

MIT 7116 RESEARCH METHODOLOGY

Documentation

Dr. John Ngubiri
ngubiri@cit.ac.ug

Makerere University

Introduction

- Research is
 - Conceptualised
 - Done
 - Reported

Introduction

- Research is
 - Conceptualised
 - Done
 - Reported
- The reporting is more perpetual
 - Has to clearly show the first two
 - The reader must be able to regenerate results

Introduction

- Research is
 - Conceptualised
 - Done
 - Reported
- The reporting is more perpetual
 - Has to clearly show the first two
 - The reader must be able to regenerate results
- Two things are involved
 - Writing in a standard way understandable by the research community
 - Exploring your creativity and present your work well

So....

- Reserach can be challenging, but so is documenting it

So....

- Research can be challenging, but so is documenting it
- It's possible to have good output but fail to communicate it

So....

- Research can be challenging, but so is documenting it
- Its possible to have good output but fail to communicate it
- Its possible to mess up the research document

So....

- Research can be challenging, but so is documenting it
- Its possible to have good output but fail to communicate it
- Its possible to mess up the research document
 - Too much depth
 - Analysis paralysis
 - Slangs
 - Structural organisation
 - Poor flow
 - Poor internal (mental) organisation

So....

- Reserach can be challenging, but so is documenting it
- Its possible to have good output but fail to communicate it
- Its possible to mess up the research document
 - Too much depth
 - Analysis paralysis
 - Slangs
 - Structural organisation
 - Poor flow
 - Poor internal (mental) organisation
- So Watch out

Concept

- Address simple question "What is the research all about"?

Concept

- Address simple question "What is the research all about" ?
 - What is the real life challenge you are addressing (canopy)
 - What is the technical gap (evidence you did some reading)
 - What approach do you want to use

Concept

- Address simple question "What is the research all about" ?
 - What is the real life challenge you are addressing (canopy)
 - What is the technical gap (evidence you did some reading)
 - What approach do you want to use
- A few pages
- A few references
- Title is so susceptible to change

Concept

- Address simple question "What is the research all about" ?
 - What is the real life challenge you are addressing (canopy)
 - What is the technical gap (evidence you did some reading)
 - What approach do you want to use
- A few pages
- A few references
- Title is so susceptible to change

All it does is to convince the supervisor the work is researchable

Research Proposal

- A detailed Documentation of the research ambition

Research Proposal

- A detailed Documentation of the research ambition
- After reading, the reader must be convinced the research is
 - Useful
 - Doable (viable methods)
 - Sufficient (not so small)
 - Novel (adds to body of knowledge)

Research Proposal

- A detailed Documentation of the research ambition
- After reading, the reader must be convinced the research is
 - Useful
 - Doable (viable methods)
 - Sufficient (not so small)
 - Novel (adds to body of knowledge)
- Has to be systematically written
- Made up of 4 parts Introduction, Literature Review, Methodology, Appendices

Proposal - Introduction

- Core part of the proposal
- Normally made of largely predetermined subsections
 - Background
 - Problem statement
 - Justification
 - General objective
 - Specific Objectives/RQ's
 - Scope
- Written briefly and precisely.
- Simple direct english, no slangs
- Clarity is of essence

Proposal - Introduction

- Background:

Address where the problem comes from starting from real life towards technical work. Make the technical complexities clear. Once the reader can clearly sense the problematic set up, STOP.

- Problem statement:

State the problem (only) not what causes it and not why there is a need for a solution (justification). The Problem statement should be self contained - No reference.

- Justification

Enumerate why the problem is worth solving. Relate to the canopy

Introducton

- General objective

Indicate what the scientific community will benefit if you successfully carry out the research. Removal of reducing thickness of canopy

- Specific Objectives

Enumerate what you are going to do. It should be SMART(Specific, Measurable, Achievable, Realistic, Time bound). They can as well be written as questions (RQs)

- Scope

What part of the general problem are you solving?

Literature Review

- Demonstrate that
 - You understand how the problem comes up
 - You understand recent research about the problem
 - You can correctly place your problem in the knowledge gap

Literature Review

- Demonstrate that
 - You understand how the problem comes up
 - You understand recent research about the problem
 - You can correctly place your problem in the knowledge gap
- Grow content from general to Specific technical stuff

Literature Review

- Demonstrate that
 - You understand how the problem comes up
 - You understand recent research about the problem
 - You can correctly place your problem in the knowledge gap
- Grow content from general to Specific technical stuff
- Every body of knowledge that one must know to address the problem must be reviewed

Literature Review

- Demonstrate that
 - You understand how the problem comes up
 - You understand recent research about the problem
 - You can correctly place your problem in the knowledge gap
- Grow content from general to Specific technical stuff
- Every body of knowledge that one must know to address the problem must be reviewed
- Support your arguments with recent research works

Literature Review

- Demonstrate that
 - You understand how the problem comes up
 - You understand recent research about the problem
 - You can correctly place your problem in the knowledge gap
- Grow content from general to Specific technical stuff
- Every body of knowledge that one must know to address the problem must be reviewed
- Support your arguments with recent research works
- Cite not quote literature

Literature Review

- Demonstrate that
 - You understand how the problem comes up
 - You understand recent research about the problem
 - You can correctly place your problem in the knowledge gap
- Grow content from general to Specific technical stuff
- Every body of knowledge that one must know to address the problem must be reviewed
- Support your arguments with recent research works
- Cite not quote literature
- Take great care of organisation and flow

