TECHNICAL REPORT WRITING & PRESENTATION SKILLS

Muhammad Shaheer Mirza (Engr.)
MS (BME, ZU), BE (BME, ZU)

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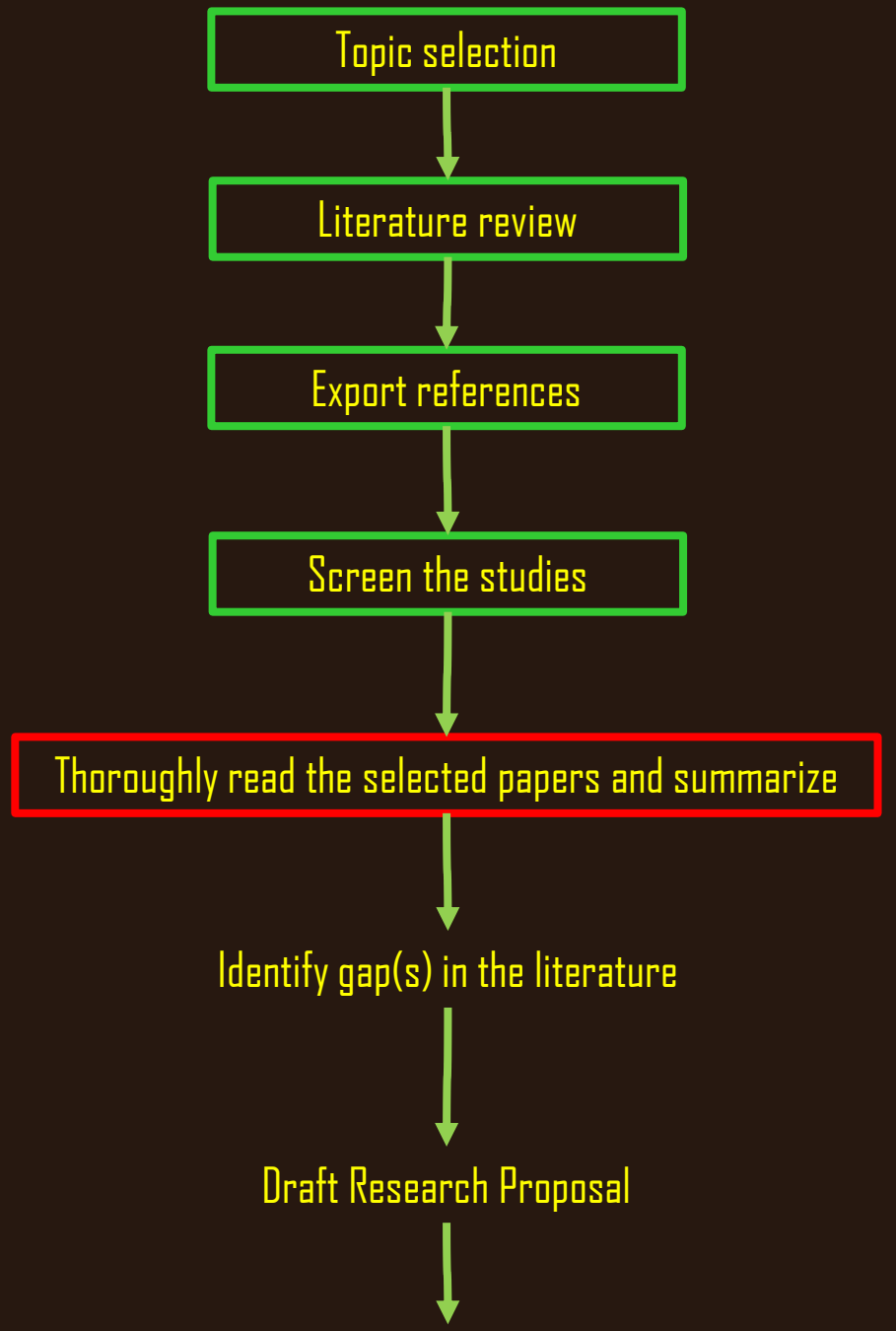
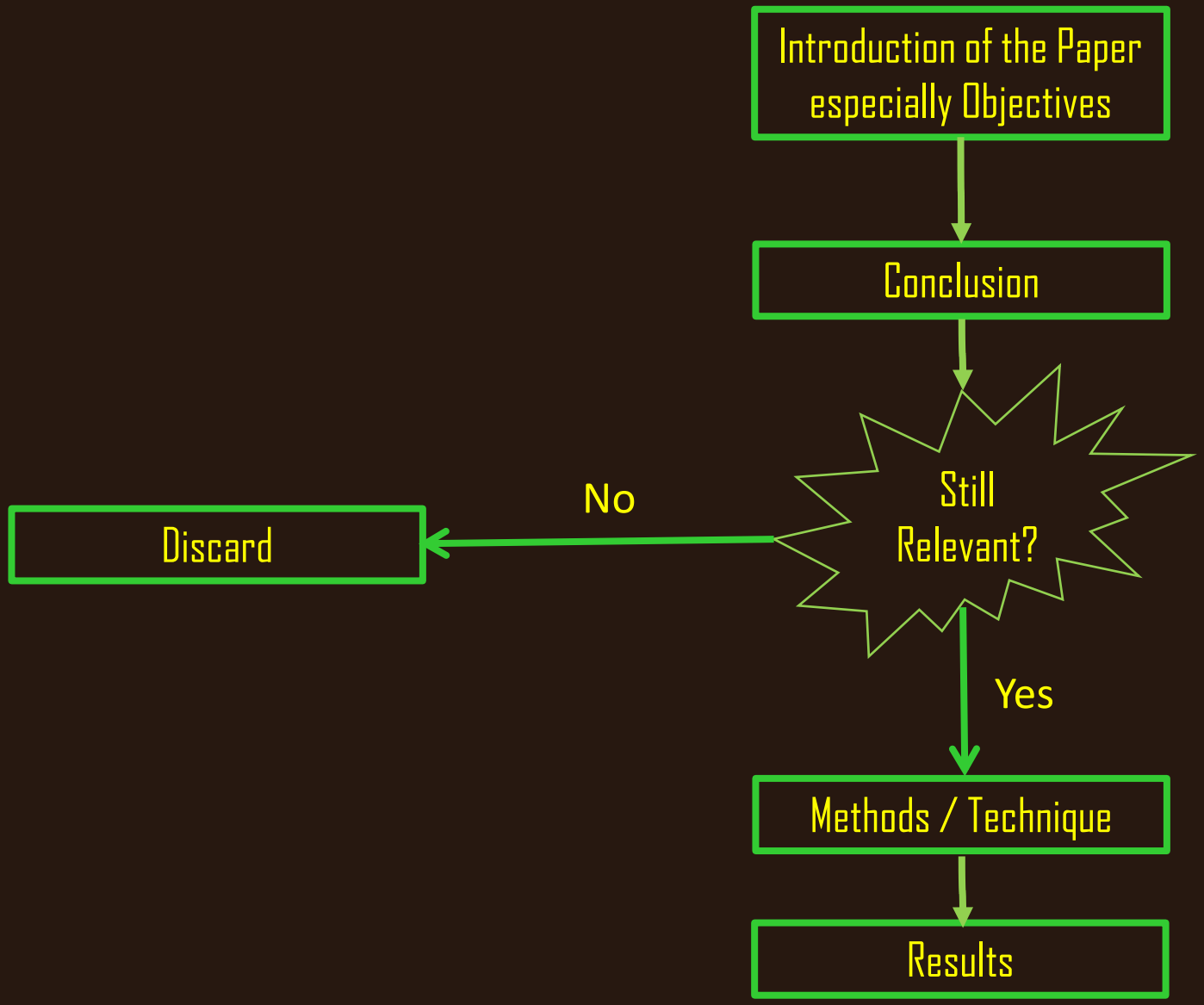
Faculty of Engineering, Salim Habib University

ENGINEERING RESEARCH METHODOLOGY FLOWCHART



How to Read A Scientific Article?



What to do while Summarizing Scientific Articles?

1. Google all the terms that are unfamiliar to you

2. Form a table for recording the objectives of study, year of article, important points in methods and results and finally the summary of conclusion in one sentence.

Section	Includes:
Introduction	Motivation, definitions, site, paradigm info, type of AR, **diagnose general problem** area/theory/question, focus, purpose, organization of paper
Theory	Literature review for theoretical/conceptual lens, but not preclusive, constructs/variables, definitions hypotheses (comparison, prediction, falsifiable)
Methods	Guidelines/evaluation criteria for type of AR approach, role of the researcher, **diagnose specific problems, action planning, action taking**, sites qualitative and quantitative data collection plan
Results	**Evaluation,** qualitative coding and quantitative measures organized by hypotheses be clear about what happened where at what point in time include evidence both supporting and questioning the hypotheses/theory include both planned and emergent constructs/hypotheses
Discussion	Triangulation using multi-cycle, multi-method framework organized by hypotheses tell the story using graphical conceptual framework **specifying learning** as contribution to theory (inductive and/or deductive), contribution to practice, limitations
Conclusions	Concise view framing of the contribution of the paper

First author, ref. no., year, type of study	Quality of evidence[a/b]	No. of studies included	Objective	Workers	Conclusions
Paget-Bailly S[65], 2012. Meta-analysis	II-b/3a	10 studies with homogeneous exposure	Incidence of laryngeal cancer	Different types of occupational exposure (wood dust)	Risk is not significantly associated with workers exposed to wood dust
Puñal-Riobóo J[66], 2010. Systematic review	II-b/3b	10 cases and controls selected by 2 researchers	Association between occupational exposure to substances and cancer	Occupational exposure. Statistical association between cancer and exposure	Exposure is associated with a higher risk of nasopharyngeal and hypopharyngeal cancers. There are non-concurrent data
De Gabory L[67], 2009. Narrative review	III/5	Classic review that assesses scientific evidence	Association between ADCN and wood dust	Risk is important from the first year. When the period of exposure is > 30 y, only 10% of patients are < 50-years-old	Exposure to wood dust plays an essential role in the development of nasal ADCN
Jansing PJ[33], 2003. Narrative review	III/4	Retrospective study of 28 patients with nasal cancer	Profiles of different risk factors, occupational and non-occupational	Risk is important from the first year, and the period is generally > 30 y, only 10% of patients are < 50-years-old	Preventive activities are recommended
Blot WJ[68], 1997. Narrative review	III/5	Population study, USA and EU	Assessment of occupational history	Wood workers	Threshold dose equivalent to 8 h at 5 mg/m^3
Demers PA[69], 1995. Systematic review	III/3b	Review of 12 studies in 7 countries	Risk of nasal cancer	OR = 45.5 (95% CI: 28.3–72.9). Risk increases according to the time of occupational exposure	Results increase consistency of individual studies between ADCN and wood dust
Nylander LA[70], 1993. Narrative review	III/5	Opinion from experts	Risk of nasal cancer	Higher risk of occupational cancer	No data or direct experimental evidence for the dangers of wood dust
Wills H[71], 1982. Narrative review	III/4	Register data from 12 countries	Population study	Higher risk of occupational cancer	61% of neoplasms of the respiratory tract and 78% of ADCNs are associated with furniture manufacture or manipulation

EU: European Union; CI: confidence interval; ADCN: adenocarcinoma.

[a/b]Type of epidemiological design determined according to US Task Force on Preventive Health Care 1989/Centre for Evidence-based Medicine, Oxford.

doi:10.1371/journal.pone.0133024.t004

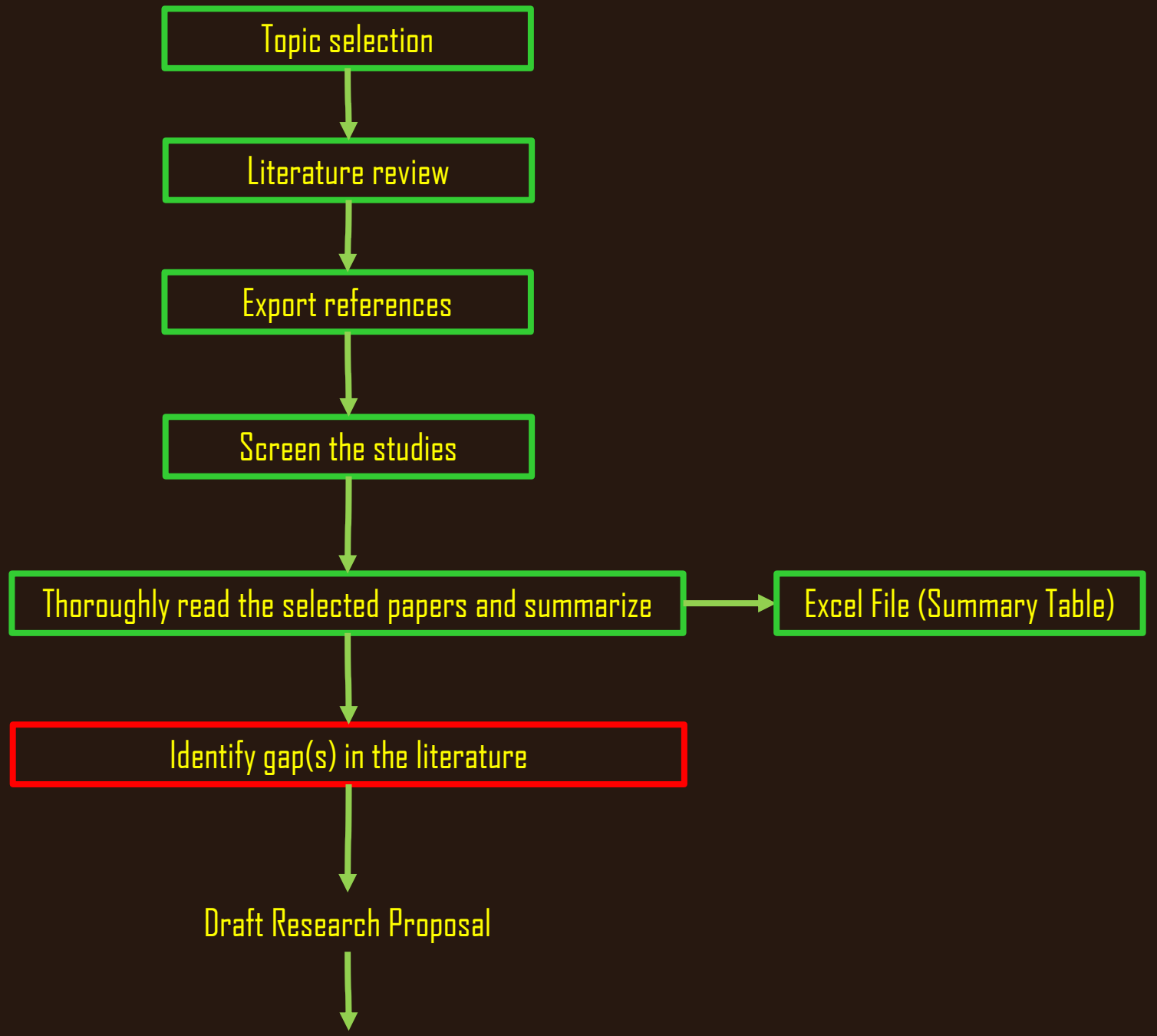
Task IV

Summary Table

Deadline: 31st March 2024

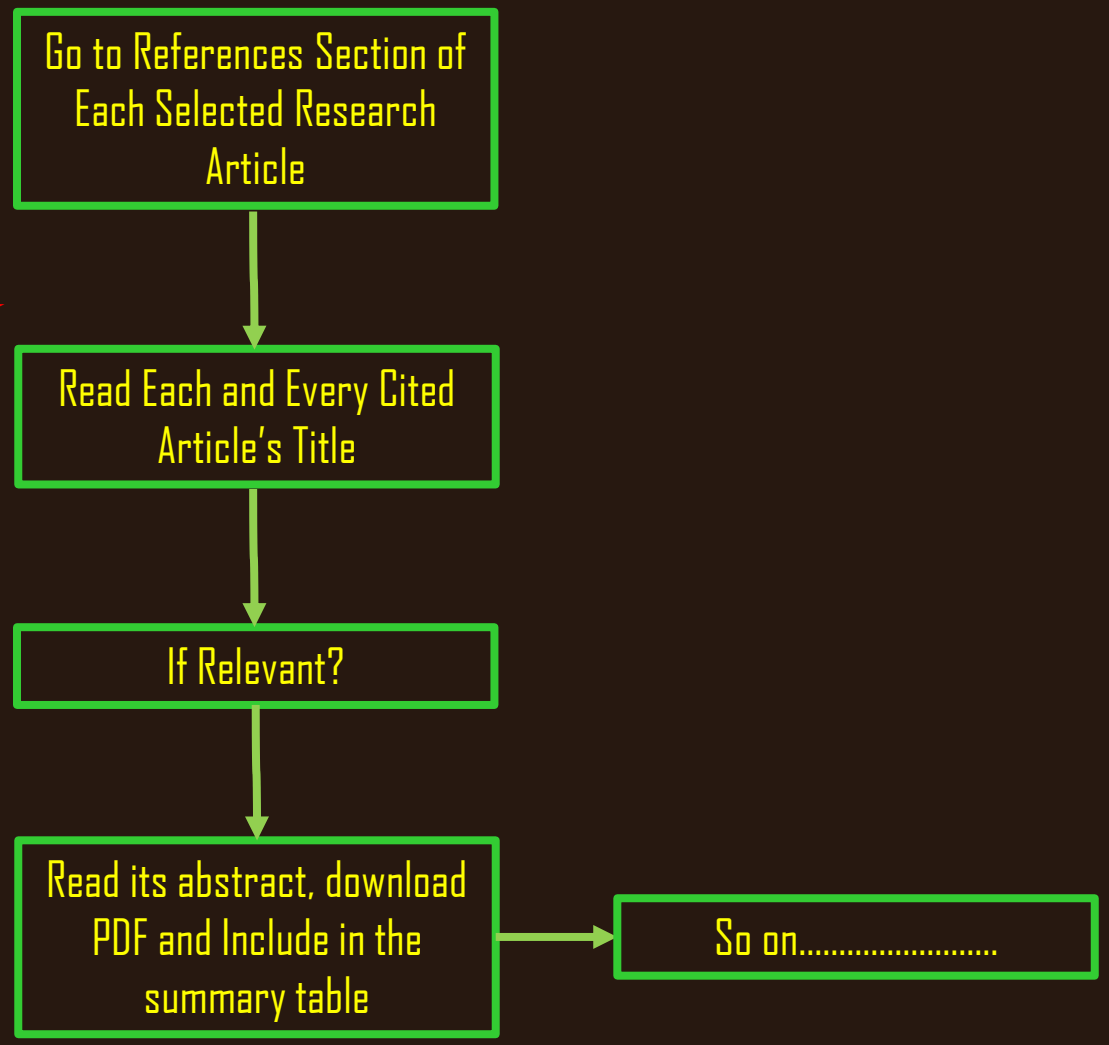
Marks: 5

ENGINEERING RESEARCH METHODOLOGY FLOWCHART



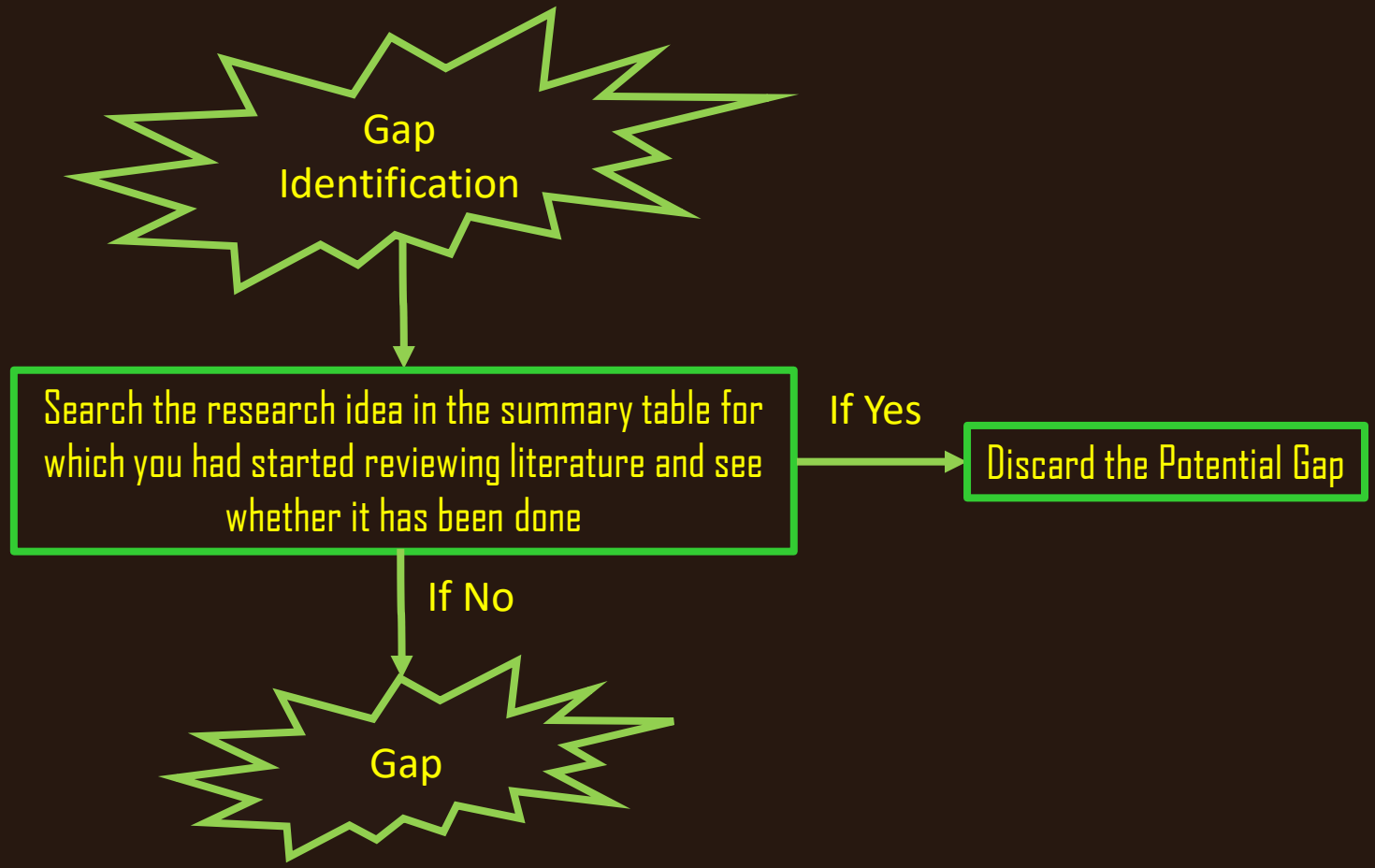
Extended Literature Review (Keep Digging):

If you have found 20 relevant articles and each article contains around 30 references, that means you would have to go through 20 x 30 = 600 titles again for your review and so on……



