Chapter Two

Writing of Final Research Report

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Abstract

The formats for writing a research report differ from organization to organization. However when a researcher or student is writing for an organization, he or she is expected to adhere strictly to the format of the organization. Most organizations have their own formats but what is expected to be written the elements that constitute the format are not well understood by the researchers or students. This thus leads to report not well written out to communicate effectively. This paper examines and explains the elements contained in a research report format to would-be researchers and students.

Keywords

Research Report, Data, Analysis, Research Design, Sampling Technique

2.1 Introduction

Research process is compared to a journey researcher embarks on when undertaking research into a particular study. It entails series of steps arranged sequentially as follows:

1. Formulating the Research Problem.
2. Doing Extensive Literature Review.
3. Developing the Objectives of the Research Study.
4. Preparing the Research Design including Sample Design.
5. Collecting the Data.
6. Analysing the Data collected.
7. Generalisation and Interpretation of Results.
8. Preparing of the Final Research Report or Presentation of Final Research Report.

Research report writing is the last normally the last step involved in the research process but very relevant and important. It is where all about the study is well documented. It is from this report that the findings can be culled and published in other publication conduits such journals, books etc. Since it is a scientific work, the report must be follow the prescribed format prescribed and style of writing and referencing. The report should be comprehensive and reflective of the study. A good report forms the basis for a good presentation and aids with knowledge dissemination which is one the essential imports of research.

There is however no doubt that for a good research to be written, the researcher must understand the structure of a research report and its content. The point needs to be made that a research reporting structure or format varied from one

institution to another; as such, the researcher or the student needs to know the structure of reporting in his or her institution and write accordingly. But then, it remains very vital for the researcher to know what is expected under each chapter or heading of the report.

Research report writing poses a lot of challenge to students and would-be researchers, and oftentimes their supervisors do not give them enough attention to understand it but rather allow them to learn it the hard – by cancelling their work till they get it right. This chapter thus concentrates on understanding and writing a good research report.

2.2 Abstract

The abstract is the last part of the research report that is written out but usually comes before the chapter one. This is because an abstract is expected to be written after the research has been done and the report on each item written. It is a short *summary of the problem tackled in the study, the approach used, the salient findings made as well as the recommendation*.

It must be noted that an abstract is supposed to be short sometimes with prescribed number of words – 200 or 250 depending on an institution and done in a piece paragraph. No paragraphing is accepted in the write up of an abstract.

2.3 Chapter One (Introduction)

The introduction is always the first chapter of a research report. The interesting here is that once the research proposal for the study is accepted or approved, with a slight modification. There are other parts that are outrightly deleted. The following are the parts expected in the chapter one (also known as the Introduction) of a research report:

2.3.1 Background

- The general information on the background.
- Specific information on the background.
- Identification of a gap in the background information.
- Raising appropriate questions about the identified gap.
- Providing the scientific answers to the raised question about the identified gap / the thesis statement.

Above parts are the same as explained for the research proposal and therefore can be maintained in the research report write up.

2.3.2 Problem Statement

The problem statement remains the same as written for the research proposal in terms of structure and sequence unless the researcher decides to make some changes.

2.3.3 Research Questions / Hypothesis

Research Questions are used in some cases and in others the hypotheses are replaced with them. When the data to be collected are qualitative in nature questions are best used. This is because the responses to such questions are more subjective. But where quantitative data is expected then a hypothesis can be used instead of research questions. This is not to suggest that all research questions generate qualitative responses. There is a blend of qualitative and quantitative data questions as well can be used but hypotheses are used when only quantitative data is expected because hypothesis testing can be done on only quantitative data.

In stating the hypothesis, both the null and alternate must be stated. It can be stated mathematically or verbally.

2.3.4 Objective of the Study

The objective of the study can be captured in the same way as done for the research proposal. There should be a main objective of the study and the specific objectives which are expected to be attainable and measureable using any of the levels of measurement known. Also, the must be action oriented.

2.3.5 Significance / Justification / Rationale

The justification of the study follows the same pattern as discussed earlier in the research proposal writing. It entails the following:

- The magnitude of the area or coverage of the study.
- The gaps in literature that demands attention.
- The improved or unusual approach / methodology being employed.
- The expected benefits or outcomes.

2.3.6 Limitations

The limitations of the study refer to the constraints that are likely to affect the achieving the objectives of the study and this must be part of the chapter one.

2.3.7 Conclusion

The conclusion summarizes briefly what is expected to be done and the expected outcome of the study and the intended benefits to be derived.

