

NEED FOR QUALITY IMPROVEMENT IN RESEARCH PROJECT WRITING: A GUIDE TO UNDERGRADUATE STUDENTS IN BEHAVIOURAL SCIENCES IN NIGERIA

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Abstract

This paper aimed at guiding undergraduate student's research project especially in behavioural sciences in Nigerian universities. The paper used descriptive research design with secondary method. Data were extracted from published and unpublished articles, and the internet. The data generated were content analysed. The paper discovered that the key to successful research project is getting the structure of the project right. These structures include introduction, literature review, methods, results, discussion and references. Students are expected to state the research questions intended to address in the introduction, the relevant scholarly materials reviewed in the literature section, what they did to answer the research questions in the methods section, what they observed in the results section, what they think the results mean in the discussion section, and the material consulted while writing in the reference section. In view of these findings, the paper recommends the use of the structural schemes and procedures to undergraduate students in behavioural sciences in order to have a good and acceptable research project.

Keywords: Behavioural sciences, Nigeria, Research project, Sampling techniques, Undergraduate students

Introduction

Writing of research project is one of the requirements undergraduate students must fulfill before graduation in Nigerian universities. Conceptually, a research project is a scientific endeavour meant to answer a research question. It involves systematic inquiry into an approved topic or theme based on either library or field work, and is conducted under the supervision of academic staff. The process of project creation by students is known as project writing (Ajibade, 2016). The essence of project writing is to give students the opportunity to put into practice earlier learning about statistical and research methods.

While students are taught by their supervisors to always observe the basic rules (explicit and implied) guiding project writing, it is observed that students are still making grievous mistakes in their project work. These mistakes include non-specification of research question, stating aim of the project in tautological/vague manners, structuring the project in chaotic manners (discussing methods in results section), reporting results selectively (e.g. percentages without frequencies, P-square without measures of effect), appearance of the same results in a table and in the text, provisions of detailed tables for results that do not relate to the main research question, non backing up of key argument by appropriate references in the introduction and discussion sections, using of outdated references, non provision of answer to research question, overstating the implications of the result through discussion, non acknowledgement of the limitation of the study,

and writing of the research project in poor English. With these, there is the need for quality improvement in research project writing by undergraduate students in Nigerian universities.

It is in view of the foregoing that this paper is conceived to serve as a blue print for undergraduate student's planning to write research project most especially in behavioural sciences in Nigerian universities. Behavioural science is any disciplines dealing with the subject of human actions (the how and why behind human behaviour), usually including the fields of sociology, social and cultural anthropology, psychology, and behavioural aspects of biology, economics, geography, law, psychiatry, and political science (Encyclopaedia Britannica, 2019).

This paper is significant for students in behavioral sciences discipline as it will help them to master the art of project writing which is one of the requirements for university graduation. The paper will also help project supervisors/lecturers in the discipline to provide suitable guidance to their supervisees/students in project writing.

Material and methods

This study used descriptive research design with secondary method. Relevant data were extracted from published and unpublished articles, and the internet. The data generated were content analyzed.

Results and Discussion:

Basic issues in research project writing

In writing research project, the first thing students are expected to do is to choose a research topic. Conceptually, a research topic is a subject or issue that a researcher is interested in when conducting research (Xun, 2017). A good research topic must be one that is agreed with the researchers' interest, competence, resources and time available; must be viable or researchable, novel, and capable of contributing to knowledge. Research topic may be sourced either from the school or classroom environment, community activities, current technological changes and development, theory, literature, academic adviser and researchers' experience (Akuezuiolo, 2003).

After the choice of a research topic by students, the next step is to design the research project by pointing out the various components of research work, the procedure to follow and techniques to use to effectively address the research questions/objectives. These components can be divided into the preliminary and the core components. The preliminary components comprises of cover page, title page, certification page, approval page, abstract, acknowledgements, table of contents, list of tables, list of figures, and list of appendices. The core component, on the other hand, are divided into the following sections namely introduction, literature review and theoretical framework, research methods, ethical decisions for the protection of research participants, the results and the discussion, summary, conclusion and recommendations, references and appendices. Each of the items in both the preliminary and core components are explained below:

Preliminary components of research project

The preliminary component of research project starts with cover page which is expected to contain title of the projects, full names of student and the proposed month and year of completion of the project. Following the cover page is the title page. The Title page should focus on title of the project, student full name, the degree for which the project is meant for and the proposed month and year of completion/submission of the project. After written the title page the next is the certification page which should show a statement signed by student to the effect that the materials that will be reported in the project will result from the research that will be

carried out. When this is done the next page is the approval page. The approval page should contain a statement signed by students' supervisor, the Head of Department and the External Examiner to the effect that the student has satisfied the requirement for the award of degree sought. Following this is the acknowledgement page which should express student gratitude to people who assisted him/her in one way or the other during his/her course and research works.

