CSIP5403: Research Methods and Applications

Lecture 2: The Research Process

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Outline

1. Know the Stages – Steps in a Research Study
2. Know Some of the Phases of a Research Plan

Motives - First Step - Success

- Motives
  - Natural Curiosity
  - Obtain Further Qualification
  - Personal Development
- First Step
  - Identify a general area which interests you
- Success
  - Not guaranteed
  - Vital: Personal interest in and enthusiasms for your subject

The Research Process is like a Journey

In a Journey

- Suppose you want to go out for a drive
- Before you start you must decide
  - where to go
  - what direction to take
- If more than one route then you also decide which one to take

The Research Process is like a Journey

In a Research Process

- Suppose you want to undertake a Research Study
- Two important decisions to make
  - what you want to find out about

    what research question(s) you want to find answers to
  - how to go about finding those answers

    this is the research methodology

The Research Process is like a Journey

Just as there are posts along the way to your travel destination, so there are practical steps through which you must pass in your research process in order to find the answers to your research questions

The Three Stages of a Research Process

- Stage I: Deciding **what to research**
- Stage II: Planning **how**
- Stage III: Actually doing

The Research Process: Steps

- Stage I: Deciding **what**
  - Step 1: Formulating a research problem
- Stage II: Planning **how**
  - Step 2: Conceptualising a research design
  - Step 3: Constructing an instrument for data collection
  - Step 4: Selecting a sample
  - Step 5: Writing a research proposal
- Stage III: Actually doing
  - Step 6: Collecting data
  - Step 7: Processing data
  - Step 8: Writing a research report

Step 1: Formulating a Research Problem

- A research problem identifies your destination

  it should tell you, your research supervisor and your readers **what** you intend to research

- The more specific and clear you are the better
- Everything that follows is greatly influenced by the way in which the research question is formulated
- An answer is only as good as the question

  Poorly constructed or vague questions $\Rightarrow$ Poor or useless answer

Conclusion: It is worth spending a great deal of time formulating the research question

Research Questions

- Research questions need to be meaningful
  - Expressed in such a way that indicates what it is that you will accept as an answer
- Research questions also need to be feasible in terms of:
  - the time and resources available
  - being within the abilities and experience of the researcher

The Initial Idea

- Can come from a very wide variety of sources
  - Academic
  - Non-academic

  Examples: Inspired by a book, or a lecture, or by the work of a fellow student
- The initial idea is exciting - but ....
  - Perhaps someone has already researched it?
  - Perhaps it is not feasible?
  - Perhaps it is not worth researching?

  Conclusion: Always establish the *current state of research on the topic you want to investigate*

Literature Review

Two Reasons for Literature Review

- The purpose of research is to **add** to the sum of knowledge
  - Reinventing the wheel: Waste of everyone's time
- Research does not take place in a vacuum
  - It relates to what has gone before
  - Your own "new" approach may be justified by making a comparison with previous works

Step 2: Conceptualising a Research Design

Main Function of a Research Design is
to explain *how*
you will find answers to your research questions

Step 3: Constructing an Instrument for Data Collection

'Research tool' or 'Research instrument'

- Anything that becomes a means of collecting information for your study
- Need to decide how you are going to collect the data
- Then construct a research instrument for data collection

Methods for Data Collection

- Information required is already available and need only been extracted

  Secondary data Secondary sources
  - Government publications, reports and previous research
- Information must be collected

  Primary data Primary sources
  - Interviewing, Observation and use of Questionnaires

