ICT90003 Applied Research Methods

Literature Review

SWINBURNE UNIVERSITY OF TECHNOLOGY

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Swinburne think forward

Week 3 Learning Objectives

- Critique academic work
- Collate and synthesize information
- Communicate research findings through writing

Literature Review – The WHAT and the WHY!

Literature Review: The What and Why

- **Literature Review** is an account of what has been published on a topic by accredited scholars and researchers.
- It is a piece of discursive prose that sheds light on, and enlarges our knowledge about, a topic
- The purpose is to convey to your reader what knowledge and ideas that have been established on a topic, and to evaluate their strengths and weaknesses.

Literature Review: The What and Why

- Literature Review must be defined by a guiding concept, such as:
  - Your research objective
  - The problem or issue you are discussing
  - Your argumentative thesis (or essay)
- Literature Review is NOT:
  - A descriptive list of the materials available
  - A list summarising one piece of literature after another

Literature Review: The What and Why

- Literature Review lets you gain and demonstrate skills in two areas:
- **Information seeking**
  - The ability to scan the literature effectively using manual or computerised methods to identify a set of useful articles and publications
- **Critical appraisal**
  - The ability to apply principles of analysis to identify unbiased and valid studies

What a Literature Review Must Do

- Be organised around and be related directly to the topic you are researching
- A Synthesised discussion of what is known and what is not known
- Identify area of controversy in the literature
- Formulate questions that need further research

Planning a Literature Review

General Questions of Interest

- What is the specific problem or question that my reviews helps to define?
- What type of literature review am I conducting?
  - Am I looking at issues of theory or policy?
  - Is my review about methodological paradigms, quantitative or qualitative perspectives?
- What is the scope of my literature review?

Questions to Consider: Information Seeking

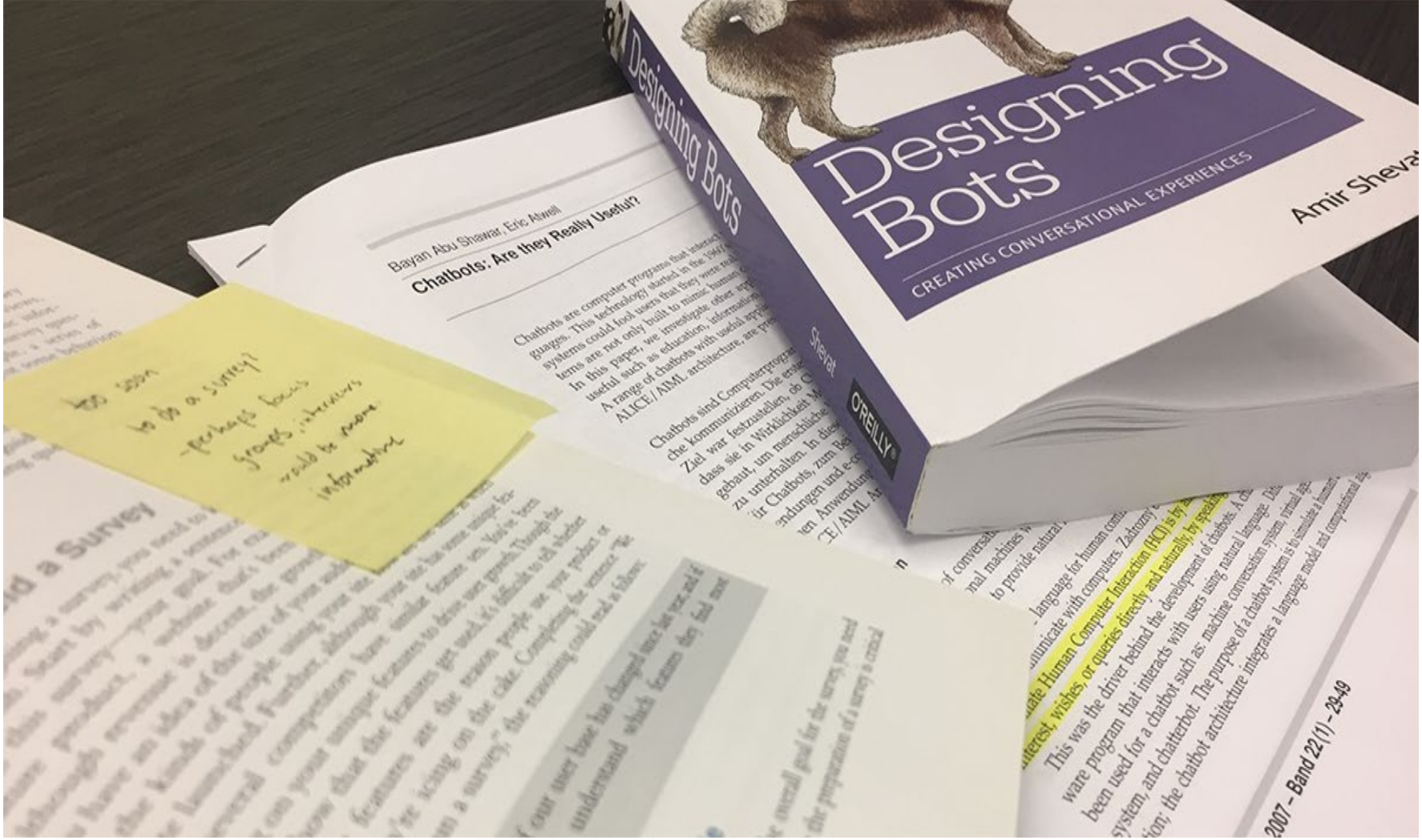
- What sources am I using?
  - Google scholar, Scopus, IEEE, etc.?
- How current, complete and unbiased is the source?
- What types of articles are acceptable?
  - Academic refereed journal
  - Conference proceedings
  - Textbooks, Edited books
  - Professional and trade journals, etc.
- Are the articles I am using peer reviewed?