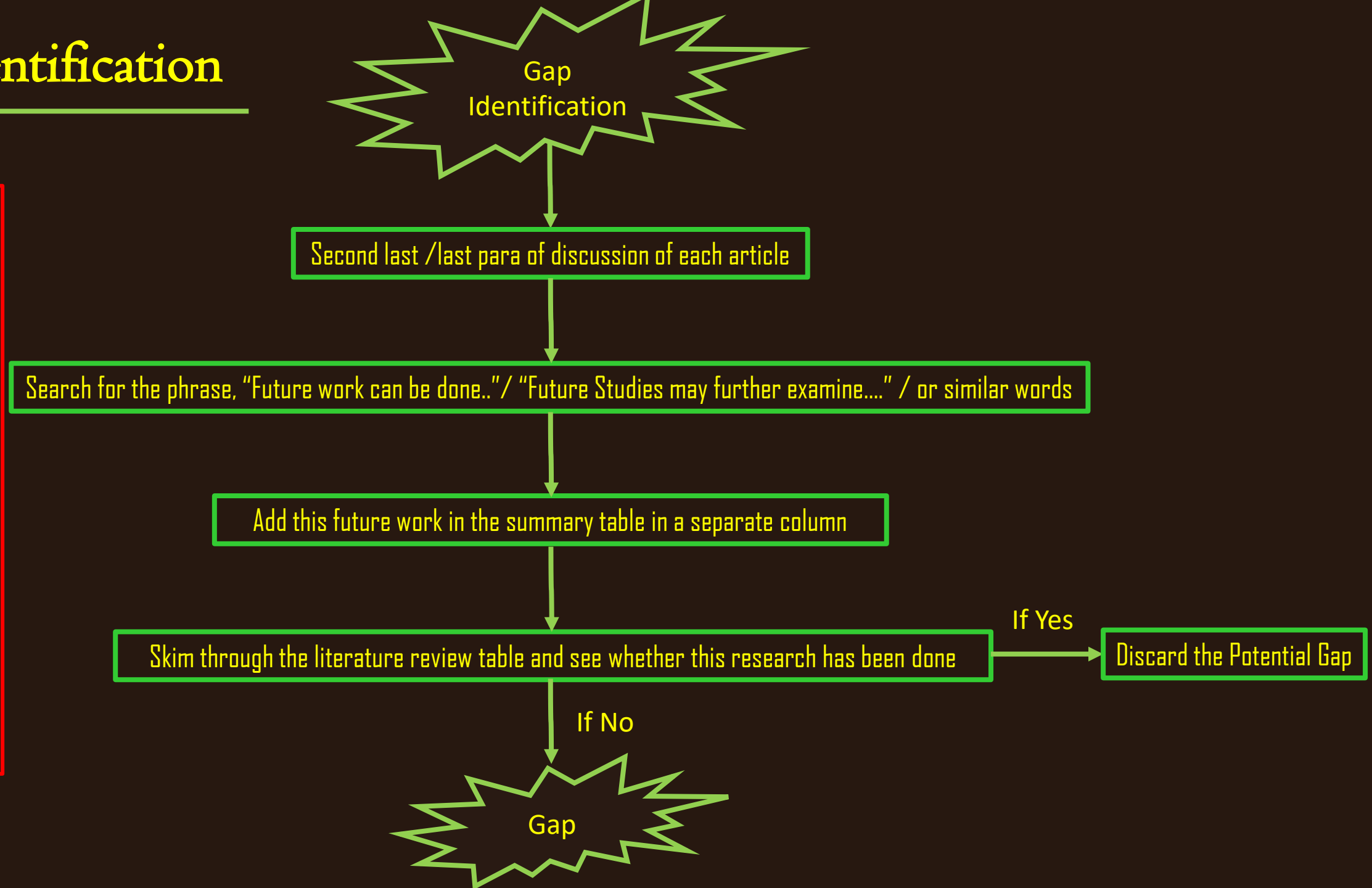
Gap Identification

Tier # I
(Passion)



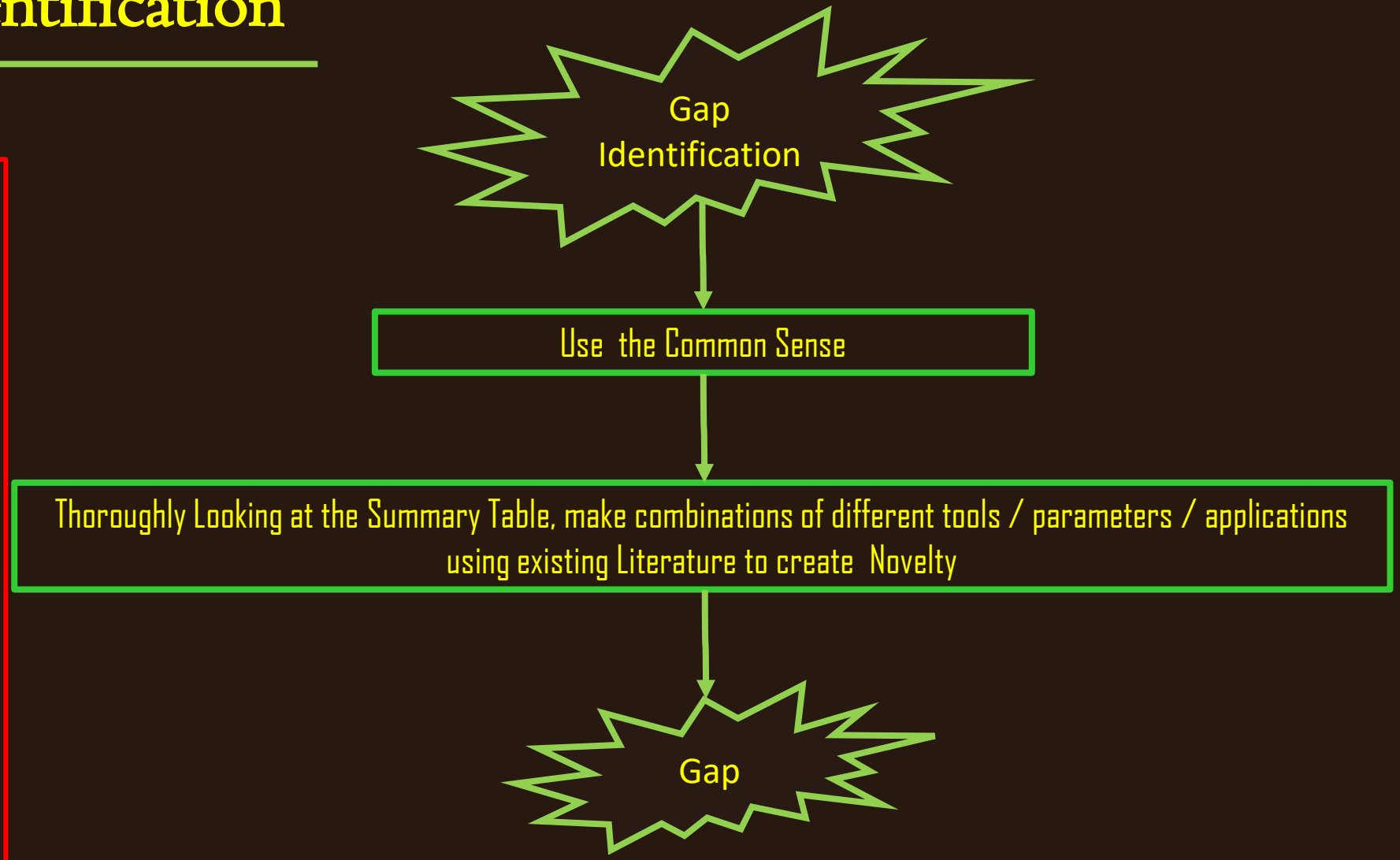
Gap Identification

Tier # II
(Pret Research)



Gap Identification

Tier # III
(Alchemy)



Author	Classes/ Channel/sub	Area	Features	Sampling/Windowing	Filter	Classifier(s)	Accuracy
Mads Jochumsen et al., 2018 [1]	5/4/8-able	Upper limb Different shoulder angle and hand posture	MAV, ZC, SSC, WL	Sampling frequency 10KHz, 200ms data window with 50ms increment	For sEMG: BPF 20-500Hz For iEMG BPF 60-2000Hz. (both sEMG, iEMG used 2nd order zero-phase shift butterworth)	Bayes Classifier	WPC: 93-98%. APC: 85-95%. BPC: 69-83%
M.Z.U.Rehman et al., 2018 [14]	7/8/7-able	Upper limb, myoarmband	---	Sampling 200Hz. Overlapping Window of 150ms with step of 25ms	HPF 2Hz (3rd order Butterworth)	Convolutional Neural Network CNN	97.8%
Tsai et al., 2015 [20]	4/6/7-able	Upper arm (shoulder and elbow motion)	STFT-ranking	Sampling at 1Khz. Window segment 256ms	Band Pass 1-250Hz	PCA (reduction) SVM (classifier)	93.9+-4.3%
Peng et al., 2015 [21]	6/8/--	Hand motion	MAV, WL	Sample at 2048Hz.	BPF 20-200Hz, notch 50Hz	NeuCube SNN	95.3%

Thank You

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Impact Factor of the Journal (Clarivate Analytics):

The impact factor (IF) or journal impact factor (JIF) of an academic journal is a scientometric index that reflects the yearly average number of citations that articles published in the last two years in a given journal received. It is frequently used as a proxy for the relative importance of a journal within its field; journals with higher impact factors are often deemed to be more important than those with lower ones.

$$\mathrm{IF}_y = \frac{\mathrm{Citations}_{y-1} + \mathrm{Citations}_{y-2}}{\mathrm{Publications}_{y-1} + \mathrm{Publications}_{y-2}}$$

For example, *Nature* had an impact factor of 41.577 in 2017:[5]

$$\mathrm{IF}_{2017} = \frac{\mathrm{Citations}_{2016} + \mathrm{Citations}_{2015}}{\mathrm{Publications}_{2016} + \mathrm{Publications}_{2015}} = \frac{32389 + 41701}{880 + 902} = 41$$

- This means that, on average, its papers published in 2015 and 2016 received roughly 42 citations each in 2017. Note that 2017 impact factors are reported in 2018
- This is called two-year Impact Factor

Five-Year Impact Factor:

And in the ’60s we (ISI) invented the journal “impact factor.” After using journal statistical data in-house to compile the Science Citation Index (SCI) for many years, Clarivate Analytics (Previously ISI) began to publish Journal Citation Reports (JCR) in 1975 as part of the SCI and the Social Sciences Citation Index (SSCI).

https://clarivate.com/webofsciencegroup/essays/impact-factor/

Beginning with the 2007 edition, Journal Citation Reports has included a 5-year Impact Factor, as well as a section on Impact Factor Trends for the last five years. The 5-Year Impact Factor is calculated in the same manner as the Journal Impact Factor, except that it encompasses five cited years rather than two. The 5-Year Impact Factor is therefore equal to the sum of citations in the edition year to items published in each of the previous five years, divided by the number of scholarly items published in the previous five years.

https://support.clarivate.com/ScientificandAcademicResearch/s/article/Journal-Citation-Reports-5-Year-Impact-Factors?language=en_US

SCImago Journal Rank (SJR):

The SCImago Journal Rank (SJR) indicator is a measure of the scientific influence of scholarly journals that accounts for both the number of citations received by a journal and the importance or prestige of the journals where the citations come from. A journal's SJR is a numeric value indicating the average number of weighted citations received during a selected year per document published in that journal during the previous three years. Higher SJR values are meant to indicate greater journal prestige. It is based on three years. It is provided by Scopus, owned by Elsevier.

https://www.scimagojr.com/index.php

Impact Factor of the Author:

The sum of all the impact factors of the journals, the author has published in. For instance, If Author A has published 10 articles during his lifetime and the journals' impact factors are 1, 5, 10.1, 1.3, 0.1, 0.2, 0.8, 2.7, 2.5, 1.8. The total impact factor of the author is 1+5+10.1+1.3+0.1+0.2+0.8+2.7+2.5+1.8 = 25.5

Journal's Quartile (Q1, Q2, Q3 & Q4)

Based on Impact Factor (IF) data, the Journal Citation Reports published by Thomson Reuters provides yearly rankings of science and social science journals, in the subject categories relevant for the journal (in fact, there may be more than one).

Quartile rankings are therefore derived for each journal in each of its subject categories according to which quartile of the IF distribution the journal occupies for that subject category. Q1 denotes the top 25% of the IF distribution, Q2 for middle-high position (between top 50% and top 25%), Q3 middle-low position (top 75% to top 50%), and Q4 the lowest position (bottom 25% of the IF distribution). For example, the 2009 Impact Factor for the ACM TRANSACTIONS ON SENSOR NETWORKS is 1.938. Thus, the journal ranks 32-nd (out of 116 journals, Q2 quartile) in the subject category COMPUTER SCIENCE, INFORMATION SYSTEMS, while it ranks 11-th (out of 76 journals, Q1 quartile) in the subject category TELECOMMUNICATIONS.

- The same procedure is used by SCImago but they use SJR Scores
- Means journal's quartile and ranking is different in both JCR by Thomson Reuters and SJR by Elsevier.

h-Index:

The h-index is defined as the maximum value of h such that the given author/journal has published h papers that have each been cited at least h times. The index is designed to improve upon simpler measures such as the total number of citations or publications.

The index was suggested in 2005 by Jorge E. Hirsch, a physicist at UC San Diego, as a tool for determining theoretical physicists' relative quality and is sometimes called the Hirsch index or Hirsch number.

$f(A)=10, f(B)=8, f(C)=5, f(D)=4, f(E)=3 \rightarrow h\text{-index}=4$

$f(A)=25, f(B)=8, f(C)=5, f(D)=3, f(E)=3 \rightarrow h\text{-index}=3$

i10-Index:

- Created by Google Scholar for measuring productivity of authors
- the number of publications with at least 10 citations
- i10-Index = 5 means author has 05 publications out of total that have at least 10 citations each

Master List of Journals (Web of Science):

Master Journal List is a free tool that allows users to search for all titles currently covered in Web of Science

https://mjl.clarivate.com/home

Journal Master List is the database that consist collection of index journals. This database can have SSCI, SCI, SCIE, ESCI index journals.

Science Citation Index (SCI) / Science Citation Index Expanded(SCIE):

The Science Citation Index Expanded (SCIE) is the larger version SCI which covers more than 8,500 notable and significant journals, across 150 disciplines, from 1900 to the present.

Emerging Source Citation Index (ESCI):

The Emerging Sources Citation Index (ESCI) was launched in late 2015 by Thomson Reuters as a new database in Web of Science. The journal's index in this ESCI will not come with an impact factor(IF). However, each journal in this new index will be evaluated every year and those qualified will be transferred to SCIE, SSCIE.

Journal Citation Report (JCR) by Web of Science:

Journal Citation Reports (JCR) provides you with the transparent, publisher-neutral data and statistics you need to make confident decisions in today's evolving scholarly publishing landscape, whether you're submitting your first manuscript or managing a portfolio of thousands of publications.

https://clarivate.com/webofsciencegroup/solutions/journal-citation-reports/

HEC Journal List:

A collection of research journals that are categorized into three different categories – W, X and Y -- within their respective knowledge areas on the basis of a number of internationally bench marked and recognized parameters that measure the quality of a journal.

https://hjrs.hec.gov.pk/

Beall‘s List of Potential Predatory Journals And Publishers:

https://beallslist.net/

Beall's List was a prominent list of predatory open-access publishers that was maintained by University of Colorado librarian Jeffrey Beall on his blog Scholarly Open Access. The list aimed to document open-access publishers who did not perform real peer review, effectively publishing any article as long as the authors pay the open access fee. Originally started as a personal endeavor in 2008, Beall's List became a widely followed piece of work by the mid-2010s. Its influence led some publishers on the list to threaten defamation lawsuits against Beall, as well as to lodge official complaints against Beall's work to the University of Colorado. As a result, Beall deactivated his blog and the list in January 2017.

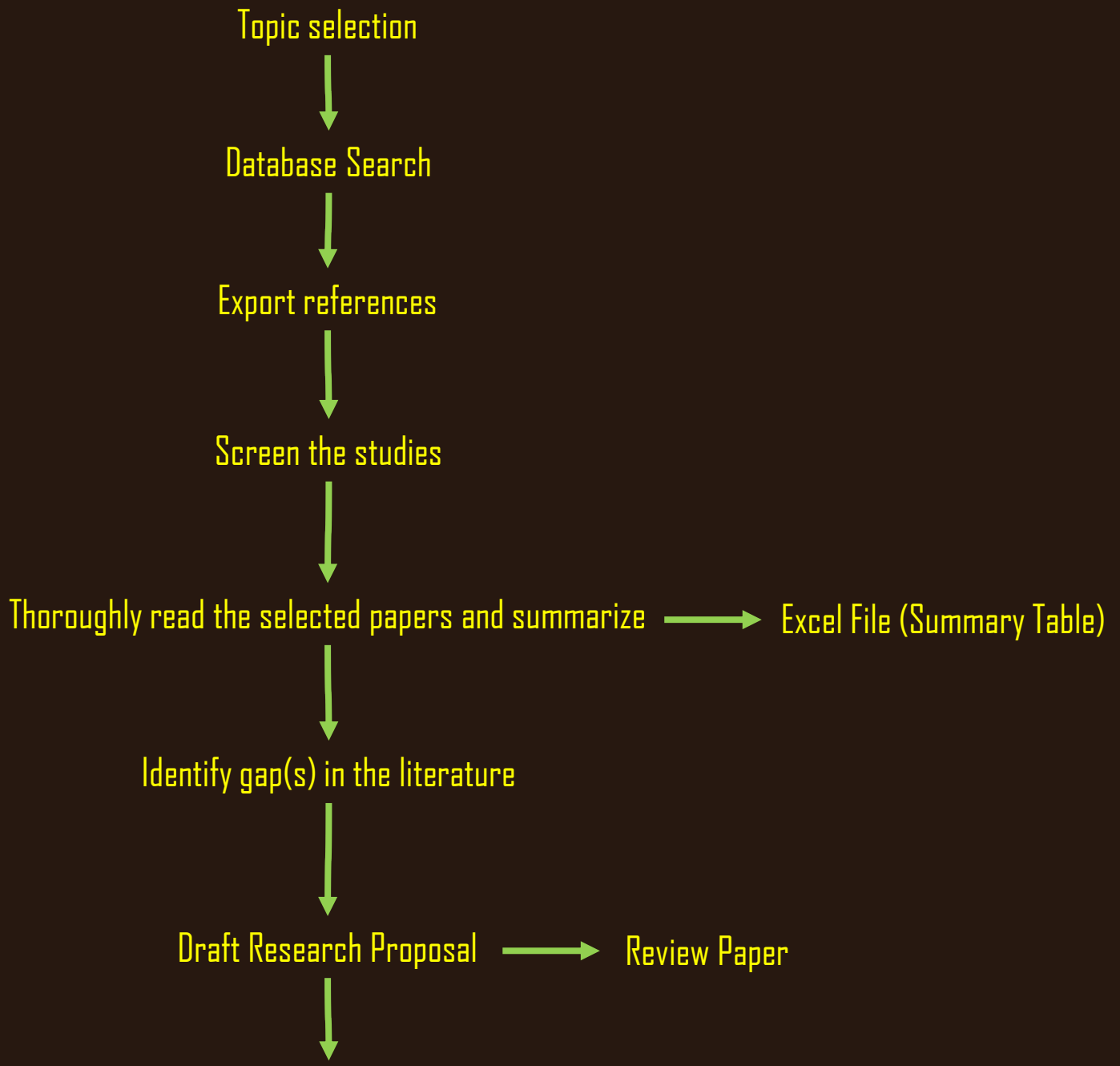
Thesis / Dissertation Writing:

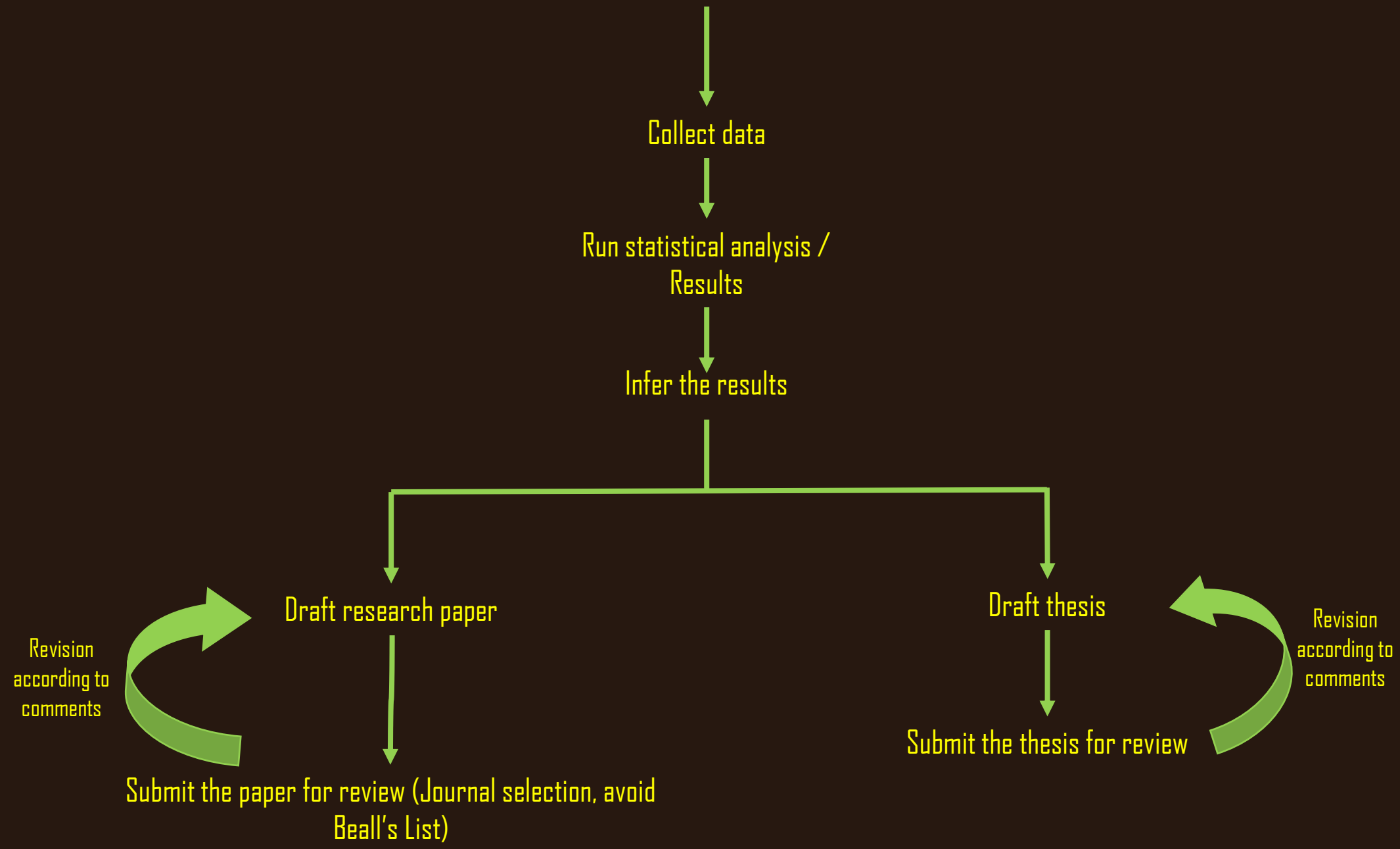
- Students in the United States are required to make a thesis to get a master degree & to write a dissertation to get a PhD degree and vice versa in Europe.
- Follow University Template / Supervisor's guidance
- Thesis / Dissertation is a detailed account of your research. It encompasses a thorough review of a literature and all the details of your research work.
- A Thesis / Dissertation is drafted first, later on you can extract material for research articles.
- In comparison to research original article, a thesis is rather generalized for wider population. That's why you should add some bookish knowledge or basic information about the area of research before going to advancements (Literature review, Methods, Results etc..)

Rebuttal / Response Letter:

- The rebuttal letter is an author's chance to directly reply to the reviewers, announce plans to improve the work, clear up misunderstandings or defend aspects of the work.
- Write a cover letter and attach a separate document in which you have addressed the reviewer comments
- Do acknowledge that the reviewers spent a substantial amount of time looking over the paper – rebuttal letters that thank the referees for their time and comments set a positive tone and ensure that the exchange takes place on a productive footing
- Address each and every point raised by the editor and reviewers
- If you cannot address a point, give a reason
- When adding new data or figures, mention their location in the manuscript
- Maintain a polite and respectful tone throughout
- Don’t vent or accuse the reviewers of bias or incompetence.
- Don’t plead that for personal or monetary reasons critically important experiments can’t be performed
- Don’t ignore specific requests by referees without comment and selectively only answer a few queries.
- Don’t rephrase a referees’ point to give it a slightly different meaning that you can more easily address.