2.4 Chapter Two (Literature Review)

Literature review is very essential in research report writing as it informs the researcher on the current trends in the area of study. It is said that when good literature review is done, it improves the quality of the research to be conducted. It has four main functions:

- Bring clarity and help the research to get focus on the study

  Normally when a research is reviewing literature it exposes to the areas within the study where others have identified gaps and recommended further studies in order to help bridge the gap. When due diligence is done during the review, the research discovers areas in the study where there are gaps, this helps him or her to focus on the real gaps identified and also to refine his or her study as such. It also provides empirical information on these real gaps presenting the basis for the study.

- It broadens the researchers knowledge in the area of study

  It is conspicuously obvious that as the researcher reads more on literature related to his or her study, the more he or she broadens her knowledge horizon on the study.

- It helps to improve the researcher's methodology

  As the research reviews literature on the study, he comes across many approaches or methods that can be used to execute the study. Out of all the methods, he or she is likely to be well placed to chose the appropriate method for the study or perhaps do a modification of the methods as a way of improving upon the existing methods that can be used to tackle the identified problem in the study.

- It useful in contextualizing the findings of the study

  When the review is thoroughly done, it can help the researcher to contextualize his other findings during the discussion. Contextualizing the findings of a study means comparing and contrasting the researchers' findings with findings of other researchers engrained in literature so that his or her findings can be placed in the proper perspective or context of intellectual or scientific basis.

2.4.1 Preliminary Literature Review

The preliminary literature review deals with the comparison of study or works that are closely related to the researcher's study. For the chapter two, the chapter dedicated to literature review, it is expected that the literature review is done extensively.

2.4.2 Conceptual Framework

A concept is an idea that is nebulous or vague this vague idea is only known to the researcher until it is reduced to a variable which can be measured by applying the known levels of measurement. Before a concept can be reduced to a variable, it must be linked by an indicator. In developing the conceptual framework of the study, the researcher must show how his or her concept can be reduced to the various variables and how he or she intends measuring the variables as well. There is the need for the researcher to support how she intends to measure the variables with the appropriate literature.

2.4.3 Theoretical Framework

Developing the theoretical framework involves identifying in literature all the

theories that underpin the study and them using it to describe and discuss the concepts, designs and models that will be used in the study. This must be done thoroughly such that the literature is not porous to attract litany of questions from the researcher's ultimate publics.

During literature review books, journals, online articles etc. are cited and therefore needed to be duly referenced. There are several referencing formats known but in a research report write, it is expected that only one is use throughout the report. The in-text referencing is used while writing the literature review.

2.5 Chapter Three (Materials and Methods)

This chapter encapsulates the approaches to be employed in the execution of the study and this must be thoroughly done in more details than the proposal.

2.5.1 Materials

The same is expected as done in the proposal write up unless new materials have been used for the actual work.

2.5.2 Area of Study / Description of the System

This gives a brief description of the area of study in terms of place or the topic area as indicated in the research proposal.

2.5.3 The Research Design

- Design type to be employed

  The design type used must be well stated and described. Refer to the proposal for details.

- Population and Sample Size

  The population and the samples size must be stated.

- Sampling Technique

  The sampling technique used must be stated and used to explain how the sampling would be done.

2.5.4 Instrumentation

The same details included in research proposal are expected unless changes are to be made.

2.5.5 Data Analysis Data

The same details included in research proposal are expected except there some changes to be made.

2.5.6 Interpretation of Data / Results

The same details included in research proposal are expected.

NB: It must be noted that all methods being used that have used by other authors must be duly referenced in the write up i.e. both in-text and out-of-text referencing.

2.6 Chapter Four (Results and Discussion)

The results and discussion is mostly contained in the chapter four of the research report but this as earlier stated varies from one institution to the other. In some institution the Results alone constitute a chapter while the discussion is

presented in a separate chapter. However, some institution combine the results and the discussion as a single chapter as being done in this case. Where the *RESULTS* are presented alone as a chapter, the researcher is only have to summarize them using the appropriate statistical tool i.e. either using graphical or tabular methods. Then, for taking *DISCUSSION* alone as a chapter, the results are interpreted and the findings or the information contextualize – compared to other similar results obtained by other authors or research that have been engrained in literature for the purposes of confirming or opposing the their findings. This places the work in its proper perspective or context.