Literature Review

- Demonstrate that
 - You understand how the problem comes up
 - You understand recent research about the problem
 - You can correctly place your problem in the knowledge gap
- Grow content from general to Specific technical stuff
- Every body of knowledge that one must know to address the problem must be reviewed
- Support your arguments with recent research works
- Cite not quote literature
- Take greater care of organisation and flow
- Show gap(s) at the end

Literature Review - Take care

- Merely transplanted works
- Works not comprehended
- Failure to aggregate judgements
- Flow of arguments (Broad focuss to the problem/
gap)

Methodology

- What research approach you are going to use
- What methods you are going to use
- How you are going to use them
- Why you are going to use them

The Methodology must be complete that someone can reproduce your results

Dissertation/Thesis

- Dissertation/Thesis are different
 - Thesis is for FULL requirement of a graduate award
 - Dissertation is a partial requirement for grad award
 - You will do Dissertation not thesis

Dissertation/Thesis

- Dissertation/Thesis are different
 - Thesis is for FULL requirement of a graduate award
 - Dissertation is a partial requirement for grad award
 - You will do Dissertation not thesis
- Academically
 - Dissertation is the climax of a graduate course
 - Its a product of research
 - With proven findings
 - Got through acceptable methodology

Dissertation/Thesis

- Dissertation/Thesis are different
 - Thesis is for FULL requirement of a graduate award
 - Dissertation is a partial requirement for grad award
 - You will do Dissertation not thesis
- Academically
 - Dissertation is the climax of a graduate course
 - Its a product of research
 - With proven findings
 - Got through acceptable methodology
- Not easy
 - Many students find it hard
 - Have to do it the hard way

Dissertation

- To understand a dissertation
 - To understand a dissertation
 - Find out what are the results
 - Why find out those results
 - What's the methodology
 - What's the presentation
 - Why are results so
 - Can something more be done?

Dissertation

- To understand a dissertation
 - To understand a dissertation
 - Find out what are the results
 - Why find out those results
 - What's the methodology
 - What's the presentation
 - Why are results so
 - Can something more be done?
- Get Idea? OK. Do not get idea? there is a problem with the dissertation or with you.

Some Cases

- 1 Typing Pattern Biometric extension to Kerberos Version 5 Authentication Protocol by Rose Nakasi
- 2 A hybrid Algorithm to Detect Malware and Eliminate Zero day Attacks by Joseph Lwomwa
- 3 A tool to mitigate Denial of Service Attacks in LAN by Kyambade George

Some Cases

- 1 Typing Pattern Biometric extension to Kerberos Version 5 Authentication Protocol by Rose Nakasi
 - 2 A hybrid Algorithm to Detect Malware and Eliminate Zero day Attacks by Joseph Lwomwa
 - 3 A tool to mitigate Denial of Service Attacks in LAN by Kyambade George
- What do you think these dissertations address?
 - What must you know before you conduct reserach leading to these dissertations

Nakasi – Deeper

- Where does the problem come from?
 - Security, authentication, possible break up of the authentication
 - Ensure they are well explained in the background

Nakasi – Deeper

- Where does the problem come from?
 - Security, authentication, possible break up of the authentication
 - Ensure they are well explained in the background
- What makes the intellectual basis of the research?
What must I not know not to read?

- Kerberos V5
- Typing Patterns representation
- The current level of research on both
- The Existing gaps

Each of them must be well explained in Literature review

- How do you address the gaps? [Methodology]
 - What methods did they use as they generated the gaps?

If No, stick to the methods in the literature

Get Deeper

- Kerberos
 - Secure authentication over an insecure channel
 - Assumes once u have the secret key, you are the right person
 - Susceptible to
 - Guessing
 - Brute force attacks
 - Cookies saved passwords
 - XSS
 - Kerberos can be improved, but the weakness is on its philosophy. Reliable on cases where the weaknesses are invalid

Typing Patterns...

- Typing patterns
 - Basic and foolish bright on deeper look
 - Eg we can all talk, how do we distinguish our voices? - speech pattern
 - We can all type, do we type the same way?
 - What determines the way of typing??
 - What can make intra variations (false +ve)
 - What can cause inter similarities (true -ves)
 - Can we extract the few that work???
 - Can we focus on a simple case? Typing Patterns

Methods

- How shall we pick the patterns
 - Respondents
 - Avoiding artificialization of collections
 - Collecting enough samples without boring respondents
- How shall we analyze the patterns?
 - Statistical
 - Regression
 - Classification
- Implimentation? Some scoping
 - Characters considered
 - Keyboard used
 - System used
 - Background effect eg distractions
 - Classifier used (KNN this case)
 - Types of users used (students this case)

Organisation

- A big problem in documents

Organisation

- A big problem in documents
- Disorganised documents distort information

Organisation

- A big problem in documents
- Disorganised documents distort information
- Lot of planning needed – Chapter, Section, subsection, paragraphs

Organisation

- Do one thing at a time
 - Looking for information
 - Interpreting it
 - Writing it down

Organisation

- Do one thing at a time
 - Looking for information
 - Interpreting it
 - Writing it down
- To be sure make the macro structure fast
- Then Micro structure

Organisation

- Do one thing at a time
 - Looking for information
 - Interpreting it
 - Writing it down
- To be sure make the macro structure fast
- Then Micro structure
- Then fill in the micros
- Anything that does not fit in the bigger level scope should be dropped

Some Bad manners

- 1 Slangs
- 2 Quoting instead of citing / unresearched materials
- 3 long sentences
- 4 abbreviations eg, etc, it's
- 5 () and [] "disrupting" sentences
- 6 Un ascending compound citation
- 7 Citing out of context
- 8 Mixed tenses
- 9 Shallow reading
- 10 Old citations
- 11 Speculation
- 12 Unjustified decisions