

COMP320: Research Practice

2: Conducting a literature review and forming the research question

Learning outcomes

- ▶ **Explain** what makes a good research question
- ▶ **Formulate** research questions in the area of your chosen project
- ▶ **Conduct** a scholarly literature review

Literature review

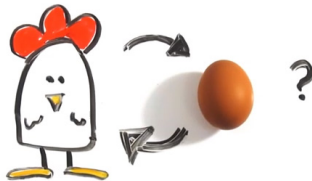
A typical dissertation structure

- ▶ **Introduction:** introduce the broad context and motivation, culminating in your research question(s)
- ▶ **Literature review:** survey existing work related to your project
- ▶ **Method:** explain how you went about answering your research question
- ▶ **Results:** present and analyse the data obtained, and discuss how it addresses your research question
- ▶ **Conclusion:** summarise the dissertation, suggest directions for further work
- ▶ **References**

The purpose of the literature review

- ▶ Understand the **context** of your work
- ▶ Understand the **state of the art** in the field
 - ▶ What is currently known?
 - ▶ What are the important open questions?
 - ▶ What research methods are used in the field?
- ▶ Understand how **your work** fits in
 - ▶ Is your work **novel** (i.e. has it not been done before?)
 - ▶ Does it build sensibly on what has come before?
 - ▶ Is your research question one that others have asked, and possibly tried to answer?

Which comes first: research question or literature review?



- ▶ Having an initial research question in mind will help focus your literature search
- ▶ What you read will influence your research question
- ▶ Be prepared to **refine** your research question

Tips

- ▶ Read widely!
- ▶ Keep thorough notes
- ▶ Annotate (either on paper or on screen)
- ▶ Write up as you go along

Recommended reading

D. Boote and P. Beile. "Scholars before researchers: on the centrality of the dissertation literature review in research preparation," *Educational Researcher* Vol. 34 No. 6, pp. 3–15, 2005.

Formulating the research question

What makes a good research question?

- ▶ **Motivates** and **focuses** your research
- ▶ Is **relevant** to the field
- ▶ Has **originality** (doesn't have to be completely original, but shouldn't be "solved")
- ▶ Is **manageable** in the context of your project
- ▶ Is neither **too broad** nor **too narrow**
- ▶ Leads to **testable hypotheses**
- ▶ Requires **argumentation** and **analysis**, not mere **statistics**
- ▶ Is **interesting** and addresses a **need**

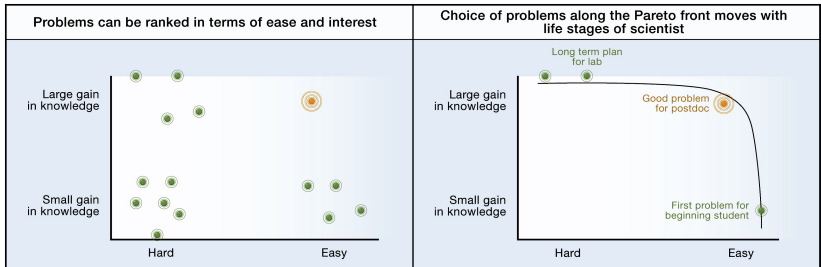
Scope of research questions

- ▶ Too broad:
 - ▶ Are videogames bad for children?
- ▶ Too narrow, not interesting:
 - ▶ How many children in Cornwall play Overwatch?
- ▶ Better:
 - ▶ What effect does regular videogame playing have on the academic attainment of children ages 11–14?

Research questions vs hypotheses

- ▶ A research question invites **exploration**
- ▶ A hypothesis makes a **testable claim**
- ▶ Research question:
 - ▶ What effect does regular videogame playing have on the academic attainment of children ages 11–14?
- ▶ Hypothesis:
 - ▶ There is a positive correlation in children ages 11–14 between hours spent playing Minecraft and grades in computing
- ▶ A good research question leads to several hypotheses

Choosing a research problem



U. Alon, "How to choose a good scientific problem," *Molecular Cell* 35, pp. 726–728, 2009.

Exercise

- ▶ Look at some of the papers you have been reading
- ▶ What are the **research questions** behind them?

Research proposal

Research proposal

- ▶ Last week you were asked to prepare a \approx 500-word research proposal
- ▶ Divide into pairs — pair up with someone who **doesn't know** (much) about your proposed project
- ▶ 5 minutes: **read** each other's proposals
- ▶ I will ask **you** to explain:
 - ▶ In 1 sentence: what is **their** proposed research topic/question?
 - ▶ In 1 sentence: why is this interesting and/or important?

Research proposal

Discuss in your pairs:

- ▶ Did you understand each other's proposals?
- ▶ Were there any misunderstandings or misrepresentations?
- ▶ How can the proposal, and particularly the research question, be improved?

For the rest of this session:

- ▶ Refine your proposal, ready for your supervision meeting