Questions to Consider: Information Seeking

- Has my search been wide enough to ensure I have found all relevant material?
- Has it been narrow enough to exclude irrelevant material?
- Is the number of sources I have used appropriate for the length of my paper?

Questions to Consider: Information Seeking

- In what ways do the articles contribute to our understanding of the problem under study?
- In what ways are they useful for practice?
- What are the strengths and limitations?
- How do they relate to the specific question I am developing?



Reviewing Articles

Reviewing Articles: Problem Statements

- Has the author formulated a problem or issue?
- Is the problem clearly defined?
- Is its significance (scope, severity, relevance) clearly established
- Could the problem have been approached more effectively from another perspective?
- Has the author evaluated the literature relevant to the problem/issue?
- Does the author include literature taking positions she or he does not agree with?

Reviewing Articles: Research Design

- How good are the basic components of the study design?
- How accurate and valid are the measurements?
- Is the analysis of the data accurate and relevant to the research question?
- Are the conclusions validly based upon the data and analysis?

Reviewing Articles: Argument

- How does the author structure the argument?
- Is there an objective basis to the reasoning or is the author merely approving what he or she already believes?
- Does the author use appeal to emotion, one-sided examples, or rhetorically-charged language or tone?
- Can you “deconstruct” the flow of the argument to see whether or where it breaks down logically?

Reviewing Articles: Critical Analysis

- Have I followed through a set of concepts and questions, comparing items to each other in the ways they deal with them?
- Have I assessed the ideas and knowledge in the articles, discussing their strengths and weaknesses?
- Have I cited and discussed studies contrary to my perspective?
- Will the reader find my literature review relevant, appropriate and useful?

Evaluating Ideas and Knowledge

- Relationships between various articles and scholars?
- Relationships between arguments (how they are similar and how they differ)
- What variables have been established as important and which haven't been explored yet? (The gap in knowledge)

Evaluating Writing Techniques and Skills

- How previous scholars justify their arguments, claim novelty, acknowledge debts, displaying allegiances, etc.
- How they identify what is known and what remains to be known
- How they relate their ideas to others
- How they highlight or acknowledge limitations, caveats or blind spots in the literature

Evaluating Writing Techniques and Skills

- Organising ideas (macro structure)
  - Familiarity (from what is known to what is yet unknown)
  - Complexity (from the simple to the complex)
  - Claims & Arguments (from the uncontested to the bone of contention)
  - Flow (from the general to the particular)
  - Chronology (from the past to the present)

