

Comprehensive Approach to Research Writing and Publication



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SciencePG
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Dedication

This book is dedicated to our families and friends for their physical and spiritual supports.

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We acknowledge and appreciate the assistants obtained from all our superiors, colleagues and subordinates in putting together the materials contained in this book. We are indeed indebted you and wants you to be part of the success.

Preface

This book is made up of several chapters with each giving a comprehensive view of topics of great importance in the act of research writing and publication. Most graduating students have faint idea of how to write a research proposal. However, final year students are expected to develop a research proposal towards the projects they will undertake in the partial fulfillment of their academic award. The act of writing a good research proposal is a skill which must be learnt and not innate. Mastering the act however comes with practice. But before one can do this practice, the needs for the rudiments of the act to be learnt and understood is of utmost importance.

The main objective of this book is to help students, would-be-research fellows and lecturers to get a good grasp of the technicalities involved in the act of research writing and publishing. It starts with a chapter that introduces the readers to the various constituents of research proposal writing by explaining the various technical terms and how to handle them in practice. For instance stating the research problem has always been a tussle for most a people. The writers have come up with a new approach, a novelty for that matter of simply defining the research problem as “the differentials of idealism and realism”. Hence the arrangement of the difference between idealism and realism in structure and sequence encapsulates the problem statement of a particular research. To help easy understanding samples of academic or research and business proposals have been included.

It is one thing undertaking a research and another thing writing the research report which once the former acts has taken place the later cannot be ignored. The book gives a comprehensive way of approaching the research reporting thus making it a must read book for all tertiary students preparing for the project report write ups. The book also gives detailed explanation on how to do reference both in-text and out-of-text for the APA format.

The later chapters of this book concentrated things to do to get ones findings from a research disseminated to the targeted clientele of the research. They include selecting the journals or medium of publication, peer-review process to acceptance and final publication of the findings. The authors have included copies examples gleaned from personal pool of experience and presented samples of such documentation for novices interested of becoming contributors towards the expansion of the frontiers of knowledge for betterment of the world.

It is said that the proof of the pudding is in its eating, just have a taste!

Contents

Preface	VII
Chapter 1 Writing a Standard Research Proposal.....	1
1.1 Introduction	4
1.1.1 Problem Statement.....	4
1.1.2 Objective of the Paper	5
1.2 Components of a Standard Research Proposal	5
1.3 A Sample of Academic or Research Proposal	23
1.3.1 Research Proposal.....	23
1.3.2 Methodology.....	30
1.4 A Sample of a Business Proposal	36
1.4.1 Background.....	36
1.4.2 Justification.....	37
1.4.3 Objective.....	39
1.4.4 Cost-Benefit Analysis	42
1.4.5 Expected Benefits to be Derived from Implementation of the Proposal	42
1.4.6 Conclusion	43
Chapter 2 Writing of Final Research Report	45
2.1 Introduction	48
2.2 Abstract	49
2.3 Chapter One (Introduction)	49
2.3.1 Background.....	50
2.3.2 Problem Statement.....	50
2.3.3 Research Questions / Hypothesis.....	50
2.3.4 Objective of the Study	51

2.3.5	Significance / Justification / Rationale	51
2.3.6	Limitations	51
2.3.7	Conclusion	51
2.4	Chapter Two (Literature Review).....	52
2.4.1	Preliminary Literature Review.....	53
2.4.2	Conceptual Framework.....	53
2.4.3	Theoretical Framework.....	53
2.5	Chapter Three (Materials and Methods).....	54
2.5.1	Materials	54
2.5.2	Area of Study / Description of the System	54
2.5.3	The Research Design	54
2.5.4	Instrumentation	55
2.5.5	Data Analysis Data	55
2.5.6	Interpretation of Data / Results	55
2.6	Chapter Four (Results and Discussion)	55
2.7	Chapter Five (Conclusion and Recommendation)	58
2.7.1	Conclusion	58
2.7.2	Recommendation	58
2.7.3	References (Out-Text Referencing Bibliography)	58
	Chapter 3 Referencing in Research Report Writing	61
3.1	Introduction	64
3.2	Reasons for Referencing	64
3.3	The APA (America Psychological Association) Style of Referencing	64
	Chapter 4 Introduction to Aspects Involved in Research Article Publication	73
4.1	Introduction	76
4.2	Title of Paper (Article)	76
4.3	Authorship and Affiliations	76

4.4	Abstract	77
4.5	Keywords	77
4.6	Introduction of an Article	78
4.6.1	Problem Statement.....	78
4.6.2	Hypothesis	78
4.6.3	Research Questions.....	79
4.6.4	Objective of the Study	80
4.6.5	Significance / Justification of the Study	80
4.6.6	Theoretical Framework.....	80
4.6.7	Conceptual Framework.....	81
4.7	Methodology	82
4.8	Results and Discussion.....	83
4.8.1	Results	83
4.8.2	Discussion.....	84
4.9	Conclusion and Recommendation.....	84
4.9.1	Conclusion	84
4.9.2	Recommendation	84
4.9.3	Acknowledgement	85
4.9.4	References.....	85
4.9.5	Preparing of List of References / Bibliography	86
Chapter 5 Selecting of Journal for Publication		89
5.1	Introduction	92
5.2	Scope of a Journal	92
5.3	Standard of a Journal.....	93
5.3.1	Impact Factor	93
5.3.2	Journal Published by Reputable Institutions.....	94
5.3.3	Length of Review Process	94
5.3.4	Journals Included in Directory of Open Access Journal (DOAJ) ...	95

