

Course : COMP6575 – Research
Topics in Computer Science
Effective Period : December 2019

Review and Discussion

Session 12

Learning Outcomes

At the end of this session, students will be able to:

- LO 3: Analyze the results from the research study
- LO 4: Write a research paper with the appropriate format

Outline

1. Review
2. Discussion

Review

Research Topics in Computer Science

- Currently there are huge numbers of promising topics that vary in difficulties.
- The starting point of your research should be starts from your interest (might be depends on you streaming)

Guideline to select your topic

- What is the problem you are trying to solve?
- How do you solve it?
- What are the benefits?
- How is the scope?

Literature Review

- Literature review helps to determine whether the topic is worth studying
- it provides insight into ways in which the researcher can limit the scope to a needed area of inquiry
- It shares with the reader the results of other studies that are closely related to the one being undertaken
- Literature sections in proposal are generally shaped from the larger problem to the narrower issue that leads directly into the methods of a study

Steps in Conducting a Literature Review

- A literature review means locating and summarizing the studies about a topic.
- There is no single way to conduct a literature review, but many scholars proceed in a systematic fashion to capture, evaluate, and summarize the literature:
 1. Begin by identifying key words, which is useful in locating material in an academic library at college or university.
 2. With these key words in mind, go next to library and begin searching the catalog for holdings.
 3. Initially try to locate about 50 reports of research in articles or books related to research on your topic.
 4. Skip the initial group of articles or chapters, and duplicate those that are central to your topic.
 5. As you identify useful literature, begin designing a literature map.
 6. Draft summaries of the most relevant
 7. After summarizing the literature, assemble and structuring it thematically or organizing it by important concepts

Table of comparison

- Another way of managing sources and arguments presented in them is to use a literature review matrix (also called synthesis matrix). Literature review matrix is a table in which you can represent the views, ideas, or data according to thematic categories that correspond to your re

Author	Year	Title	Aims	Method	Sample	Conclusion	Comments
Willis	2009	Memory efficiency and critical thinking among entry-level students	Test whether memory correlates positively with critical thinking	Quiz	50	Good memory positively influences critical thinking	Interesting quiz structure. Framing of critical thinking and memory is too similar, leading to exaggerated correlation.
Qinhua	2011	De Bono Mnemonic places technique and note taking	Examine how the De Bono mnemonic places technique influences note taking	Quiz and note analysis	12	Significant improvement (20%) in 6-strong sample.	One of the better papers on memory impact of note taking. Method useful for constructing experiment for testing critical thinking skills
Summers	2007						
D'Brant	2012						

The 5 Goals of Citations

1. Provide **sufficient context of the work** to allow for critical analysis of the work by others and thus to enable the readers to gauge themselves whether the author's conclusions are justified
2. Give the reader **sources of background and related material** so that the current work can be understood by the target audience (thus creating a web of science)
3. Establish **credibility with the reader** (e.g., the authors knows the field, have done their homework, etc.) and/or inform the reader that the paper belongs within a specific school of thought;
4. Provide examples of alternate ideas, data, or conclusions to **compare and contrast** with this work
5. **Acknowledge and give credit** to sources relied upon for this work (i.e., acknowledge the use of another's ideas or data), thus upholding intellectual honesty.

The Deductive Approach Typically Used in Quantitative Research

Researcher test or verifies a theory



Researcher test hypotheses or research questions from the theory



Researcher defines and operationalized variables derived from the theory



Researcher measures or observes variables using an instrument to obtain scores

The Inductive Logic of Research in a Qualitative Study

Researcher gathers information (e.g., interviews, observations)



Researcher asks open-ended questions of participants or record fieldnotes



Researcher analyzes data to form themes or categories



Researcher looks for broad pattern, generalizations, or theories from themes or categories



Researcher poses generalizations or theories from past experiences and literature

Structure and Organization

- Writing is inherently a creative process
- Many scientists do not think of themselves as qualified readers, finding the task of writing both intimidating and arduous
- There is a formula for how to structure and organize a scientific paper, so that the scientist/writer can focus on what they know best– the science – and worry less about the writing

The Standard Structure of a Scientific Paper

- The vast majority of papers published in scientific journals today follow a fairly simple structure. With some variations, most papers use an “IMRaD” format:
 1. Introduction
 2. Method (experiment, theory, design, model)
 3. Results and Discussion
 4. Conclusions