RESEARCH METHODOLOGY FLOWCHART




Collect data
Run statistical analysis / Results
Infer the results
Draft research paper
Revision according to comments
Submit the paper for review (Journal selection, avoid Beall's List)
Draft thesis
Revision according to comments
Submit the thesis for review

Thank You

TEXT AND REFERENCE BOOKS

1. Patterns of College Writing (4th Edition) by Laurie G. Kirszner and Stephen R. Mandell. St. Martin's Press
2. The Mercury Reader. A Custom Publication. Compiled by Norther Illinois University. General Editiors: Janice Neulib; Kathleen Shine Cain; Stephen Ruffus and Maurice Scharton.
3. Writing. Advanced by Ron White. Oxford Supplementary Skills. Third Impression 1992. ISBN 0 19 435407 3 (particularly suitable for discursive, descriptive, argumentative and report writing).
4. College Writing Skills by John Langan. McGraw-Hill Higher Education. 2004.

Curriculum of Biomedical Engineering by Higher Education Commission 2017

What is the simplest definition of Technical Report Writing you can think of?

Technical Report Writing is the writing of technical reports!

A technical report (also scientific report) is a document that describes the process, progress, or results of technical or scientific research or the state of a technical or scientific research problem.

It usually includes in-depth experimental details, data, and results.

What is the simplest definition of Research you can think of?

Research is…

the creation of knowledge that

did not exist before

Now more difficult (and more proper) definitions…

‘a careful study of a subject, especially in order to discover new facts or information about it’

Oxford learner’s dictionary

‘the systematic and objective analysis and recording of controlled observations that may lead to development of generalizations, principles, or theories, resulting in prediction and possibly ultimate control of events’

Research in Education by John W Best

‘investigation or experimentation aimed at the discovery and interpretation of facts, or practical application of new or revised theories or laws’

An Introduction to Research Procedure in Social Sciences

by M H Gopal

Scientific Research in a nutshell

You have a question

Check if anyone else has addressed that question
(Literature Review via different databases)

No

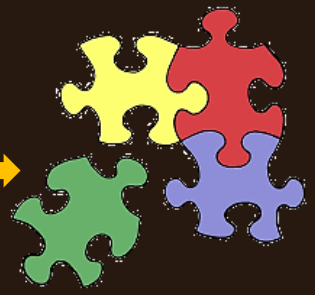
Design a research study

Yes

Change your question

Collect information
(Data Collection)

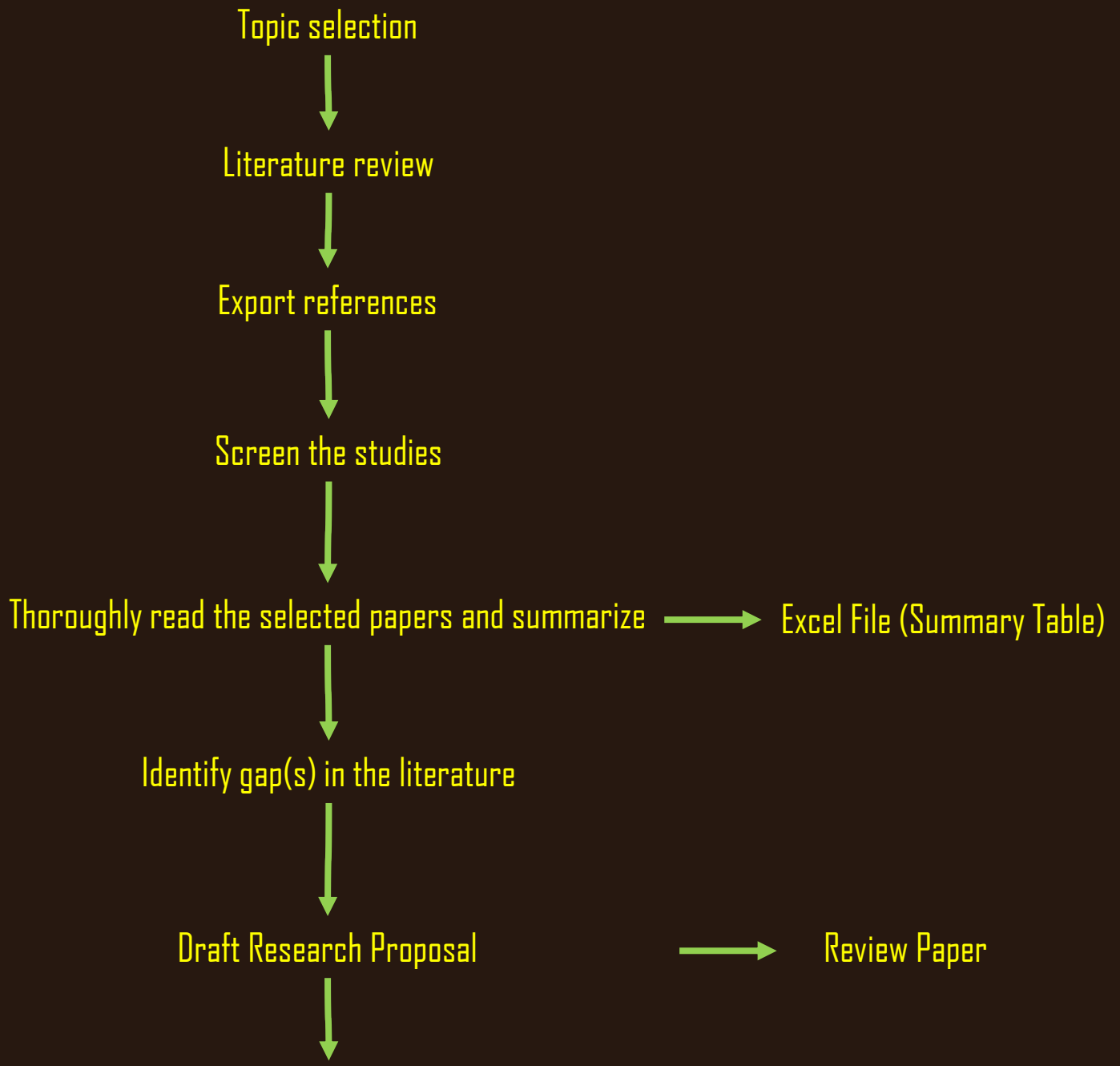
Analyse this data
(Statistical Analysis)

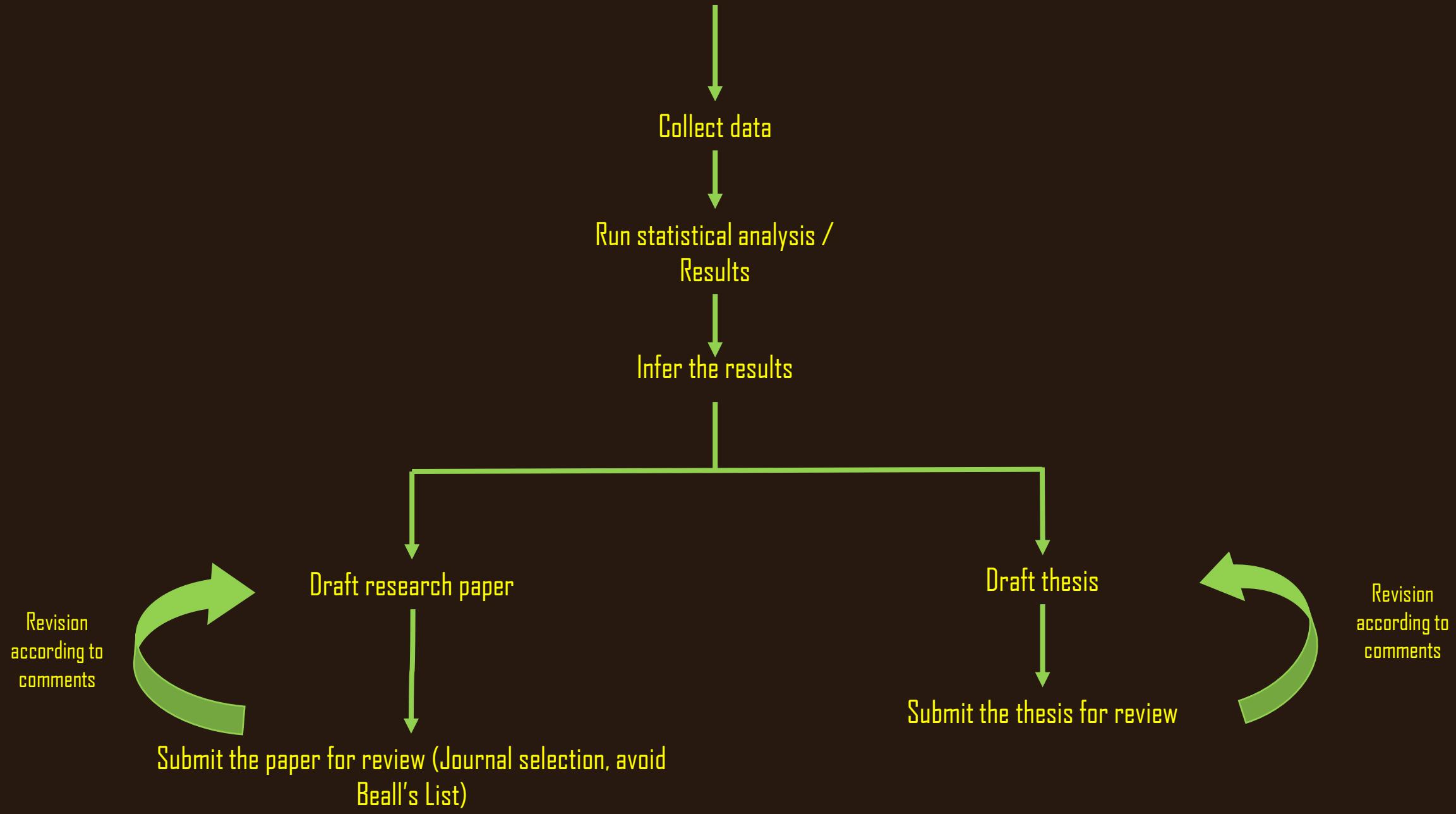


Interpret this analysis

Write it all down
(Thesis, Research Papers, Conferences Proceedings, Patents)

ENGINEERING RESEARCH METHODOLOGY FLOWCHART

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Draft thesis
Submit the thesis for review
Revision according to comments

Journal Vs Conference

Journal Articles	Conference Proceedings
A journal is a regular periodical publication, printed say monthly or bi-monthly, containing a collection of peer reviewed papers.	Conference : A conference is a place where researchers are physically present to discuss and present their research specific to a field. Proceedings are collections of papers presented at a conference and printed later
Most Reputable in academia: Web of Science (WoS) & Scopus Indexed	Less Reputable as compared to the Journal Articles but acceptable if the proceedings are indexed in IEEE Xplore, Web of Science or Published by Springer, Elsevier or in Scopus / WoS indexed Journals
Avoid Beall's List (List of Predatory Journals) Beall's List – of Predatory Journals and Publishers	The purpose of the conference is to build confidence in young researchers.
Journal Articles may be open access or may not be. But It is considered that both of the Journal articles are equal if they are indexed in WoS or in Scopus.	To announce discovery at earliest possible as Journal articles take time to get to public
Open Access means visible to public at no cost / full text accessibility of the article via Google	To market / sale your product as the companies are present in conference
Open access takes charges from author while free journal takes money form reader	To increase research network in terms of collaboration

Journal Articles and Conference Proceedings:

Conclusion:

- Proceed with the journal publication *iff* targeted journal is Web of Science or Scopus Indexed

- Proceed with conference *iff* conference is indexed in IEEE Xplore / Web of Science or published by Springer / Elsevier or by the journal indexed in Web of Science / Scopus

KNOWLEDGE DIFFUSION SERIES

December 12, 2020

Regulatory Framework of Higher Education in Pakistan

Policy Regarding Conference Papers

1. Conference paper has no worth for the award of PhD or faculty appointment.

2. If conference paper proceeding is published by any recognized journal then it will be considered as HEC recognized depending upon category of that journal.

Reference: No. 2(22/Acad(SS&H)/HEC/2017/236
December 5, 2017
And
1-4(MS/PhD)/QAD/HEC/2018/86/293
December 3, 2018

Start with your topic selection please….

1. Brainstorm (Personal Interest)
2. Google (Google Scholar)
3. Check the first link
4. Read the title and abstract
5. Is this what you are interested in?
6. If yes, go through the full text
7. Underline the terms you do not understand in the first run
8. Search for the terms and understand them
9. Then go through the full text of the article again
10. Summarize the topic it in your own words (not more than 100)
11. Select the keywords for the next step

Task # 1

Deadline: 11th March 2024

Marks: 5

Thank You

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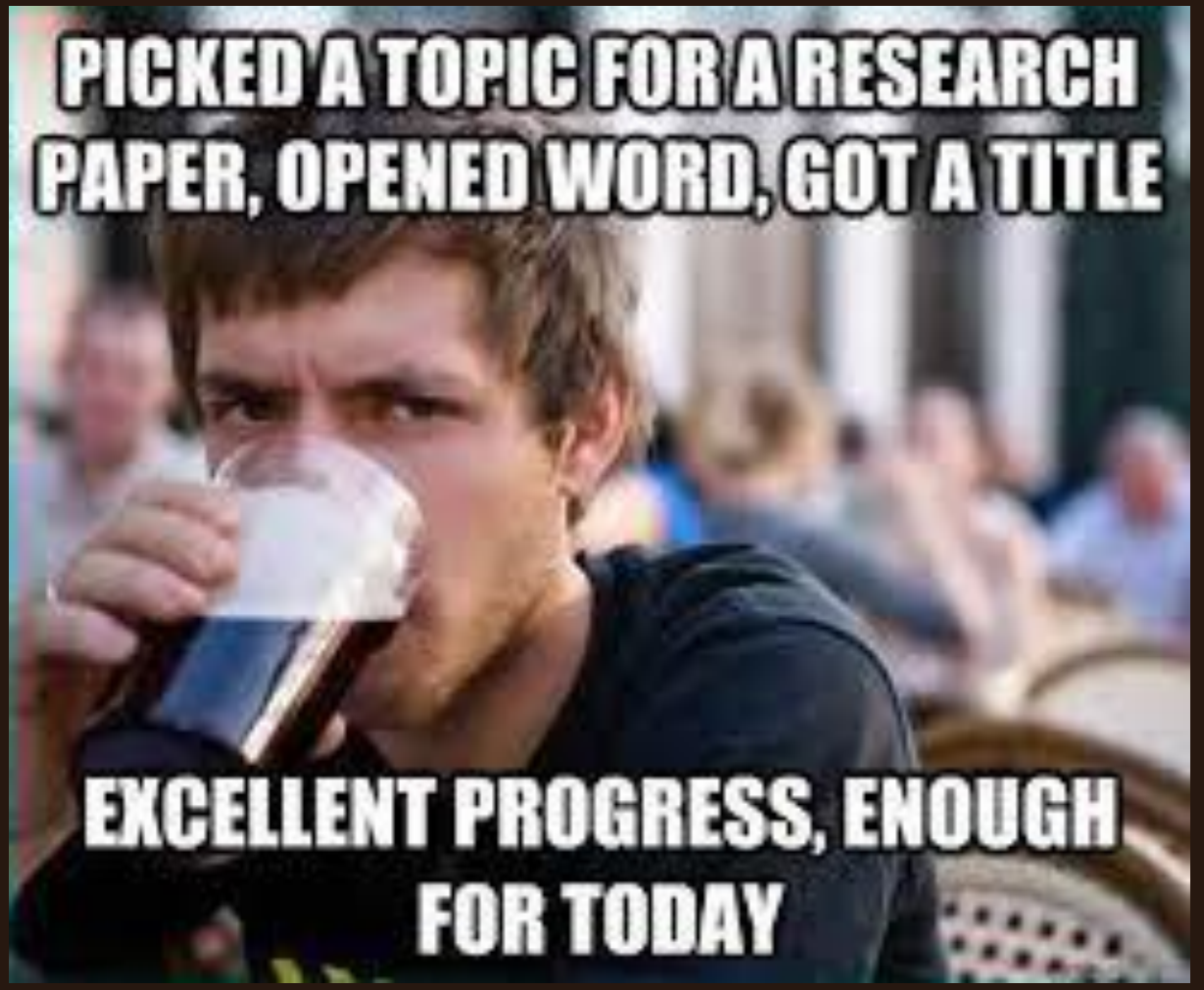
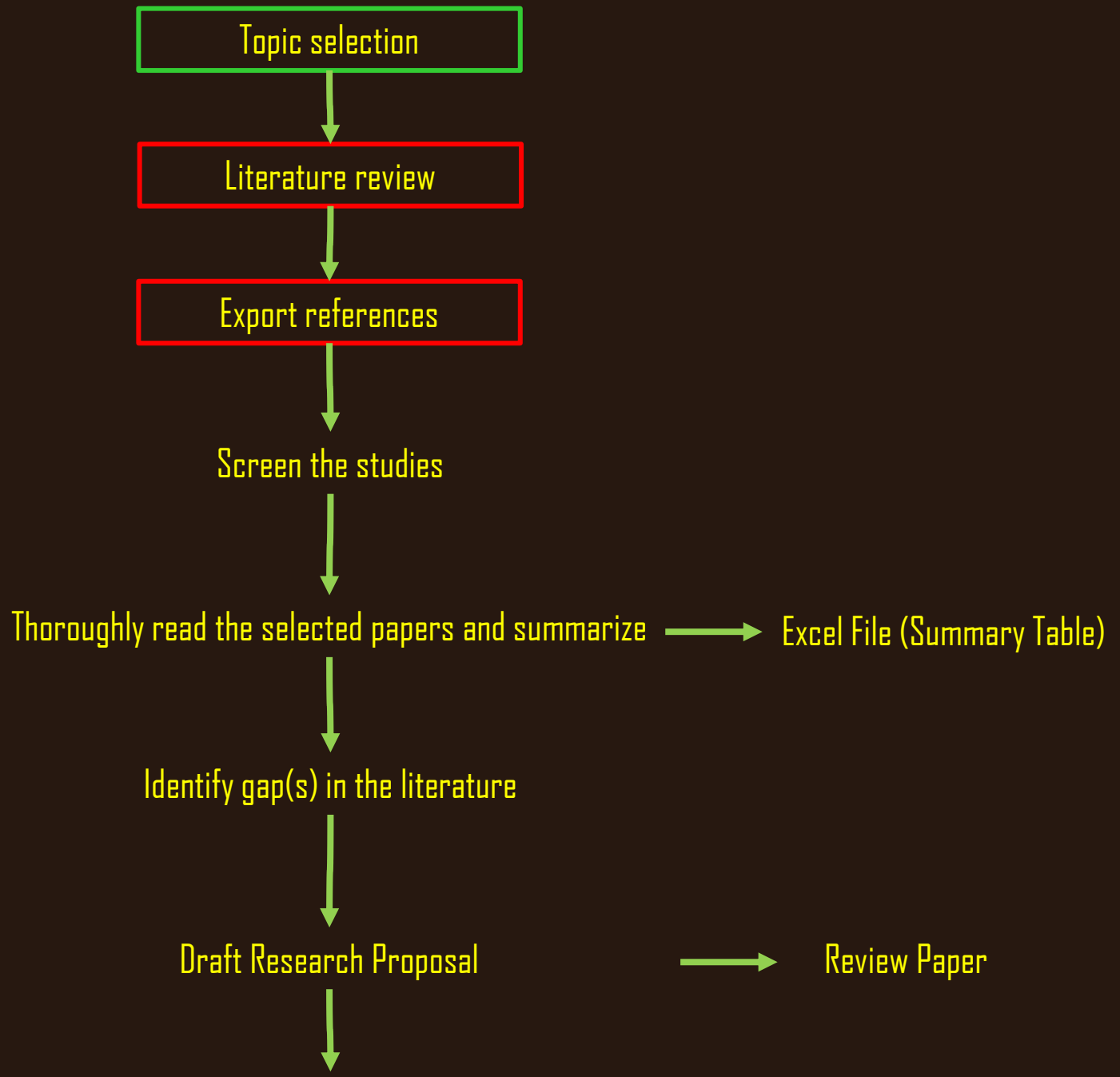
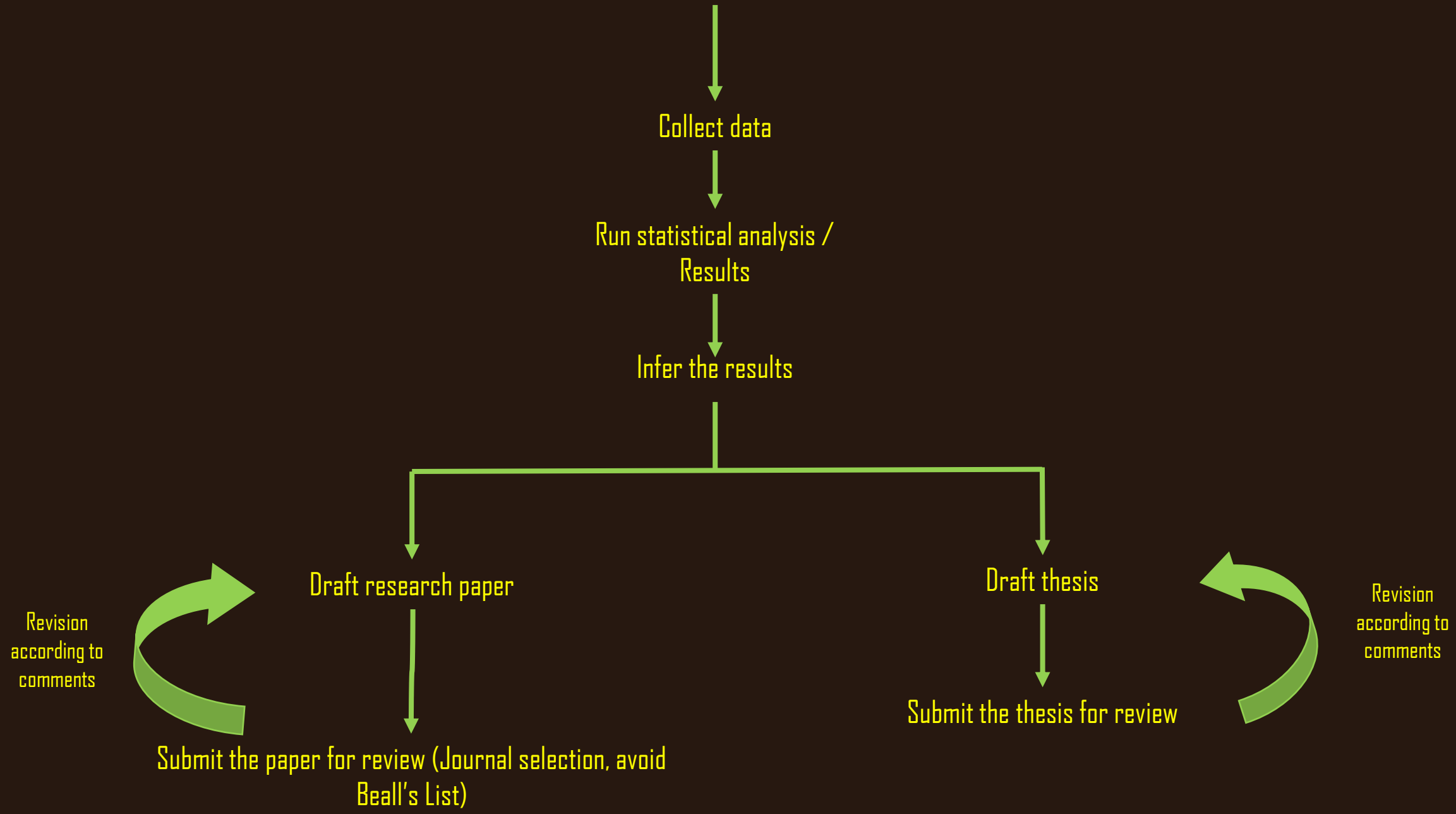

PICKED A TOPIC FOR A RESEARCH PAPER, OPENED WORD, GOT A TITLE
EXCELLENT PROGRESS, ENOUGH FOR TODAY

ENGINEERING RESEARCH METHODOLOGY FLOWCHART




Collect data
Run statistical analysis / Results
Infer the results
Draft research paper
Revision according to comments
Submit the paper for review (Journal selection, avoid Beall's List)
Draft thesis
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Revision according to comments

