

# Final Project DATA 621



## Introduction and Overview

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# Final Project

- You will deal with question formulation, data collection, data cleaning, exploratory analysis, hypothesis generation, design of research approach, literature review, model building, analysis of results, verbal and written presentation skills, and research ethics.



## Final Project Report

- Find and formulate research questions
- Know how to find literature relevant to a problem
- Know how to read and explain a research paper
- Be aware of common ethical issues in research
- Write a paper including abstract, introduction, literature review, methodology sections, and conclusion



## For First Step

- The general area of interest
- Some background information and prior work in the area
- The importance of the problem area
- Important questions within that area

## Compiling a list of keywords

- Before beginning a search for information, it is important to develop a search strategy that will most effectively locate useful, relevant information. This will often involve breaking down an essay or research question into:
  - *keywords or phrases; entering your search; and evaluating your results to determine whether you need to employ various strategies to broaden, narrow or otherwise modify your research.*
- You will need to include all the key concepts or ideas contained within the essay or research question. It might be useful to include alternative ways of phrasing and expressing concepts and ideas. Think about both general terms and very specific terms for broadening and narrowing your search. The keyword or phrase is the basic unit of any search.
- Selecting keywords is more an art than a science

## So how do I come up with keywords?

- At first generate 10 keywords that you think pertain to the research question (based on papers you have, your own understanding of the problem etc.)
- Find and sift through relevant papers you get with those keywords
- If you find good papers look in those papers for additional keywords (either in the keyword section or within the title/body).
- Look in the paper references for paper titles that may yield keywords
- This is an iterative process. As time goes by drop the useless ones and grow your useful keywords

## Literature Review

- Do a literature review of your more specific area of interest with at least 10 references reviewed
- Make sure the focus, goal, coverage, organization and audience are clearly addressed in your review
- Use CUNY library resources as well as open/free resources to the extent possible
- Make sure never to use a sentence like it was used in the source material, but to write your interpretation/understanding of it (rephrase)
- Always cite everything that is not trivial



# Using Research Questions to Arrive at Research Design

- When you have done your literature review and found a feasible and significant research question
- Now it is time to design your research strategy
- Your research strategy includes all the activities you will do from TODAY until you write your paper, which contribute to closing the loop on your research question



# The Structure of a Paper

- Abstract
- Introduction
- Literature Review
- Research Methodology
- Case Study (if applicable)
- Discussion of Findings, Recommendations, Limitations and Conclusion
- References/Bibliography
- Appendices

## Abstract

- Short summary of the research problem and its importance, what you do and what you find
- A person reading your abstract should get a good sense of what problem you addressed and how you addressed it without having to look at the rest of the paper



## Introduction

- What is the general area? What is the exact problem you are addressing?
- Why is it important? (why should I be interested as a reader?)
- What are the objectives of the research? What are your hypotheses?
- How is the paper structured?



## Introduction

- Readers need to understand all the reasons for performing the study, the assumptions underlying the methodology, and the nuances of the performance of the study.
- The purposes of the Introduction are, first, to provide the rationale for the study and, second, to explain the study's goals. The Introduction should include a problem statement that conveys the important issues and provides the context for the study.



## Methodology Section

- Define data collection method
  - Accurate representation of the sample population and coverage issue from the target population
- Description of Data
  - A complete description of the desired output
- Data Analysis
  - Describe the instrumentation
  - Describe the analysis plan
- Describe the scope and limitations of the methodology

# Methodology Section

- **The Results Section**

- Needs to systematically and clearly articulate the study findings. If the results are unclear, the reviewer must decide whether the analysis of the data was poorly executed or whether the Results section is poorly organized.

- **The Discussion Section**

- Should state whether their hypotheses were verified or proven untrue or, if no hypotheses were given, whether their research questions were answered. The authors should also comment on their results in light of previous studies and explain what differences (if any) exist between their findings and those reported by others and attempt to provide an explanation for the discrepancies.

# Result

- **The Figures and Graphs**

- Should illustrate the important features of the methods and results.
- Should allow the reader to understand the figure or graph without having to refer back to the text of the manuscript.
- Common mistakes made by inexperienced authors are failing to include figures that best depict their findings, writing unclear figure legends, and making poor use of arrows.

- **Tables**

- Should summarize the data, make the data more easily understandable, and point out important comparisons.
- Description of the data in the text, if possible, is preferable to the use of a space-consuming table.



## Discussion of Findings

- What does the case study tell you about your hypotheses? How does it support your research question and what do you learn from it?
- What are the implications of your findings for the research question, for the area of study, and for the field and discipline?
- What is the validity of the results?





## Discussion Section

- Should be long enough to discuss the findings against the background of previous work, but not too long to detract from the merits of an otherwise good manuscript.
- Many authors tend to reiterate the results in the Discussion section, which is an unnecessary step that distracts the reader from the more important points of the discussion.
- One important feature on which readers should also concentrate is whether the authors have noted limitations to their study.
- Need to assess whether the authors' conclusions are justified by their results.

## Conclusion and Summary

- Recap briefly what you do in the paper
- Evaluate the effectiveness of your research and provide recommendations (if applicable)
- Make sure that all of the questions raised in the introduction and the literature review have been addressed
- Compare the final results against the original aims and objectives
- Identify any shortcomings and future research

## Bibliography & Appendices

- Standard in most cases
- Have to choose which style (IEEE)
- Use Endnotes or similar software



# Presentation

- The final term presentations will be 15 min
  - Introduction
  - Literature review
  - Methodology
    - Result
    - Discussion
  - Conclusion
    - Future Work