



UGANDA CHRISTIAN
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DSC3114 Scientific writing, reporting and publishing

BSCS31, BSDS 3:1

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Tuesday 30th Sept 2025



A Complete Education for A Complete Person

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Structure of today's Lecture

- ❑ Review of the previous lecture activities
 - ❑ Introduction Methods Results Discussion (IMRaD)
 - ❑ Developing logical arguments using “Premise, Premise, Conclusion” structure
- ❑ Review of the learning outcomes
 1. Write clear, structured scientific documents.
 2. **Critically read and review scientific literature.**
 3. **Use correct referencing and citation styles.**





Prev Lecture..

❑ Scientific Writing: A specialized form of writing used to communicate research findings, ideas, and knowledge in a clear, precise, and objective way. It is the standard style used in **research papers**, theses, dissertations, **technical reports, and journal articles**.

❑ Main features

❑ Clarity and Precision

❑ Objectivity

❑ Structure and Organization, e.g. IMRaD: Introduction, Methods, Results, and Discussion.

❑ **Evidence-based (Literature Review)**

❑ Formal Tone

❑ Conciseness

❑ Consistency and Accuracy





Literature Review - Introduction

- A literature review is a **structured summary and evaluation** of what has already been written and researched on a particular topic. It is not just a list of sources—it is a critical synthesis that:
- Explains what is already known.
 - Highlights gaps, debates, and trends.
 - Shows how your research fits into the bigger picture.





Why Literature Review?

□ Purpose of a Literature Review

1. **Context** → Places your research in relation to what has already been studied.
2. **Evaluation** → Assesses the quality and relevance of existing studies.
3. **Identification of Gaps** → Shows what is missing or underexplored.
4. **Justification** → Provides a rationale for why your study is needed.
5. **Framework** → Helps you refine research questions, methods, and theoretical foundation.





Types of Literature Review

- ❑ **Narrative/Traditional** → A broad summary without strict methods.
- ❑ **Systematic** → A highly structured, comprehensive, and replicable review.
- ❑ **Scoping** → Explores the extent and nature of research on a topic.
- ❑ **Critical** → Goes beyond description to analyze and critique methods, findings, and assumptions.





Steps to doing Literature Review

- ❑ **Search** → Use academic databases (Scopus, Web of Science, Google Scholar, IEEE, etc.).
- ❑ **Select** → Apply inclusion/exclusion criteria to filter relevant studies.
- ❑ **Read Critically** → Ask: What's the purpose? What methods are used? What are the strengths/limitations?
- ❑ **Organize** → Group studies into themes (e.g., by method, theory, findings, or chronology).
- ❑ **Synthesize** → Compare and contrast, find connections, and highlight differences.
- ❑ **Write** → Present a logical narrative that builds toward your research gap.





Characteristics of a Good Literature Review

- ❑ **Focused:** Stays relevant to the research problem/topic.
- ❑ **Critical:** Evaluates, doesn't just summarize.
- ❑ **Organized:** Flows by theme/idea, not by article.
- ❑ **Current:** Covers up-to-date works. Less than 8Years
- ❑ **Balanced:** Includes multiple perspectives.





Example

- **Topic:** Predictive Maintenance using Machine Learning
- **Descriptive:** “Many studies have used machine learning for predictive maintenance in manufacturing.”
- **Critical:** “While several studies (e.g., X, Y, Z) apply machine learning to predictive maintenance, most rely on small datasets and lack real-time validation. Few studies integrate domain knowledge with ML models, leaving a gap in practical applicability.”