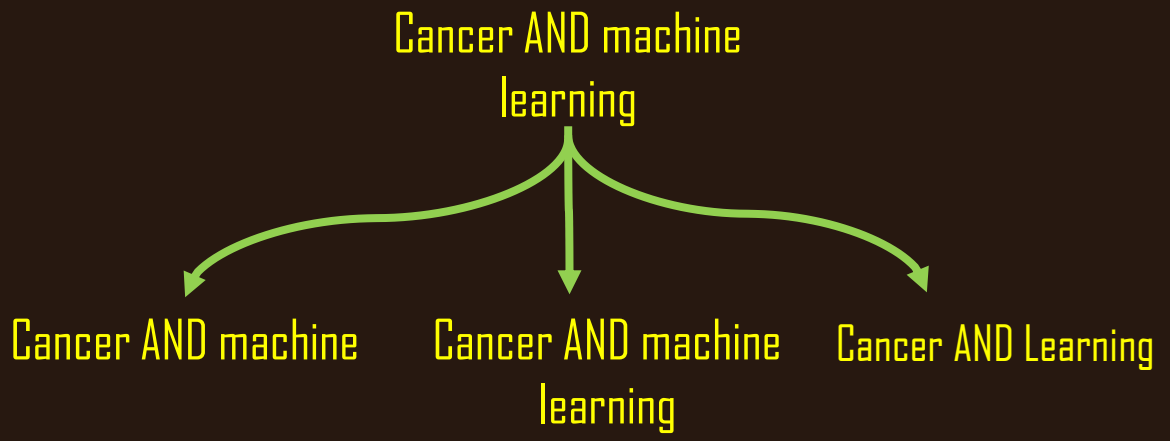

STRESS
STRESS EVERYWHERE

Literature Search (Step II)

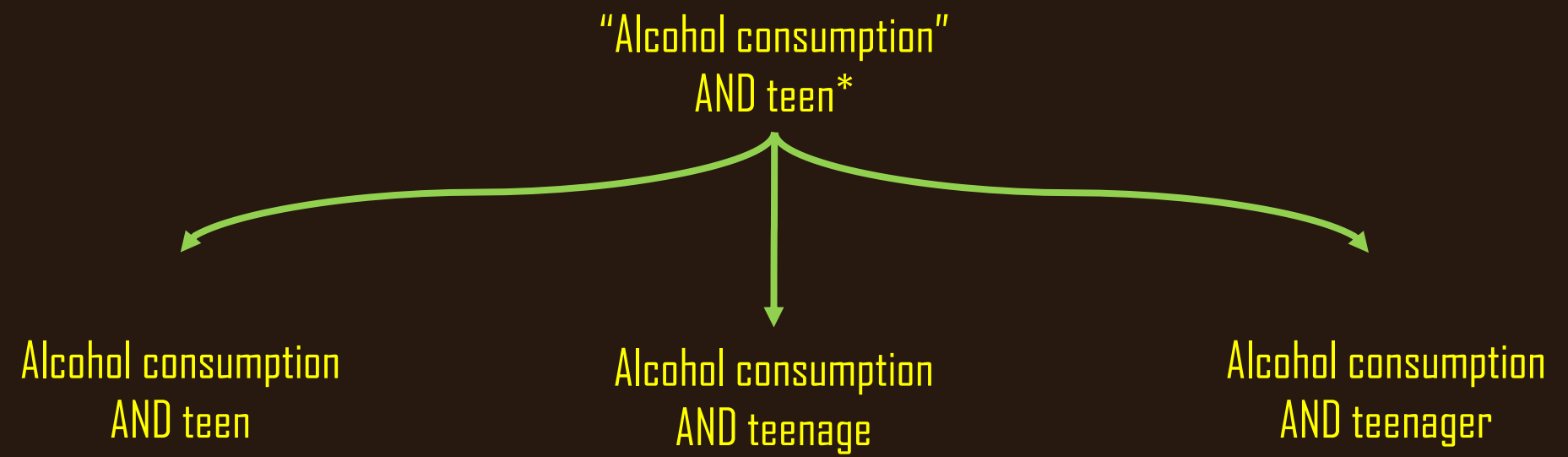
- Always use advanced search
- Use operators AND / OR to limit / expand search (If confused, prefer to use OR operator)
- To further limit your search use inverted comma in compound word like (Cancer AND “machine learning”)

Cancer AND “machine learning”

Machine learning is taken as single word, only the those articles will pop up that contain cancer and machine learning only



- Use asterisk (not for ScienceDirect) to find all the similar words:



- You can still limit your search by selecting Journal articles only or customize year span etc.

RULE OF THUMB

"Search strategy is not a fixed / confirmed / straight science. Trial and Error will often uncover the right terms. Usage of the keywords given in research articles may also be useful. Literature search should be performed many times (at least twice: at the start of the research and before starting thesis writing) during the research for the confirmation of novelty."

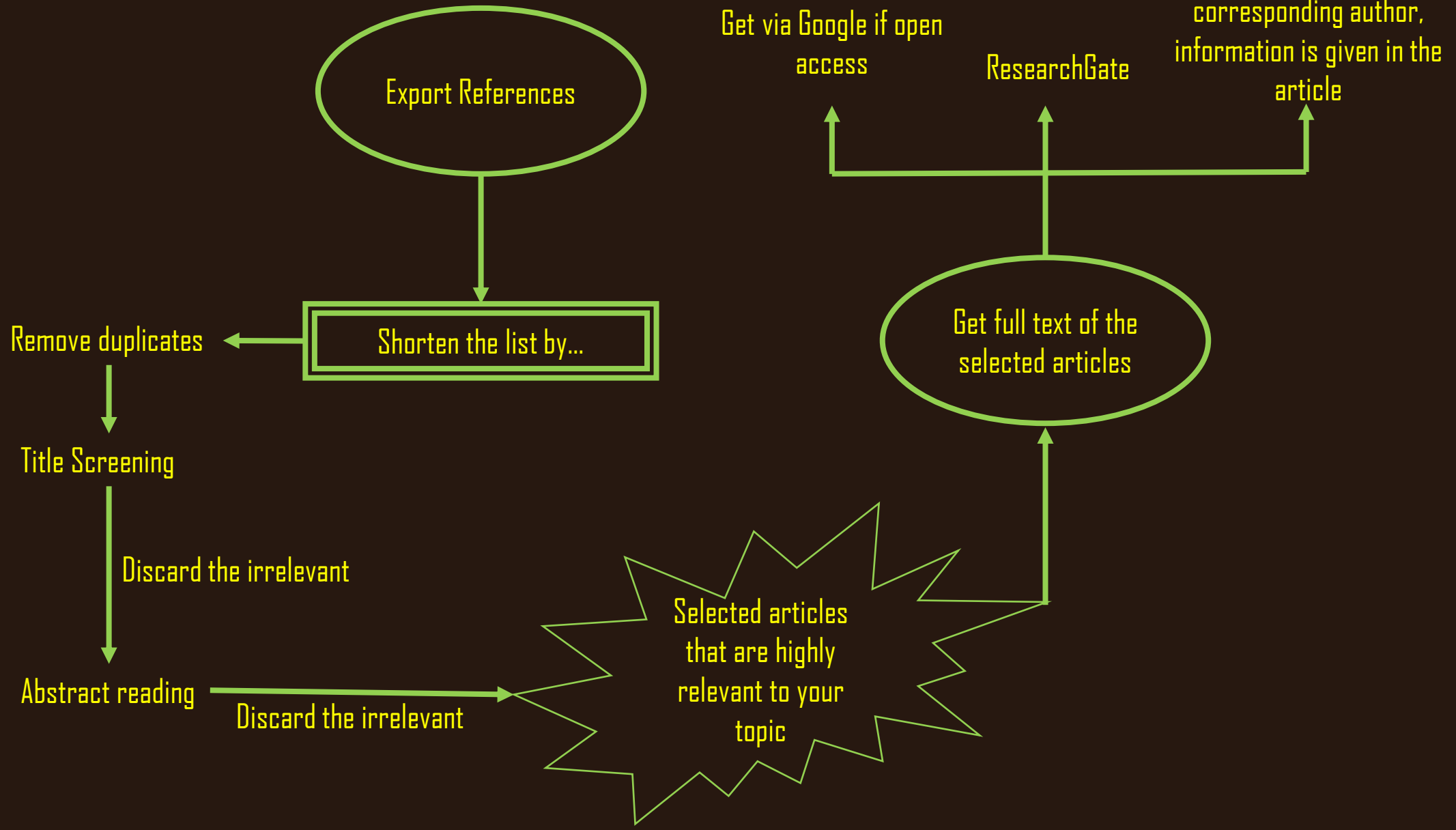
TASK # II
Deadline: 18 March 2024
Total Marks: 05

- Finalize keywords for your research
- Perform search via different databases i.e. IEEE Xplore, ScienceDirect, PubMed and by using AND / OR / NOT operators
- Download all RIS and PubMed literature citation files
- Make account to Endnote Web for collection and management of references
- Collect all references via Endnote web
- Remove Duplicates

TASK # III

Deadline: 24 March 2024

Total Marks: 05



Thank You

TECHNICAL REPORT WRITING & PRESENTATION SKILLS

Muhammad Shaheer Mirza (Engr.)
MS (BME, ZU), BE (BME, ZU)

Lecturer at the Department of Biomedical Engineering,
Faculty of Engineering, Salim Habib University

WRITING AN ORIGINAL RESEARCH ARTICLE

Scientific Article Writing

- Most important kind of communication among scientific community.
- That's why ***"Publish or Perish"*** has become the most important phrase in academia.
- A researcher who has at least one ISI-Indexed (W category) journal publication as a first author can guide you in article writing in the same field.

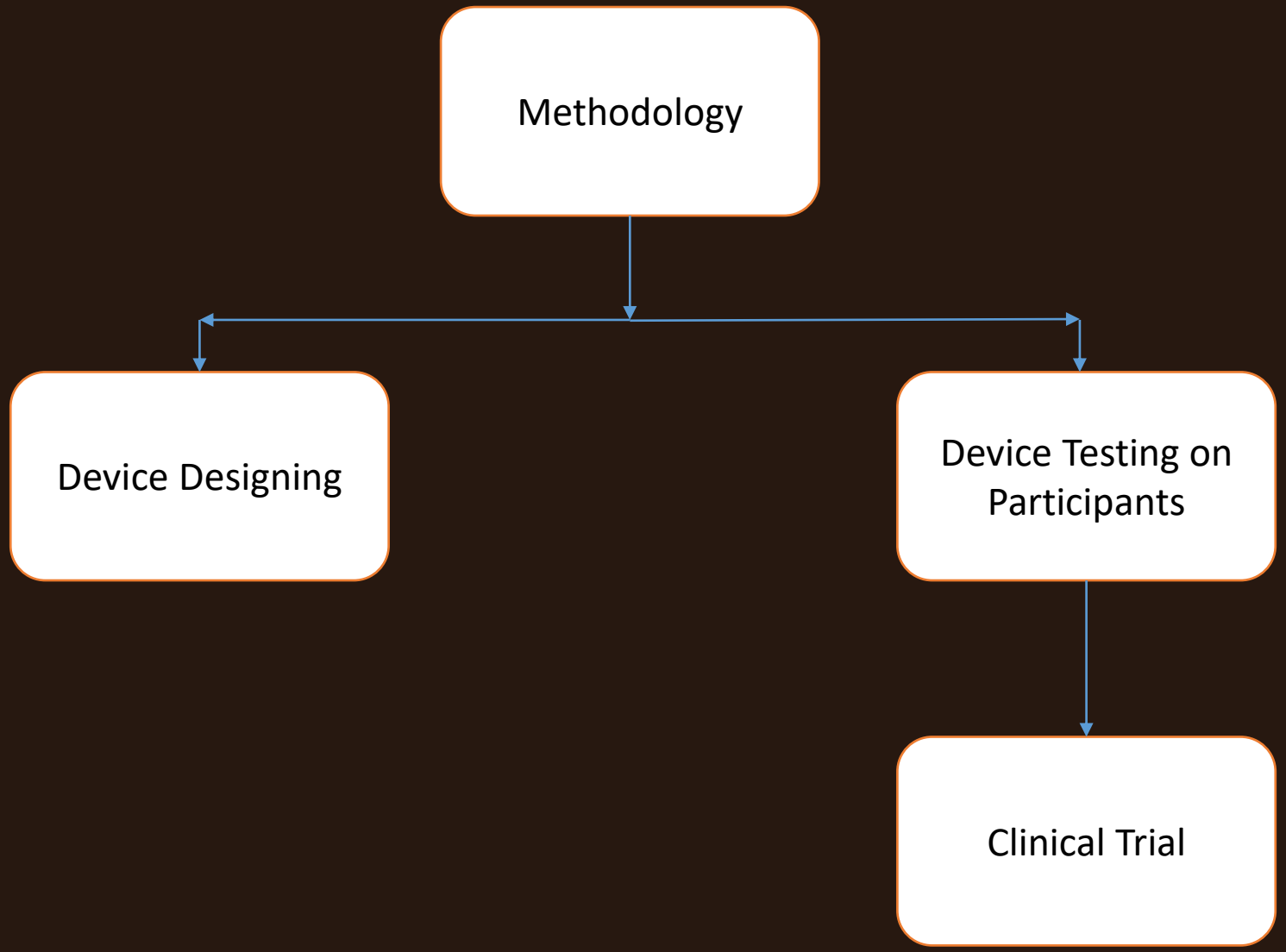
Major Sections in an Article

- Introduction
- Methodology / Methods / Material and Methods
- Results
- Discussion
- Conclusion
- References

"IEEE format combines results and discussion section"

Sequence of Writing Sections

1. Methodology
2. Results
3. Discussion
4. Conclusion
5. Introduction
6. Abstract
7. Title of the study


Methodology
Device Designing
Device Testing on Participants
Clinical Trial

Section II – Methodology (Device Designing)

- Around 500 to 1000 words (No definite length)
- Past tense
- Divided further into sub-headings:

1. Explain the device: Components, circuit, device material with pros and cons (Use labelled pictures, flow-charts etc)

2. Parameters of Interest

3. Working principle of the device – Underlying physics

Design and Development of 6-DOF Robotic Arm Controlled by Man Machine Interface

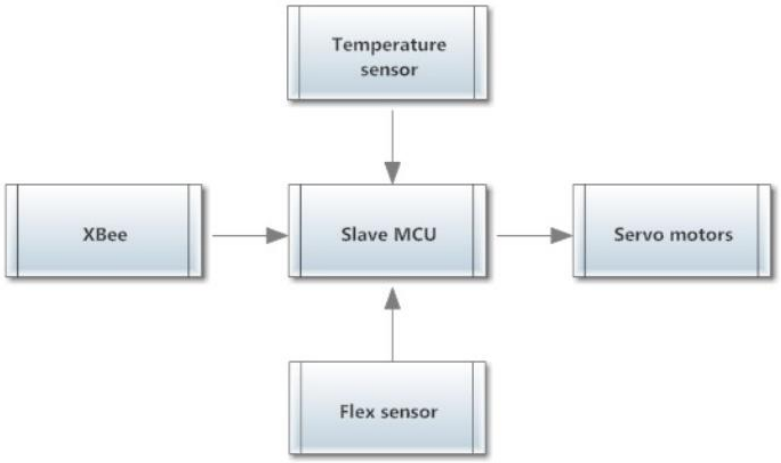


Fig. 1: Block diagram of Robotic Arm (Slave)

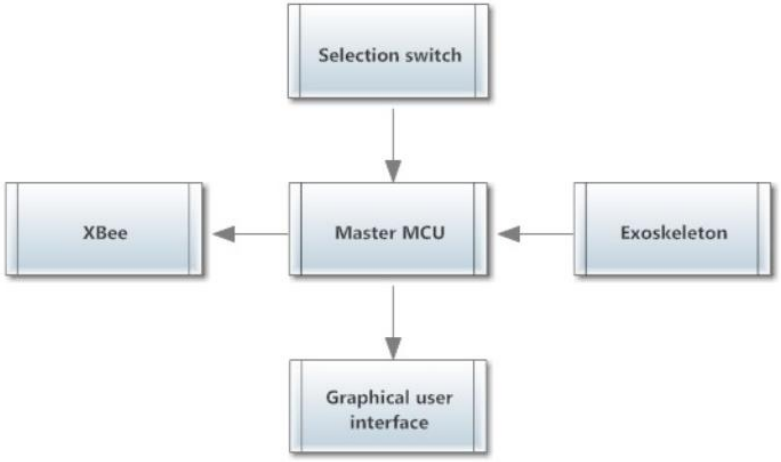


Fig. 2: Block diagram of Man Machine Interface (Master)

II. ROBOTIC ARM

The primary advantage of tele-operation is that homo-sapiens are adaptive and hence are compatible in dealing with unstructured environments. Specifically, this is an anthropomorphic robotic arm with 6-DOF (degree of freedom) [2]. The 6-DOF covers the major and most common arm movements to cover a large volume, and it also makes the arm easy to manoeuvre to lift and move objects in any orientation of space. It is very similar to a human arm with respect to the number and positioning of joints. Of the six degrees of freedom, four are for positioning (including the gripper) and two for orientation. If the joints are compared to their human equivalent, then the robotic arm can be said to have the following joints: abduction (shoulder rotation), shoulder back and forth [3], elbow, wrist up and down, pivot (wrist rotation), and gripper[7].

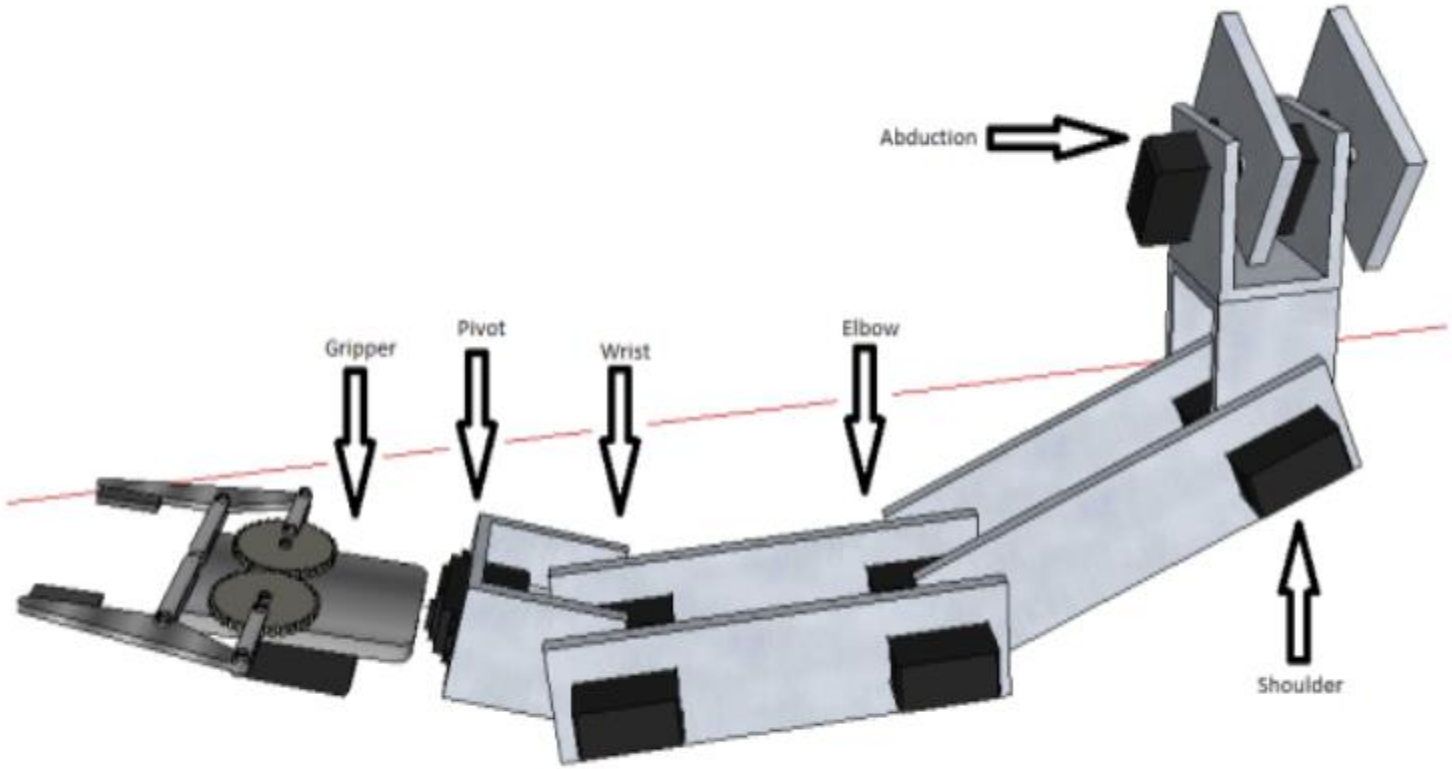


Fig. 3: 3D sketch of 6-DOF robotic arm

TABLE 1
JOINT RANGES AND NUMBER OF SERVO MOTOR

Joint	Range (degrees)	No. of Servos
Abduction	105	2
Shoulder	130	2
Elbow	125	2
Wrist	180	2
Pivot	180	1
Gripper	NA	1

Specifications of the Robotic Arm are:

- Length: 68.5cm(When straight)
- Width: 4cm
- Weight: 2096gms (Moving part only)
- Load capacity: 500gms
- Degree of freedom: 6

The specifications of the 2 DOF gripper used are:

- Gripping size: 50mm
- Gripping force: 500gms (Maximum)
- Length: 110mm (When fully closed)
- Weight: 157gms (Including 2 NRS-585 servo motors for gripping and twisting)

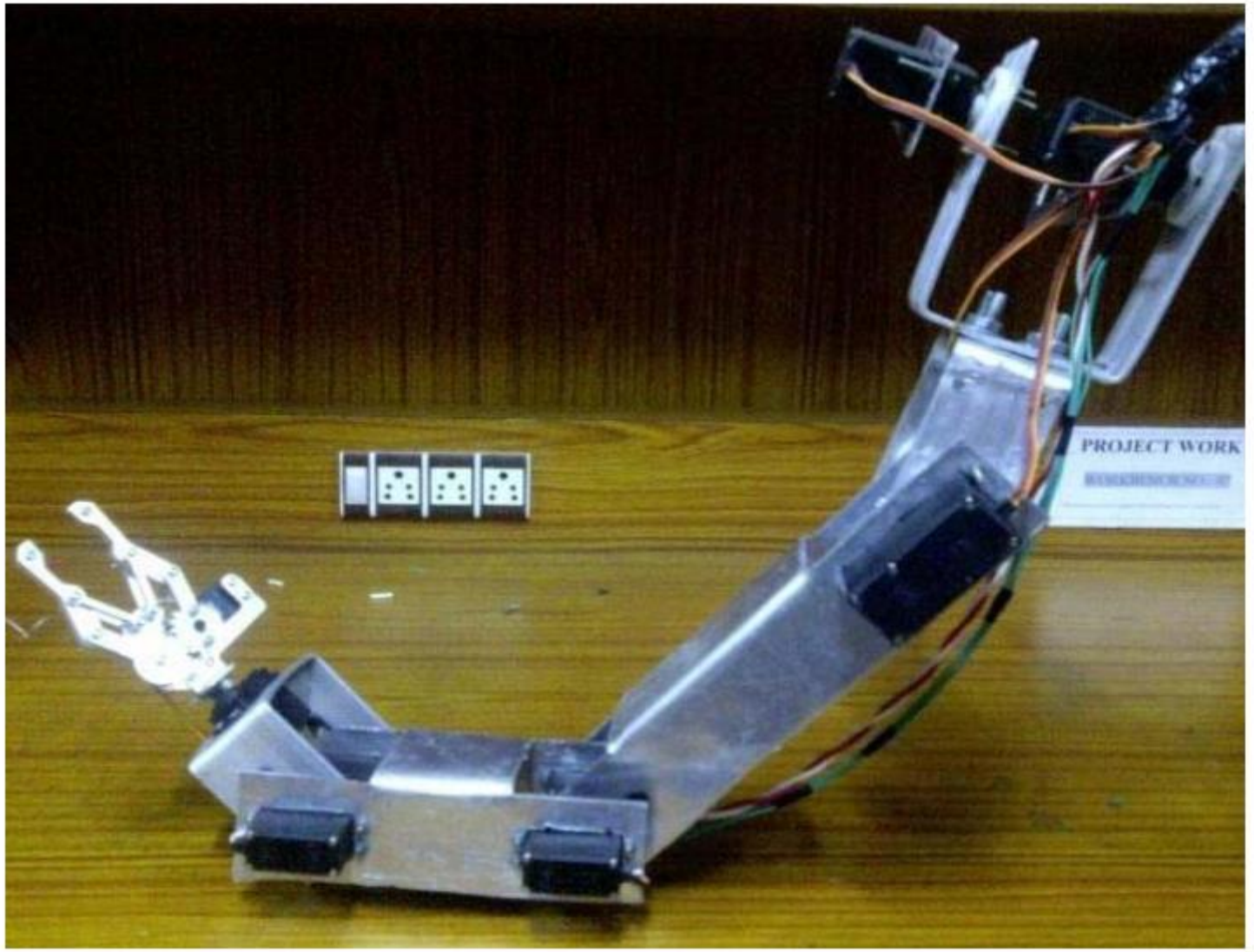


Fig. 4: Actual 6-DOF robotic arm

III. MAN MACHINE INTERFACE

Special emphasis has been given to the ease of operation and some form of force sensation. The control rig is fitted to the user's arm. Use of a 'wearable' jig in a bilateral master slave control setup has been introduced to simplify the MMI (Man-Machine Interface)[4][5].The prototype of the master unit, shown in Fig. 5 and Fig. 6, is aluminium alloy frame which the user straps onto his arm.