Other parts of the preliminary component include abstract, table of contents, list of figures and list of appendices. Abstract should summarize usually in one paragraph of either 250 or 300 words or more the major aspects of the entire research work in a sequence that includes the overall purpose of the study and the research problem(s) investigated, the basic design of the study, major findings found as a result of analysis done, implications of the findings, conclusion and recommendations. However, the abstract should not contain lengthy background information, references to other literature (say something like, 'current research shows that'), the use of elliptical (i.e. ending with "_____"), abbreviations, jargon, or terms that may be confusing to the reader, and any sort image, illustration, figure, or table, or references to them (Koltay, 2010). Table of contents, on the other hand, should contain the list of main topics in the research work beginning with the title page and ending with the appendices. It should also contain the first page of each of the topics listed in the core component of the research projects. The table of contents has the merits of enabling reader to locate without difficulty any topic of interest to him/her in the research report. In addition, it gives the reader an overview of all topics covered by the research work (Akuezuiolo, 2003). List of figures, on its own, should contain all figures in the project work including titles and the pages where they appear; while the list of appendices is expected to show appendices including titles and the pages where they appear.

Core Components of research project

As earlier stated in this paper, the core components of research project comprises of introduction, literature review and theoretical framework, research methods, ethical decisions for the protection of research participants, the results and the discussion, summary, conclusion and recommendations, and references. However, each of these can be referred to as a chapter.

Introduction

This is the title of the first chapter of a typical research project. The introduction establishes the scope, context and significance of the research being conducted by summarising current understanding and background information about the research topic, stating the purpose of the work in the form of the research problem supported by a hypothesis or a set of questions, explaining briefly the methodological approach to be used in examining the research problem, highlighting the potential outcomes your study can reveal and outlining the remaining structure and organisation of the project work (University of North Carolina, 2011).

Structurally, the introductory part of research project can be divided into background of the study, statement of the problem, the research questions, objectives and hypotheses, significance of the study and definition of terms. The background of the study is a broad description of unresolved issues or social concerns, related to the problem under investigation. The statement of the problem, on the other hand, is the description of an issue currently existing which needs to be addressed. It provides the context for the research study and generates the question which the research aims to answer. The research questions, on its own, are questions raised by researcher to answer research problem; while the research objective is the purpose or intention of the research which is usually to answer the questions raised by the problem of the study. The statement of hypotheses is a formal affirmative statement predicting a single research outcome,

a tentative explanation of the relationship between two or more variables. The importance/significance of the study points out how the solution of the problem or the answer to the research questions will influence theory and practice; while the definition of terms implies explanations of all unusual/unfamiliar terms that may be misinterpreted (Akuezuilo, 2003; Olayinka & Owumi, 2006; Bwisa, 2008).

In short, the goals of introductory section is to ensure that prior studies about the topic under investigation are summarised in a manner that: lays a foundation for understanding the research problem; explain how your study specifically addresses gaps in the literatures, or other deficiencies in the literature; and note the broader theoretical, empirical and policy contributions and implications of your research (University of Carolina, 2011)

Literature Review and Theoretical framework

This is the second chapter of research project. A literature review surveys books, scholarly articles, and any other sources relevant to a particular issue, area of research, or theory and by so doing, provides a description, summary and critical evaluation of these works in relation to the research problem being investigated (Kennedy, 2007; Fink, 2014). Literature reviews are of various types. These include argumentative review, integrative review, historical review, methodological review, and systematic review. The argumentative review examines literature selectively in order to support or refute an argument, deeply imbedded assumption or philosophical problem already established in the literature. The integrative review considers a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way such that new frameworks and perspective on the topic are generated. The historical review examines research throughout a period of time, often starting with first time an issue, concept or phenomena emerged in the literature then tracing its evolution within the scholarship of a discipline. The methodological review examine method of analysis that provides a framework of understanding at different level i.e. those of theory, substantive fields, research approaches, and data collection and analysis techniques; while the systematic review is an overview of existing evidence pertinent to a clearly formulated question, which uses pre-specified and standardized methods to identify and critically appraise relevant research, collect report, and analyze data from the studies that are included in the review (Hart, 1998; Torracro, 2005; Fink, 2005; PettCrew & Robert, 2006; and Rocco & Plakhotnik, 2008).

