

ACADEMIC WRITING

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From problem to questions!

- Research studies are done because there is a problem: maybe something doesn't work as it should, maybe we don't know much about some phenomenon, maybe there is not enough information for important decisions, or maybe we do not know how to build a system without using too much resources.
- The *research problem* is the main driver of a whole research project: If formulated well, it keeps reminding the researcher about the right direction. If formulated poorly, it lets the researcher aimlessly wander around the research landscape.

From problem to questions!

- In a research study, *research aim* describes what the research study is aiming to achieve, and *research objectives* are measurable, concrete, achievable goals that contribute to meeting the research aim.
- Once the problem is well stated, research aims and objectives follow almost automatically from them.
- Each research study needs to also be limited so that the study does not become a life-long project: they need to be *focused and feasible*.

Some questions

- How to frame a research problem?
- How to frame research aims?
- How to frame a research question?
- How to frame a research objectives?

Formulating research questions

- Once the objectives of a research study are clear, they are made into research questions: "What", "Why", "How", and so forth.
- First, one should know what kinds of research questions arise from specific research objectives.
- Secondly, one should know how does a good research question look like - and how does a bad one.
- Third, one should know how scientific literature and theories are typically used in research studies.

What type of question are you asking?

What type of question are you asking?

- **Existence**
 - Does X exist?
- **Description & Classification**
 - What is X like?
 - What are the properties?
 - How can it be categorized?
 - How can we measure it?
 - What are its components?
- **Descriptive-Comparative**
 - How does X differ from Y?
- **Frequency & Distribution**
 - How often does X occur?
 - What is an average amount of X?
- **Descriptive-Process**
 - How does X normally work?
 - By what process does X happen?
 - What are the steps as X evolves?
- **Relationship**
 - Are X and Y related?
 - Do occurrences of X correlate with occurrences of Y?
- **Causality**
 - Does X cause Y?
 - Does X prevent Y?
 - What causes X?
 - What effect does X have on Y?
- **Causality-Comparative**
 - Does X cause more Y than does Z?
 - Is X better at preventing Y than is Z?
 - Does X cause more Y than does Z under one condition but not others?
- **Design**
 - What is an effective way to achieve X?
 - How can we improve X?

→ Existence:

- ↳ Does X exist?

→ Description & Classification

- ↳ What is X like?
- ↳ What are its properties?
- ↳ How can it be categorized?
- ↳ How can we measure it?
- ↳ What are its components?

→ Descriptive-Comparative

- ↳ How does X differ from Y?

→ Frequency and Distribution

- ↳ How often does X occur?
- ↳ What is an average amount of X?

→ Descriptive-Process

- ↳ How does X normally work?
- ↳ By what process does X happen?
- ↳ What are the steps as X evolves?

Exploratory

→ Relationship

- ↳ Are X and Y related?
- ↳ Do occurrences of X correlate with occurrences of Y?

→ Causality

- ↳ Does X cause Y?
- ↳ Does X prevent Y?
- ↳ What causes X?
- ↳ What effect does X have on Y?