Note to remember

❑ “understanding literature review” means realizing it is not just about reading and summarizing articles—it’s about connecting, critiquing, and synthesizing them to create a foundation for your own research





Activity

Select a topic and conduct a systematic literature review following the **PRISMA** protocol

- ☐ PRISMA = (Preferred Reporting Items for Systematic reviews and Meta-Analyses)
- ☐ To be done individually, but each member should present and discuss with groupmates.
- ☐ **No repetition of topics among groupmates groups**
- ☐ A 3-page review paper should be prepared (in Latex with proper referencing and use of tools)
- ☐ **Draft paper 1 – 8th October 2025**
- ☐ **Final Paper Wednesday 15th October 2025)**
- ☐ **Poster presentation (Friday 17th October 2025)**





Computer Science students topics

□ Artificial Intelligence & Machine Learning

1. A critical review of explainable AI (XAI) approaches and their effectiveness.
2. Literature review on bias and fairness in machine learning models.
3. Comparative analysis of deep learning vs. traditional ML methods for image recognition.
4. Review of federated learning for privacy-preserving applications.
5. The role of transfer learning in natural language processing.
6. Quantum Computing for Machine Learning: Opportunities and Challenges





Data Science Student's topics

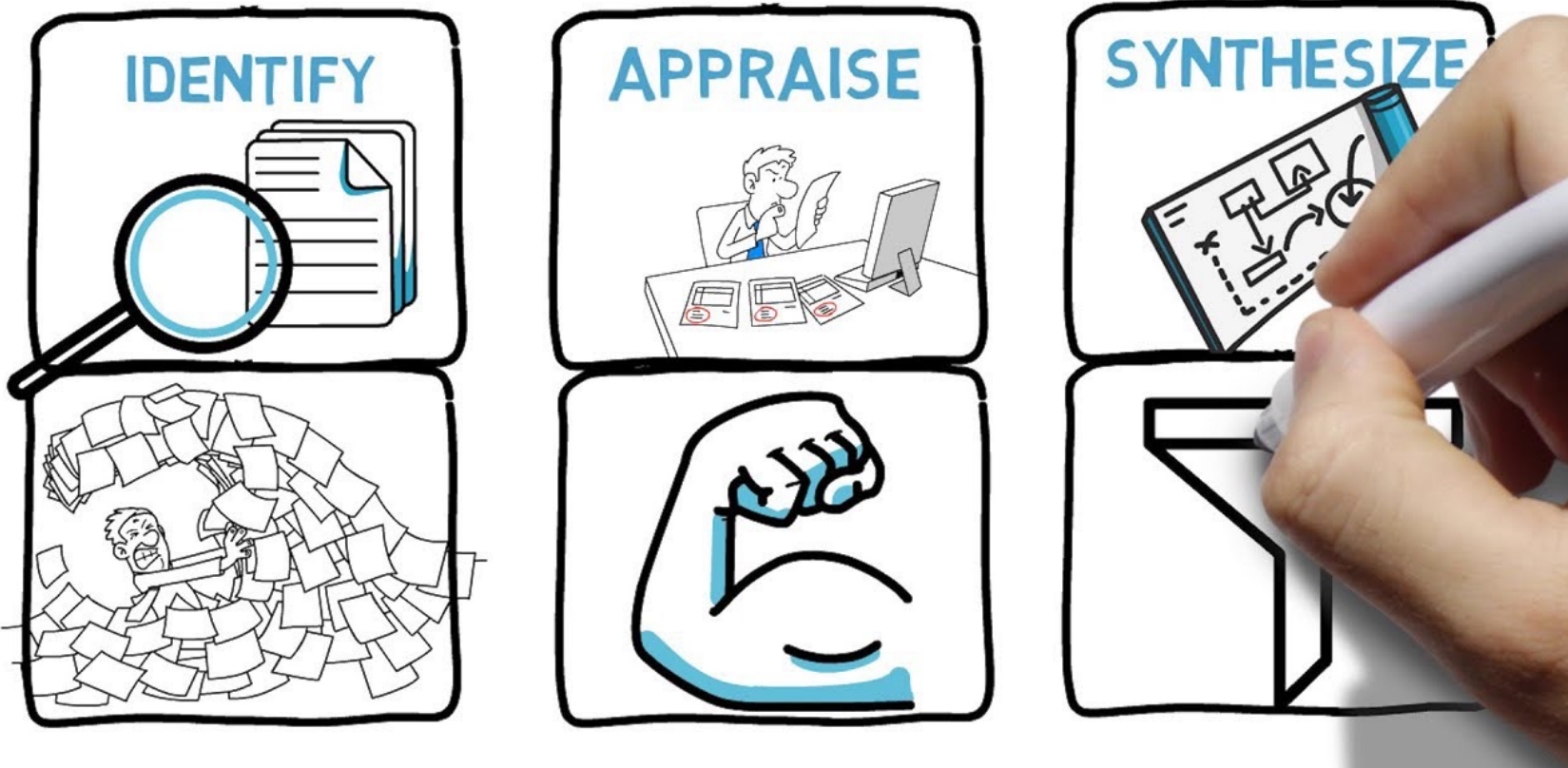
- ❑ Literature review on real-time big data analytics frameworks.
- ❑ Critical analysis of data cleaning and preprocessing techniques in large datasets.
- ❑ Review of graph-based approaches for social network analysis.
- ❑ Cloud vs. edge computing for big data applications: A comparative study.
- ❑ Blockchain for Cybersecurity: Current Applications and Limitations