However, before explaining the meaning of theoretical framework, the concept of theoretical review will first of all be explained. Conceptually, theoretical review is the examination of the corpus of theory that has accumulated in regard to an issue, concept, and phenomena. The theoretical review helps to establish what theories already exist, the relationship between them, to what extent the existing theories have been investigated, and to develop new hypotheses to be tested (Hart, 1998; Torracro, 2005; Fink, 2005; PettCrew & Robert, 2006; and Rocco & Plakhotnik, 2008). Theoretical framework therefore is the choice of a theory or theories among the reviewed theories for use in a research work.

In all, the purpose of a literature review is to place each research work in the context of its contribution to understand the research problem being studied, describe the relationship of each work to the other under consideration, identify new ways to interpret prior research, reveal any gaps that exist in the literature, resolve conflicts amongst seemingly contradictory previous studies, identify areas of prior scholarship to prevents duplication of effort, point the way in fulfilling a need for additional research, and locate one's research within the context of existing literature (Hart, 1998; Akuezuilo, 2003; Fink, 2005; and Ridley, 2012).

Methodology:

This is the third chapter. The methods chapter describes actions to be taken to investigate a research problem and the rationale for the application of specific procedures or techniques used to identify, select, process, and analyze information applied to understand the problem, thereby allowing the reader to critically evaluate a study's overall validity and reliability (Kallet, 2004). The methodology section of a research project answers two main questions namely how was the data collected or generated? And, how was it analyzed? In writing this section of the research project students should be direct and precise.

Structurally, the methodology part of research project consists of research design, study area and study population, sample and sampling techniques, methods of data collection, and data analysis. Each of these is explained below:

Research design

Research design is the overall strategy chosen to integrate the different components of a study in a coherent and logical way in order to effectively address the research problem. Research design is of various types. These include experimental design, semi-experimental design, ex-post facto design, correlational design, and descriptive design. The experimental design is purposely meant to investigate possible cause and effect relationship by exposing one or more experimental groups to one or more treatment conditions and comparing the results to one or more control groups not receiving the treatment. The semi-experimental design, on the other hand, approximates the conditions of the true experiment in a setting that does not allow for the control/manipulation of all relevant variables and random assignment of subjects. The ex-post facto design, on its own, investigates possible between group differences by observing some existing consequences and searching back through the data for plausible contributory factors that may have impacted the dependent variables. The correlational design investigates the extent to which variations in one factor correspond with variations in one or more other factors based on correlation coefficients; while the descriptive design systematically, factually, and accurately describe the facts and characteristics of a given population or area of interest (Akuezuiilo, 2003; Kjell & Rae, 2015). Note however that it is the research problems that determine the type of design you will use and not the other way round.

Study area and study population

Study area in research project refers to study setting/location; while the study population means not just people but also events, animal and object who/which are members of the target of the study as defined by the aim and objectives of the research. In conducting a research, students have to decide whether to study the entire population or to study only a certain portion of the population. It is important to study the entire population when (i) the population is small (ii) the student has a lot of time at his/her disposal (iii) the student has adequate human and material resources for the study, and (iv) the demand of the study is to make a complete counts or record of the entire population (as in census). Similarly, students may decide to study only a portion of the population when (i) the population of the study is large (ii) the time available for the study is limited (iii) the student has inadequate human and material resources for the study.

However, if students want to study a portion of a population the issue of sample comes in. Sample refers to a portion of a population selected in a study. The method of selecting the sample from the population is known as sampling technique. The major types of sampling technique are (i) probability sampling techniques, and (ii) non-probability sampling techniques. The probability sampling techniques are those techniques for which we can determine the probability, likelihood

or chance of including each member of the population in the sample. Examples include simple random sampling, proportionate stratified random sampling, disproportionate stratified random sampling, and cluster/area sampling. The simple random sampling is a method of selecting sample from a population in such a way that all members of the population have equal chances of being selected. The proportionate stratified random sampling, on the other hand, is a method of selecting sample from a population in such a way that the relative proportions of the strata in the sample correspond to their relative proportions in the population. The disproportionate stratified random sampling, on its own, is a method of sampling where the relative proportions of the strata in the sample do not correspond to their relative proportions in the population; while the cluster/area sampling is used when the population to be sampled is vast and spread over a wide geographical area (Akuezilo, 2003).

