



Lecture 1: Introduction

Part 2: What a literature review is and how to get started?

Informatics Research Review (IRR)

Aurora Constantin

Based on and adapted from earlier versions by Armstrong, Anderson, Franke van Rossum, Bundy, Lavrenko, and Viglas

Content

- **What a literature review is?**
- **What IRR is?**
- **What a topic is?**
- **How to select and narrow down a topic?**

Literature Review

Definition - a piece of academic writing demonstrating knowledge and understanding of the academic literature on a specific topic placed in context. It includes a critical evaluation of the material.

Purpose - “to build an argument, not a library” [1]

Important: A literature review is *not* a series of annotations (like an annotated bibliography)

“...in essence, like describing trees when you really should be describing a forest. In the case of a literature review, you are really creating a new forest, which you will build by using the trees you found in the literature you read.” ([2, p72] the difference between an annotated bibliography and a literature review)

[1] (Rudestam, K.E. and Newton, R.R. (1992) *Surviving your dissertation: A comprehensive guide to content and process*. California: Sage, p49)

[2] Galvan, J. (2006). *Writing literature reviews: a guide for students of the behavioral sciences* (3rd ed.). Glendale, CA: Pycszak Publishing.

What a Literature Review Is Not?

- a list of all articles that you have read about the subject
- a summary of the articles you have read about the subject
- an exhaustive list of all articles that have been written about the subject
- a summary of everything that has been written about the subject

Goals of a Literature Review

- Understand the **state-of-the-art**
 - What is current substantive knowledge?
 - What are the most important questions?
 - What research has been done most recently?
 - Who is doing the research?
 - What are they investigating?
- Identify **current methodological knowledge?**
 - What research methods are being used?
 - What tools and techniques are being used?
 - How are results being analysed?

Why Do a Literature Review?

- Help you understand current work in the field
 - Provide an overview of key concepts
 - Identify major relationships or patterns
 - Identify strengths and weaknesses
 - Identify any gaps in the research
 - Identify any conflicting evidence
- Can assist with understanding of theoretical or practical problem and/or hypothesis
- Provides a firm foundation for your work
- Helps identify your (novel) contribution
- Increases chances of paper being accepted

Rules for Writing a Literature Review*

- 1. Define a Topic and Audience**
- 2. Search and Re-search the Literature**
- 3. Take Notes While Reading**
- 4. Choose the Type of Review You Wish to Write**
- 5. Keep the Review Focused, but Make It of Broad Interest**

* From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3715443/>

Rules for Writing a Literature Review*

6. Be Critical and Consistent

7. Find a Logical Structure

8. Make Use of Feedback

(9. Include Your Own Relevant Research, but Be Objective)

10. Be Up-to-Date, but Do Not Forget Older Studies

* *From: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3715443/>*

IRR Rubric

- **Topic and research question/hypothesis**
- **Language**
- **Structure/Organisation of the review**
- **Narrative flow/Cohesion**
- **Quality of the argument**
- **Quality and use of references**
- **Quality of conclusions**
- **Future research directions**
- **Exceptionality**

Review Template: <https://github.com/bfranke1973/IRR-Template>

What is a topic?

- In general, a Research Review topic should aim to answer a **question**.
- The research review states the question and then it **uses** the **current state of knowledge** in the research community to provide an answer to the question.
- At its simplest, the question might be:

“What is the state of the art in area X?”

