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

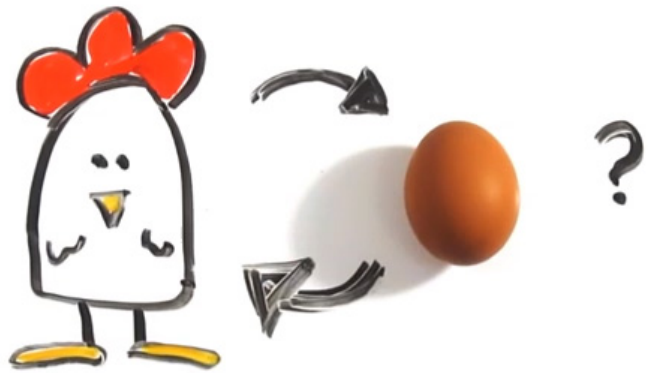
A typical dissertation structure

- **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 disseration 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**

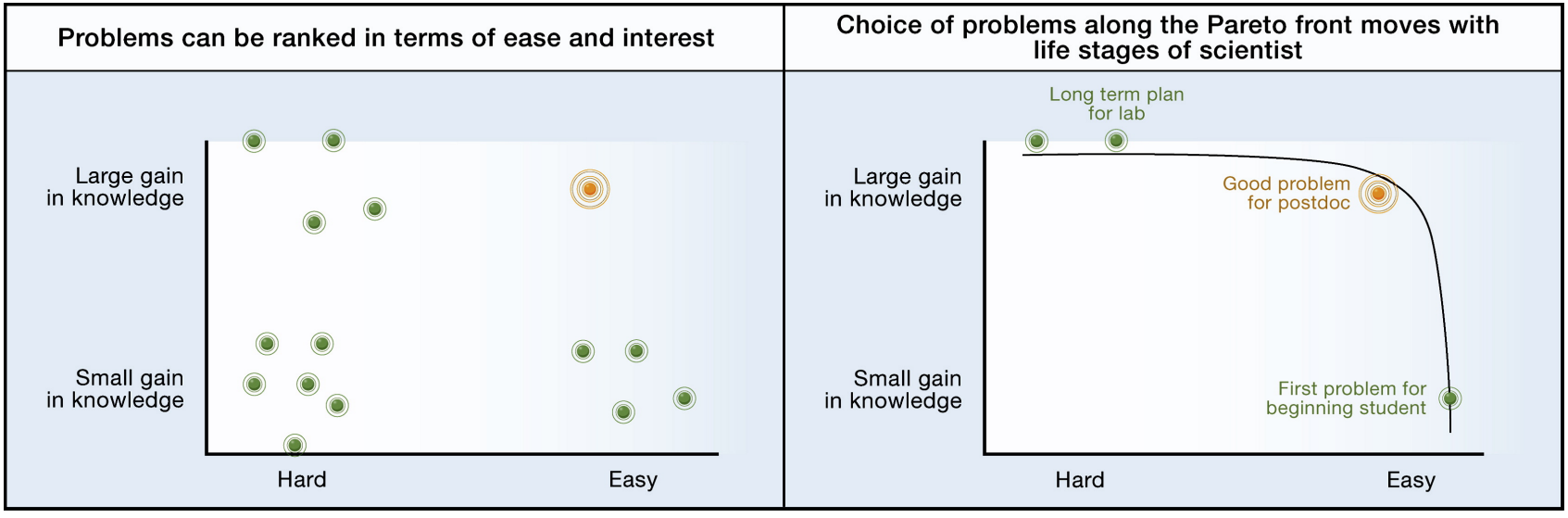
Scope of research questions

- 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 into a well-defined research question, to discuss with your supervisor after this