Chapter 6 Overview of Formats of Some Journals	99
6.1 Introduction	102
6.2 Journal Type One.....	102
6.2.1 Authors Instructions.....	102
6.2.2 A Format to be Followed	103
6.2.3 The Font Type and Size to be Used	103
6.2.4 Type of Referencing Adopted by the Journal	103
6.2.5 Size of the Manuscripts (Number of Words / Pages).....	104
6.2.6 Use of Journal’s Template.....	104
6.2.7 Periodicity	104
6.2.8 Mode of Submission	104
6.2.9 The Review Process Adopted and the Duration	105
6.3 How Authors are Informed About Acceptance of Articles	106
6.4 Fees Charged and Payment Mode	106
6.4.1 Wire Transfer	106
6.4.2 Western Union	107
6.4.3 Credit Card / Paypal.....	107
6.5 Journal Type Two	107
Chapter 7 Working Example: Converting Research Report to Publishable Article for Submission to Peer Review Journal	109
7.1 Introduction	112
7.2 Sample of Unpublished Paper	113
7.3 Post Manuscript Submission	124
7.4 Payment of Publication Charges	127
7.5 Publication of the Article.....	129

Chapter One

Writing a Standard Research Proposal



Writing a Standard Research Proposal

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Abstract

Research proposal writing is an activity that precedes the research process. A research proposal is expected to map out clearly the research an individual wants to conduct and how it must be executed. It is after the approval of the research proposal that the researcher can embark upon the research. However, in order that a proposal is accepted, it must contain the certain needed elements well explained. This paper examines and explains comprehensively the constituents of standard research proposal as well as presents a guideline for writing one.

Keywords

Research, Proposal, Objectives, Gaps, Problem Statement, Design, Data Type

1.1 Introduction

Proposal is a piece of document that details the ideas about the problems a researcher or for that matter what anyone wants to tackle or investigate as well as the comprehensive methods to be designed and used in remedying the identified problem. It offers the sound bases for the rejection or acceptance of for funding and supervision by fund grantors and academic supervisors respectively.

Proposals are classified in two folds: solicited and unsolicited. The solicited proposals are those that are requested via advertisements by funding organizations for the purpose of funding in anticipation of remedying a situation or by universities for the purpose of award a degree via providing information linked to expanding frontiers knowledge or its application for development. However with unsolicited proposal, the researcher or anyone individual with a requisite skills and credentials identifies a problem and draws the attention of would-be beneficiary institutions to it for funding and subsequent execution.

Proposals, whatever the type need to have strong scientific footing or foundation to be acceptable and winnable. In order for a proposal to be winnable and acceptable, it must contain some essential elements. Many students have faint idea about the essential and must have elements in a proposal for their research and how to write it. This paper is thus geared towards guiding students and researchers towards writing effective research proposals.

1.1.1 Problem Statement

Research proposal is the initial document that must submitted for to a potential supervisor for perusal and appraisal before it is approved for executing. It is expected to contain the essential elements needed in any standard proposal and well written out logically and comprehensively manner to reinforce its

understanding. However, most students and would-be researchers have shallow knowledge on the components of a standard proposal and how to write them out to convey their intended meanings to their respective potential supervisors or funders. This paper is to aid students and would-be researchers to understand the various components involved in standard research proposal writing as well as present a guide to writing same.

1.1.2 Objective of the Paper

The main objective of this paper is to introduce students and would-be researchers to the essential components of a standard proposal and to introduce them to writing same. The paper however seeks to achieve the following specific objectives:

- To list all the components needed in a standard research proposal
- To explain each of the components of a standard research proposal
- To present a guide towards writing a of a standard research proposal
- To distinguish between a research proposal and a business proposal

1.2 Components of a Standard Research Proposal

Research proposals may vary according to the intended uses, either research or business; and the design approaches, whether qualitative or quantitative. However, whatever the intended uses or design approaches, the essential components remains the same but with slight variations or exclusions in the proposal write-up. It is also extremely important to logically arrange these components in the write up in order to enhance the comprehensiveness of the proposal. The following are the components of a student research proposal arranged logically:

- The title page
- Introduction / background
- Problem statement
- Research questions / hypothesis (note required for business proposal)
- Objective
- Significance / justification / rationale
- Preliminary literature (note required for a business proposal)
- Theoretical framework (note required for a business proposal)
- Methodology
- Budget
- Organization of study (note required for a business proposal)
- Timelines
- Limitations
- Conclusion
- References

(A) The Title Page

The title page though not an essential component in a research proposal cannot be omitted a research write up. It captures the title of the proposed topic and the name of the researcher or students. It should be noted that the research topics should not be lengthy or convoluted or windy. It should be short and precise and unambiguous.

(B) The Introduction or Background of Research Proposal

The introduction or background is the first essential component of a proposal as it is expected to introduce or give the reader the background of the study in order to situate the study in its proper perspective and context. It therefore entails the following:

- 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 a scientific answers to the raised question about identified gap / the thesis statement

The General Information on the Background

This part of the background concentrates on the general scope of the study. It takes into consideration information that has a general link with the topic understudy. For instance if it has to do with composting, the general information can look at the general definition of composting; its use as waste management and how it compares with the other known waste management techniques; its disadvantages and the uses of the final products derived from the process. This presents a general idea on the topic and more importantly it should be arranged logically in its write out.