→ Causality-Comparative

- ↳ Does X cause more Y than does Z?
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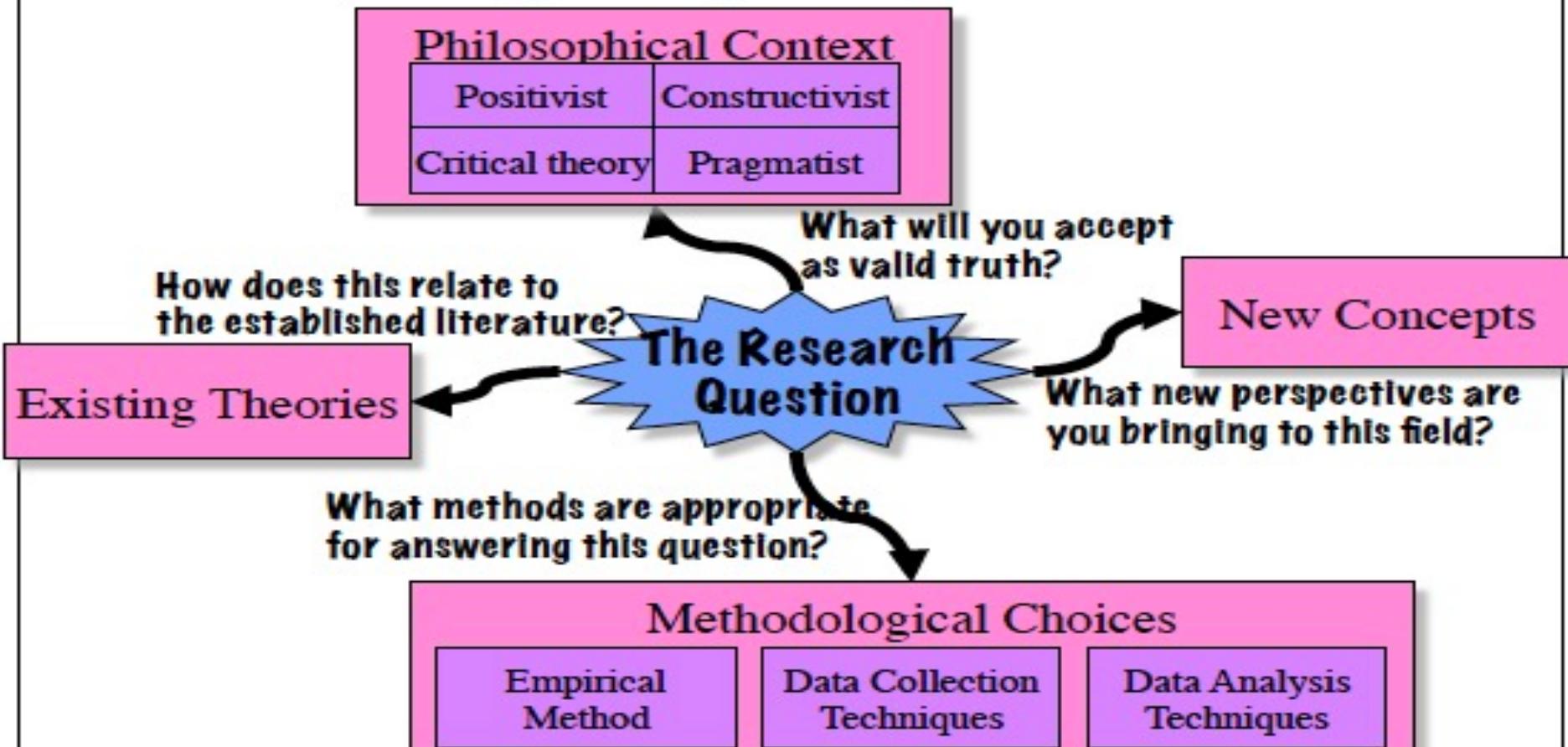
→ Design

- ↳ What is an effective way to achieve X?
- ↳ How can we improve X?

*Causal
Relationship*

Design

Putting the Question in Context



Academic article!

In Game Programming Research



General breakdown of a Academic article

The scholarly article is broken down into distinct sections:

- **Title:**
- **Abstract:**
- **Introduction:** In this section you present the general problem you are addressing, the literature review on the topic you are looking at, and your research question.
- **Methods/Methodologies** of data collection and analysis: In this section you lay out the method of data collection (e.g. interviews, field notes, etc.), selection of data (why the subjects were chosen and how), how it was analyzed (e.g. ethnographic triangulation, feminist discourse analysis, ANOVA testing, regression, etc.), and limitations of analysis (i.e. not enough data, methodological limitations, etc.).

General breakdown of a scholarly article

- **Findings**
- **Discussion sections:** In this you describe and explicate the findings and relate it as answers to your general research question. Subsequently you connect your findings and analyses to the scholarship on the topic – that is you develop a discussion between your findings/analysis and the scholarship.
- **Conclusion:** This is where you summarize your major findings and articulate points for developing your future work.
- **References:**

Writing effective titles

- Start thinking about your title from the start of your research project--don't leave it until the very end.
- Brainstorm key words that should go into your title. These could be words that are related to your
 - Topic
 - Intervention
 - Theory
 - Participants
 - Outcomes
 - Research design
- Write out several titles and ask colleagues and co-authors for their input
- Titles can be “informative” (topic/results), “indicative” (methods/design), or both (*Geijtenbeek and Pronost. 2012; Graham, McCabe, & Sheridan, 2004*).
- Interactive Character Animation Using Simulated Physics: A State-of-the-Art Review. *Comput. Graph. Forum* 31, 8 (2012), 2492–2515.
- Neural Networks for Real-time Pathfinding in Computer Games. *The ITB Journal*, 5, 21.
- Generally, avoid abbreviations in the title

What is an Abstract?

- An abstract is a concise and accurate summary of the contents of a longer work.
- Abstracts are self-contained (meaning they can be read independently from the original text) and informative.
- Based on an abstract alone, readers should be able to survey the contents of the full article.

Introduction

- Introduction
- Background
- Motivation
- Problem definition
 - Aims and objectives
 - Research questions
- Equality and ethics
- Sustainability
- Delimitation
- Thesis structure

Literature review

- Related work
- Describe existing solutions and other peoples' scientific work in the same area.

