Essential skills of writing research proposal

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DENT4219

Learning outcomes

- To identify the key components of a UWA research proposal
- To clarify your thoughts regarding your research proposal
- To develop a writing strategy that is effective and efficient

Study Smarter

- StudySmarter are a team of learning skills advisors that help UWA students develop study skills. They offer a range of online support, workshops and drop-in sessions and a number of their workshops focus on productivity.

- Read more here: http://www.student.uwa.edu.au/learning/studysmarter
- Find the workshop dates here: http://www.student.uwa.edu.au/learning/studysmarter/orientation

Research published in the journal must be:

- In scope of the journal;
- Scientifically valid;
- Technically accurate in its methods and results;
- Representative of a specific advance, or replication, or null/negative result, which is worthy of publication;
- As reproducible as possible;
- Ethically sound.

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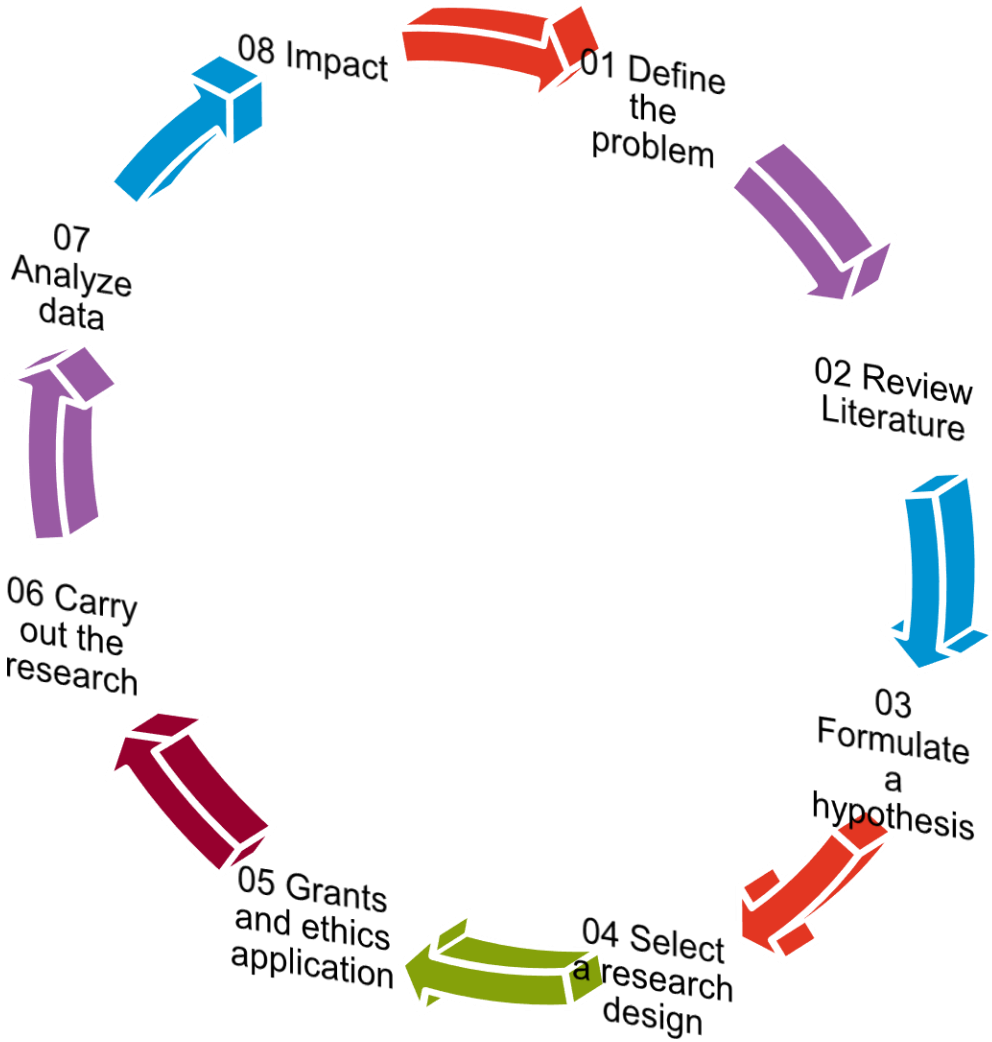
The Research Journey

Getting the most out of your research

Research cycle



Research proposal

- What are benefits from preparing a research proposal?
- Do you see any pitfalls, risks or disadvantages associated with this step?

What is the main purpose of a research proposal?

Aims of the research protocol

1) To raise the question to be researched and clarify its importance.
2) To collect existing knowledge and discuss the efforts of other researchers who have worked on the related questions (Literature review).
3) To formulate a hypothesis and objectives.
4) To clarify ethical considerations.
5) To suggest the methodology required for solving the question and achieving the objectives.
6) To discuss the requirements and limitations in achieving the objectives.