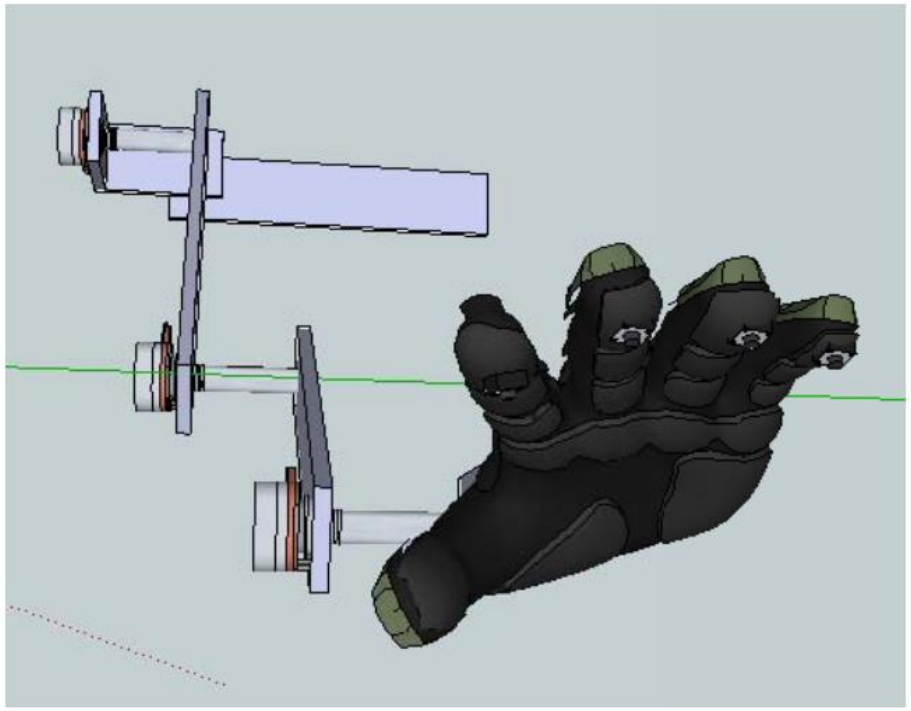


Fig. 5: 3D sketch of the MMI (Front view)

Fig. 7: Man Machine Interface

Figure 7 shows the developed Man Machine Interface for the control of the robotic arm. This arrangement is used to measure the positional error. A joint is commanded to move to a certain angle, and the voltage from the corresponding potentiometer is read. The Atmel 2560 mega microcontroller used for control operations of the humanoid has 14 PWM ports with individual timers, hence the ALU is free for other operations rather than keeping track of the timer count. The inbuilt mapping function in the wiring language of the Atmel 2560 mega maps the analog voltage signals into corresponding outputs to drive the servomotors of the humanoid. All the electronic circuitry of the humanoid is powered by a Lithium Polymer 2 Cell, 7.4V, 5000mAh, 30C discharge Battery.

Section II – Methodology (Clinical Trial)

- Around 500 to 1000 words (No definite length)
- Past tense
- Divided further into sub-headings:
    1. Participant Information
    2. Inclusion and exclusion criteria
    3. Sample Size
    4. Ethical Approval
    5. Data Collection Protocol
    6. Statistical Analysis

Effects of different foot progression angles and platform settings on postural stability and fall risk in healthy and medial knee osteoarthritic adults

Methods

Participants

In total, 20 participants were recruited for the healthy control group (CG) from the general community having no known symptoms of any degenerative lower limb joint deformity. In total, 20 participants with bilateral symptomatic medial compartment knee OA, comprising the OA group (OAG), were recruited from the Department of Sports Medicine, University of Malaya Medical Centre. Medial compartment knee OA was confirmed through anteroposterior weight-bearing radiographic evidence and was graded according to Kellgren–Lawrence scoring system. The healthy participants also went through a weight-bearing radiographic examination. The experiment was conducted at the Body Performance Lab, University of Malaya.

Inclusion and exclusion criteria

The inclusion criteria for both the CG and OAG were of age 50–70 years and body mass index (BMI) of less than 30 kg/m^2 (non-obese).[27] The OAG were of Kellgren–Lawrence grade II and III and required to ascend and descend a 10-steps flight of stairs and jog 5 m safely. The participants were excluded on the basis of any neurological or musculoskeletal disorder, cardiovascular or respiratory disease, lower limb fracture/surgery in the past 12 months or inability to adopt toe-in and toe-out gait pattern. The patients were also excluded if they had other deformities like knee extension lag, excessive internal/external tibial rotation or mid-tarsal abduction deformity.

Sample size

The sample power calculation was based on the OSI of physical balance and considered an *F*-test statistical design for repeated measures (between and within effects), with a moderate effect size of 0.25, a power of 80% and an alpha error of 5% suggesting each group should contain at least 20 participants.

Ethical approval

Ethical approval was obtained from UMMC Medical Research Ethics Committee (MREC), MECID.NO: 20161-2070. All participants provided written informed consent for the study.

Protocol of balance assessment

The Biodex Balance System (BBS; Biodex Medical System Inc., Shirley, NY, USA) assesses a person's neuromuscular control over balance. The machine consists of a circular platform and a display unit, see Figure 1. The participant stands on the circular platform which tilts up to 20° in each direction (360° range of motion). The platform tilts according to the level set through the display unit. There are 12 levels of platform tilt, with 12 being the easiest and 1 being the most difficult. By varying the platform level, the force exerted by the springs attached to the underside of the platform is changed. The force of each platform level is pre-set by the manufacturer using eight springs placed underneath the perimeter of the balance platform. Each spring, having an

uncompressed length of 0.14 m, when compressed to 0.75 m, exerts a force of 88.9 N to the platform. The resistance level declines from most resistant (level 1) to least resistant (level 12), with each resistance lasting 3.75 s.

For this study, the following set of platform settings was used in random order:

1. Postural stability:
    1. Static.
    2. PS8: dynamic platform setting 8.
2. Risk of fall:
    1. FR12: each test trial starts from dynamic level 12 and keeps on decreasing to level 8.
    2. FR8: each test trial starts from dynamic level 8 and keeps on decreasing to level 2.

The platform can move in anterior–posterior (AP) and medial–lateral (ML) axes simultaneously, giving three types of measurements: anterior–posterior stability index, medial–lateral stability index and OSI. This study focused on OSI only (calculated as in the equation below), because it is reported to be the most reliable parameter for assessing balance.[28] A higher control over balance is indicated by a lower OSI score

$$OSI = \sqrt{\frac{\sum (0 - X)^2 + \sum (0 - Y)^2}{No.\ of\ samples}}$$

At the centre of balance (the position at which the participant is standing balanced, represented by the dot in the middle of the crosshair on screen), the x and y variables are (0,0). As the user deviates from the centre of balance in sagittal plane, the value of x increases; while when they deviate from this centre of balance in frontal plane, the value of y increases. In other words, we can say that x and y represent the coordinates of the centre of gravity on the platform, whose value is (0,0) at time $t = 0$. Number of samples is the number of test recordings for each test protocol.

Data collection

In this single-visit study, the participants were briefed about the study protocol and introduced to the BBS. Before the starting the experiment, they filled out the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) version VA3.1. It is a self-reported questionnaire containing three sections for pain, stiffness and difficulty performing daily activities. Each of the 24 questions is represented by a score of 0–10 (2 points each for none, mild, moderate, severe and extreme pain levels), with a higher score indicating worse pain, stiffness or physical function.

The participants were asked to stand on the BBS facing the monitor, barefoot with eyes open and their hands on their hips. Trials were discarded if they supported themselves with handlebars. The distance

between the heels was kept constant at 0.16 m in order to avoid the adaptability effects on the stabilizing response due to different heel distances.[22,24] The data were taken with the following FPAs: (1) participant's natural FPA (*N*), (2) 10°, (3) 20°, (4) 30°, (5) 40°, (6) −10° and (7) −20° (see Figure 2). They were asked to stand straight and sway without changing their foot positions, in order to keep the moving black dot at the centre of the crosshair displayed on the monitor. For each platform setting and each toe angle, two trials were obtained, each of 30-s duration and separated by a 10-s rest period. For each participant, 28 data points were obtained (four platform settings × seven toe angles). These settings and toe angles were randomized through www.randomisation.com.

Statistics

Shapiro–Wilk test was applied to the data to assess normality. Independent sample *t*-test was applied to compare demographics between the participant groups. Mann–Whitney test ($\alpha = 0.05$) was applied to compare WOMAC scores using IBM SPSS version 20 (SPSS Inc., Chicago, IL, USA).

Three-way mixed repeated measures analysis of variance (ANOVA) was applied keeping group (CG or OAG) as the between-participants variable and platform settings and toe angles as the within-participants variables. Bonferroni corrections were applied for post hoc analyses. Simple contrasts were observed for the significant interaction effects. Mann–Whitney test ($\alpha = 0.05$) was applied to compare WOMAC scores using IBM SPSS version 20 (SPSS Inc., Chicago, IL, USA).

Figure 1. Biodex Balance System, Biodex Medical Systems, Inc. (courtesy: operation/service manual).

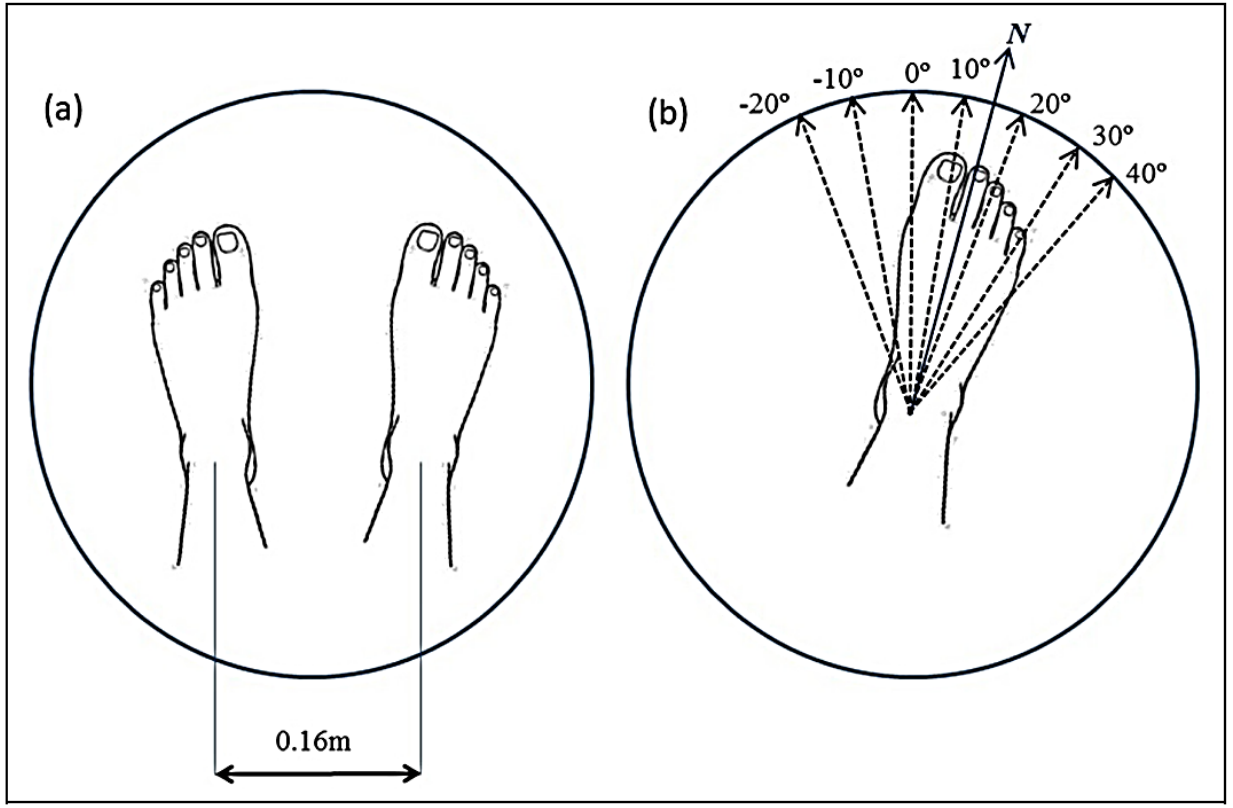
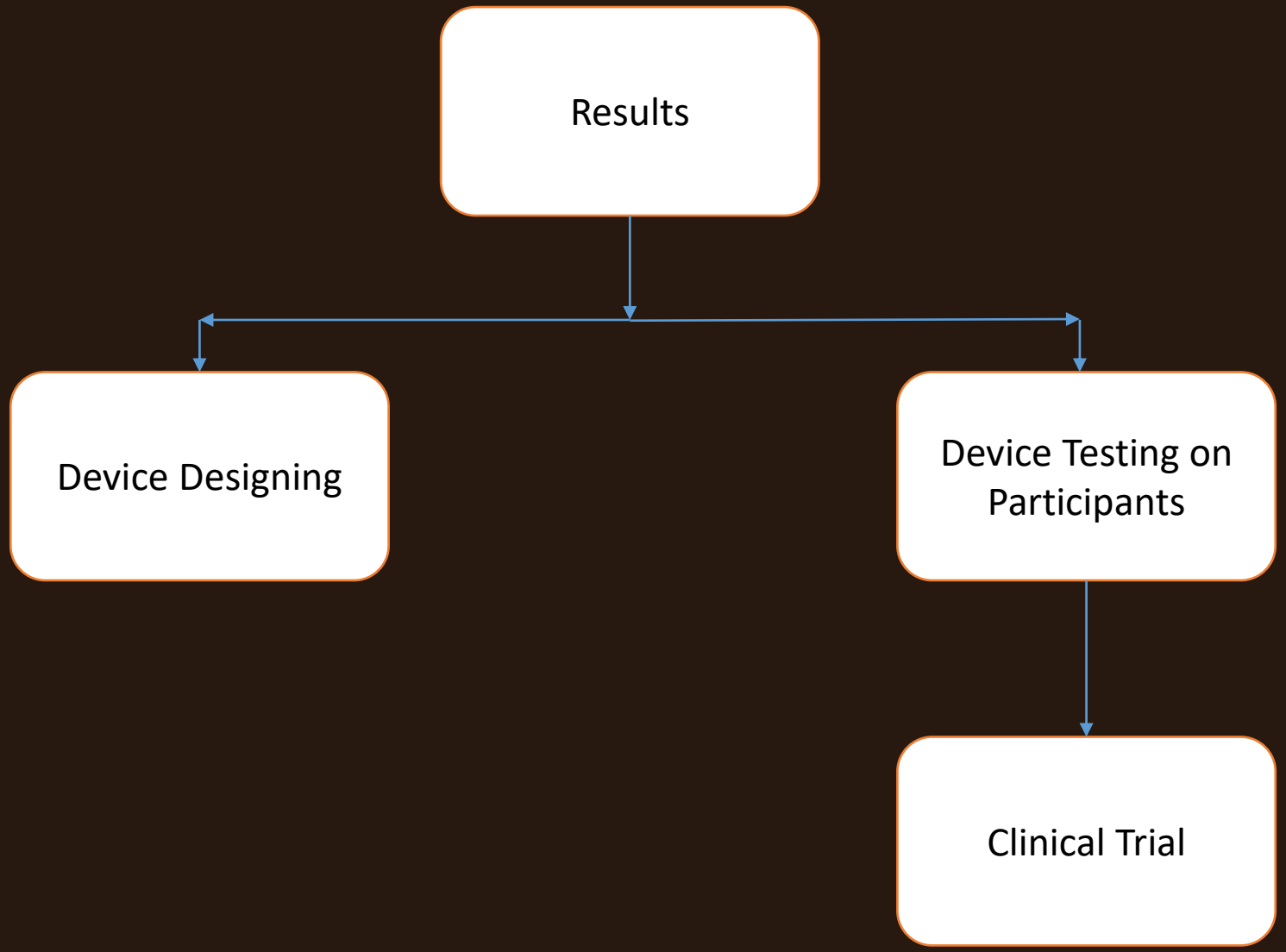


Figure 2. (a) Heel distance was kept constant at 0.16 m and (b) schematic showing different foot progression angles from −20° to 40°, where *N* represents natural foot angle (5.6° for healthy group and 6.4° for osteoarthritis group).


Results
Device Designing
Device Testing on Participants
Clinical Trial

Section III – Results & Discussion (Device Designing)

- Around 300 to 700 words (No definite length)
- Past tense for results , discussion can be in both past and present tense
- Results of the design is mentioned, torque, force calculations (values), Linearization result of sensor if designed.
- Use graphs, figures, tables and charts for the presentation
- Device, after designing, was used on at least one participant to check its performance.
- Accuracy calculations
- False positives, false negatives
- Only the results of the study being conducted should be mentioned
- Information should not be repeated. Information which has already been shared through tables / figures should not be repeated in text.
- If this device or similar devices are already designed. Compare your results with the existing ones and tell the reader if there is variation between the two.

Design and Development of 6-DOF Robotic Arm Controlled by Man Machine Interface

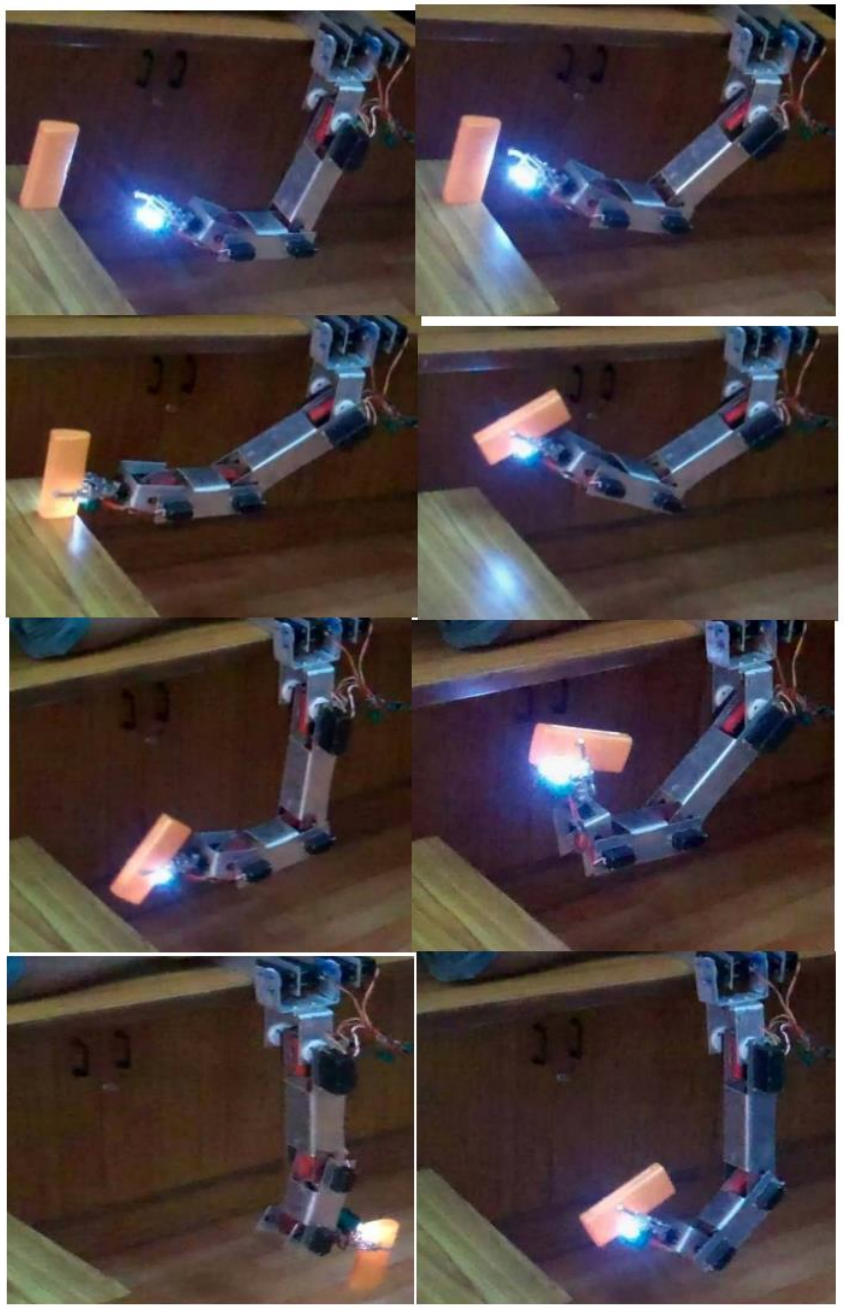
IV. EXPERIMENTS

We performed various experiments to check the performance and the accuracy of the robotic arm using MMI. The gripper accuracy test was performed using various objects and it was determined that the maximum gripping size and force of the gripper was 50mm and 500gms respectively.

The 10 bit ADC on the Atmel 2560 mega maps the analog input into 10 bit digital data (i.e.1023 levels of resolution). Since the servomotors used in the robotic arm have a maximum operating range of 180°, only 512 levels are sufficient to map the entire range of the servomotor.