The Specific Information on the Background

The specific information on the background narrows the information and brings the chosen topic to focus. It presents materials that specifically relate the topic and forms the basis of the study. For instance, if it the topic is on “Appraisal

of Composting as a Waste Management Technique”, the student or researcher must concentrate on the strength and weaknesses of the composting as a waste management techniques vis-à-vis the other know waste management techniques as well as highlight known methods of appraising on which the appraisal can be based on.

Identification of Gaps in the Background Information

This is the basis of the study and presents or advances an argument for a scientific or intellectual discourse. It is said that one needs to identify a problem before finding a solution to it and not vice-versa. This portion points out the gaps available in the presented information captured in the specific information background. For instance, as regard the topic on composting stated earlier, though it is the regarded as the most environmentally friendly organic waste management method and its product beneficial for enriching the soil as an organic fertilizer, when used immaturely, can serve an entry of zoonotic and pathogenic microbes into the food chain to pose health hazards and threats to the public. This identified gap can stimulate the debate for the study.

Raising Appropriate Questions about the Identified Gap

Once the researcher or student has identified a gap in the study, it is incumbent on him or her to raise all the necessary questions whose answers are expected to be antidotes for bridging the identified gaps. “How can the survived zoonotic and pathogenic microbes be eliminated in the final compost? What composting method can be used to achieve pathogenic-free compost?”

Providing the a Scientific Answer to the Raised Question about Identified Gap / the Thesis Statement

This is where the researcher or students provide an interim answer to the raised

questions though has not conducted the experiment which is referred to as the thesis statement. For the question raised, the thesis statement that can be made is “There is a method of composting that can be used to achieve pathogenic-free compost”.

(C) Problem Statement

The problem statement is the second essential component that must be included in a research proposal. It captures the ‘problem’ identified in the study concisely and precisely. Normally it should not be a mere observation but a comparison and contrast of observations. When it is left as a mere observation, it is regarded as a weak statement. It must have a structure and sequence.

Structure

In terms of structure, it means it must be superimposed on a defined structure such as idealism part, realism part and a link-up of idealism and realism part:

The Idealism Part

This part presents the ideal situation of the case. It looks at the perfect situation should all conditions remain constant. This presents the perfect way the situation needs to be addressed. For instance, in the case achieving pathogenic free compost. The idealism part of the problem focuses on the fact that all composting techniques or methods are expected to yield pathogenic-free compost.

The Realism Part

This portion presents the real situation at hand and raises the fact that the composting techniques are unable to yield pathogenic-free compost as expected.

Link-up of the Idealism and Realism Part

This is where both the idealism and realism parts are linked and gaps that exist or existed between the two are stated as the problem.

Sequence

This suggests the ordering of the structure in order to build the logic between the parts: idealism –realism – the link-up between the idealism and realism part, to enable that the problem statement comes out logically.

Using the problem statement of this paper for instance:

- It should be changed to "Research proposal is an initial document that must be submitted to a
- “Research proposal is an initial document that must be submitted to a potential supervisor for perusal, appraisal and approval before executing. It is expected to contain the essential elements of conducting or carrying out the intended research study and also serve as a 'manual or guide' for the execution of the an intended research study. It thus must confound to standards required in any standard research proposal writing” - *Idealism Part*
- “However, most students and would-be researchers have shallow knowledge in the components of a standard proposal and how to write them out meaningful proposals for the perusal and subsequent approval of their prospective potential supervisors or funders.” - *Realism Part*
- “This paper is to aid students and would-be researchers to understand the various components involved in standard research proposal writing as well as serve as a guide towards writing a good research proposal.”- Link up between Idealism and realism or bridging up the gap between idealism and realism.

(D) Research Questions / Hypothesis

Research Questions

This is third component where the necessary research questions relating whose answers when found are likely to lead to the solving of the identified problem. Answers need to be provided to all the research questions raised at the end of the research. The answers also must lead to achieving the stated objectives of the study. The research questions raised here are often open ended questions but can yield numerical data. Therefore the data that can emanate from these questions can be either qualitative or quantitative. So in a study where only qualitative data or a blend of quantitative and qualitative data is expected, the research questions can be raised in place of the hypothesis.

Hypothesis

A hypothesis is a scientific guess or statement a research hazards with the aim of designing an experiment to collect data to test whether it is valid or invalid based on evidence presented by the data collected. A hypothesis is expected to be tested once it has been stated in order to help the research reject or fail to reject it. It thus follows the positivist's approach where mathematics or statistics is used to present objective view of the situation at hand. In order to test the hypothesis, it presupposes that all quantitative approaches should be used such that all qualitative variables are converted to quantitative data to enable the testing of the hypothesis. It should be noted that most responses of open ended questions on a questionnaire are classified as qualitative while the responses to closed ended questions are considered as quantitative.

The hypothesis is supposed to be woven from the research questions is thus the research interim answer provided to the research question until proven at the end of the study to be either valid or invalid.

Hypothesis statement is in two folds:

Null hypothesis (H_0): the statement that captures the general situation

Alternate hypothesis (H_1): the claim of the researcher which is the converse of the null *hypothesis*

Stating of Hypothesis

Null hypothesis (H_0): over speeding wastes fuel

Alternate hypothesis (H_1): over speeding does not waste fuel

(E) Objective of the study

The objective of the study can be captured in two ways. The overall objective, also referred to as the main objective can be captured first and subsequently the specific objectives of the study. For instance, as regard the composting title, main objective of the study could be “to appraise the various composting techniques in terms of their ability to eliminate pathogens”. The specific objectives are those that when achieved will help the realization the main objective. These objectives are supposed to be numbered and stated in an action oriented manner.