Step 4: Selecting a Sample

Sampling may or may not be necessary but if it is then

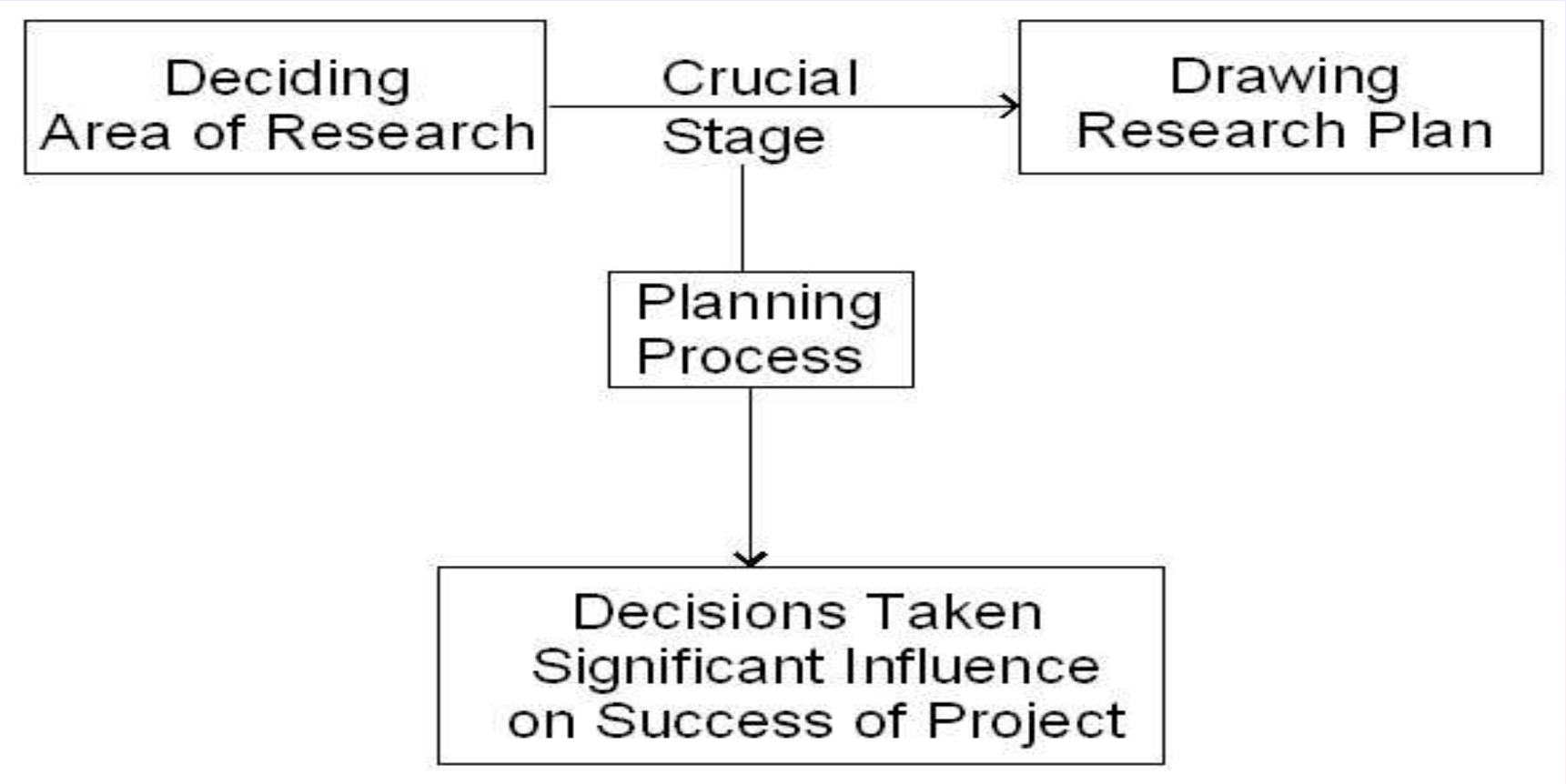
- Needs to be selected in order to
  - achieve maximum precision
  - avoid bias: selection influenced by human choice
- Types of sampling design
  - random/probability sampling designs
  - non-random/non-probability designs
  - 'mixed' design

Step 5: Writing a Research Proposal

A Research proposal must tell you, your supervisor and reviewers

- *what* you are proposing to do
- *how* you plan to proceed
- *why* you selected the proposed strategy

Create a Research Plan



- Consists of a number of Phases
- Take place more or less simultaneously

1. Refine the Initial Idea

- Once an area of general research is selected (you must be interested!)
- Narrow it down to a possible research topic
- Must be carried out in the time and resources available to you
- Then ask yourself lots of questions
  - who,
  - what,
  - where,
  - when,
  - why,
  - how, ...

Possible Questions

- How could you divide your topic into parts?
- What are the relations between these parts?
- What whole is your topic a part of?
- How is it related to more general topics?
- What is the history of your topic?
- What are the categories of your topic, its main concepts?
- What kind of variations does your topic show?
- How are different instances of it similar or different?
- What is the value of the topic in respect to its usefulness?
- Are some parts of it more valuable than other parts?