Non-probability sampling techniques, on the other hand, are those techniques for which we cannot determine the probability of including each member of the population in the sample; sampling is therefore not random and conclusions reached by using the techniques cannot be generalized. These types of sampling are generally used to obtain a rough impression of a group of elements. However, the generability of non-probability samples can be enhanced by including probability sampling at some stage (Akuezilo, 2003). Examples of non-probability sampling include purposive/judgmental sampling, accidental sampling, and snowball sampling. The Purposive/judgmental sampling is the type of sampling in which researcher simply hand picks his/her subjects because to his/her judgment they are typical of what he/she wants or have information he/she needs. In accidental sampling researcher chooses only individuals he/she can reach easily; and snowball sampling is a method where researcher needs to first of all identify a small number of individuals who possess the traits/attributes he/she requires for a study. These identified individual identify other people whom they also feel possess the required traits the researcher wants; this third group identifies other people in such a continuous process (Ofo, 1994; Akuezilo, 2003).

Methods of Data Collection

These are the approaches used to collect primary and secondary data/ information. In research project, students are expected to provide details of available sources of secondary data, or the methods such as questionnaires, interview, observation and group discussions to be used for the collection of primary data; as well as outlining the procedures for the development, pretesting and administering of any research instrument (Olayinka & Owumi, 2006). Whatever choice of methods you make, you must bear in mind whether the method would answer the questions you set out to achieve; is it in agreement with the theory? Will different methods be required for robust data to be gathered? If yes, then Triangulation (the use of several research methods to collect data on the same topic/phenomenon) is recommended. Triangulation is encouraged because no singular method may furnish the research with the required data (Frankfort-Nachimias & Nachmas, 1996 cited in Olayinka & Owumi, 2006:64).

Analysis

Here, students are expected to state whether the data would be analysed qualitatively or quantitatively. In making this choice, students must take into cognizance the study objectives, type of data (qualitative/quantitative), design of study, nature of sample (independent/dependent), and sample size. For qualitative data collected through either text, audio-taped conversation/responses, observed behaviour, video-taped behaviour; the methods of analysis include text coding, intuition, graphical displays, deconstruction, etc. For quantitative data, statistical techniques are mostly employed for data analysis for either descriptive purposes

or for drawing of inferences or both. Descriptive statistics used in quantitative data analysis include frequency counts, minimum and maximum values; as well as measures of central tendency such as the mean, median, mode, range; and measures of dispersion such as standard deviations. Others statistics also used in quantitative data analysis include ratio, proportion, percentages and rate. In quantitative analysis, students should be able to identify the extent of statistics required for data analysis. He/she should also know if his study will only need descriptive statistics or will require statistics to test a certain hypothesis and therefore draw appropriate inferences from the data (Bamgboye, Lucas, Agbaja, Adewale, Ogunleye and Fawole, 2006)

In research project that involves testing of hypothesis (to determine the truthfulness or otherwise of an assumption made about the status of a phenomenon) students are expected to first of all identify the variables in the hypothesis, and then use appropriate statistics to examine the relationship/differences between the variables. Examples of statistics used in testing hypothesis include contingency chi square (used to determine association/relationship between two variables whose measure are given in frequencies, and are categorical), One variable chi-square (used when examining the incidence/occurrence of a variable in a sample and the data on the incidence/occurrence are given in frequencies), Pearson's Product Moment Correlation (used to explore relationship between two variables that are measured continuously), One –way ANOVA(used when more than two independent groups are to be compared on a variable that is measured continuously), Dependent t-test (used where there is a case of pretest and post test, and a group is being studied on its comparative performances on the variables, variables are correlated, and scores are continuous), multiple regression (used when a variable is to be predicted with two or more variables), etc (Bamgboye, Lucas, Agbaja, Adewale, Ogunleye & Fawole, 2006; Olayinka & Owumi, 2006; Asika, 2010).

Further, in hypothesis testing, students are expected to make choice of either accepting or rejecting the null/research hypothesis. This choice is very important and should be decided carefully. Students however have four options to choose from. These four possibilities which form the decision rule are either student: retains a true null hypothesis, rejects a false null hypothesis, rejects a true null hypothesis, retains a false null hypothesis (Akuezilo, 2003). Any mistake in the decision making leads to an error. Error in decision making are of two types namely type one error (occurred when researcher rejects a true null hypothesis), and type two error (occurred when researcher retains a false null hypothesis). Students should try as much as possible to avoid committing any of the errors. In all, some of the tools for analysing data include Microsoft excel, Apache spark, Rapid Miner, Python, Statistics Package for Social Sciences (SPSS), etc.

