AUT

DATA SCIENCE
RESEARCH CENTRE

ENGE817 Research Methods

Associate Professor Farhaan Mirza

Welcome, Fa to:

STEM Research Method

Assessments

Canvas Updates

Check email for Update!

Week 3 - Ethics

Introduction to proposal writing

Finding Supervisors

- PhD Students → PhD Supervisor
- Master of Analytics → See math staff projects
- Master of Cyber Security and Digital Forensics → Dr Alastair Nisbet
- Master of IT Project Management (Observers) → No Supervisor
- Master of IT Project Management → Dr. Sam Madanian
- Others – please look at Topics and Supervisors on Canvas
  - Lets see few research profiles

- Thinking of doing Masters or PhD in future, please inform supervisor

Final Report Requirements

Requirements

Template

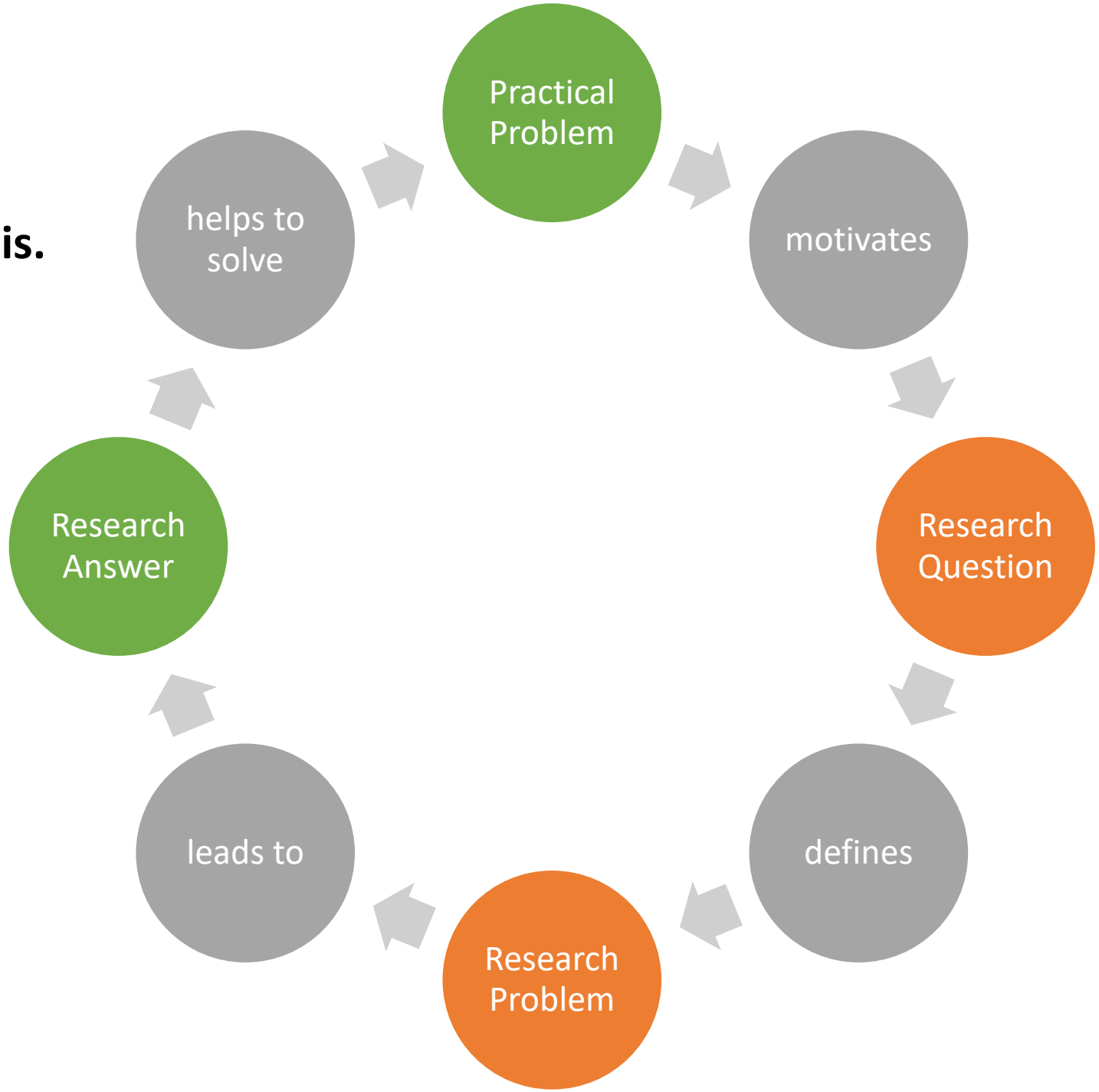
Word length

Marking Criteria

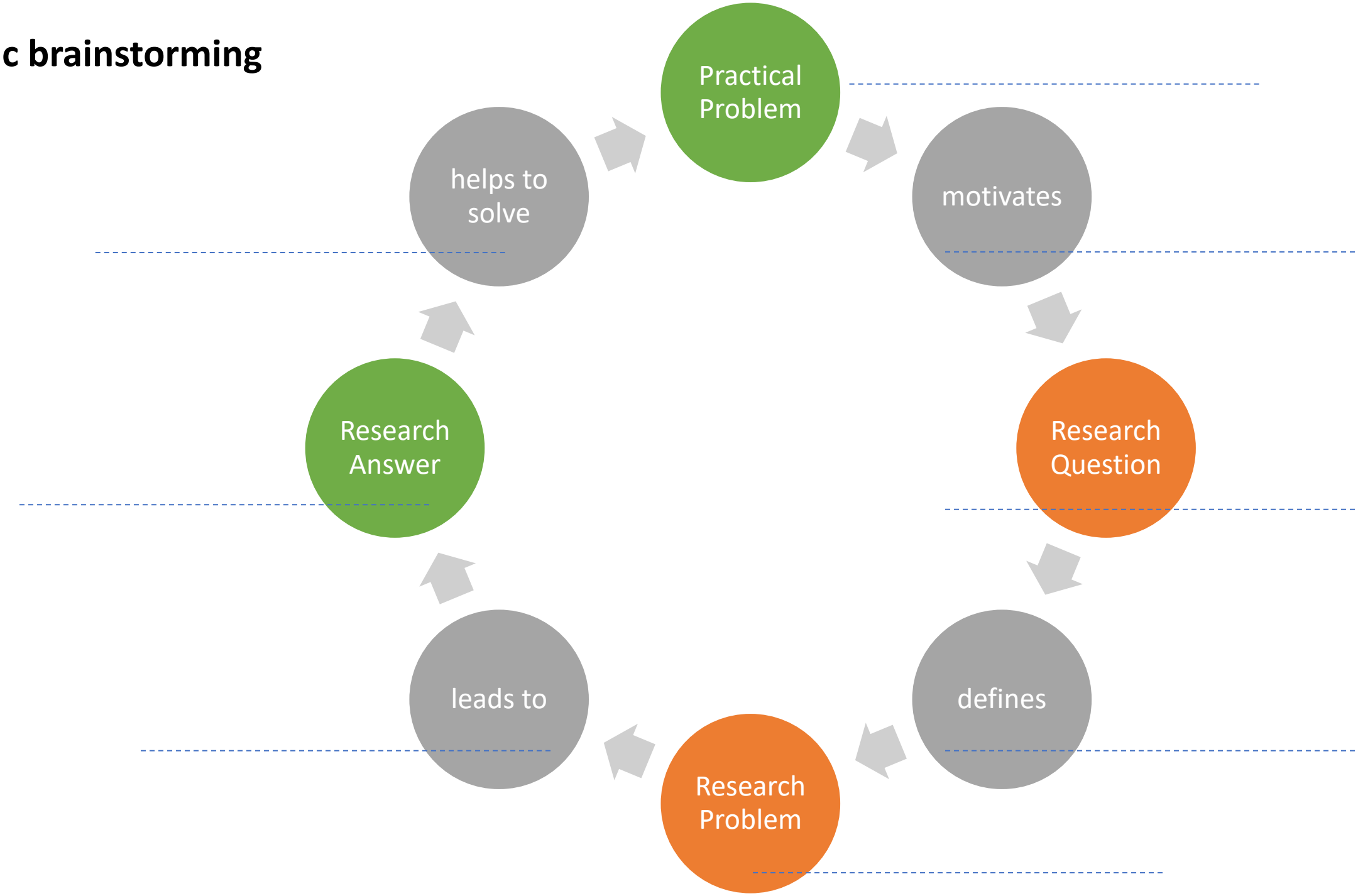
Rubric

Deadlines

Graphically, the relationship between practical and research problems looks like this.