Possible Steps to Follow

Step 1. Name the general topic you are interested in:
`I am working on group decision making with fuzzy preferences`

Step 2. Suggest a question stating what you do not know about it:
`because I want to find out how different representation formats are used to model human preferences`

Step 3. Motivate the question, i.e., provide the rationale for your research:
`in order to understand decisions made in heterogeneous contexts where each expert has his/her unique characteristic with regard to knowledge, skills, experience and personality`

2. Talk to Someone Who Knows (Experts)

- Helpful to discuss your ideas
- Someone experience in the area you want to research
  - Lecturer
  - Active researcher
- Most will be delighted to talk to anyone interested in their work
- Face-to-face communication: easiest and most effective way
- Alternatively: e-mail
- But observe basic email etiquette (especially if a different country)

3. Check out Other Resources

- University librarians in your subject area
- University librarians in the Inter-library loan
- Paper Journals
- Electronic Journals (more and more frequent)
- 5 last years is sufficient to get an idea of the "general trends in the field"
- Online Resources: Athens account

4. Read Critically

Everyone Reads for a Purpose

Keep in mind your purpose when reading a text for the first time

Example: Review for a Journal – Literature Review

5. Take and Classify Full Notes

When researching

- You need to make notes on everything you read
- In your own words (avoid plagiarism)
- Distinguish between ideas that come from the source and your owns (as reaction to the source)
  - Compare source A with source B, who seems to disagree with A
- If in a Library, make a note of the library code
- Careful about recording bits you want to quote
  - They must be absolutely verbatim
  - Omissions and changes marked, e.g. with square brackets
- Classify your notes according to themes or topics
  - In a thesis: notes classified according to chapters

Questions when Reading (Critically)

- Are the author's objectives clear?
- Is the methodology explained clearly enough?
- Are the facts accurate, as far as you can tell?
- Is the argumentation logical, relevant?
- Are the conclusions justified by the evidence?
- Does the presentation seem careful, or careless?
- Does the author seem to be trustworthy?
- Is the author actually saying something important?

6. Keep Complete Bibliographic Records

As soon as you start

- You **MUST** start keeping bibliographic records
- Difficult at the beginning but with practice becomes easy
- If you wait until you start writing your report then this task will be probably the most difficult one
- Tracking sources for specific argument can be time consuming unless . . .

References – Bibliography

- Distinguish between **References** and **Bibliography**
  - List of works cited
  - List of works relevant to a particular field
- Build a bibliography database (BibTeX in LaTeX)
- References at the end of a text have two purposes:
  - To provide the sources of the work of others cited and/or referred
  - To enable readers to identify and locate works for checking the validity of the work

7. Plan your Time

Time available for your project

- It is one of the most important considerations in its design
- 3 months over summer to complete the project
- Not only this is very short
- Libraries may be closed or have restricted opening hours
- Supervisors may be absent from the University
- Important to *be realistic* about what can be achieved in the time available
- Failure to meet a submission date may have *serious consequences*

8. Work with your Supervisor

- In some instances you will have no choice about your supervisor
  - In this MSc you are allocated a supervisor and a second reader for your project
- Ideally, a supervisor is
  - someone who is an expert in the field you want to research
  - has many years' experience of supervising post graduate students
  - reliable and conscientious, firm but fair
  - someone you enjoy working with
- In the real world such people are rare
- In actual fact, no need to be an expert in your field to be an excellent supervisor

Crucial to the Success

Both parties have to agree with regard to:

- the role of the supervisor
- the frequency/lengh of consultations
- the time-scale of the project
- the methodology of the project
- submission of work and feedback
- the availability of the supervisor

9. Keep a Research Diary

Functions

A planning function to set priorities for each week and note deadlines

A recording function to log your reading, writing and other research-related activities everyday

A reflective function to note questions you need to reflect on as well as ideas which occur to you

An organizing function to list important contacts, opening times to library and so on

Structure of a Research Plan

1. *Introduction:* the topic, its background and the significance of the topic to science and/or society
2. *Aim and scope of the research:* clear research question(s), and how you restrict the scope of your project
3. *Theoretical background:* brief literature survey, main relevant sources, main concepts and definitions
4. *Material:* what kind of data, where from ...?
5. *Research Methodology:* Methods
6. *Timetable/deadlines*
7. *Costing* (if any)

Summary

- Steps to follow in a Research process
  - what, how
  - From ‘what’ to ‘how’: Research Plan
- Need to be systematic
- Allow enough time to meet the deadline for submission of applications

Further Reading


Ranjit Kumar
Research Methodology: A Step-by-Step Guide for Beginners, 4th Ed.
Sage Publications Ltd, 2014.


Tony Greenfield (Editor)
Research Methods for Postgraduates, 2nd Ed.
Arnold, 2002.


Christian W. Dawson.
The Essence of Computiong Projects: A Student's Guide
Prentice Hall, 2000.