TABLE 2
JOINT SERVOMOTOR CURRENT AND TORQUES

Joint	**Torque (Kg-cm)**	**Current (Amps)**
Abduction	52.3	3.7
Shoulder	47.7	3.2
Elbow	32.6	2.4
Wrist	13.1	1.9
Pivot	8.4	1.2
Gripper	3.2	1.5



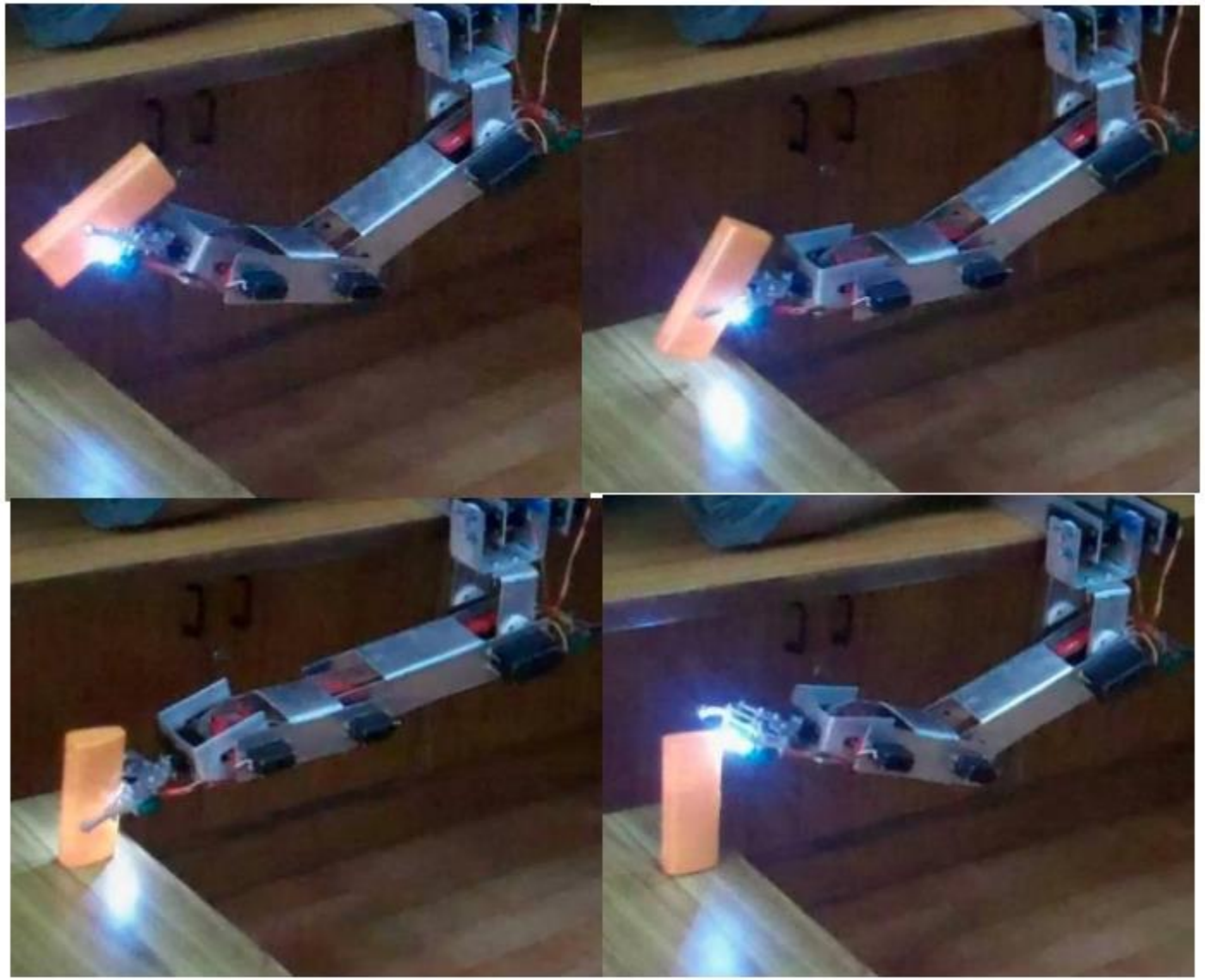


Fig 8: Picking and placing the object

Section III – Results (Clinical Trial)

- Around 100 to 500 words (No definite length)
- Past tense
- Only the results of the study being conducted should be mentioned
- Usually all tables, figures, statistical solutions are mentioned under this heading
- Information should not be repeated. Information which has already been shared through tables / figures should not be repeated in text.
- Results should be backed by proper statistical techniques. Statistical values should be given in results.
- No interpretation / explanation in this section.
- No comparison with other studies.

Effects of different foot progression angles and platform settings on postural stability and fall risk in healthy and medial knee osteoarthritic adults

Between-participants effects

Three-way mixed repeated measure ANOVA showed that there was a significant main effect of group, $F(1, 38) = 15.60$, $p < 0.01$. The OAG group, having an estimated marginal mean (EMM) of 1.23 ± 0.08, had significantly higher OSIs than the CG group with an EMM of 0.74 ± 0.06.

Table 1 represents the demographic data and WOMAC scores of the two participant groups. No significant differences were found between the two groups for age, height, body mass and BMI. As for WOMAC pain, stiffness, physical function and total scores, significant differences were found between the groups ($p < 0.001$).

Table 2 summarizes the mean stability indices for all test conditions. The highest OSI values were observed with an FR8 platform setting for the OAG, going up to 2.74 ± 1.25.

Table 1. Demographic data of the CG (control group) and OAG (osteoarthritis group).

Attributes	CG	OAG	*p*-value
n (male, female)	20 (11, 9)	20 (8, 12)	
Age (years)	59.5 ± 7.33	61.5 ± 8.63	0.49
Height (m)	1.64 ± 0.04	1.63 ± 0.03	0.64
Body mass (kg)	69.95 ± 9.86	70.45 ± 8.80	0.95
BMI (kg/m^2)	26.00 ± 4.21	26.40 ± 4.20	1
Duration of OA (years)	N/A	6.87 ± 2.89	
Kellgren–Lawrence grade			
II		10	
III		10	
Femoro-tibial angles	N/A	180.41° ± 3.95°	
WOMAC			
Pain (0–50)	1.60 ± 0.89	13.5 ± 5.65	< 0.001
Stiffness (0–20)	1.50 ± 0.54	7.25 ± 7.16	< 0.001
Physical function (0–170)	5.8 ± 3.11	61.75 ± 31.45	< 0.001
Total (0–240)	8.8 ± 3.49	82.5 ± 39.85	< 0.001

BMI: body mass index; OA: osteoarthritis; WOMAC: Western Ontario and McMaster Universities Osteoarthritis Index.

Group × toe angles interactions

There was a non-significant interaction between the toe angles and whether the participant was from CG or OAG, $F(7, 266) = 0.89$, $p = 0.50$.

Toe angles × settings interactions

There was a significant interaction between the type of platform setting and the toe angle, $F(21, 798) = 2.83$, $p < 0.01$. The interaction graph (Figure 4) shows that the behaviour of platform settings static, FR12 and PS8 resembled each other while FR8 behaved differently. For further clarification, we investigated within-participants contrasts.

Section IV - Discussion

- Around 1000 (No definite length)
- Can be in past / present tense
- Objective of the study → Comment on acceptance or rejection of hypothesis → Summary of the findings → Comparison with existing literature → possible causes (refer to methods) if your results are different from literature → Limitations of the study → Future directions

- Backbone of an article

ance. This study investigated how changing the FPAs may affect postural stability and risk of fall under static standing and dynamic standing conditions. By introducing varying degrees of platform tilt, we aimed at simulating the challenges offered by different types of terrains to the static and dynamic standing balance of a person. Our first hypothesis that the changing FPAs will bring a change in balance parameters for both the participant groups holds true only for the highly unstable dynamic platform settings.

In general, the healthy population was found to be so stable by nature that variations in the toe angles did not affect it for static and highly unstable platforms. The only angle at which the healthy group was found to be unstable was −20° and 40° only for FR8 setting. A possible explanation of this behaviour may be that the foot's natural progression angle is inherently toe-out,[29,30] hence there are inherent abilities of balancing mechanisms for a range of toe-out angles. The body loses its stability when we make this angle opposite to the natural.

A similar study by Nafiseh et al. took three participant groups (healthy, mild knee OA patients and moderate knee OA patients) and found the differences in OSI through one-way ANOVA.[22] They reported that the healthy participants differed from both the OAGs at static standing and dynamics standing settings. Our results also support this finding that the osteoarthritic participants have poorer balance as compared to healthy participants. We got these results from a different statistical approach (three-way mixed ANOVA) which also gave us the interactions between the independent variables. This interaction was not addressed before and fills the gap in the literature.

5. Limitations

A limitation of the study is that we provided the orthoses to the patients for a very short period and did not have any follow-up sessions. Another potential factor that may have influenced the results is that we asked the patients to wear the knee brace on only one leg (the more symptomatic leg). This was done because wearing a brace on each leg would have been cumbersome for the participant. This could, however, have influenced pain scores.

An application of our findings is in the prescription of toe-out and toe-in angles for knee OA treatment which are gaining popularity as practically feasible and cost-less, non-surgical and non-pharmacological treatment options for knee OA.[21]

Future studies should develop balance enhancement strategies for OA patients at higher FPAs and for highly unstable terrains.

Section V - Conclusion

- Around 50 to 200 words (No definite length)
- This section is an answer to the last paragraph of introduction section (objectives of the study)
- Specific to general

V. CONCLUSION

In this paper, we presented the dynamical analysis and development of a 6-DOF[2] arm of an anthropomorphic tele-robot system controlled and commanded in real-time by a tele-operator in using the Man Machine Interface. The man machine interface was implemented on the real robotic platform. The presented model of the robotic arm has also provided correct joint angles to move the arm gripper to any position and orientation within its workspace. Results obtained from the model were compared with the actual performance of the robot in accomplishing a task e.g. pick and place of an object. It has been found that with the joint angles computed, the robot achieves position precision within ±0.5cm. This little deviation is because of many reasons namely, mechanical coupling of the joints, non-linearity in mapping angles to low-level encoder ticks.

Objective:

This study aims to investigate the effects of varying toe angles at different platform settings on Overall Stability Index (OSI) of postural stability and the risk of fall using BBS in healthy participants and participants having moderate knee OA. We hypothesize that

Conclusion:

The participants having moderate medial knee OA have a poorer postural stability and increased risk of fall as compared to healthy participants. Changing platform settings had a profound effect on balance, and this effect was more pronounced for the participants with knee OA than healthy participants. Changing toe angles produced similar effects on both the participant groups, with decreased stability and increased fall risk at extreme toe-in and extreme toe-out angles. Future studies should develop balance enhancement strategies for OA patients at higher FPAs and for highly unstable terrains.

Section I - Introduction

- Around 500 words (No definite length)
- Present tense
- Normally in four paragraphs
- First Paragraph – General background of the study – Problem statement backed up with statistics
- Second Paragraph – What has already been done
- Third Paragraph - What has not been done / needs to be done/ Gap identification in the existing literature
- Fourth Paragraph – Purpose of the study / Objectives of the study
- General to specific

First Paragraph:

Introduction

Maintaining static and dynamic balance is a key factor in performing activities of daily living (ADL). Failing to do so, risks the postural stability (a person's control over their body's orientation in space),[1] making them vulnerable to perturbations and increasing their risk of fall. The elderly are especially prone to fall-related injuries,[2–4] mainly because of the deterioration of the body systems responsible for maintaining posture, such as vision, somatosensory input and muscle strength with age.[5–7] Around 11% of the falls among adults result in fatalities.[8] Falls are also reported to have a major contribution in injury-related hospitalization in different parts of the world such as the United States,[9] Canada,[10] Finland[11] and Iran.[12]

Second Paragraph:

So far, studies have reported the effects of changing foot position on balance in quiet standing with double stance and single stance. The variations in foot position include changing the heel width (inter-calcaneal distance), the angle between the feet and anteroposterior or mediolateral position of the feet relative to each other.[23–26] The earliest of these studies measured the standing balance of 10 healthy participants through a force platform by varying the angle and distance between their feet by uneven increments.[23] Later on, another study taking a female only sample, tested the effects of different foot positions on orthostatic posture.[25] They suggested a heel width in the range of 0.1–0.2 m and feet angle of 15°–45° for better stability. A more recent study observed the effects of self-selected and pre-determined foot positions on single-limb stance postural sway through BalanceMaster® with both eyes open and eyes closed.[26]

Third Paragraph:

All these studies however, have only observed static balance. In real-life, there are situations where a person has to encounter uneven terrains (pebbles, gravels, etc.), ramps, stairs and slippery or wet floor in which the person has to regain balance. To the best of our knowledge, the effects of changing FPA while standing on an unstable platform with varying degrees of tilt have not been observed. Furthermore, no such experiment has been done for knee OA patients. If toe-in or toe-out gait modifications compromise the postural stability of the patient and/or increase the risk of fall, then these gait modifications need to be considered with caution. Another limitation in our knowledge from the existing literature is that so far, we do not know the interaction of the changing FPAs and platform settings with the presence of knee OA.

Fourth Paragraph:

This study aims to investigate the effects of varying toe angles at different platform settings on Overall Stability Index (OSI) of postural stability and the risk of fall using BBS in healthy participants and participants having moderate knee OA. We hypothesize that changing the FPAs will affect the postural stability and risk of fall in both of the participant groups for static and dynamic conditions. We also hypothesize that the different platform settings will affect the postural stability and risk of fall in both of the participant groups.

Abstract

- Around 200 to 300 words
- Past tense
- Summary of the following sections of the article: Objectives, Methods, Results, Conclusion.
- It summarizes the whole article.

Title of the Study

- Should be very specific and concise.
- It summarizes the abstract
- It should be in present tense and may not follow proper grammatical structure (subject, verb and object)
- Maximum 15 Words

Abstract

This study aims to investigate the effects of varying toe angles at different platform settings on Overall Stability Index of postural stability and fall risk using Biodex Balance System in healthy participants and medial knee osteoarthritis patients. Biodex Balance System was employed to measure postural stability and fall risk at different foot progression angles (ranging from −20° to 40°, with 10° increments) on 20 healthy (control group) and 20 knee osteoarthritis patients (osteoarthritis group) randomly (age: 59.50 ± 7.33 years and 61.50 ± 8.63 years; body mass: 69.95 ± 9.86 kg and 70.45 ± 8.80 kg). Platform settings used were (1) static, (2) postural stability dynamic level 8 (PS8), (3) fall risk levels 12 to 8 (FR12) and (4) fall risk levels 8 to 2 (FR8). Data from the tests were analysed using three-way mixed repeated measures analysis of variance. The participant group, platform settings and toe angles all had a significant main effect on balance ($p \leqslant 0.02$). Platform settings had a significant interaction effect with participant group $F(3, 144) = 6.97$, $p < 0.01$ and toe angles $F(21, 798) = 2.83$, $p < 0.01$. Non-significant interactions were found for group × toe angles, $F(7, 266) = 0.89$, $p = 0.50$, and for group × toe angles × settings, $F(21, 798) = 1.07$, $p = 0.36$. The medial knee osteoarthritis group has a poorer postural stability and increased fall risk as compared to the healthy group. Changing platform settings has a more pronounced effect on balance in knee osteoarthritis group than in healthy participants. Changing toe angles produced similar effects in both the participant groups, with decreased stability and increased fall risk at extreme toe-in and toe-out angles.

Effects of different foot progression angles and platform settings on postural stability and fall risk in healthy and medial knee osteoarthritic adults

Section VI - References

- Every scientific claim made should be backed by reference
- If you are citing someone else's / previous work then it should also be backed by a reference.
- Around 10 references for conference and 30 for journal article
- Software should be used for referencing – EndNote / Mendeley
- Only journal articles should be cited for journal publication.
- Conference / Journal articles should be cited for conference publication.
- Book references, websites, un-published work (Thesis/Dissertation) should be avoided.

Other Headings

- **Acknowledgement**

1. Direct technical help (e.g. supply of animal subjects, cells, equipment setup, methods, statistics/data manipulation, samples, chemicals/reagents, analytical/spectroscopy techniques)
2. Indirect assistance (topical and intellectual discussions about the research which can lead to generation of new ideas)
3. Affiliated Institutions
4. Funding bodies
5. Grant numbers
6. Who received the funding (if not the author- e.g. a supervisor)
7. Any associated fellowships

- **Funding / Financial Support**

- **Authors' Contributions**

AUTHORSHIP SEQUENCE

Who should become author?

The ICMJE (International Committee of Medical Journal Editors) recommends that authorship be based on the following 4 criteria:

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND

2. Drafting the work or revising it critically for important intellectual content; AND

3. Final approval of the version to be published; AND

4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Acknowledgment

Contributors who meet fewer than all 4 of the above criteria for authorship should not be listed as authors, but they should be acknowledged. Examples of activities that alone (without other contributions) do not qualify a contributor for authorship are acquisition of funding; general supervision of a research group or general administrative support; and writing assistance, technical editing, language editing, and proofreading. Those whose contributions do not justify authorship may be acknowledged individually or together as a group under a single heading (e.g. "Clinical Investigators" or "Participating Investigators"), and their contributions should be specified (e.g., "served as scientific advisors," "critically reviewed the study proposal," "collected data," "provided and cared for study patients", "participated in writing or technical editing of the manuscript").

http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html

Authorship Sequence

- First author also called main author contributes most and receives most of the credit.
- Whereas position of subsequent authors is usually decided by contribution, alphabetical order, or reverse seniority.
- The last author also gets as much credit as the first author, because he or she is assumed to be the driving force both intellectually and financially behind the research.

First Author

- Main contributor in all the phases of research: idea, design, implementation, conducting the experiment, data analysis, and writing / Overall main contributor
- Usually student
- Sometimes Main Supervisor

Last Author

- Main Supervisor / Guardian / Father of a project / Think Tank / Resource Provider
- Supervises all the phases of project and remove all hurdles that come in any form
- Usually Supervisor
- Sometimes most experienced / famous in research group

Corresponding Author

- It bears overall responsibility and represents team of authors in a published article
- It takes responsibility of communication with editor-in-chief of the journal and audience during and after the publication respectively
- Usually Main Supervisor
- Usually the one who’s possibility of staying affiliated with the university is greater
- Sometimes Student

Gift / Honorary Author

Gift authorship is one of the most common kinds of unethical behaviour seen in academic publishing. In this practice, an author is added to a paper when they have not actually made a contribution to the work, perhaps to reward a collaborator, return a favour, or for some other gain.

Ghost Author

The ghost-writer is a professional writer, whose contribution to produce a paper will be excluded in the final publication.

SUBMISSION OF A RESEARCH ARTICLE (JOURNAL SELECTION)

How to select a Journal?

Check the references section of the article

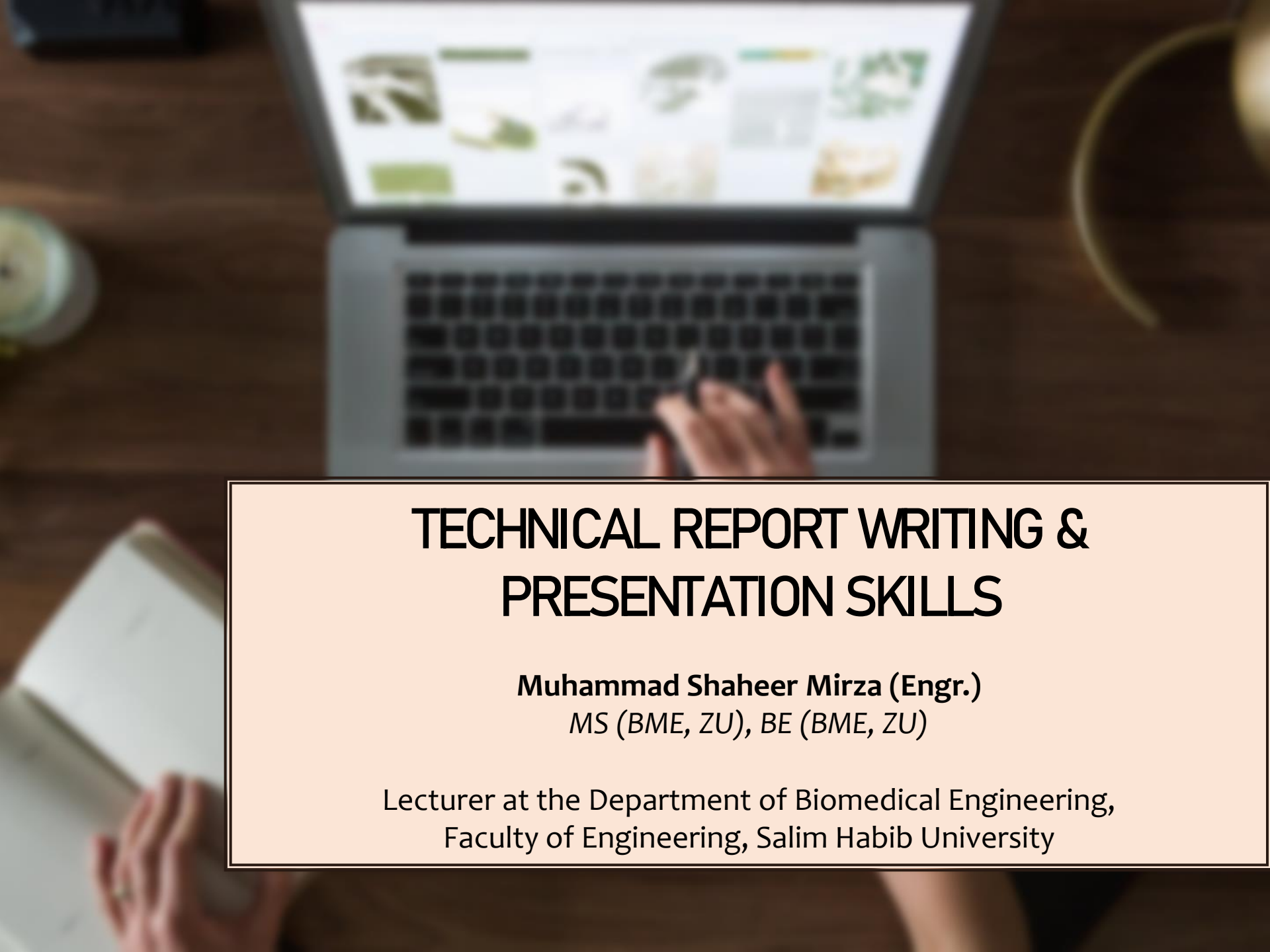
Journal Finders

- Elsevier Journal Finder
- Springer Journal Suggester
- EndNote Journal Match (WoS)
- IEEE Publication Recommender

Ask your Supervisor, they may tell you the best one

If Journal is finalized, go to the Journal's website and check its aim & Scope

Thank You



TECHNICAL REPORT WRITING & PRESENTATION SKILLS

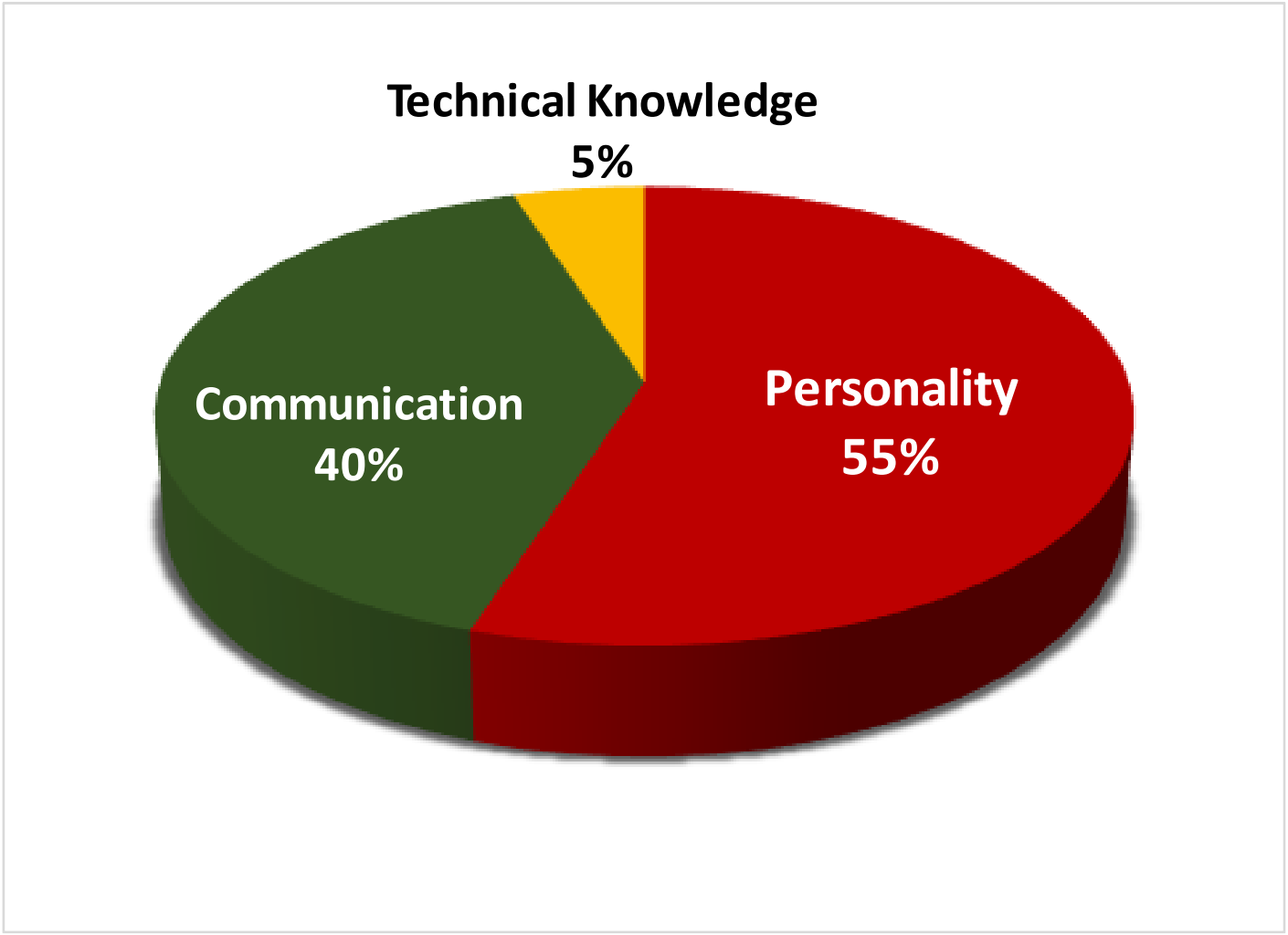
Muhammad Shaheer Mirza (Engr.)
MS (BME, ZU), BE (BME, ZU)