- *Summarization of Results of Study*

  The results are presented and summarized using the appropriate statistical tools depending on whether the data at hand is either quantitative or qualitative.

  Use of tabular methods for summarization of results

  This involves using tables to summarize the data at hand depending on the data type – qualitative or quantitative.

  For *qualitative data*, the following tables can be used: frequency distribution, cumulative frequency tables, relative and percentage frequency distribution and cross tabulation; and for *quantitative data*; frequency distribution, cumulative frequency tables, relative and percentage frequency distribution, cross tabulation and the stem-leaf plot.

  Use of graphical method for summarization of results

  This where graphs and charts are plotted and used in summarizing the various data types generated from the study.

Qualitative data is graphically summarized using statistical tools like bar chart and pie chart whereas *quantitative data* is graphically summarized with statistical tools like histogram, dot plot, scatter diagram and ogive.

- *Interpretation of the Results*

  This is where the meanings of the results are explained and discussed based on the tests, the data obtained in the study were subjected to; and the conclusion criteria used for the rejecting or failing to reject the null hypothesis for the study. During the interpretation of the results, it should be done thoroughly such that it does not beg of questions from supervisors, other researchers as well as the ultimate consumers of the information.

- *Contextualization of Findings*

  This is where the findings in of the study are juxtaposed with findings of other researchers cited literature.

  For example: *During week 3, the germination index increased with reduction in the total fungi count whereas in week 6, the germination index decreased as the total fungi count increased and total viable count decreased. This indicates that the fungi present were using the nutrient during the early stage of composting hence the low germination index recorded with rises in the fungi count. However, from week 10 to week 12, as the total fungi increased and the total viable count decreased, the germination index increased. This confirm the fact that fungi dominated the process at the end to decompose the cellulose, chitin and lignin coupled with the low temperature that favour their growth as reported in Compost Microbiology and Soil Food Web (2008).*

2.7 Chapter Five (Conclusion and Recommendation)

2.7.1 Conclusion

In the concluding part of the research report, the researcher needs to summarize study and highlighted the various outcomes of the study and the benefits derived from embarking on the study.

2.7.2 Recommendation

It is said that problems emanate from problems. In tackling problems, there are other attendant problems that come along. The researcher must be focus on the initial problem and note done the attendant problems as he or she tackles the main problem.

2.7.3 References (Out-Text Referencing Bibliography)

There are so many referencing styles but the researcher must adhere strictly to the required style of the organization the report would be submitted to. Normally the out text referencing takes into account all the references cited in-text listed out in alphabetical order.

Bibliography

[1] Compost Microbiology and the Soil Food Web (2008). Retrieved on January 5, 2008, from <http://www.ciwmb.ca.gov/publications/Organics/>.

[2] Davies, W. M., Beaumont, T. J. (2007). *Research Proposals.* Teaching and Learning Unit, Faculty of Business and Economics, the University of Melbourone.

[3] Philips, E. M., Pugh, D. S. (1987). *How to get a PhD.* Milton Keynes, U. K: Open University Press.

[4] Sekaran, U. (1992). *Research Methods for Business: A Skills Building Approach*. New York: Wiley.

[5] M. O'Connor, *Writing Successfully in Science*. London: Chapman & Hall, 1995.

[6] J. Peat, E. Elliott, L. Baur, and V. Keena, *Scientific Writing - Easy when you know how*. London: BMJ Books, 2002.

[7] Huth EJ. *How to Write and Publish Papers in the Medical Sciences*, 2nd edition. Baltimore, MD: Williams & Wilkins, 1990.

[8] Browner WS. *Publishing and Presenting Clinical Research*. Baltimore, MD: Lippincott, Williams & Wilkins, 1999.

[9] Devers KJ, Frankel RM. Getting qualitative research published. *Educ Health* 2001; 14: 109–117.

[10] Docherty M, Smith R. The case for structuring the discussion of scientific papers. *Br Med J* 1999; 318: 1224–1225.

[11] Alley, M. 1996. The craft of scientific writing, 3rd edition. Prentice Hall, NJ. [and accompanying web site: http://filebox.vt.edu/eng/mech/writing/]

[12] Day, R. 1998. How to write and publish a scientific paper, 5th edition. Orynx Press.

[13] Day, R. 1995. Scientific English: A guide for scientists and other professionals, 2nd edition. Orynx Press.

[14] Goben, G., and J. Swan. 1990. The science of scientific writing. Am. Scientist 78: 550-558. [Available online at http://www.research.att.com/~andreas/sci.html].