The road towards post-graduate studies.

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Abstract

Every year, a number of recent Masters and PhD graduates face the shortage of exciting employment opportunities. The times when a fresh PhD graduate was given a lecturing or a senior researcher job are almost over. Thus, our new graduates need to have an edge that is beyond high GPA score and a few-hundred-page thesis. There is a need to include a more practical approach to our post graduate studies. This presentation provides a framework in which research towards completion of Masters or PhD degree is more than just an academic exercise.
Outline

Understanding post-graduate research studies and the strategies involved.

Conscious decision making.

Literature Review. What are we looking for?

Working towards your contribution.

The next big step. Is there a future product?
Choose a Problem

Understand the Problem

Q1?
Q1?

Q2?
Q2?

What others have done?

Q3?
Q3?

Work on your contribution

Compare with others

Critical Point

Q1: Do I understand the problem?

Q2: Is the problem important?

Q3: Can I contribute towards its solution?
Post-Graduate Research Strategy

Q1: Do I understand the problem?
Q2: Is the problem important?
Q3: Can I contribute towards its solution?
Choosing YOUR Research Project

Project suggested by your supervisor

– a real problem.
– an archaic problem. Has he/she been working on it for the last two decades (and could not solve it)?

Project suggested by you

– Is it really a problem?
– Is the solution already out there in those journals from 50-ies and 60-ies (that have not been placed in current digital data bases).
Choosing YOUR Research Project

- Well-known problem elaborated in popular science literature.
- A REAL problem based on commercial need or opportunity.
- Allow self criticism. It can be statistically proven that:
  - You are NOT a genius.
  - Your supervisor is NOT a genius, either.
Basic vs Commercial Research

Projects do not have to be divided into basic and applied research.
Post-Graduate Research Strategy

Choose a Problem

Understanding the Problem

Q1?

No

Q2?

Yes

No

What others have done?

Q3?

Yes

No

Work on your contribution

Compare with others

Critical Point

Q1: Do I understand the problem?

Q2: Is the problem important?

Q3: Can I contribute towards its solution?
What is the PROBLEM?

Do you understand what the problem really is?

Is it feasible to provide at least partial solution to the problem during the program?

What are the possible outcomes of research dedicated to its solution?

What are the possible benefits of such research beyond your PhD thesis (look grandchildren, here is what I have done, thick eh? )
Post-Graduate Research Strategy

Q1: Do I understand the problem?
Q2: Is the problem important?
Q3: Can I contribute towards its solution?
Why is it an IMPORTANT Problem?

Do you choose solving this problem because your supervisor asks you to do so?

Are you sufficiently motivated to spend 3 to 4 years of your life to solve this problem?

Is there anyone else (except your supervisor and yourself) who could benefit from your research?

Would you hire someone to solve the problem using your own funds?
Making the FIRST Decision

If the chosen problem is genuine AND it is an important problem ⇒ continue your research to find out what has been done to date to solve the problem (Green Light).

If the chosen problem is superficial OR it is of no importance ⇒ choose another problem (Red Light).

YOU need to make this decision 6 months from the commencement, at the latest.
Role of Supervisor in Decision Making

A good supervisor guides the student in critical decision making.

Supervisor has to be realistic (evaluate student’s capabilities in regards to the project scope).

Supervisor has to allow for individualism, often expressed by the student.

The supervisor with the student have to form partnership in critical decision making (not a Master/Slave approach)
Opportunities in the *Red Light* Option

- Choose another problem
- Change the supervisor (often linked to change of a problem)
- Quit
Q1: Do I understand the problem?
Q2: Is the problem important?
Q3: Can I contribute towards its solution?
Literature Search

- Scientific journals
- Conference proceedings
- Technical (product oriented) journals and magazines
- Patents
- Internet resources
- Other
Patents

The best source of information.

If others are willing to pay 20,000 to 30,000 USD to protect their ideas, it has to have some merit.

Availability:

– http://patents.uspto.gov
– http://www.delphion.com
– http://gb.espacenet.com
Literature Search

Knowing what to look for?

- Systematic literature search.
- Chaotic or random search.
- Cross-disciplinary search.

Applying critical thinking (or common sense) approach.

The weeding approach.
Making the SECOND Decision

- Realistic assessment of your own capabilities.
- Can I contribute towards the solution of the problem?
  - Yes ⇒ continue your research (Green Light).
  - No ⇒ choose another problem (Red Light).

YOU need to make this decision 12 months from the commencement, at the latest.
Opportunities in the Red Light Option

- Choose another problem
- Change the supervisor (often linked to change of a problem)
- Quit
Post-Graduate Research Strategy

Q1: Do I understand the problem?

Q2: Is the problem important?

Q3: Can I contribute towards its solution?
Working towards your contribution

- Having continuous scientific consciousness
- Remembering
  - what the problem really is,
  - what are the potential benefits,
- Knowing the main track and the side-tracks.
- Making refinements and adjustments. The trial and error approach.
Post-Graduate Research Strategy

Q1: Do I understand the problem?
Q2: Is the problem important?
Q3: Can I contribute towards its solution?
Validating your contribution

- Fair comparison of your contribution with the work of other researchers.
- The UCS–(un)conscious cheating syndrome (my methodology is the best).
- Allow self criticism (you and your supervisor are not geniuses).
- The use of statistics and the legacy of the 95% confidence level.
Final Steps

- Is your PhD research an academic exercise?
- Can you work towards a future product?
- The intellectual property. Yours, your supervisor’s, or your university's?
- Contacting industry partners
  - Should you approach industry?
  - Should you wait to be approached?
  - What are the best strategies?
The Best Path

Choose a Problem → Understand the Problem

Q1: Do I understand the problem? YES
Q2: Is the problem important? YES
Q3: Can I contribute towards its solution? YES

What others have done?

Work on your contribution → Compare with others

Q1? → Q2?

Q3?
GOOD LUCK!