- **Advice:** Have an explicit plan for your literature reviews
  - Will help you avoid summarising ideas instead of evaluating them

The Affinity Process

The Affinity Process

- Generate ideas
- Sort ideas into related group
- Identify sub-categories within groups
- Develop an overarching thesis

The Affinity Process

A. Analysis of individual articles

Author(s): Year of Publication: Title: Name of Journal/Book/Proceeding: Page numbers:	
Phenomenon/context:	
Aims/Objectives/Questions/hypotheses:	
Methodology/Methods/Techniques: (data generation, data analysis, reporting, discussion)	
Findings/Results:	
Key arguments/Challenges/Conclusions:	
Recommendations:	
Others (e.g. Literature to follow up on):	

The Affinity Process

Interviewer: Describe how you respond to disruptive events?
= Acquiring requisite knowledge for dealing with an event = Escalating problems to where expertise resides = Addressing a problem and communicating decisions
Respondent (OPC-01): It depends on what the event is really; there is always a particular department I can seek advice from. Like if it's a security issue, I'll contact the airline security straight away. If it is something that relates to the aircraft, I'll do a conference call with maintenance watch and the duty captain. If it's something that I feel we don't have a procedure for, I'll deal with the issue first and then do a follow up later on with an email to a manager or whoever highlighting the fact that we don't have a procedure or something in our manual that covers that event.
Respondent (OPC-04): Usually, information regarding some form of issue comes into the ops control area and we basically start to handle it from there. Once we know what the issue is, we'll escalate it to the necessary areas. If it is a maintenance issue, we will talk to our maintenance controller, and let him know. We will then liaise with the engineer in the relevant port or he will speak directly on the HF or the set-phone to the pilot with the issue. Once we've ascertained the issue and we know it's going to cause us some problems, we will then speak with crewing to check the crew hours, to make sure they are not breaching any of their hours. Once all of that has come together in [the operations control centre]; once we've ascertained all those issues, we (the ops controllers) will then go back to the ports and advise them of our plan. The port will then implement the plan.
Respondent (DM-01): When somebody rings us or tells us that there's an issue, we've got this [a trigger list] as guidance for our [Crisis Management] triggers. So we have a look at that, and if we feel that it needs to be escalated, then we will do a [Crisis Management] meeting. The meeting is basically ringing these people up here [names on the board], getting them on a conference call, telling them what the event is, and we take it from there. But, if we feel that something [is a] normal day-to-day stuff (event), we will handle [it], like cancellations and whatever, and we SMS out. So there are numerous people on this list that we SMS out to, so everybody knows what's going on. We've got parameters around that; a good thing is, I may SMS something because I don't think it needs to be escalated, I'll SMS that because it is under our requirement to do that, that [also] goes to senior management, etc. So if they felt that I should have escalated further, then they can contact me. I mean, I suppose that's a backup way there.
Respondent (DM-06): If I got a call, or the ops controller got a call, or the maintenance got a call, to advise that there was a smell in the cabin, or a haze or fume of any description, I will immediately call a [Crisis Management] meeting. I will get the details and that'll all be discussed. It'll be checked [to see] has it had a prior...., has this occurred before, had there been any issue with this aircraft, and all sort of things will all be looked into. And then, providing if it was all ticked off, the [Crisis Management] team would then liaise with engineering before that aircraft can fly again.