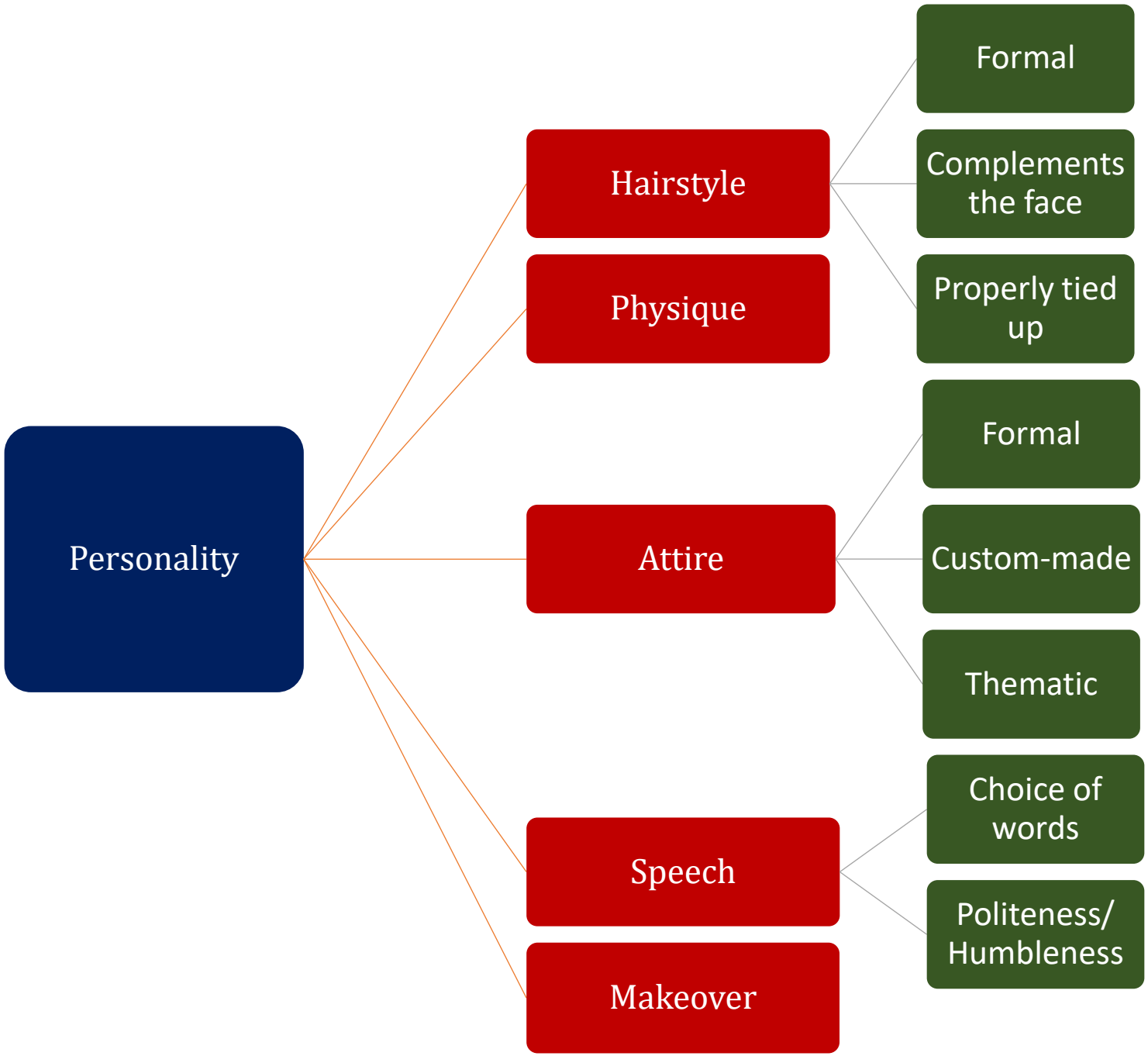
Lecturer at the Department of Biomedical Engineering,
Faculty of Engineering, Salim Habib University

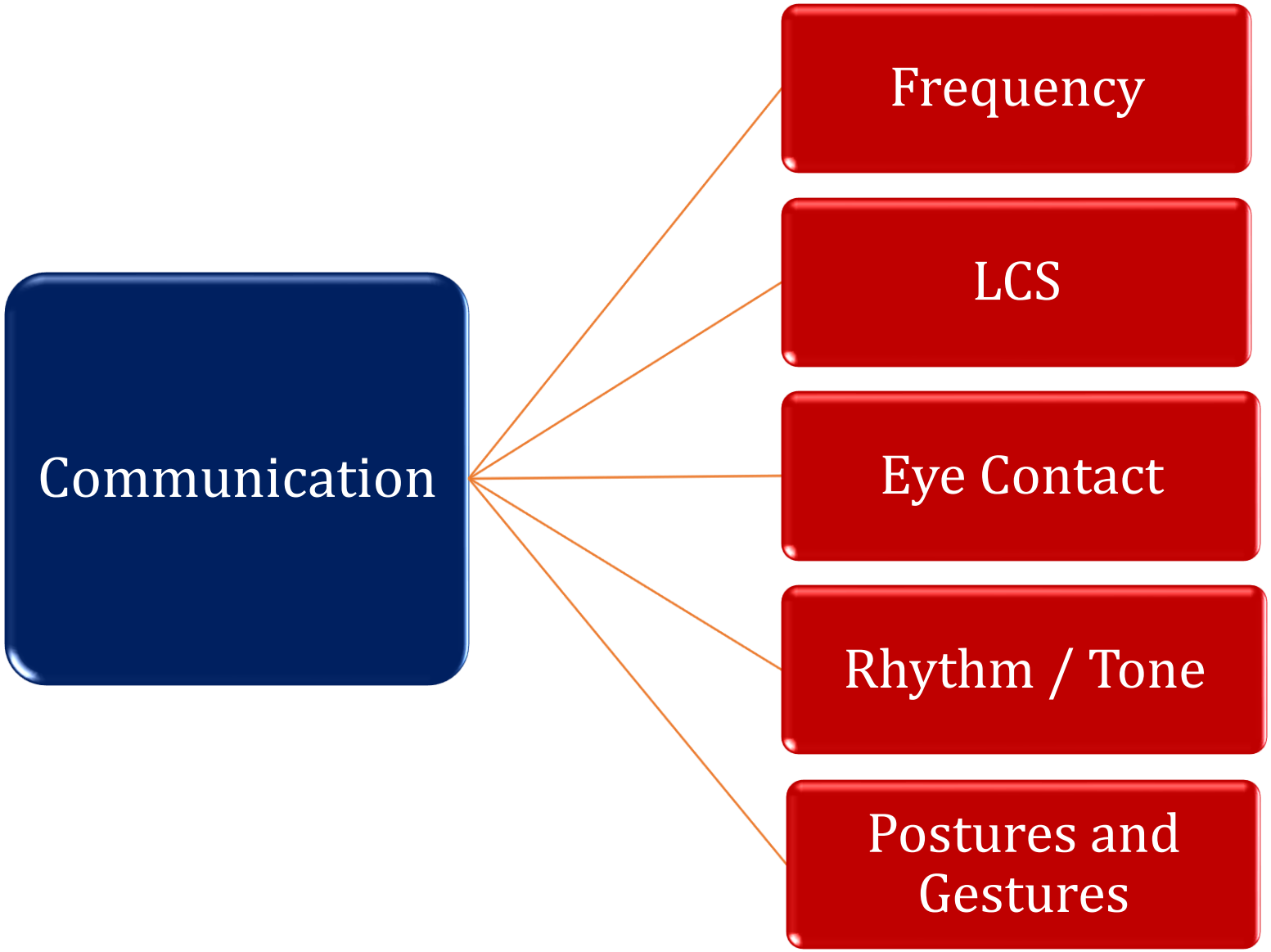
Presentation Skills


85% of your financial success is due to your personality and ability to communicate, negotiate and lead.
Shockingly, only 15% is due to technical knowledge.
Carnegie Institute of Technology

Presentation Skills




Personality
Hairstyle
Physique
Attire
Speech
Makeover
Formal
Complements the face
Properly tied up
Formal
Custom-made
Thematic
Choice of words
Politeness/ Humbleness


Communication
Frequency
LCS
Eye Contact
Rhythm / Tone
Postures and Gestures

What is Demonstration ?

- A demonstration is showing someone else how to do something.
- It is a show and tell method.
- Demonstration means showing examples or proofs about a particular product or service which will benefit the buyer / audience.

FACT

“Over 85% of our learning takes place through our sense of sight. The best way we can pass on to others what we know is by showing them."

A good demonstrator

1. Introduce yourself
2. Say title and use it while you are giving demonstration.
3. Use eye contact with “audience”.
4. Don’t let demonstration drag. Keep talking at all times.
5. Speak loud and clear. Do not go too fast.
6. Change posters as you go.
7. Summarize demonstration and go to “Closing”.

What is a Good Demo ?

- The one which explains the features well
- The one which doesn't overdo
- The one which explains all the FAQ's to the audience
- Lets the audience feel the demonstration
- Makes the audience comfortable


© Getty Images


UPI

Do's

- ✓ Nails trimmed
- ✓ Hair combed
- ✓ Make-up subtle
- ✓ Shoes formal, preferably laced
- ✓ Shirts full-sleeved

How to prepare presentation slides?

1. Follow 6x6 rule

2. Follow KISS principle

3. Slides should contain attractive theme (Using white background is preferred usually, but some themes are standard and considered as universal, like yellow writing on the black background)

How to prepare presentation slides?

4. If you need to put pics, don't put text on that slide. The image should be of reasonable size and of HD quality and suitably labelled. No texts and bullets on that slide.

5. Use animation if you want to describe a process.

6. If you are unable to draw animations, make flow diagrams.

7. Use abbreviated forms instead of full forms.

Thank You

TECHNICAL REPORT WRITING & PRESENTATION SKILLS

Muhammad Shaheer Mirza (Engr.)
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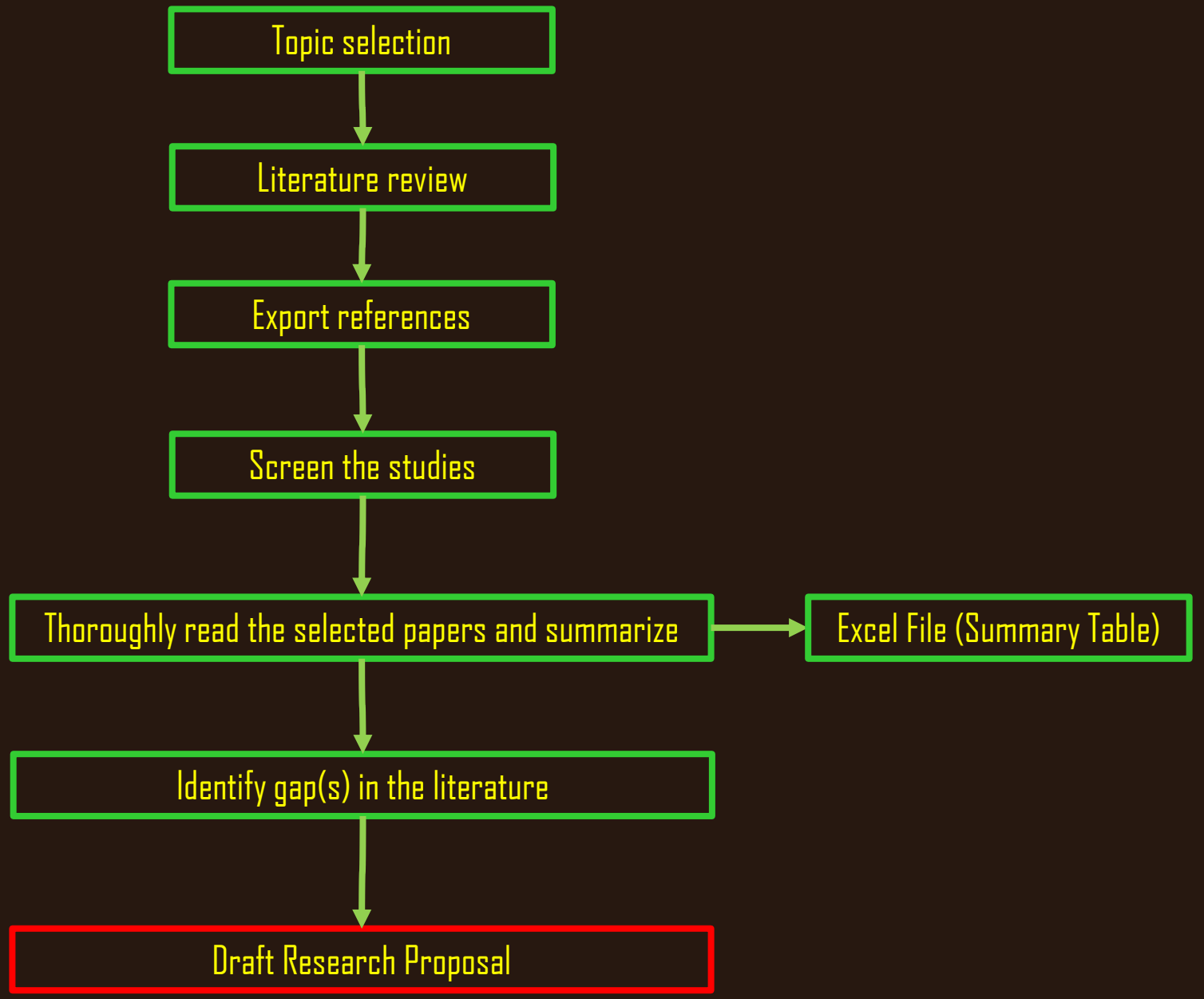
Lecturer at the Department of Biomedical Engineering,
Faculty of Engineering, Salim Habib University

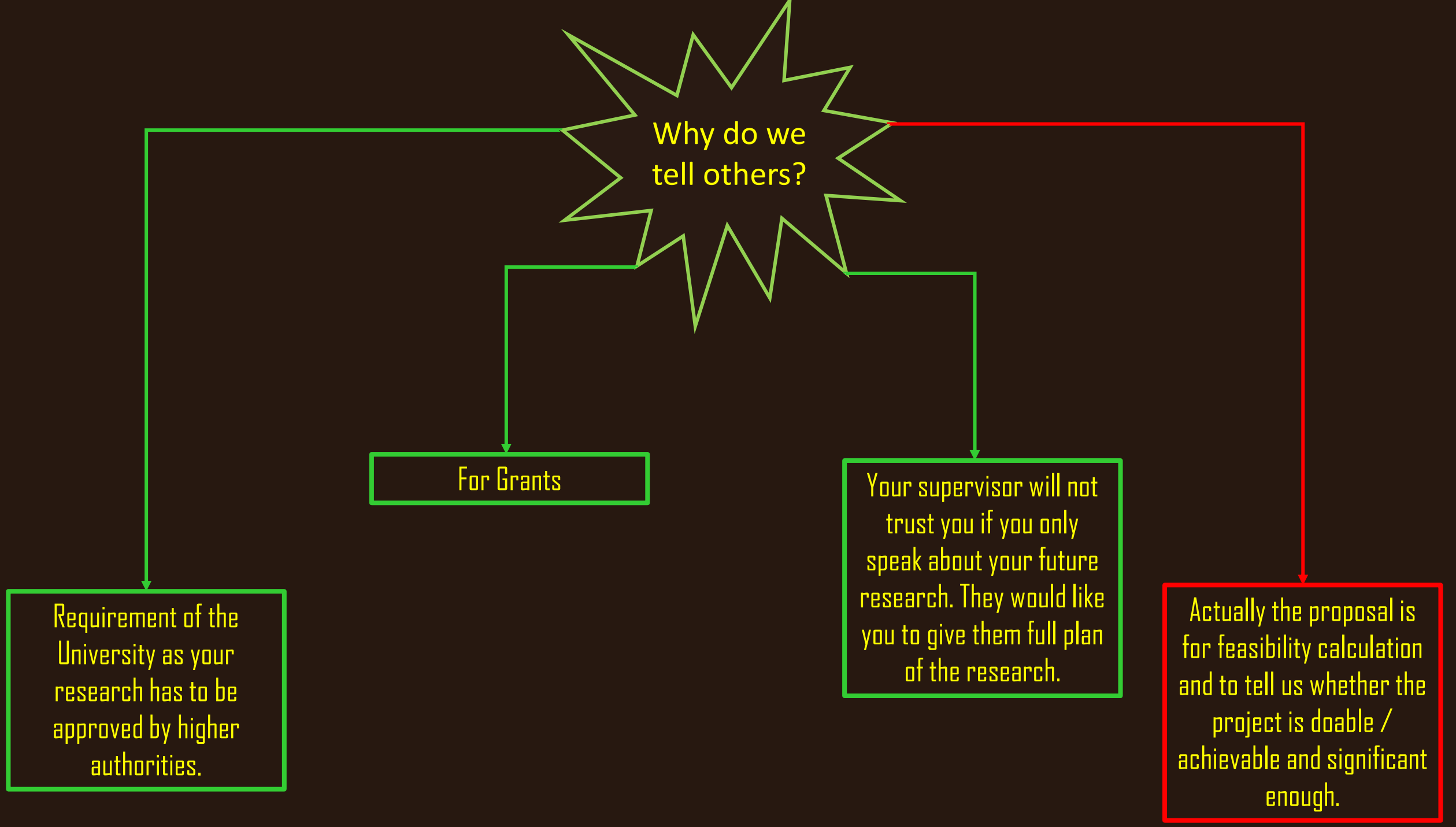
ENGINEERING RESEARCH METHODOLOGY FLOWCHART



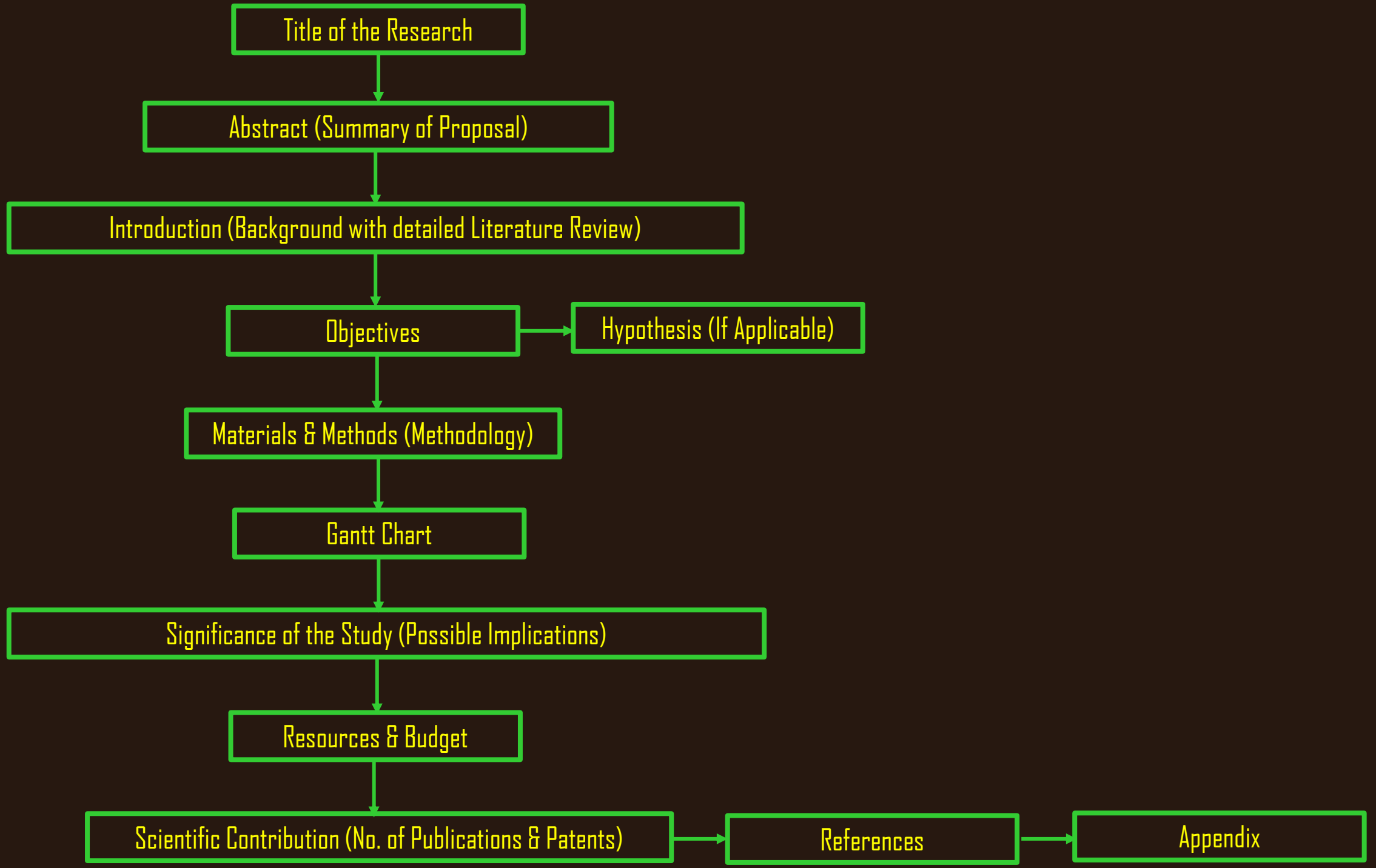
Research Proposal

The goal of a research proposal is twofold: to present and justify the need to study a research problem and to present the practical ways in which the proposed study should be conducted. The design elements and procedures for conducting research are governed by standards of the predominant discipline in which the problem resides, therefore, the guidelines for research proposals are more exacting and less formal than a general project proposal. Research proposals contain extensive literature reviews. They must provide persuasive evidence that a need exists for the proposed study. In addition to providing a rationale, a proposal describes detailed methodology for conducting the research consistent with requirements of the professional or academic field and a statement on anticipated outcomes and/or benefits derived from the study's completion.

Krathwohl, David R. How to Prepare a Dissertation Proposal: Suggestions for Students in Education and the Social and Behavioral Sciences. Syracuse, NY: Syracuse University Press, 2005.


Why do we tell others?
Requirement of the University as your research has to be approved by higher authorities.
For Grants
Your supervisor will not trust you if you only speak about your future research. They would like you to give them full plan of the research.
Actually the proposal is for feasibility calculation and to tell us whether the project is doable / achievable and significant enough.

Steps of Writing a Research Proposal:



Title of the Study:

- Shortest possible summary of the whole project / Abstract Summary
- May not follow proper grammatical structure (subject, verb, object), use strong statement
- Around 10 - 15 words
- The title should reflect content of the study, be interesting and contain Important keywords.
- **Example:**

"A study was conducted to compare the intelligence between girls and boys and found that the intelligence in girls is higher. The possible titles are:"

- Comparison between Girls' and Boys' Intelligence
- Girls vs Boys: A comparison of wits
- Girls are more intelligent than Boys

✓ Girls are more intelligent than Boys: A quantitative Study of mindfulness among high school students

Abstract:

- Around 250 to 300 words
- Future tense
- Summary of the following sections of the article: Background, objectives and Methods
- Descriptions of the method may include the design, procedures, the sample and any instruments that will be used. It should stand on its own, and not refer the reader to points in the project description.
- It summarizes the whole proposal.