In the case of a student admitted into Bachelor of Mechanical Engineering Programme for instance, his or her main aim will be to come out or graduate as a mechanical engineer. However, to achieve this main objective, the following specific objectives must be achieved:

1. To pass all semester courses
2. To pass the project work
3. To pay all fees required

The research objectives stated should be measurable and attainable.

(F) Significance / Justification / Rationale

The justification of the study is actually the reason or rationale behind the embarking on the study. In the selection of football players for a match, there is a popular parlance used by coaches and lay people alike “justify your inclusion”. This means that the researcher needs to justify the need for the study. The justification of the study can be done in the following ways:

The magnitude of the area or coverage of the study

Once the study has large area of coverage, it is likely to affect so many people, objects or areas of study and so becomes vital for examination.

The gaps in literature that demands attention

Where there is little or no literature on the identified gap or the literature available points out the fact that a further work must be done vis-à-vis the gap has been identified. This can be used to justify the need for the study.

The improved or unusual approach / methodology being employed

When researcher proposes an improved method or a new or an unusual of tackling the study, it can also serve as a basis for the study.

The expected benefits or outcomes

The expected benefits or outcomes to be derived from undertaken the study can be used to justify the need for it.

(G) Preliminary Literature

Literature review is one of the areas that must be done extensively for one to

know the historical antecedence of the problem to be tackled. This will make the research up beat with the current trend of events as regard the problem.

For a proposal the one needs to do a preliminary literature review that is not extensive relates the problem as on hand. The researcher in doing a preliminary literature will only need to compare works or studies that have been done relating to the proposed study. It is supposed to be summarized and the authors duly cited.

The Theoretical Framework

This is where the researcher outlines the various theories that underpins his or her work and uses them to describe the models and concepts been used for the study. In research proposal writing, this aspect is supposed to be brief but theories must be exhaustive with the all relevant theories cited.

(H) Methodology

The methodology encapsulates the approaches to be employed in the execution of the study and this must be very well established and written clearly to eliminate all forms ambiguities. Basically the methodology entails the following:

Materials

This lists out the materials to be used for the study or for the design and construction of a system for the study. If various materials are to be used, the composition of all the materials needed for the study or the design and construction of the system must be stated.

Area of Study / Description of the System

This gives a brief description of the area of study in terms of place and the topic area.

The Research design

This is the map out of how the research will carry out the study. It entails deciding whether a qualitative or a quantitative research approach will be adopted based on the variables or data to be collected to achieve the objectives of the study and how that will be done; the sample size to be considered; the sampling technique to be used; the instrument for the data collection; how the data will be analyzed and interpreted based on the test the data has been subjected.

Design type to be employed

The research must state whether a qualitative or quantitative or both designs will be used for the study as per the variables to be measured. For instance, research questions raised are used instead of hypotheses, the blend of qualitative and quantitative research design method must be used but if the hypotheses are used, then the design must employ a quantitative design approach.

Population and Sample Size

The researcher must indicate the population being studied and the size that will be selected as sample. The sample and size selected must be reflective and representative of the population so that it can be used to make inferences about it.

Sampling Technique

The appropriate sampling techniques to be used must be stated by the researcher. There are various types: probability sampling techniques – simple random sampling, systematic sampling, stratified (group) sampling, cluster (area) sampling; non probability sampling – convenience sampling, purposive sampling, judgmental sampling, quota sampling, snowball sampling, intercept sampling. It is thus incumbent on the researcher to select the best sampling technique suited for his or her study. The choice of the researcher therefore depends on his or her

working knowledge of the various probability and non probability sampling techniques listed above.

Probability Sampling Techniques:

They are sampling techniques in which all the objects of the population are given equal chances of being selected.

- Simple random sampling

This is where random numbers are given to all the objects of the population, bulked together and then selections made at random. In simple words, if the researcher consider studying a population of size of 50 by use selecting a sample size of 25. He or she has to label all the items or elements of the population from one (1) to fifty (50). These numbers can be write on a pieces of paper folded, placed in a cup, shuffled and then the twenty –five of these pieces of paper picked. The numbers picked thus corresponds with the items selected constitutes the sample.

- Systematic sampling

This is used in selecting samples during a batch production to ensure quality standards of the items. For instance in the brewing industry if Two Hundred (200) cartons of beer are to be brewed a day out of which fifty (50) cartons are to be selected from the total number of cartons (population) in a day to constitute a sample for testing for quality standards. It means that the research is supposed to pick every nth item (in this case carton produced). The nth item is thus defined mathematically as the population size divided by the sample size

$$n^{th} = \frac{\text{Population Size}}{\text{sample size}} = \frac{200}{50} = 4$$

This means that to select a sample of 50 cartons of beer from the population of 200 cartons, the research must select every fourth carton (4th) until the 200 cartons is exhausted as it moves along the conveyor.

- Stratified (Group) sampling

This involves sampling based on grouping (strata) and involves the use of simple random sampling technique. For instance, since there are form one; form two and form three science students; if samples are to be selected from the Science students of Senior High School of a particular school, they are to be selected from all the various forms in order to have a representative sample. In this case random sampling techniques can be used to select equal numbers of science students from each form and then bulked up to form the representative sample as science students of the said school.

- Cluster (Area) sampling

This involves sampling based on area. For instance if a researcher wants to sample the garages in Accra, he or she can demarcate or zone Accra into four ie. north, south, east and west. From this demarcation or zoning of Accra the research can select equal number of garages which can be bulked up to give a representative sample of garages in Accra.