Topic brainstorming



Essential requirements – looking at an example on what needed to be shown in a proposal

Endeavour Fund

Call for Proposals

2020 Investment Round

This Call for Proposals includes funding application and submission guidelines for Smart Ideas and Research Programmes

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The Endeavour Fund

Excellent research topics wanted →

The Endeavour Fund supports excellent research with the potential to positively transform New Zealand's economy, environment and society. The fund uses an open, contestable mechanism to select excellent research proposals that will provide the highest potential impacts across a range of economic, environmental, and social objectives.

Funding is made through two investment mechanisms – **Smart Ideas** and **Research Programmes.**

- Smart Ideas are intended to catalyse and rapidly test promising, innovative research ideas with high potential for benefit to New Zealand, to enable refresh and diversity in the science portfolio.
- Research Programmes are intended to support ambitious, excellent and well-defined research ideas which have credible and high potential to positively transform New Zealand's future in areas of future value, growth or critical need.

Essential requirements – looking at an example on what needed to be present in a research topic

EXECUTIVE SUMMARY

***Executive Summary**

Summarise the overall objective of your research proposal and how you will achieve it, including:

- why your research is needed (the issue or problem you are addressing)
- what you propose to do (your hypothesis and scientific approach)
- the results, impacts or outcomes you expect, how they will be achieved, and who will use or benefit from them.

The Executive Summary is your opportunity to introduce Assessors and the Science Board to your research, the potential impact(s) of that research and your methodology. It should not introduce material that is not present in the Excellence and Impact sections of your proposal.

A research topic needs to show:

Essential requirements

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INFORMATION REQUIRED

*This is a guide and is not intended to constrain the information you provide. An asterisk * indicates mandatory fields.*

***Science Excellence**

If applying for Smart Ideas funding, expand on the science excellence information submitted in your Concept.

If applying for Research Programmes funding, describe the excellence of your science by clearly explaining:

- the science issue or problem you are aiming to address
- your overarching science question or hypothesis that addresses the science issue or problem
- the relevance of this hypothesis to the issue or problem identified
- how your method and high level approach (methodology) will enable the delivery of your research aims
- how your research is positioned in the domestic and international research context
- how you are leveraging state of the art knowledge and facilities, including through any collaborations with overseas researchers, teams or institutions
- the new knowledge, approaches and/or scientific or technological advances that will be enabled by your proposed research

Science issue/ problem

Science question or hypothesis

Method & approach

Advance-ment

"The Endeavour Fund supports excellent research with the potential to positively transform New Zealand's economy, environment and society."

A research topic needs to show:

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***Methods**

Provide a clear and precise description of how you propose to perform your research, your rationale for your choice of methods and other science or research characteristics of the project. This can include:

- your choice of study material(s), sites and/or subject(s); this may also include reasons for not choosing various options
- how you plan to collect and manage data such as variables, measurement methods, sampling methods and sample size
- how you have considered potential errors (random or systematic) and the methods and strategies you will use to control them
- any experimental design approach where this has a significant impact or is out of the ordinary, e.g., the type of participants or types of controls
- any analytical advantages enabled by your choice of instrumentation/equipment for data analysis, including your use of statistical methods.

Your methods should be understandable to Assessors, regardless of their specific field of expertise. You may include images but not hyperlinks, video, or audio files.

A research proposal needs to show:

- Material(s)/ facilities
- Experiments/meas-urement
- Data treatment/ analysis
- Simulation/ modelling

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A few actions when you select your topic

Main points from previous slides:

Science issue/problem

Science question or hypothesis

- Material(s)/facilities
- Experiments/measurement
- Data treatment/analysis
- Simulation/modelling