Ethical decision for the protection of study participants

All human research is expected to begin with the informed consent of participants, but how it is implemented depends on the nature of the research and the type and degree of risk that participation entails (Ulin, Robinson, Trolley, & Neil, 2002). However, at its most basic, informant consent means that study participants understand possible risks and benefits, voluntary participation, assurances of confidentiality, the purpose of the research, how they were chosen to participate, data collection procedures, and whom to contact with questions and concerns.

In sum, the methodology section of research project should be thorough but students should avoid irrelevant detail, unnecessary explanation of basic procedures, problem blindness, and literature review.

The Result and the Discussion

This section is regarded as the fourth chapter in project work. The result section reports without bias the findings of study based upon the methodology(ies) applied to gather information (Annesley, 2010). The discussion section, on the other hand, interprets, and describes the significance of findings in light of what was already known about the research problem being investigated and explain any new understanding or insights that emerged as a result of your study of the problem. The discussion must always connect to the introduction by way of the research questions or hypotheses you posed and the literature you reviewed, but the discussion does not simply repeat or rearrange the first parts of your project, the discussion clearly explain how your study advanced the reader's understanding of the research problem from where you left them at the end of your review of prior research (Annesley, 2010).

Further, the discussion section is the most important part of research project because this is where you (i) most effectively demonstrates your ability as a researcher to think critically about an issue, to develop creative solutions to problems based upon a logical synthesis of the findings and to formulate a deeper, more profound understanding of the research problem under investigation (ii) present the underlying meaning of your research, note possible implication in other areas of study, and explore possible improvements that can be made in order to further develop the concerns of your research (iii) highlight the importance of your study and how it may be able to contribute to or help fill existing gaps in the field. In addition, the discussion section is also where you state how the findings from your study revealed and helped fill gaps in the literature that had not been previously exposed or adequately described(Kretchmer, 2008; Annesley, 2010).

In all, when presenting discussion of the results you are not expected to be verbose or repetitive, but be concise and make your points clear. Avoid the use of jargon or undefined technical language and follow a logical stream of thought. In general, interpret and discuss the significance of your findings in the same sequence you described them in your results sections, use the present verb tense especially for established facts, however, specific works prior studies in the past tense; and if needed, use sub headings to help organize your discussion or to categorize your interpretation into themes (Yellin, 2009).

The Summary, Conclusion and Recommendations

This is the last chapter of research project. It is often called chapter five. The summary section is meant to point out the purpose, methodology, and key findings/outcomes of your research project. The conclusion section, on the other hand, is meant to help the reader understand why your research should matter to them after they have finished reading the work. A conclusion is not merely a summary of the main topics covered or a re-statement of your research problem but a synthesis of key points and where you recommend new areas for future research. When writing the conclusion of your research project, you are expected to state your conclusions in clear, simple language, and indicate opportunities for future research, and do not simply reiterate your results, but provide synthesis of arguments presented in the project work to show how these coverage has addressed the problem and the overall objectives of your study (University of North Carolina, 2019). Finally, the recommendations section is expected to point out specific actions to be taken with regard to policy, practice, theory or subsequent research. It should point out specific steps to be taken to address a problem, immediate actions to be implemented to solve a particular question, what needs to be corrected and what needs to be avoided to solve a problem, etc Recommendations should however be supported by results of your study.

Citing Sources/References

Citation is a formal reference to a published or unpublished source that you consulted and obtained information from while writing your research project (Ballenger, 2012; University of North Carolina, 2019). The way in which you document your sources depends on the writing styles manual you are asked to use by your project supervisor. The available styles include the American Psychological Association (APA) style, Modern Language Association (MLA) style, the Chicago manual style, and the Turabian style.

Concluding Remarks

This paper provides a blue print that point out the research components and procedure to follow and use by students most especially in behavioural sciences when writing research project. It should be noted, however, that there is no rigid chronological scheme in the writing of research project, in the same way as there are no special clues to perfect procedures to a successful project. This is due to the fact that the tenets of a good project are dynamic and institutional. Notwithstanding, this paper discovered that the key to successful project writing is getting the structure of the project right. These structures include introduction, literature review, methods, results, discussion and references. Students are expected to state (i) the problem they intended to address (research questions) in the introduction (ii) the relevant scholarly materials reviewed in the literature review section (iii) what they did to answer the research questions in the methods section (iv) what they observed in the results section (v) what they think the results mean in the discussion section, and (vi) the material consulted while writing in the reference section. In view of these, the paper recommends the use of the structural schemes and procedures to undergraduate students in behavioural sciences in order to have a good and acceptable research project.

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