Non probability Sampling Techniques

These techniques are not based on probability, the objects to be selected using these techniques are not given equal chances of being selected. Thus there are biases associated with these techniques.

- Judgemental sampling

This is where a sample is selected from a population based on the judgement

of the researcher. The basis for the selection is left to the discretion of the researcher. The researcher selects objects that constitute a sample based on what he or she thinks is will best suit or represent the population.

- Quota sampling

This sampling technique employs the discretion of the researcher. For instance, where the population constitute different object (eg. Persons – males and females of unequal numbers constituting a population), the researcher in constituting his or her sample might use different quota of both gender based. For example in a population of 30 persons consisting of 20 males and 10 females, the researcher can select all the 10 females and 10 males to constitute his or her sample.

- Convenience sampling

This is where the researcher selects the sample based on convenience. If researcher wants to do a study on polytechnic students in Ghana, once he or she lives in Accra, it will be convenient in terms of proximity to select students from Accra Polytechnic to constitute his sample.

- Purposive sampling

For this technique of sampling, the researcher bases his or her sample on the purpose of the study. A researcher might want to study people who frequently visit expensive hotels thereby selecting wealthy people to constitute his or her sample.

- Snowballing or Snowball sampling

This technique is used in selecting a sample in cases where the targeted persons are rare to locate. Since the individuals for selection are rare, once

contact is made with any of the targeted persons, the individual acts as a liaison or an informant to the researcher to help identify persons of characteristics of his or her kind to constitute the sample.

- Intercept sampling

Intercept sampling is almost like the snowball sampling but in this case, the researcher selects an individual who will locate or intercept the objects or persons to be sampled. It is often used in marketing, where a representative is designated for a region who subsequently locates clients to market the company's items.

It should however be noted that in a research study, two or more sampling technique can be combined in the selection of one's sample depending on the nature and objective of the study.

Instrumentation

This refers to the various instruments the researcher that would be used for the collection of data on the study. In experimental research this can refer to the devices for measuring the various variables being examined for the study. In social research, the questionnaire, interview guide as well as observation method are the basic instruments used for the data collection. These instruments are used for primary data collection. Therefore under the researcher's instrumentation, he or she is to mention the type of instrument that will be used to collect the data and how the chosen instrument will be used to achieve that. Also, researcher can also collect secondary data from reports and papers for desktop analysis.

It must be noted that the choice of the instrument depends the type of design being used for the study. The questionnaire can be used in for both qualitative and quantitative research designs while interview is basically used when the design

adopted for the study is qualitative.

Data Analysis

The data that will be obtained from the experiment are usually at the firsthand raw and therefore meaningless. This is where the researcher must write on how the collected data will be processed into information. In doing this, the software or application must be stated and the tests that will be subjected to the data also stated. The appropriate statistical test needs to be given based on the design being used. It also encompasses the method that will be used to summarize the results or data. It should however be noted that some statistical tools can be used to summarize qualitative data and others for quantitative data. For instance, the bar chart and pie chart are graphical method used for summarizing qualitative data whereas the histogram, dot plot, scatter diagram, ogive are used for summarizing quantitative data. With tabular methods used in summarizing data, frequency distribution, cumulative frequency tables, relative and percentage frequency distribution and cross tabulation are used for both qualitative and quantitative data. However, the stem-leaf plot is the tabular method is only used for summarizing quantitative data. Sequel to this the researcher must select the appropriate tool based on the data being processed.

Interpretation of Data or Results

Under this heading, the researcher is expected to tell how the results will be interpreted. For instance if has to do with testing of hypotheses, stating how they will be tested and the set criteria for rejecting of failing to reject the null hypothesis and the conclusion to be made either verbally or in mathematical expressions.

(I) Organization of Study

This is where the researcher indicates the way the study is to be organized. It is

expected to indicate the various chapters into which the study will be executed or reported. It supposed to be arranged in a logical sequence, i.e. from introduction in chapter one to the last chapter to be considered. For instance, the researcher might write this under the organization of the study:

The introduction will be captured in chapter one; extensive literature review will be done in chapter three and finally the chapter five will contain the conclusion and recommendations of the study.

(J) Budget

The budget of the study must be captured if the researcher is seeking funding. However if no funding is being sought, then the budget section can be omitted. However for a business proposal, it is essential to include the budget so that the funders can appraise the viability of the proposal.

Below is a sample of a simple student research budget:

Sample of a Simple Student Research Budget

ACT. NO.	ACTIVITIES	ESTIMATED EXPENSES (GH ₵)	REMARKS
1	Proposal Write up and submission for Approval by Supervisor	10	
2	Questionnaire design and administration	40	
3	Data collection	50	
4	Data entry and analysis	50	
5	Report write up	50	
6	Submission of report for correction	-	
7	Correction and Presentation of final report	50	
Total: 250			

(K) Timelines

The timelines refer to charting the activities together with their schedules as to

when each will be started and when each will be completed. It can be done using the Gantt Chart or a housed in a simple table as done below:

Timelines for the Study

Act. No.	Activities	Duration	Start to Finish
1	Proposal Write up and submission for Approval by Supervisor	One month	May
2	Questionnaire design and administration	One month	June
3	Data collection	One month	July
4	Data entry and analysis	One month	August
5	Report write up	One month	September
6	Submission of report for correction	One month	October
7	Correction and Presentation of final report	One month	December

MAY				JUNE				JULY				AUG.				SEPT.				NOV.				DEC.			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Activity 1																											
				Activity 2																							
								Activity 3																			
												Activity 4															
																Activity 5											
																				Activity 6							
																				Activity 7							

Gantt Chart for the Study for the Research Study

Note: Refer to the budget for numbers assigned to each activity; the numbers 1 to 4 under each month indicates the weeks in each month.