Benefits of research protocol

1) Allows the researcher to plan and review the project's steps.
2) Serves as a guide throughout the research.
3) Forces time and budget estimates.

Test

Components of research protocol

1) Title of the study
2) Administrative details
3) Project summary
4) Introduction to the research topic,
5) – Background: summary of prior literature.
   – Identification of research topic and research questions.
6) Study objectives and/or questions. Statement of the problem.
7) Preliminary Data (optional)
8) Methodology: Study design, study population and methods of recruitment, variables list, sample size, methods of data collection, data collection tools, plan of analysis (analysis of data)
9) Project management: Work plan (Timeline - proposed schedule)
10) Issues for ethical review and approvals

Objectives

The objectives should be (SMART objective):

- Specific
- Measurable
- Achievable
- Relevant
- Time based

Aims

Aims should be logically linked and arranged according to the tested hypothesis statement.

Example:

- Research question: Is there a difference in fluoride release between the Compomer and Glass- ionomer cement?
- Null Hypothesis: There is no difference in fluoride release between the Compomer and Glass- ionomer cement.
- Alternate Hypothesis: There is a difference in fluoride release between the Compomer and Glass-ionomer cement.

Al-Jundi A, Sakka S. Protocol Writing in Clinical Research. J Clin Diagn Res. 2016;10(11):ZE10-ZE13. doi:10.7860/JCDR/2016/21426.8865

The statement of the problem should provide a summary of exactly what the project is trying to achieve.

- What exactly do you want to study?
- Why is it worth studying?
- Does the proposed study have theoretical and/or practical significance?
- Does it contribute to a new understanding of a phenomenon? (i.e., Does it address new or little known material or does it treat familiar material in a new way or does it challenge an existing understanding or extend existing knowledge?)

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The justification of the research should be a convincing statement for the need to do it:

- How does the research relate to the priorities of the region and the country?
- What knowledge and information will be obtained?
- What is the ultimate purpose that the knowledge obtained from the study will serve?
- How will the results be disseminated?
- How will the results be used, and who will be the beneficiaries?

Materials and Methods

- Methods and Materials: It should describe in detail the ‘Where’, ‘Who’, ‘How’ the research will be conducted.
- It explains the study design and procedures and techniques used to achieve the proposed objectives.
- It defines the variables and demonstrates in detail how the variables will be measured.
- It details the proposed methodology for data gathering and processing.
- Methodology composes an important part of the protocol.
- It assures that the hypothesis will be confirmed or rejected.
- It also refers to a thorough strategy to attain the objectives

Materials and Methods

- Study design (cross-sectional, case-control, intervention study, RCT, etc.)
- Study population (Study subjects)
- Sample size
- Proposed intervention
- Data collection methods, instruments used
- Identified risks

Materials and Methods

Purpose	Study Design
To determine frequency and burden of a disease	* Cross-sectional survey (Prevalence) * Cohort study (Incidence)
To identify the risk factors	* Cohort study * Case-Control study
To determine prognosis of a disease	* Cohort study
To determine efficacy/effectiveness of a new treatment	* Clinical trials * Community intervention
To evaluate community programs	* Evaluation

[Table/Fig-4]: Suitable research design depends on the purpose of the study.

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Data Management and Analysis Plan

Operational Planning and Budgeting (Budget Summary)

Ethical Considerations (Issues for Ethical Review and Approvals)

Reference System

Common pitfalls

- Incorporating insufficient elements regarding proposed studies and inadequate explanation for the implication of the problem must be shunned as well as suggesting far more work than can be practically done during the study period.

- Furthermore, underpowered sample size should be justified, invalid or unreliable instrumentation should be tested and improper statistics should be adequately analyzed.

Australian Dental Research Foundation

https://www.ada.org.au/AusDentResearchFoundation/ADRF-Home/Grants-Scholarships/Research-Grants

Deadline: 31 March each year

School Deadline: 15 March each year

- Guidelines can be found from
- https://www.ada.org.au/AusDentResearchFoundation/ADRF-Home/Grants-Scholarships/Research-Grants/Guidelines-for-preparing-a-grant-application/ADRF_Guidelines_for_Preparing_A_Grant_Application.aspx

Remember keep it simple but holistic

Checklist for quality assurance

- Is there evidence of a systematic review of the literature?
- Appropriateness of research design: are there potential problems?
- Any perceivable shortcomings in data analysis skills -
- Ethics and safety issues- have the appropriate approvals been obtained?
- Does the budget make sense, are there concerns about funding for the research?
- Appropriate use of references and absence of plagiarism

Developing a writing strategy

- When and where will you write your paper?
- What will your writing schedule be?
- How will you avoid distraction?
- What is the length of the paper,
- What is the structure of the paper
- The nature of the paper will change according to the journal you choose to publish in, so deciding this early in publication can improve writing efficiency.