Methodology

- Method and theory
- Data collection method
- Participants / Sampling / Data Collection Strategy
- Data analysis
- Research ethics

Data Collection Techniques

- Direct Techniques
 - Brainstorming / Focus Groups
 - Interviews
 - Questionnaires
 - Conceptual modelling
 - Work Diaries
 - Think-aloud Sessions
 - Shadowing and Observation
 - Participant Observation
- Indirect Techniques
 - Instrumented Systems
 - Fly on the wall
- Independent Techniques
 - Analysis of work databases
 - Analysis of tool usage logs
 - Documentation Analysis
 - Static and Dynamic Analysis

Results/Findings

- Data collection and analysis: processed data and analyzed data

Discussion

- Discuss how you solved your problems and what the results were
- Answers to the research questions
- Describe alternative solutions, what you could have done differently, problems you encountered, how your results compare to other peoples' results, etc.
- This section can have several subsections
- The meaning of your results to the theories that you discussed earlier, the relationship of these results to other studies (do they confirm or conflict with earlier studies?)

Conclusion

- Describes the outcome of your work and summarizes your efforts.
- Outlines things that are left to do to reach a full solution, or to integrate your solution with something else.
- Summarize the main findings of your review.
- Provide closure.
- Explain “so what?”
- Implications for future research.

OR

Connections to the current study.

References

- This section should be easy if you always write down your references the moment you read them / use them.
- There are, however, several acceptable ways of writing references.
- There are plenty of instructions online to help you get these correct.
- The typical format is:
- [1] Authors separated by comma, "Title in cursive and within citation marks", Place of publication, (for articles you also add issue, number, and pages as well), date. instead of [x] you can also use [First Author (, et. al), year].

References

- The list of references, in any given referencing style - but consistently within that style.
- Most common ones in Humanities, psychology, education, social science, history, etc:
- APA, MLA, Chicago A, B, Harvard, APSA, IEEE, AMA, AAA, ACS, etc.

Appendix

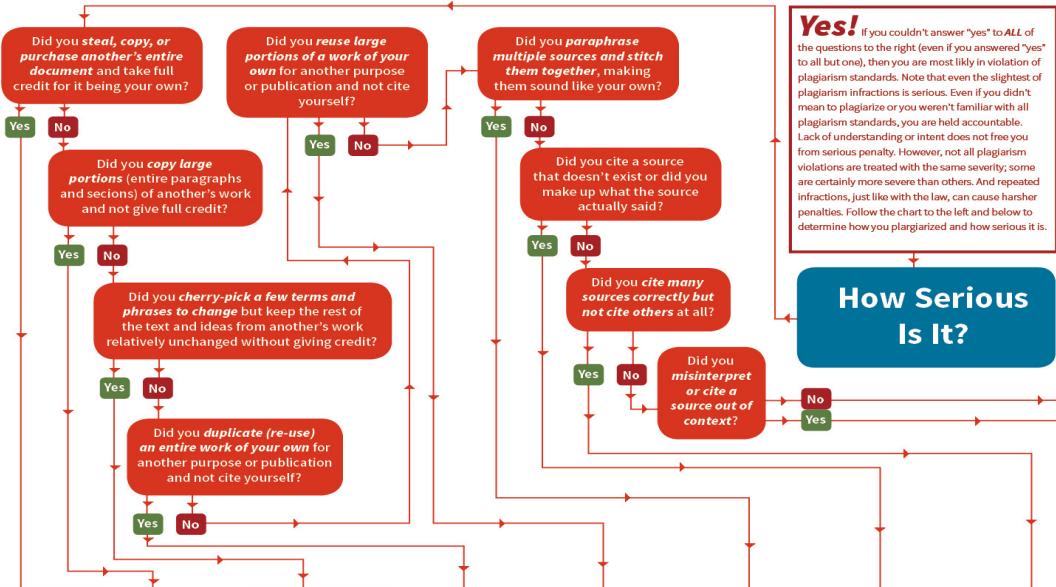
- **Appendix 1: Informed Consent Form**
 - Attach your informed consent form to your submission.
- **Appendix 2: Data Collection Protocols Used**
 - If you used a survey, attach the survey here. If you did structured or semi-structured interviews, attach the structure here.
- **Appendix 3..n: Other Appendices**
 - If you have images, videos, arts, etc., large spreadsheets, tables, data sets, or other things that need to be presented in support of your findings, but that are too large to be a part of the text itself, they can be included as extra appendices.

Dangerous words

- List of dangerous words that have specialized meanings in research
 - **Factor** (don't use unless you've done factor analysis)
 - **Random** (don't use unless a truly randomized procedure was ensured)
 - **Significant** (don't use unless you mean statistical significance)
- **Other words to avoid**
- Words that should be avoided or at least used sparingly:
 - **Novel** (prefer "new")
 - **Technologies** (usually prefer "tools", "devices" if you mean a tool or device. *Technology* has a special meaning; see the -logy suffix)
 - **Usage** (prefer "use")
- Weasel words (which make a statement weak):
 - **May, Might, Could, Can, Seems, Possible, Perhaps, Obvious, Copy and paste**

Did I Plagiarize?

The Types and Severity of Plagiarism Violations







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