Method & approach

Advancement

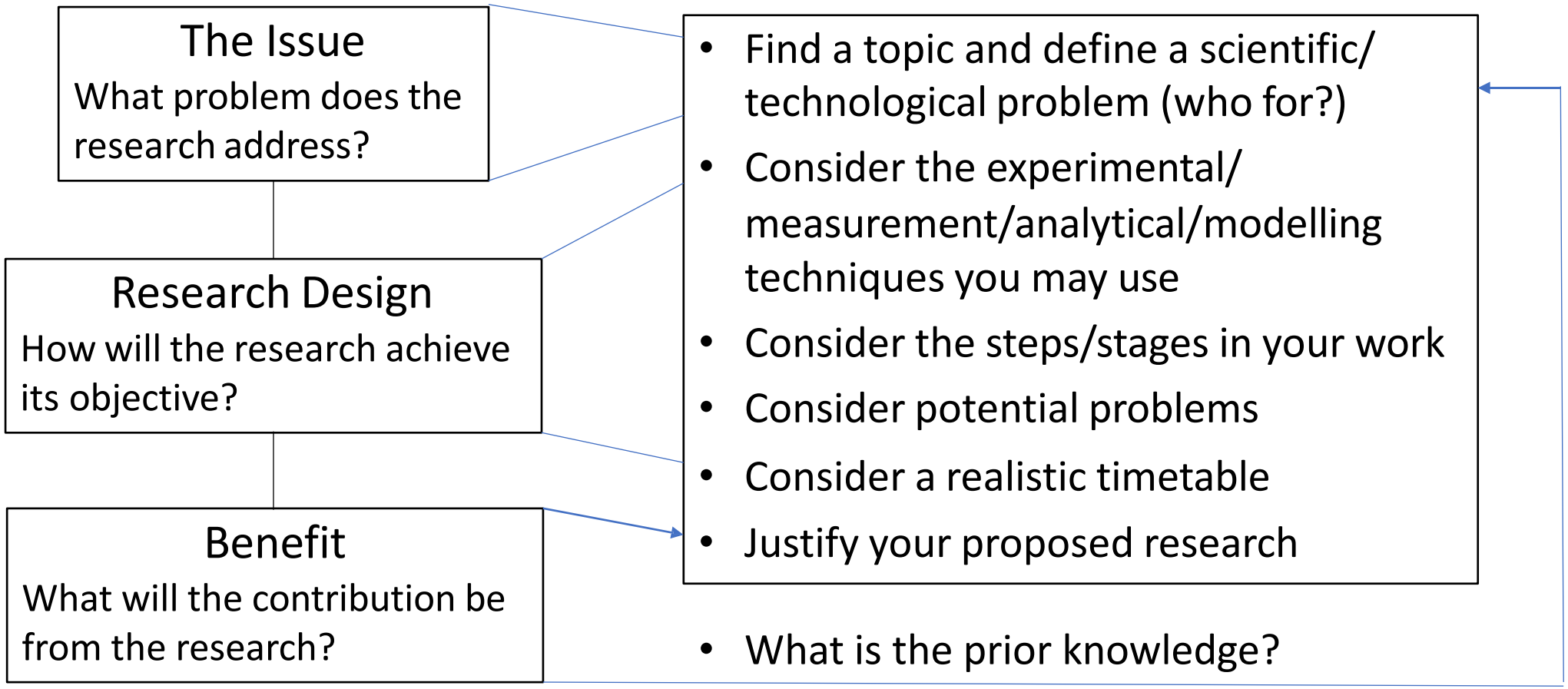
A few points to consider when you do your proposal:

The Issue
What problem does the research address?

Research Design
How will the research achieve its objective?

Benefit
What will the contribution be from the research?

A few actions when you select your topic



A few actions when you select your topic

A few actions when you do your topic selection:

- Find a topic and define a scientific/ technological problem (who for?)
- Justify your proposed research
- Identify the prior knowledge
- Consider the experimental/ measurement/analytical/modelling techniques you may use
- Consider steps in your approach
- Anticipate potential problems
- Come up with a realistic timetable

Why

What

How

When

What are in your initial report (guideline):

- Title
- Abstract
- Introduction
- Literature review
- Research questions or hypothesis
- Research design & methods
- Resources
- Timeline
- References

when we communicate in academic writing, we can use numbers, equations, graphs/drawings/diagrams, images ….

Part 1: From what are required to do to what we actually do – a general guideline

What are in your proposal (guideline):

- **Title**
- **Abstract**
- **Introduction**
- Literature review
- Research questions or hypothesis
- Research design & methods
- Resources
- Timeline
- References

Title: Indicate what you will do
(approach & key questions in mind)

Abstract/Summary:

Summarise the why, what, how, and when of the proposal (because a research proposal is one that details why, what, how and when of your proposed research)

Introduction:

- Provide background information relevant to the problem you have identified
- Describe and explain the problem you have identified that needs to be investigated or investigated further
- State the purpose of your proposed study
- Explain the significance of your proposed study (for extending engineering knowledge or improving engineering practice if possible)

Note: We are engineers and normally, when we communicate and in engineering writing, we see/use numbers, equations, graphs/drawings/diagrams, images ….

Data Collection Ideas

Forms & surveys	Interviews	Observation	Focus Groups
Social Media	Documents and Reports	Data Repositories	Online Data Sets

THANK YOU

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