Title page

- A title page is essential item that includes the title of the project and list of contributors and their affiliations, in addition to key words
- A title of a paper should provide a condensed summary
- key words as this is important for search engine algorithms particularly if the journal does not request keywords).

Write a draft abstract

- Writing a very rough abstract for the paper before you start will help you help you understand what you want to say & what the main message of your paper may be.

- What are you researching and why? (Background/Objective/Research question)

- What did you do? (Methods)

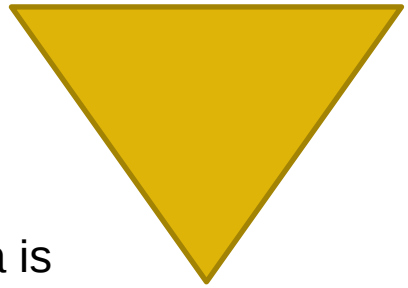
- What did you find? (Results)

- What is your main message? (Conclusion)

Things to consider

- Ensure the abstract is a true reflection of the paper. Do not include information that does not appear in the article.
- The abstract should ‘stand-alone’ – avoid unfamiliar terms but define all unique terms, abbreviations, acronyms, symbols if necessary.
- Keep the text within the word limit in the guidelines and shorter if possible. Do not repeat the title.
- Avoid citing references in the abstract unless absolutely necessary.
- Do not refer to figures and tables in the main text.

Introduction/Background



- State the broad theme or problem, and why the research area is important
- Summarise the literature
- Indicate the gap, inconsistency and/or controversy
- Stating the research problem/question/aims, the specific objective(s)

- The structure of the Introduction is often an inverted triangle - the broadest part at the top representing the most general information, tapering down to the apex which describes the specific problem addressed in the paper and the aims of the study.

Methods

- Identify the source of any specific equipment, samples, reagents, or organisms (supplier, country, possibly even catalogue number).

- Draw a sketch of your methods in the order you have written to assess if the methods are complete and logically ordered.

Results

- Consider how to best represent the data. The raw data and/or tables and figures initially generated by your research output may not be the best way to present the data. Do not report raw data if it can be summarized. Understand how to best present tables and figures.

- Refer to every Figure and Table in the text.

- Use past tense when referring to your results – but use present tense when referring to results presented in figures and tables

Results

- Use past tense when referring to your results – but use present tense when referring to results presented in figures and tables
- Be as factual and concise as possible in reporting your findings. Do not use phrases that are vague or non-specific. Avoid words such as clearly, essential, quite, basically, rather, fairly, really, virtually
- Know the rules for reporting numerals.

Discussion

- Do not include sentences that purely restate results.
- Do not include any results that have not been detailed in the results section.
- Do not ignore unexpected results – address them confidently.
- As always, make it reader-friendly, concise and specific
- Don’t adopt an apologetic style when describing the limitations of the study & don’t write about the imitations in a way that suggests you shouldn’t have done the study in the first place

Common reasons for manuscript's rejection

- Lack of relevance to journal
- Not adhering to journal format/instructions to authors
- Lack of focus, poor indication of significance
- Lack of consideration of readership with regard to presumed knowledge (too technical)
- Lack of structure
- Proofing problems, particularly missing references

General considerations

- Journal impact factor (Top 20%)
- Respect is of the utmost importance in scientific research and academic publishing. Don't miss the classics!!! Be modest!!
- Edit your paper taking into account the needs of the reader and the instructions to authors
- Proofread!!! Typos, missing references..
- Many find feedback on their academic writing very challenging. For many, past feedback has been positive and anything 'less than positive' comes as a shock.

General considerations

- Do not take criticism from reviewers personally
- If you do not agree with a criticism from a reviewer you can choose to argue that a suggested change to a paper is not required
- Acknowledge that if a reviewer does not understand your paper it is likely the academic writing needs improving.
- If your paper is rejected outright, it is unlikely that the paper will ever be accepted by the journal so do not revise and resubmit the paper to that journal – revise where appropriate and submit the revised paper to another journal

Useful resources

- 10 tips for writing a truly terrible journal article https://www.elsevier.com/authorsupdate/story/publishing-tips/10-tips-for-writing-a-truly-terrible-journal-article
- A Pragmatic Approach to Getting Published: 35 Tips for Early Career Researchers https://www.frontiersin.org/articles/10.3389/fpls.2016.00610/full
- Maximizing Productivity and Recognition, Part 1: Publication, Citation, and Impact. Science 2007: http://www.sciencemag.org/careers/2007/11/maximizing-productivity-andrecognition-part-1-publication-citation-and-impact
- Citations, Altmetrics and Researcher Profiles - UWA library Workshops for Researchers & LibGuides http://guides.library.uwa.edu.au/rim
- Understanding submission and publication fees http://www.aje.com/en/arc/understandingsubmission-and-publication-fees/

References

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Questions???

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