Introduction:

- Around 500 words (No definite length)
- Present tense
- Normally in three paragraphs
- First Paragraph – General background of the study – Problem statement backed up with statistics; main paragraph that highlights the problem's severity
- Second Paragraph – What has already been done (detailed literature review)
- Third Paragraph - What has not been done / needs to be done/ Gap identification in the existing literature
- General to specific

First Paragraph:

Introduction

Maintaining static and dynamic balance is a key factor in performing activities of daily living (ADL). Failing to do so, risks the postural stability (a person's control over their body's orientation in space),[1] making them vulnerable to perturbations and increasing their risk of fall. The elderly are especially prone to fall-related injuries,[2–4] mainly because of the deterioration of the body systems responsible for maintaining posture, such as vision, somatosensory input and muscle strength with age.[5–7] Around 11% of the falls among adults result in fatalities.[8] Falls are also reported to have a major contribution in injury-related hospitalization in different parts of the world such as the United States,[9] Canada,[10] Finland[11] and Iran.[12]

Second Paragraph:

So far, studies have reported the effects of changing foot position on balance in quiet standing with double stance and single stance. The variations in foot position include changing the heel width (inter-calcaneal distance), the angle between the feet and anteroposterior or mediolateral position of the feet relative to each other.[23–26] The earliest of these studies measured the standing balance of 10 healthy participants through a force platform by varying the angle and distance between their feet by uneven increments.[23] Later on, another study taking a female only sample, tested the effects of different foot positions on orthostatic posture.[25] They suggested a heel width in the range of 0.1–0.2 m and feet angle of 15°–45° for better stability. A more recent study observed the effects of self-selected and pre-determined foot positions on single-limb stance postural sway through BalanceMaster® with both eyes open and eyes closed.[26]

Third Paragraph:

open and eyes closed.[26] All these studies however, have only observed static balance. In real-life, there are situations where a person has to encounter uneven terrains (pebbles, gravels, etc.), ramps, stairs and slippery or wet floor in which the person has to regain balance. To the best of our knowledge, the effects of changing FPA while standing on an unstable platform with varying degrees of tilt have not been observed. Furthermore, no such experiment has been done for knee OA patients. If toe-in or toe-out gait modifications compromise the postural stability of the patient and/or increase the risk of fall, then these gait modifications need to be considered with caution. Another limitation in our knowledge from the existing literature is that so far, we do not know the interaction of the changing FPAs and platform settings with the presence of knee OA.

Objectives:

- Very specific , not too much generalized:
- The general objective for example: to determine whether or not a new vaccine should be incorporated in a public health program.
- The specific objectives for example, Primary: To determine the degree of protection that is attributable to the new vaccine in a study population by comparing the vaccinated and unvaccinated groups. Secondary: To study the cost-effectiveness of this program.
- Not too many. For undergraduate 1, For Masters maximum 2 and for PhD Maximum 3 objectives are fine.
- Present / Future tense
- Mention hypothesis in a separate heading right after objectives, if applicable

This study aims to investigate the effects of varying toe angles at different platform settings on Overall Stability Index (OSI) of postural stability and the risk of fall using BBS in healthy participants and participants having moderate knee OA. We hypothesize that changing the FPAs will affect the postural stability and risk of fall in both of the participant groups for static and dynamic conditions. We also hypothesize that the different platform settings will affect the postural stability and risk of fall in both of the participant groups.

Methodology:

- This section is very important because it tells us how objectives are going to be achieved?
- Around 1000 – 2000 words (No definite length)
- Future tense

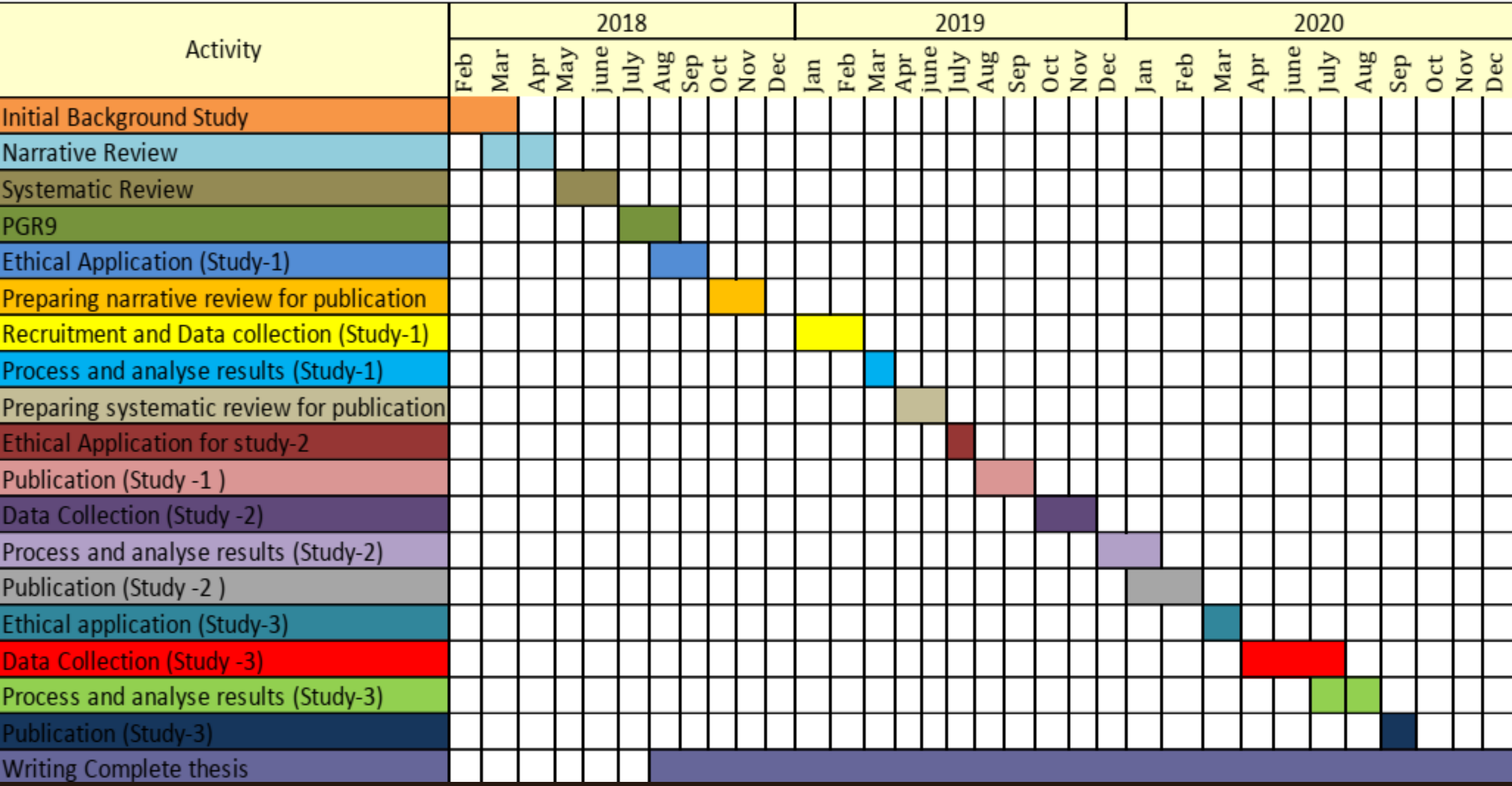
- **It contains every tiny detail:**
- Participants (sample size, inclusion criteria, height, mass, BMI, age and other details of participants, consent and ethical approval, where the participants will be recruited from? And where the study will be conducted at?)
- Details of the intervention to be applied
- Details of the questionnaires
- Equipment details
- Software details
- Variables of interest / Parameters
- Procedure of data collection
- Procedure of data analysis
- Statistics details

- It should contain flowcharts etc.

Gantt Chart:

- Timeline / Planner
- A Gantt chart is an overview of tasks/proposed activities and a time frame for the same. You put weeks, days or months at one side, and the tasks at the other.
- Many online softwares are available for many beautiful Gantt charts, use them

	Year 1		Year 2		Year 3	
	1-6	7-12	1-6	7-12	1-6	7-12
Literature review	X	X				
PhD courses (10 ECTS)	X					
PhD courses (10 ECTS)		X				
PhD courses (10 ECTS)		X	X			
Study plan	X	X				
Ethics application		X				
Data collection - Study 1		X				
Data analysis - Study 1			X			
Writing paper - Study 1			X			
Data collection - Study 2			X			
Data analysis - Study 2			X			
Writing paper - Study 2				X		
Data collection - Study 3				X		
Data analysis - Study 3				X		
Writing paper - Study 3				X	X	
Data collection - Study 4					X	
Data analysis - Study 4					X	
Writing paper - Study 4					X	X
Writing thesis					X	X


Activity
2018
2019
2020
Feb
Mar
Apr
May
june
July
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
june
July
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
june
July
Aug
Sep
Oct
Nov
Dec
Initial Background Study
Narrative Review
Systematic Review
PGR9
Ethical Application (Study-1)
Preparing narrative review for publication
Recruitment and Data collection (Study-1)
Process and analyse results (Study-1)
Preparing systematic review for publication
Ethical Application for study-2
Publication (Study -1)
Data Collection (Study -2)
Process and analyse results (Study-2)
Publication (Study -2)
Ethical application (Study-3)
Data Collection (Study -3)
Process and analyse results (Study-3)
Publication (Study-3)
Writing Complete thesis

Significance of the Study:

- Indicate how your research will refine, revise or extend existing knowledge in the area under investigation.

- How will it benefit the concerned stakeholders? What could be the larger implications of your research study?

Resources and Budget:

Recourses Required	Estimated Costs	Funding Sources	Funding Resources
Study 1			
1) Equipment supplies (Electrode, tape, needles) 2) Communication (Telephone, postage, printing) 3) Koha (Petrol/Taxi vouchers)	 $250.00 $1,700.00	 HRRI	 Available
Study 2			
1) Equipment supplies 2) Communication (telephone/postage/printing. 3) Koha (Petrol/ Taxi vouchers) 4) Research Assistant Hours 250 hrs	 $250.00 $ 1,200.00 $ 6270.00	 HRRI, PhD Faculty funding	 Available
Study 3			
1) Equipment supplies 2) Communication (telephone/postage/printing. 3) Koha (Petrol/ Taxi vouchers)	 $250.00 $1,700.00	 Brain Research New Zealand (BRNZ)	 To be applied in 2019
Total	**$11620**		

- You can also mention future conference expenses, article submission fee etc.

Scientific Contribution:

- Mention possible number of publications (journal / conference / patents) with their titles (if possible).

1st Paper: Characterizing the elicitation of Error-related Potentials in different paradigms.
Nayab Usama, Kasper Kunz Leerskov, Mads Jochumsen, Kim Dremstrup
Journal of Neural Engineering

2nd Paper: Optimal feature selection and classification of Error-related potentials.
Nayab Usama, Kasper Kunz Leerskov, Mads Jochumsen, Kim Dremstrup
IEEE Transections on Neural Systems and Rehabilitation Engineering

3rd Paper: An Online study of detection and classification of Error-related Potentials in stroke patients.
Nayab Usama, Mads Jochumsen, Kim Dresmstrup, Imran khan Niazi
IEEE Transections on Neural Systems and Rehabilitation Engineering

4th Paper: Long-term BCI use; an un-supervised 3-class adaptive classifier BCI vs static classifier BCI.
Nayab Usama, Mads Jochumsen, Imran khan Niazi, Kim Dremstrup
Journal of Neural Engineering

References:

- Every scientific claim made should be backed by reference
- If you are citing someone else's / previous work then it should also be backed by a reference.
- At least 50 references
- Software should be used for referencing – EndNote / Mendeley
- Journal articles are preferably cited
- Conference papers, Book references, Thesis/Dissertation can also be cited.
- Any referencing style can be opted, however, we choose IEEE style in this course

Appendix:

- May include consent forms, questionnaires, any other form, equipment details, equipment specs etc

Assignment # 2

Question: Draft a research proposal of your research of around 2000 words, following the sequence and instructions below:

Formatting:
Font: Times New Roman
Font Size: 12
Font Size of Headings: 12 Bold
Spacing: 1.5

Please draft a proposal according to the headings below:

Title:----------*03 Marks*
Word Limit: **15**

Introduction:----------*03 Marks*
Three paragraphs
First paragraph must contain statistics showing the severity of the problem: **200 word limit**
Second Paragraph must contain literature review stating what has already been done in this area of research: **500 word limit**
Third Paragraph must contain what has not been done, the gap in the literature: **300 word limit**

Assignment # 2

Objectives:----------*03 Marks*
Maximum 2 objectives : Word Limit: **100**

Material and Methods:----------*03 Marks*
Detailed methods and information of the material used : Word Limit: **1000**

Gantt Chart:----------*02 Marks*
Use online software (preferred)
One year span

Significance of the Study:----------*02 Marks*
Impact of your research on stake holders, scientific community and society overall : Word Limit: **100**

Resources and Budget: ----------*02 Marks*
List down the resources and the required budget : Word Limit: **None**

Scientific Contribution: ----------*01 Marks*
Total number of expected journal / conference articles or patents
Write down their possible titles : Word Limit: **50**

References: ----------*01 Marks*
IEEE Style
At least 20 references in the proposal
Word Limit: **Not applicable**

Assignment # 2

- Total Marks: 20
- Deadline: 06 May 2024
- Submission: Microsoft Teams against Assignment # 2
- Only PDF files should be submitted

Thank You

TECHNICAL REPORT WRITING & PRESENTATION SKILLS

Muhammad Shaheer Mirza (Engr.)
MS (BME, ZU), BE (BME, ZU)

Lecturer at the Department of Biomedical Engineering,
Faculty of Engineering, Salim Habib University

Similarity Index:

- The percentage of overlap between text submitted to plagiarism detection and that in original source material. This should not be considered the percentage of a paper that is plagiarized (IGI-Global)

What is Turnitin:

It is a tool that checks your assignment against various electronic resources for matching text. It will then highlight the areas of your assignment where a match has been found. Examples of resources that are checked are:

1. 45 billion webpages (and growing daily)
2. Electronic books
3. Electronic journals
4. Student assignments that have already been submitted through Turnitin and other higher education institutions around the world.

- There will be many sources, however, that are not checked against, such as new web content (e.g. today's news articles) and password protected sites (e.g. intranets). It is important to note that originality reports do not detect plagiarism – it merely highlights unoriginal text (i.e. text that matches text already in the Turnitin comparative database) and reference quotes in your submission.

Similarity Index:

What information is included in the report?

- An overall ‘similarity index’ percentage. This indicates the amount of text in the whole assignment that has been matched with other sources.
- The ‘similarity index’ is a sum of the percentages matches for all sources (i.e. 20 1% matches would produce a ‘similarity index’ of 20%)
- Text that has been matched will be number/colour-coded for easy reference.
- The ‘Match Overview’ appears on the right-hand side of the screen. This is a list of original sources and the percentage of text that has been matched against each source.

What does High and Low Similarity Index mean?

This is the percentage of text in your assignment that has been matched to other sources.

If the figure is high, it does not necessarily mean that you have plagiarized, as the report could be matching text against the following:

1. Quotations that have been correctly referenced
2. your reference list/bibliography, particularly if the citations you used could be exactly the same as those of another student
3. A common phrase or series of words used in context to the topic

Similarly, a low or zero percent similarity index does not necessarily mean that plagiarism has not taken place. As there are many sources that Turnitin does not check against, the similarity index cannot be used as an indicator of whether plagiarism has occurred or not.


PLAGIARISM???

Plagiarism:

Many people think of plagiarism as copying another's work or borrowing someone else's original ideas. But terms like "copying" and "borrowing" can disguise the seriousness of the offense:

According to the Merriam-Webster online dictionary, to "plagiarize" means:

- to steal and pass off (the ideas or words of another) as one's own
- to use (another's production) without crediting the source
- to commit literary theft
- to present as new and original an idea or product derived from an existing source

In other words, plagiarism is an act of fraud. It involves both stealing someone else's work and lying about it afterward.

https://www.plagiarism.org/article/what-is-plagiarism

But Can Words and Ideas Really be Stolen?

According to U.S. law, the answer is yes. The expression of original ideas is considered intellectual property and is protected by copyright laws, just like original inventions. Almost all forms of expression fall under copyright protection as long as they are recorded in some way (such as a book or a computer file).

https://www.plagiarism.org/article/what-is-plagiarism

All of the following are considered plagiarism:

- turning in someone else's work as your own
- copying words or ideas from someone else without giving credit
- failing to put a quotation in quotation marks
- giving incorrect information about the source of a quotation
- changing words but copying the sentence structure of a source without giving credit
- copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not (see our section on "fair use" rules)

Most cases of plagiarism can be avoided, however, by citing sources. Simply acknowledging that certain material has been borrowed and providing your audience with the information necessary to find that source is usually enough to prevent plagiarism. See our section on citation for more information on how to cite sources properly.

https://www.plagiarism.org/article/what-is-plagiarism

What about Images, Videos and Music?

Using an image, video or piece of music in a work you have produced without receiving proper permission or providing appropriate citation is plagiarism. The following activities are very common in today's society. Despite their popularity, they still count as plagiarism.

•Copying media (especially images) from other websites to paste them into your own papers or websites.

•Making a video using footage from others' videos or using copyrighted music as part of the soundtrack.

•Performing another person's copyrighted music (i.e., playing a cover).

•Composing a piece of music that borrows heavily from another composition.

Certainly, these media pose situations in which it can be challenging to determine whether or not the copyrights of a work are being violated. For example:

https://www.plagiarism.org/article/what-is-plagiarism

•A photograph or scan of a copyrighted image (for example: using a photograph of a book cover to represent that book on one's website)

•Recording audio or video in which copyrighted music or video is playing in the background.

•Re-creating a visual work in the same medium. (for example: shooting a photograph that uses the same composition and subject matter as someone else's photograph)

•Re-creating a visual work in a different medium (for example: making a painting that closely resembles another person's photograph).

•Re-mixing or altering copyrighted images, video or audio, even if done so in an original way.

The legality of these situations, and others, would be dependent upon the intent and context within which they are produced.

The two safest approaches to take in regards to these situations is: 1) Avoid them altogether or 2) Confirm the works' usage permissions and cite them properly.

https://www.plagiarism.org/article/what-is-plagiarism

HEC Guidelines:

- Similarity index of the originality report is showing matches of submitted work with internet content. It is not verdict that document with high similarity index is plagiarized.
- Similarity index is based on percentage of matched text out of total number of words in the document.
- The similarities in the document may contain matches with author's previous work; it may be ignored if it is the same work
- Bibliography and quoted material may be excluded after verifying. It is important to note that too much quoted material is not desired as per policy.
- Common phrases and proper nouns also appear as similarities in the report, therefore every instructor/faculty member should ignore matches returned from them.

HEC Guidelines:

- The graphs, tables, formulae and other pictorial material is not matched through the service therefore, it will only offer similarities with only text.
- The instructor/faculty member supervising students/scholars can give verdict of plagiarism after interpreting report. The report will be used as evidence of the report.
- If the report has similarity index <=19%, then benefit of doubt may be given to the author but, in case, any single source has similarity index >=5% without citation then it needs to be revised.
- If similarities of a report are from author's own (previous) work then these may be ignored only if the material has been cited by the author.
- As documents which are checked through this service are not yet published and no benefit is acquired, therefore, no punishment or penalty is recommended. It is advised that similarities at greater level may be taken care of in the light of the HEC plagiarism policy.

Thank You

TECHNICAL REPORT WRITING & PRESENTATION SKILLS

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A Review:

- a formal assessment of something with the intention of instituting change if necessary.
- a reconsideration of a judgement, sentence, etc. by a higher court or authority.
- a report on or evaluation of a subject or past events.
- a critical appraisal of a book, play, film, etc. published in a newspaper or magazine.

http://english.oxforddictionaries.com/review

A Review of Literature (Literature Review):

A literature review is a comprehensive summary of previous research on a topic. The literature review surveys scholarly articles, books, and other sources relevant to a particular area of research.

Why do we write literature reviews?

- Determine what has already been written on a topic
- Provide an overview of key concepts
- Identify major relationships or patterns
- Identify strengths and weaknesses
- Identify any gaps in the research
- Identify any conflicting evidence
- Provide a solid background to a research paper's investigation

Literature Review Paper:

"Writing a review paper is an art in which the author tries to sum up 100 conclusions in one conclusion"

Cochrane Reviews are systematic reviews of primary research in human health care and health policy, and are internationally recognized as the highest standard in evidence-based health care.

Review

- Narrative Review
  - A narrative review is the type first-year college students often learn as a general approach. Its purpose is to identify a few studies that describe a problem of interest. Narrative reviews have no predetermined research question or specified search strategy, only a topic of interest. They are not systematic and follow no specified protocol. No standards or protocols guide the review.
- Systematic Review (Qualitative)
  - A well planned review to answer specific research questions using a systematic and explicit methodology to identify, select, and critically evaluate results of the studies included in the literature review.
- Systematic Review (Quantitative)
  - A Systematic review with meta-analysis (statistics)
    - A **meta-analysis** is a statistical analysis that combines the results of multiple scientific studies. Meta-analysis can be performed when there are multiple scientific studies addressing the same question, with each individual study reporting measurements that are expected to have some degree of error. The aim then is to use approaches from statistics to derive a pooled estimate closest to the unknown common truth based on how this error is perceived.
- Cochrane Systematic Review (Live Reviews)

Preparations for Writing a Narrative Review Paper (Steps):

1. Find a review article relevant to your field
2. Go through that review article in detail, if necessary read it twice
3. Now look at your summary of selected studies table
4. And see if you recognize some patterns, weakness, strengths in the literature (Mind Mapping)
5. If not, you need to go through all the PDFs of your area of interest
6. If you think that now you can comprehensively summarize all the articles and draw useful conclusions, form them
7. It’s time to start writing a review

Writing a Systematic Review Paper (Steps):

1. Prepare a question you would like to address in your review paper

2. Follow Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Guidelines.

3. Start from **Methodology:**

- The eligibility criteria for selecting the studies.
- Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.
- Present full electronic search strategy, databases, keywords etc.
- Process of study selection
- List and define all variables for which data were sought (e.g. PICO, funding source etc.) and any assumptions made
- Study quality assessment criteria

4. **Results:**

- Draw PRISMA flow diagram
- Present studies' characteristics (summary table)
- Results of the study quality assessment
- Present the results from summary table, any inferences you have made or summarize the summary table
- Extract similar data from each study and draw graphs etc. for their comparison

5. **Discussion:**

- The objectives of your review paper (paraphrased)
- Summary of the results (main findings)
- Comparisons with other similar kind of review paper, give reasons if your findings are different from others
- Claim novelty if applicable
- Limitations of this review paper

6. **Conclusion:**

- The answer of your objectives / main inference
- Suggestions what to do and not to do in future researches

7. **Introduction:**

- Background of study
- Information about area you are writing review for
- The significance of writing a review paper
- What made your review different if other reviews are available in the same field
- What would this review contribute
- Objectives of the review in the form of (PICO)

  P: Population

  I: Intervention

  C: Comparison

  O: Outcome
- Introduce upcoming sections of the review

8. **Abstract:**

- Summary of the paper, better in structured format

9. **Title:**

- Mentioned the word **Systematic review** in the title

Assignment # 3

Question: Write a systematic literature review article on the same research topic that you have already submitted as your research proposal. You are suggested to follow all the guidelines given in your lectures and supplementary files.

Number of words: 2500 Minimum

Formatting:

Font: Times New Roman
Font Size: 12
Font Size of Headings: 12 Bold
Spacing: 1.5

Please draft a proposal according to the headings below:

Title: ---------- *03 Marks*
Introduction: ---------- *05 Marks*
Material and Methods: ---------- *06 Marks*
Results: ---------- *06 Marks*
Discussion: ---------- *05 Marks*
Conclusion: ---------- *03 Marks*
References: ---------- *02 Marks*

- IEEE Style
- At least 30 references in the proposal

Assignment # 3

- Total Marks: 30
- Deadline: 29 May 2024
- Submission: Microsoft Teams against Assignment # 3
- Only PDF files should be submitted

Thank You