Final remarks

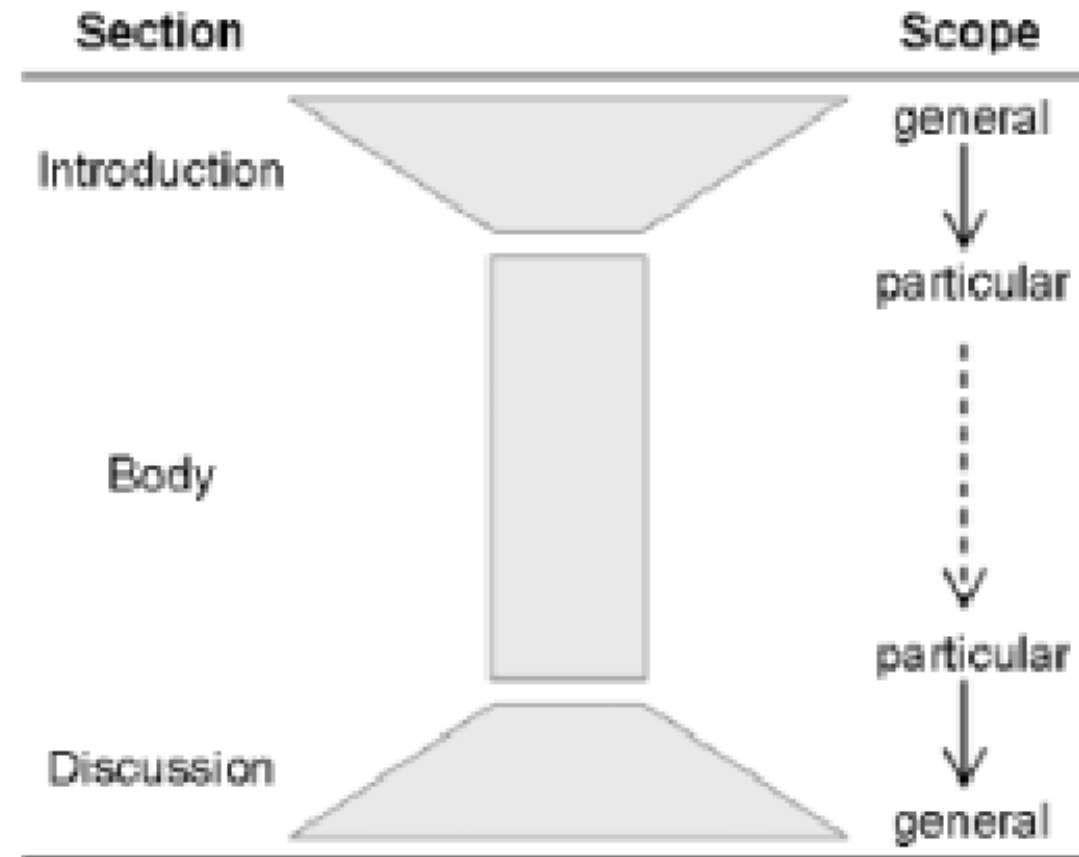
SYSTEMATIC LITERATURE REVIEW



Significance of the hour glass in writing



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