Workshop on Scientific Research: Facilitating research ……

Research Proposal Designing and Applying for Research Grants

Staff Development Centre

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Research Proposal Designing

- **Why do research ?**

- ***Research is the scholarly pursuit of <u>new knowledge, discovery, or creative activity</u> in an area with the goal of advancing that area's frontiers or boundaries."***

(https://www.utoledo.edu/honors/undergradresearch/why.html)

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? **Research problem** ?

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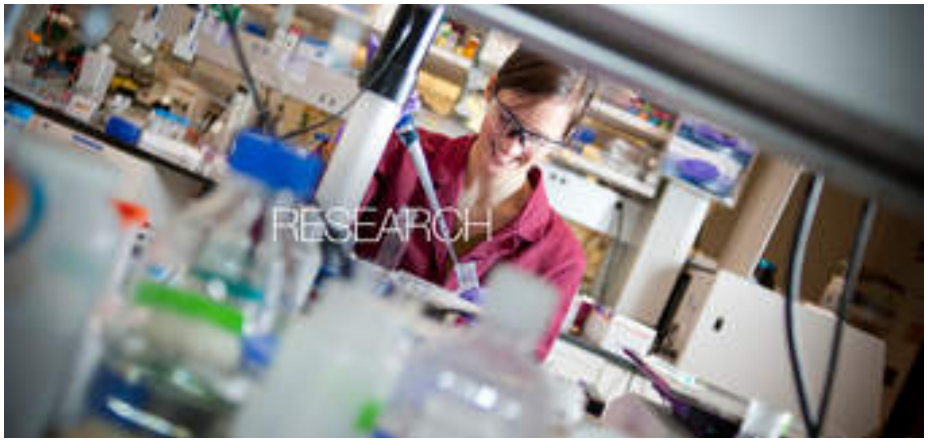
Compulsory:

- Thorough literature search (N & I lit)
- **Do not repeat the same research** unless there is ground for you to do so (waste of money, resources and time)
- Should have a **meaningful outcome** which will have some benefit to the country, individuals society, culture etc ……

- Doing research –

Intellectually stimulating & enjoyable



Research design

- A plan of - the need of the study, what to gather, from whom, how and when to collect data and how to analyze the data obtained.

Contain:

- **Background and rationale** (Introduction and purpose statement)
- **Objectives of the research**
- **Research question and hypothesis**
- **Significance of the study**
- **Methodology**
- **Limitations and delimitations**

Background and rationale (Introduction & purpose statement)

- **Background of the study and the research problem:** Introduce the problem that the research intend to address.

- **Cover what is already known about the problem in the scientific literature, and highlight the major gaps or limitations in the current knowledge base.**

- **Final paragraph should state precisely what you will achieve if the project succeeds, and the likely impact of a successful research project**.

Why you want to do the study and what you intend to accomplish !

Qualitative research: Explore, understand or discover

Quantitative research : Determine, identify or compare (focus comparing and relating two or more variables)

Mixed method research : Both qualitative and quantitative research

Eg: if you are working in a field relating to the control of diseases, describe how your research could lead to new drugs, vaccines, or diagnostics, or to the improved understanding of the pathogenesis of the disease.

- **Many application forms, now have a section in which you are required to describe how the research is likely to contribute to economic development.**

Objectives of the study

- Succinctly describe the goal of your research, and what you propose to do to achieve this goal.
  - **General (main)**
  - **Specific (sub)**
- Propose only those objectives that you feel relatively confident of achieving within the grant period.
- A proposal with too many objectives to be included in a relatively short time (eg: two years) — is likely to be considered too ambitious, & might well be rejected, even if it involves a good idea.

Example

Overall aim (General Objective/s)

- To determine the association between CAD risk factors and the recovery following CABG.

- To determine the variation between nutritional and immune status on recovery following CABG.

Example

- **Specific Objective/s**

1. To determine the risk factors for coronary artery disease (CAD) in patients awaiting CABG.

2. To determine the nutritional and immune status of patients pre and post operative CABG.

3. To develop a suitable nutrient therapy for post operative patients following a study on their nutrient intake post operatively.

Research Questions and Hypothesis

- **Research questions**: are inquiring statements or questions that the researcher seeks to answer

- **Hypothesis:** predictive statement(s) that the researcher holds about the relationship among variables to be tested

Determination of association of risk factors for development of coronary artery disease and nutritional status & immune status on the recovery following coronary artery bypass graft(CABG) surgery

- What are the risk factors for development of CAD?
- What are the nutritional and immunological factors that would affect development of CAD?
- Do nutritional status and immunological factors affect recovery following CABG?

Significance of the study

This part should elaborate the importance and implication of the study for researcher, practitioner or a policy maker

Ways in which the study

Adds to scholarly research or literature

Helps improve practice

Will improve policy

Experimental design and methods

Includes methods, procedures and techniques used to collect and analyse information/data.

- Site and samples – design
- Method of data collection (questionnaire/ laboratory techniques)
- Data analysis
- Time line (Gantt chart)

- **This is the most crucial part of your grant application.** Describe in detail exactly what you are going to do to achieve your stated objectives.

- Should provide sufficient details to enable the review panel to critically evaluate your project. In particular, you must show how the experimental design will answer the questions that you are setting out to address.