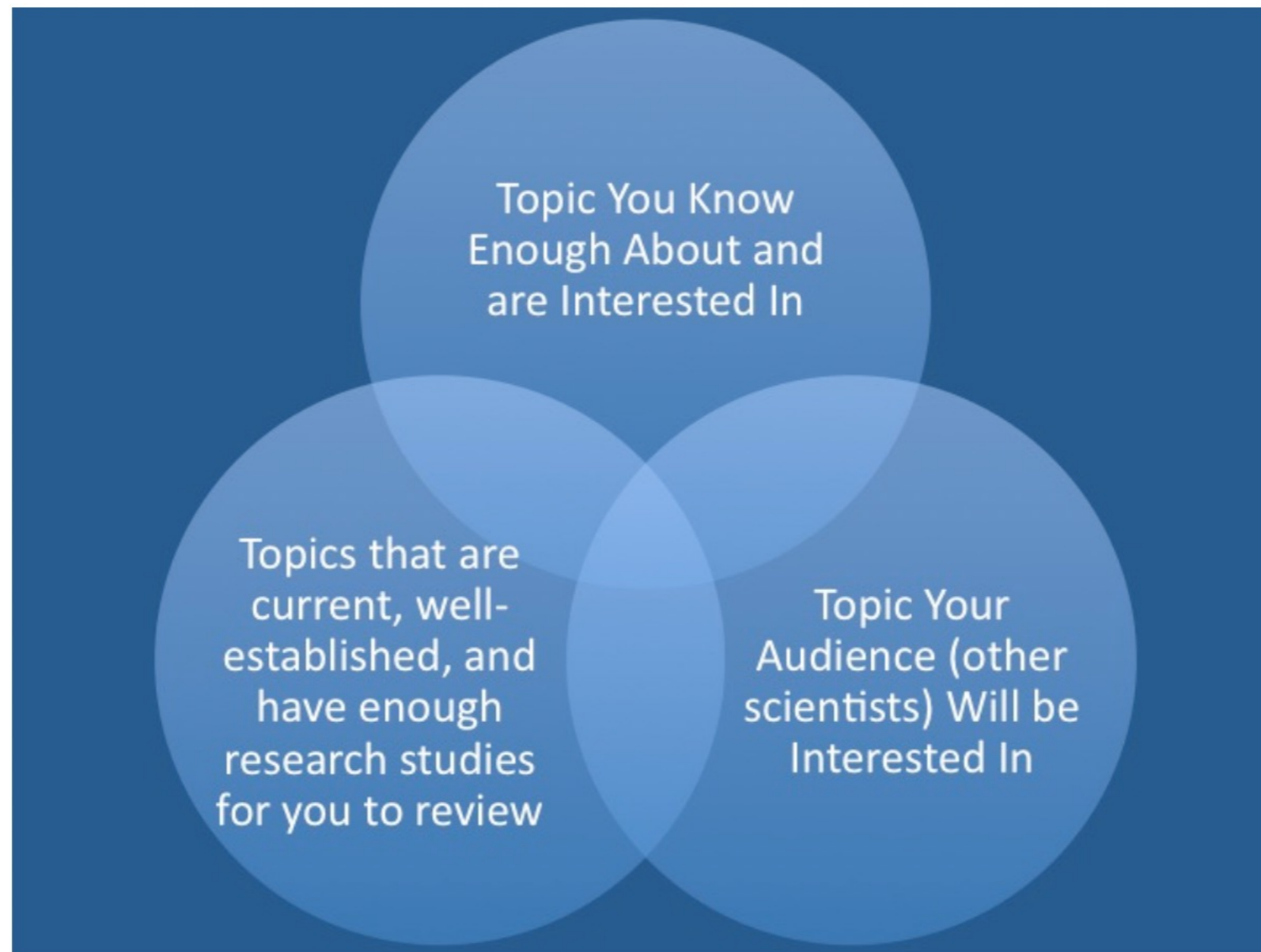
Or, probably better, it might be something more specific like:

“What is the role of simulators in the development of Autonomous Vehicle systems.” or,

“How can data from continuous integration contribute to governance?” or,

“How has deep learning been applied to legal decision support?”

Choosing a topic



(from <https://guides.lib.umich.edu/c.php?g=283300&p=2915110>)

What are the constraints?

- IRR is a 10-credit course, so you are expected to spend around 100 hours on the tasks.
- The IRR is expected to be max 10 pages in length.
- The IRR will be assessed by the IRR rubric that requires some features are present in the IRR.
- You may be doing this for the first time and so there is a lot to learn...

What are the pitfalls?

- The topic is insufficiently well defined.
- You are not really interested in the topic.
- There is not much literature about the topic that is of guaranteed quality (i.e. some peer-reviewed papers published in good venues).
- The topic is too broad – there is far too much literature.
- You do not have the right background to understand the papers.
- So you need to find a topic that:
 - interests you, that you have a sound technical background in, that has a rich (but not too rich) good quality, literature and is well defined.

What strategies can I use?

- You should be driven by interest. Your IRR will be easier to write and easier for a reader to read if you have a genuine interest in the topic.
- You might start out with a broad topic and narrow it a bit by looking at literature, but you need to get it to fit into 10 pages... what is to be done?
- There are three principle strategies:
 - You can narrow the domain of application you are looking at.
 - You can narrow the range of techniques you are looking at.
 - You can narrow the range of phenomena of interest.

Narrowing

- Suppose we start with: “What is the role of simulators in the development of Autonomous Vehicle systems.”
- We could narrow the domain to unmanned aerial vehicles (UAV): “What is the role of simulators in the development of UAV systems.”
- We could narrow the techniques to concentrate on integrating operational data, to get: “What is the role of simulators in integrating operational experience into the development of UAV systems.”
- Then we might try narrowing the phenomena we are concerned with to be something like collision avoidance, to get: “What is the role of simulators in integrating operational experience into the development of collision avoidance in UAV systems.”
- Depending on your topic and literature this may get you to a feasible IRR topic.

Where do I start?

- Always start with **your interest!**
- Some Degree Programmes have **specific guides**. On the IRR Learn page look at *Course Materials*>>*Resources and Reading* >> *Topic Guidance Resources*
- **Discuss** with other students and your tutorial group members.
- Staff in the School of Informatics have contributed to a list of so-called “**seed papers**” (On Learn in *Course Materials*>>*Resources and Reading* >> *Topic Guidance Resources*). These are papers that staff think are good starting points for a search. You can look at papers they refer to and (using a citation index) you can find papers that cite seed papers.
- As an alternative you can also **use review journals** such as ACM Computing surveys as a useful source of current knowledge of active research in our discipline. This should be easy to access provided you are logged into MyEd. You can find it here:

<https://dl-acm-org.ezproxy.is.ed.ac.uk/journal/csur>

This provides good quality surveys of topical areas of interest.

Questions

If you have questions, please:

- ask your question during the live session
- ask the tutor of your group
- post your question on the Piazza forum
- email the TA
- email me (Aurora.Constantin@ed.ac.uk)
- make an appointment to see me