(L) Limitations

The limitations of the study refer to the constraints that are likely to affect the achieving the objectives of the study. This can be the availability of data to be collected for the study; the time frame allotted for the study; the financial limitations etc. The constraints should be clearly stated before embarking on the study so that the scope of the study can be well defined by it. It will enable the supervisor to know what aspects of the work is likely the researcher or student would not be given attention due to the stated constraints. The limitations are

meant to define clearly the scope of the study.

(M) 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.

(N) List of References / Bibliography

Once the researcher worked on the preliminary literature review as well as the theoretical concept or framework, authors or books or articles are expected to be cited in-text and therefore the need for a list of references or bibliography at the end of the proposal.

1.3 A Sample of Academic or Research Proposal

Below are a presentation of two proposals, a research proposal and business proposal respectively:

1.3.1 Research Proposal

Pyrolysis of Coconut Fruit Waste and Packaging Waste Plastics for Energy Generation and Waste Management.

(A) Introduction

Waste is expected to be generated by humans and industries unabated as long as life exists. This is because for human beings to survive, raw materials and finished goods on which they depend must be produced and these leads to the generation of waste. Waste when unmanaged occupies space, creates filth and harbours disease causing organisms which eventually poses threat to human life

apart of creating social nuisance. There are so many waste disposal and management techniques but there is the concerted effort by scientist worldwide to use methods that are more environmentally friendly, can maximize volume reduction, and create wealth via the generation of energy and recovery of useful raw materials beneficial to humans.

Currently the waste management systems being practiced in Ghana include the landfill method, incineration, composting and open burning, aerobic digestion – Composting and anaerobic digestion technique – biogas technology. Though the composting and biogas technology is used for the production of compost and energy generation respectively, they are all limited to management of only organic waste; and waste volume reduction is not zero. Incineration and open burning methods only reduce the waste volume without generating energy and also allow for the pollution of the environment through the emission of green house gases. Coupled with the difficulty of waste separation, these methods are practised on low scale. In Ghana waste management has become a problem with the country recording high perennial filth related diseases such as cholera and malaria. Almost all waste dumping sites are filled and the cost of managing even household waste has hiked up. Sequel to these challenges of waste management, malaria continues to be the number one killer disease in Ghana and there is also an upsurge in cholera cases being recorded in the country because these diseases are filth related.

Pyrolysis, also referred to as thermolysis, gasification, cracking is a thermochemical decomposition of waste (organic and inorganic) to generate useful products such as gas, biofuel, char or activated carbon which can be used as raw materials to propel industrial growth. This waste management method is conspicuously missing as waste management technique in Ghana. This may be due to the lack of the technical expertise in the area or the facilities. That notwithstanding, pyrolysis offers the opportunity for the management of both organic and inorganic waste for energy generation and provision of other useful

raw materials for industries.

Bulk of waste generated in Ghana is made organic waste (65%) and plastic waste (9%) resulting from materials packaging and bottling (Ackah *et al.*, 2012). Organic waste such as the coconut cannot easily be degraded via composting into organic fertilizer and biogas technology for gas generation. In terms of inorganic waste, plastics for packaging of water, food and gifts are predominant, and these cannot be managed by both aerobic and anaerobic digestion. According to Mohana *et al.* (2012) waste plastics also do not biodegrade in landfills and therefore are not easily recycled. For effective management of the country's waste challenges, a suitable waste management technique such as pyrolysis must be studied for its feasibility and effectiveness of being used for the management coconut fruit waste and plastic waste types for energy generation and industrial raw materials production for wealth creation.

(B) Problem Statement

Although waste provides a vital resource for energy generation, effective waste management is a challenge in the country. Bulk of the waste generated in Ghana is organic - food waste, faecal matter and paper waste; and inorganic waste - plastic waste derived from packaging of food, water, drinks and gifts. Landfilling, incineration, composting, biogas technology and landfilling are all waste management methods. However, incineration and open burning produce green house gases that are environmentally unfriendly; composting and biogas technology though are able to generate usable raw materials from waste, are limited to organic waste management. Thus effective management technique for both organic and inorganic waste for generation of energy, biofuel production and other useful raw materials for industries is absent in the scheme of waste management in Ghana. The need to study the use of pyrolysis for managing coconut fruit waste which cannot easily be done using the composting and biogas

technology though organic; and for the management of plastic waste types for energy generation and the production of other raw materials parallel with management of these waste types become vital towards finding a sustainable approach to waste management in the country.

(C) Objectives of Study

The study mainly seeks to use pyrolysis to decompose coconut fruit waste (shell and fibre) which cannot easily be biodegraded; and plastic wastes from packaged food, drinks, food and gifts in order to manage these waste types for energy generation and explore the production of other useful raw materials as well as modeling the use of the pyrolysis process for waste management to enable prediction of its outcomes and cost effectiveness.

The following are some of the specific objectives of the study:

1. To ascertain if coconut fruit waste (shell and fibre) and packaging plastic waste can be managed efficiently through pyrolysis.
2. To estimate the quantum of energy that can be generated on weight basis of feedstock of coconut fruit waste and plastic waste pyrolysed.
3. To find out and estimate the amount of other raw materials that can be produced from the process using the respective feedstock.
4. To model the process in order to predict the feedstock amount that needs to be fed to the system to realize the quantum of each of the products to be generated and the cost of operation.