The Affinity Process

Interviewer: Describe how you respond to disruptive events?	
= Acquiring requisite knowledge for dealing with an event = Escalating problems to where expertise resides = Addressing a problem and communicating decisions	
Acquiring requisite knowledge for dealing with an event:	
There is always a particular department I can seek advice from. Like if it's a security issue, I'll contact the airline security straight away. [OPC-01]	**Seeking expert advice**
We've got this [a trigger list] as guidance for our [Crisis Management] triggers. [DM-01]	**Using pre-defined protocol**
Escalating problems to where expertise resides:	
I'll do a conference call with maintenance watch and the duty captain. [OPC-01]	**Engaging specific functions**
Once we know what the issue is, we'll escalate it to the necessary areas. If it is a maintenance issue, we will talk to our maintenance controller, and let him know. We will then liaise with the engineer in the relevant port or he will speak directly on the HF or the set-phone to the pilot with the issue. Once we've ascertained the issue and we know it's going to cause us some problems, we will then speak with crewing to check the crew hours, to make sure they are not breaching any of their hours. [OPC-04]	**Engaging specific functions**
So we have a look at that, and if we feel that it needs to be escalated, then we will do a [Crisis Management] meeting. The meeting is basically ringing these people up here [names on the board], getting them on a conference call, telling them what the event is, and we take it from there. [DM-01]	**Engaging a committee with broader skill-set**
I will immediately call a [Crisis Management] meeting. I will get the details... [DM-06]	**Engaging a committee with broader skill-set**
Addressing a problem and communicating decisions:	
I'll deal with the issue first and then do a follow up later on with an email to a manager or whoever highlighting the fact that we don't have a procedure or something in our manual that covers that event. [OPC-01]	**Address the problem before sending out an FYI**
Once all of that has come together in [the operations control centre]; once we've ascertained all those issues, we (the ops controllers) will then go back to the ports and advise them of our plan. The port will then implement the plan. [OPC-04]	**Work out plans and then advice affected units to implement**
But, if we feel that something [is a] normal day-to-day stuff (event), we will handle [it], like cancellations and whatever, and we SMS out. So there are numerous people on this list that we SMS out to, so everybody knows what's going on. We've got parameters around that; a good thing is, I may SMS something because I don't think it needs to be escalated, I'll SMS that because it is under our requirement to do that, that [also] goes to senior management, etc. So if they felt that I should have escalated further, then they can contact me. I mean, I suppose that's a backup way there. [DM-01]	**Address the problem before sending out an FYI**
That'll all be discussed. It'll be checked [to see] has it had a prior...., has this occurred before, had there been any issue with this aircraft, and all sort of things will all be looked into. And then, providing if it was all ticked off, the [Crisis Management] team would then liaise with engineering before that aircraft can fly again. [DM-06]	**Involve higher authority in solving the problem**

General Advice on Research Paper Review

Introduction

- Sets up the review when all critical elements are addressed well:
  - Background, motivation for study
  - Clear aims and objectives of study
  - Significance or expected impact of study
  - Outline of study
- This is about establishing purpose for writing this piece of assessment

Introduction

- Avoid over-generalized opening statements
  - Is your opening statement unique to your problem or can it be apply generally to other ICT problems
- Avoid unsubstantiated claims
  - Back up claims with stats or with a scientific research

Contributions, Evidence and Limitations

- Avoid presenting a high-level summary of the articles
- Aim to identify and examine the following:
  - Focus, claims, contributions, discussions, evidence (or the lack thereof), stated or implied limitations, etc.
- Aim to find common links between articles:
  - Do the authors agree or disagree with prior work?
  - How did they back up their claims or arguments?

Critical Analysis

- The critique needs to assess both the claims and the evidence presented in the papers
- The critique needs to be rigorous, respectful and unbiased toward a particular viewpoint
- **Rigour** means that the claims and evidence are not simply accepted at face value, but are subjected to critical questioning
- The critique clearly differentiates between **action verbs**: suggested, found, claimed, implied, stated, etc.

Differences in Viewpoints

- This is about identifying and contrasting similarities and differences in views, claims, evidence, methods, etc.
- Again, the discussion needs to be rigorous, respectful and unbiased toward a particular viewpoint
- Don’t compare apple and oranges, unless you are able to find and explain the common denominator

State of the art/Implications

- State-of-the-art refers to developments within the ICT domain or technology that is being reviewed
- Avoid generic implications that are not specific to your problem statement
- Identify and discuss both implied and stated significance as presented in the articles reviewed
- Are there other possible implications that were omitted in the articles?
- What is the outlook for the future?

Sources

- Acceptable sources (databases):
  - Scopus, Web of science, EBSCOHost, IEEE, ACM, Google Scholar, etc.
- Search Method
- Number of articles
- Justification for selected articles:
  - Relevance to topic,
  - Citations,
  - Author affiliations, etc.

References & Further Reading

- Taylor, D and Procter, M. (2012), The Literature Review: A few tips on conducting it, www.advice.writing.utoronto.ca.

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