknowledgment is no longer simply a means of expressing gratitude.
- Funding agencies these days often require that their grant be acknowledged and explicitly state the exact information to be provided if the research work leads to a publication.

Attribution and Citations:

Giving Credit Wherever Due

Importance of Acknowledgment:

- The grantee is responsible for assuring that an acknowledgment of support is made in any publication (including websites) of any direct or indirect outcomes from the funded project.
- The format of required information is often explicitly stated in the in the terms and conditions of grants provided.
- Unless the information can be considered “common knowledge,” proper attribution of an idea, algorithm, computational methodology, or experimental design is required even if a journal operates with double-blind review.

ATME College of Engineering

Attribution and Citations:

Giving Credit Wherever Due

3.4.2 Acknowledgments in Books/Dissertations

Department of EEE
Emitting Elite Energy

Attribution and Citations:

Giving Credit Wherever Due

- A page of acknowledgments is usually included at the beginning of a thesis/ dissertation immediately following the table of contents.
- These acknowledgments are longer than the one or two sentence statements in journal papers or articles in conference proceedings.
- These detailed acknowledgments enable the researcher to thank all those who have contributed in completion of the research work.
- Careful thought needs to be given concerning those whose inputs are to be acknowledged and in what order.

Attribution and Citations:

Giving Credit Wherever Due

Generally, one should express appreciation in a concise manner and avoid emotive language.

Sample Acknowledgement in Thesis:
I wish to express my sincere appreciation to my supervisor Prof. Gang Tao for the useful comments, remarks and encouragement throughout this thesis work. Furthermore, I wish to express my thanks to Prof. Jacob Hammer for introducing me to the topic and for the support along the way. Also, I like to thank my peers in the Adaptive Control Lab such as Yu Liu and Shanshan Li, who have shared their precious time during many lively technical discussions. I would like to thank my family members who have supported me throughout this journey in many different ways.

Hierarchy Format:

main supervisor, second supervisor, peers in the lab, other academic staff in the department, technical or support staff in the department, colleagues from other departments, other institutions, or organizations, former students, family, and friends.

Attribution and Citations: Giving Credit Wherever Due

3.4.3 Dedication or Acknowledgments?

Attribution and Citations:

Giving Credit Wherever Due

- **Dedication** is almost never used in a journal paper, an article in a conference proceedings, or a patent, and it is used exclusively in larger documents like books, thesis, or dissertations.
- While **acknowledgments** are reserved for those who helped out with the book in some way or another (editing, moral support, etc.), a dedication is to whomever the author would like it to be dedicated to, whether it is the author's mother, the best friend, the pet dog, or Almighty God. And yes, it is possible to dedicate something to someone while also mentioning them in the acknowledgments.

For example: one may dedicate a book to one's spouse, but acknowledge them for being the moral support and putting up with when one got very stressed.

Attribution and Citations:

Giving Credit Wherever Due

- The acknowledgments in technical books can be sometimes as brief as the ones in journal articles.
- The acknowledgment section of a technical report may be a paragraph that is longer than a journal paper but shorter than dissertations.
- Generally, the length of the acknowledgment may have some correlation with the length of the document.

Attribution and Citations:

Giving Credit Wherever Due

Summary:

- Citation is a specific form of attribution, but attribution itself can be done in many different ways. For engineers, citation is very useful to their careers due to the prevailing publish or perish environment.
- Proper citation and reference:
  - Gives credit and respect to the original author(s).
  - Allows readers to find the original source(s).
  - Strengthens the credibility of your report. If a researcher does not cite the sources, it is plagiarism.

Attribution and Citations:

Giving Credit Wherever Due

- Plagiarism is using another person's ideas without giving credit or citation and is an intellectual theft.
- Plagiarism comes in varying degrees, and there are serious consequences for a researcher if caught plagiarizing.
- All academic and industrial research organizations have integrity and misconduct policies.
- Even past one's time at a research organization, evidence of plagiarism can affect the integrity and credibility and can also retrospectively make an earned degree null and void.

Thank You