Structured Abstracts

- In engineering and physical sciences a five-structure format is probably best :
 1. Background
What issues led to this work? What is the environment that makes this work interesting or important?
 2. Aim
What did you plan to achieve in this work? What gap is being filled?
 3. Approach
How did you set about achieving your aims (e.g. experimental method, simulation approach, theoretical approach, combination of these, etc.), what did you actually do?
 4. Results
What were the main results of the study (including numbers, if appropriate)?
 5. Conclusions
What were your main conclusions? Why are the results important? Where will they lead?
- Each subsection should contain 1 to 2 sentences

Titles

- Once the abstract is finished, it is time to write the title
- Unfortunately, it is against human nature to write the title last. Instead, the title is often the first thing written, at the top of that blank document that will soon become your manuscript.
- It is probably impossible to define a universal procedure for creating a good title – there is no equivalent “structure method” for writing a title.
- There are some basic guidelines, however that make use of the structured abstract to guide the creation of the title.
- In general, the title should reflect the aim and approach of the work

The Scientific Style

- According to Thomas and Turner, a writing style is defined by the stand taken on 5 issues:
 - Truth
 - Presentation
 - Scene
 - Cast
 - Thought and Language

The Goals of Using Figures

- As a form of communication, figures (and in particular, the graphical display of quantitative data) are uniquely suited to conveying information from complex data sets quickly and effectively.
- Graphs take advantage of the magnificent power of the human brain to recognize visual/spatial pattern and to quickly change focus from the big picture to small details.
- Graphs are extremely popular in scientific literature for the simple reason that they work so well.
- But like all the forms of communication, graphics can be used to explain and clarify but also to confuse or deceive.

Tables

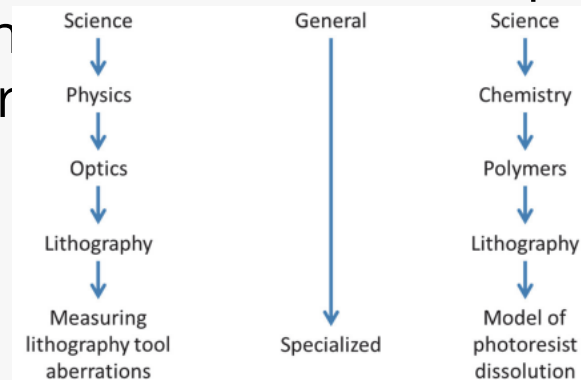
- Tables present data directly and are preferred over graphs when the exact numerical values of the data are needed
- Still, tables often have a goal similar to that for figures: enabling comparison
- As with figures, tables should be made comprehensible on their own, without reference to the text of the paper, if possible
- Table should have a good caption, and the items presented should be clearly defined within the table
- Do not forget units and uncertainty estimates

Introduction to Right Journal (1)

- A simmering question facing the scientist or engineer thinking about publishing a peer-reviewed paper is which journal to submit to.
- What factors should lead to a decision as to the most appropriate publication venue for your work?
 - Relevance
 - Acceptance rate
 - Circulation
 - Prestige
 - Publication time

Introduction to Right Journal (2)

- The preceding questions address the specialization spectrum of science journals
- At the top (Most general) are the interdisciplinary science magazines, with famous journals like science and nature attempting to publish significant and timely research of wide interest
- At the bottom are the most specialized where further specialization leads to the diminishing number of papers



Introduction to Right Journal (3)

- There is no right answer to these questions because they depend specifically on the paper and the goals of the author
- However, one thing is clear : moving up or down the specialization spectrum is not inherently better or worse.
- There is no doubt that the best general-science journals have higher levels of prestige, often associated with a higher journal impact factor
- Send your manuscript to the one with the highest impact factor that you think may accept it

Discussion

References

- John W. Creswell. (2017). Qualitative, Quantitative, and Mixed Methods Approaches Research Design: 5th edition. SAGE Publications, Inc. ISBN: 978-1-5063-8671-3
- Chris A. Mack. (2018). How to Write a Good Scientific Paper. Society of Photo-Optical Instrumentation Engineers (SPIE). ISBN: 978-1-5106-1913-5

The background is a solid blue color. On the left side, there are three large, overlapping circles of varying shades of blue, creating a stylized, organic shape. The circles overlap in a way that creates a central area where all three shades meet.

Thank you