- Within this section, there should be several sub-sections, some of which are required for all types of grants, others of which are dependent on the topic of the research.

Preliminary data (pilot study)

- Granting bodies like to see a concise description of the results of any preliminary work that you have carried out.

- You should focus primarily on the results that suggest that the proposed work will probably succeed.

Description of study area (field studies only)

- If the proposed research involves **field studies**, your application should include a description of some of the characteristics of the study area.

  Eg: Latitude and longitude, elevation, vegetation, rivers, rainy and dry seasons, mean rainfall and temperatures, schools and health centres or hospitals, and distance from the capital city.

- If it is relevant, include a brief description of the population, such as the membership of ethnic group(s), main occupation (e.g. fishing or subsistence agriculture) and religion.

Subject recruitment (clinical trials) - if relevant

- For clinical trials, it is important to briefly describe the design of the trial, how the sample size will be calculated, and what randomisation procedure you intend to use.

- **If your research involves human subjects**:

  Recruitment of research subjects with inclusion & exclusion criteria

  How you will obtain informed consent of the research subjects

  National authority or authorities that have given ethical approval for your research.

- Clinical trials –

  Register - Sri Lanka Clinical Trials Registry (SLMA)

  http://slctr.lk/

  Prospective registration of all clinical trials involving **human participants** is a requirement for trial publication in international biomedical journals.

  Sri Lanka Clinical Trials Registry (SLCTR), will provide a facility for registration of trials conducted in Sri Lanka or overseas.

Sample collection

Clinical trials

- Once subjects have been recruited and randomly assigned to different experimental groups, samples — for example of blood, urine or faeces — may need to be collected.
- The grant application must describe **how this will be done**, **how the samples will be stored temporarily**, and **how they will be transported to the laboratory for permanent storage**.

- **Other (plant parts, food material etc)**

  How the samples will be obtained (where etc)

  Authentification (if plants)

  Storage / Herbarium

- **Questionnaire**

  - Self administered
  - Interviewer administered

Laboratory investigations

- No need to go into a lot of detail if the procedures that you plan to use are standard and widely described in scientific literature.

- However, you must still provide some details of your proposed laboratory procedures. Make sure you **include a brief description of the various analytical techniques** that you will carry out in the laboratory

Data analysis

- Briefly describe some of the important aspects of the way in which the data obtained during the research will be analysed.
- This includes how the data will be entered into a computerised database and what software will be used.
- In the case of clinical trials, you should include how various variables, either continuous or discrete, will be compared among different groups studied using a variety of statistical methods, and how you intend to control for confounding variables.

Collaboration

- Identify the partners with whom you intend to collaborate with, either in your own country or overseas.

- This can be in a separate section, or it can be incorporated into the appropriate sections under 'Experimental design and methods'.

- Research partner or partners should provide complementary, rather than identical, expertise and/or facilities, and it must be clear how their presence will strengthen your proposal.

References

- This is usually placed at the end of the 'Experimental design and methods' section.

- The style of presentation is a question of personal choice, unless the granting body has specified it.

Limitations and Delimitations

- Possible weaknesses of the study that cannot be controlled.

Eg; one of your proposed methodologies may have certain disadvantages that could impact adversely on your findings.

Reviewer will certainly point this out, and might find it sufficient grounds for rejecting your proposal.

To meet such concerns, you should therefore state clearly that you are aware of the limitations of your approach, **and if possible propose an alternative strategy if your first approach fails to deliver.**

Delimitations

- Boundaries set by the researcher that limit the generalizability of findings

In addition:

- You should also describe briefly the particular strengths of your laboratory that are likely to contribute to the success of the project if it is funded.

- Eg; located in a disease-endemic area
  ensuring access to field materials
  expertise
  clinical facilities etc

Ethical considerations

- If the research involves animal studies or human studies ….

Applying for Research Grants

- Identify a potential funder and scheme

- Identifying the appropriate granting body or agency to submit your proposal

(each such body will have its own particular work plan and/or priority areas).

Internet (searchable databases, links to granting bodies and agencies.)

NSF / NRC / Universities /UGC

International Foundation for Science (Sweden – < 40 years of age) / TWAS / DAAD / possible funding

opportunities in journals and newsletters /talking to colleagues

- Once the appropriate granting body is identified:

- Check eligibility criteria and the deadline for the submission of applications
- Make sure that your proposal is written out in the format stipulated by your chosen organisation.

(Almost all granting bodies have electronic application forms posted on the Internet)

- A grant request is generally broken down into the following components:

- Objectives
- Background and rationale
- Experimental design and methods
- Limitations & delimitations etc

- Plan the resources required

- Equipment
- Chemicals /Solvents /Kits
- Consumables
- Equipment repair
- Miscellaneous (statistical analyses, WS –seminar registration, animals etc…..)
- Personnel (RA, technical support, field workers [subsistence], other [incentives])
- Registration (PG) / Ethical fees
- Travel

- Consider whether any ethical review and approvals will be necessary

- Prepare the costing (Technical officers can help) - Always add 25% more

- Writing the application

  Start well before deadline

  Head/ Dean / VC signatures

You are on the way up

Good Luck