(D) Research Questions

The study seeks to pose the following research questions:

1. Can the coconut shell and plastic waste be respectively managed efficiently for energy generation through pyrolysis?
2. What quantity of energy can be generated on weight basis of feedstock of coconut shell and plastic waste respectively that undergo pyrolysis?
3. Which other useful raw materials and their respective amounts on weight basis can be produced respectively from pyrolysis of the coconut shell and packaging plastic waste?
4. Can a model on the process be built for prediction of its outcomes and cost effectiveness?
5. Can the pyrolysis of these materials help complement the energy needs of the country?
6. Is the pyrolysis of these materials cost effective?

(E) Hypothesis for the Study

The study would put forward the following hypothesis:

Alternate hypothesis (the claim): A model on the quantum of energy and other useful products generated from the pyrolysis of plastic waste types, coconut fruit waste and their associated cost can be built and used for the prediction and management of the respective waste types.

(F) Justification

Coconut fruit is produced on large quantities in Ghana and its water and meat

sold to workers as snack and some also processed into oil. However, when the water is drunk and meat removed and eaten, the shell, which is part of the endocarp are thrown away. These fruit wastes are often times left uncollected or collected and deposited at landfill sites. Since they are cup-shaped and take time to be degraded, they hold rainwater which becomes stagnant over time and subsequently serve as a breeding ground for mosquitoes, vectors of the malaria parasite. This thus poses health threat to the public because malaria is considered as the number one killer disease in Ghana. Also people often collect and dry these fruit wastes to be burnt for heating. However, this open burning produces smoke which eventually pollutes the environment with green house gases. There is the need to recover energy and other useful raw materials like activated carbon from these waste types alongside managing them to reduce the incidence of filth related disease.

Plastic waste accumulation is ever increasing because of plastic packaging of food, water and gifts. Satchet water and mineral water bottles as well as plastic bags are the predominant waste types which must be managed. There is daily accumulation of large volumes of these waste types in every nook and cranny of the country and this when not managed would gradually destroy agricultural land (because plastics take long time to degrade in the soil) which must be cropped to reverse the threat of food security in Ghana.

Currently, pyrolysis of waste is not being practised in Ghana for waste management and there is no or little data available. Since Ghana has perennial energy crisis, the need to explore the energy generation alongside managing these waste types become necessary. Also the modeling of the pyrolysis process for prediction of feedstocks, the cost of waste management using the pyrolysis process, and the products to be generated would provide literature for further studies.

(G) Related Literature Review

Waste according to (UNEP, 2013) are substances or objects which are disposed or are intended to be disposed or are required to be disposed off by the provisions of national laws. Coconut fruit waste can be classified as a municipal solid waste which is defined as the waste arising from human and animal activities that are normally solid and are discarded as useless or unwanted (Pearvy *et al.*, 1985). The generation of solid waste is on the increase due to rapid rise in population, changing life styles and popularity of fast foods and disposable utensils (Chowdhury *et al.*, 2006). However, limited resources in terms of money, skilled manpower and logistics make it very difficult to handle the bulk volume of solid waste being generated (Edema *et al.*, 2012).

Malaria is by far the leading cause of death in Ghana. Twenty five percent (25%) of children who die before their fifth birthday are killed by the disease, and it claims the lives of many pregnant women too (Asante and Asenso-Okyere, 2003). The cup-shaped like nature of the coconut shells allows rain water to be collected and thus becomes stale over time serving as a breeding environment for mosquitoes. In Ghana, the coir and the shell are mostly burnt openly for the generation of heat for cooking which eventually cause environmental pollution. CO₂ emissions from these open field burning activities accelerate the increase in atmospheric temperature and cause global warming. Due to the health and environmental concerns, many countries have imposed new regulations to restrict field burning activities (Mansaray, 1999).

Instead of biodegradation, plastics waste goes through photo-degradation and turns into plastic dusts which can enter in the food chain and can cause complex health issues to earth habitants (Mohana *et al.*, 2012). It has been estimated that in Accra, plastic waste takes about 16.5% of the waste stream. About two decades now, plastics have become the most favoured materials in the food and

water packaging industry, contributing to an increase in their proportions in the waste stream in Accra (Ackah *et al.*, 2012).

According to Fobil (2001), waste composition studies estimate the percentage of plastics in the waste stream in Ghana at 9%. Littering of plastic bags and other plastic waste is associated with numerous environmental problems such as visual pollution that affects sectors such as tourism; they block gutters and drains creating serious storm water problems and provide breeding place for mosquitoes; they kill when ingested by animals mistakenly for food (Ackah *et al.*, 2012).

Landfilling with plastic waste is not also desirable since plastics take about 20 to 1,000 years to degrade and no economic values will be derived from the waste in that case. The management options for sustainable plastic waste management by recycling, energy recovery, re-use and reduction has its own environmental and socio-economic challenges, since there is no source separation of waste (Ackah *et al.*, 2012).

Several processes and means have been attempted to fight against these alarming levels of waste plastics generation. However each process had its drawbacks in terms of economical, operational and financial limitations for practical implementation. In this contrast, thermochemical process such as pyrolysis can be used to safely convert waste plastics into hydrocarbon fuels that can be used for transportation (Mohana *et al.*, 2012).

1.3.2 Methodology

(A) Materials to be Used

Materials needed for this study would include: a pyrolysis system, feedstocks – coconut fruit waste, packaging plastic waste for food, drinks, water and gifts bags. These waste types identified would be collected for pyrolysis.

(B) Experimental Design

A Randomized Complete Block Design (RCBD) would be used for analysis of this experiment. Coconut fruit waste and plastic waste types for packing of food, water, drinks and gift bags, feedstock for the pyrolysis would serve as the plots or experimental materials in the design for which five (5) levels of the treatment (the five (5) different weights of the waste types measured) would be subjected to and replicated five (5) times in the design. The pyrolysis process would be run on the various experimental materials or plots and measured made on the quantum of energy generated, quantity of any other raw materials produced; and the cost involved in the pyrolysis of each material type determined. Analysis of variance table would be constructed and used to determine whether any significant differences exist between various levels of the treatments on the experimental units.

The obtained data from the experimental units such as the cost involved in running the pyrolysis process; the quantum of energy generated by each waste type; quantity of each raw material produced for each feedstock type and weight used would be used for modeling of the pyrolysis process for the prediction of outcomes and cost effectiveness of pyrolysis process in managing the various waste types.

(C) The Pyrolysis Process

The pyrolysis process would involve subjecting each of the feedstock being considered for the study separately to heat at a temperature of between 400 °C – 450 °C, and sometimes to as high as 800 °C in the absence of oxygen, to allow each feedstock to break into smaller molecules of its constituents in the form of gas, oil, solids such as char etc.

Measured weights of each feedstock would be fed into an air-locked or tight compartment where it would be subjected to heat (pyrolysed) at a temperature of

400 °C – 450 °C. The pyrolysis system as shown in the diagram (1) would allow the various constituents such as oil, gas, char, and sludge to flow into different compartments. The oil and vapour undergo fractional condensation. The char would be collected and measured; the pyrolysis oil would be further treated by clarifying, stabilizing, then collected and measured; the hydrocarbon gas would be stored and fired into a flue gases and subsequently made to undergo drying and scrubbing for the clean gas to be obtained and measured. Also, the cost incurred at every stage of the process starting from the collection of the waste together with the cost involved in using a built pyrolysis system for the experiment to the time the feedstock are pyrolysed and the products obtained, tested and measured would be priced.

This process would be run on each of the feedstock being considered for the study separately and the data generated for the process subjected to analysis and interpretation.

(D) Data Analysis

The data collected for the study would be input into enhance Excel and MATLAB application for analysis. The results would be summarized using the appropriate statistical tools, and the data collected on feedstock amount that needs to be fed to the system to realize the quantum of each of the products to be generated and the cost of operation would be used in modeling the pyrolysis process of managing the different waste types.

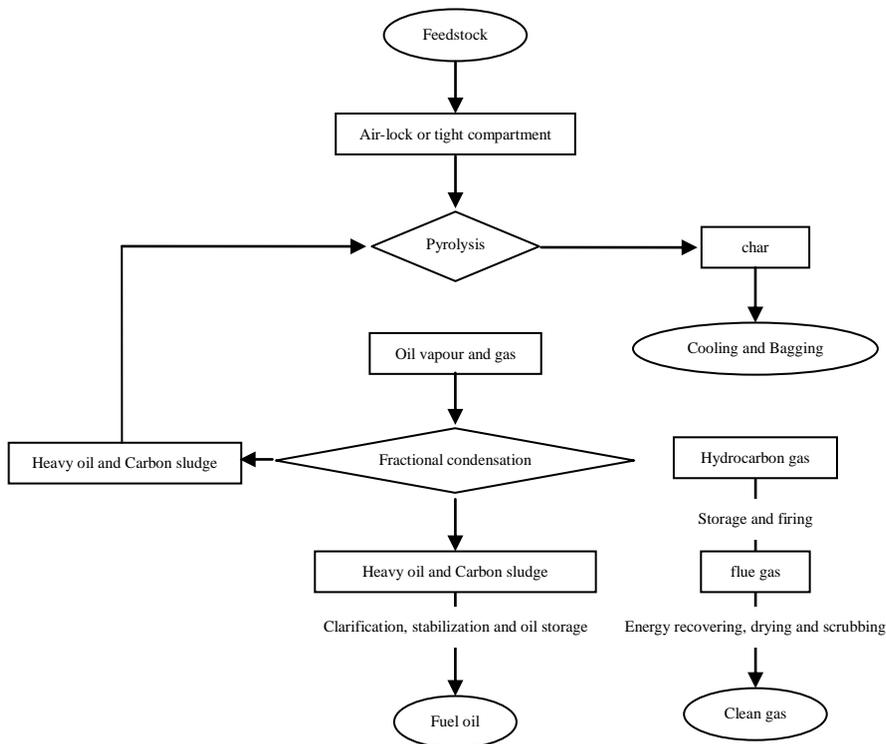


Diagram 1: Pyrolysis System for pyrolysing the Feedstock.

(E) Budget for the Study

Activities	Estimated Costs (GH¢)
Collection of the various feedstock for the Design	3000
Transportation of feedstock to Experiment Site	2000
Use of a Built Pyrolysis System for pyrolysing the feedstock	5000
Operating Cost of Pyrolysis on feedstock	3000
Recovery Cost of Products of feedstock	5000
Tests and Regents to be purchased for the identification of derived products	6000
Dissertation write up and articles publication	2000
Total Estimated Cost	26000

*Estimated cost is contingent on the unavailability of pyrolysis system. Availability would drastically reduce cost.

(F) Organization and Timelines for the Research

Activities	Duration	Year
Writing and fine tuning of Proposal	1 month	Semester1, year 1
Identifying sites for the collection of waste types and pyrolysis of waste	1 week	Semester 1, year1
Collecting of waste types and transporting to experimental site	2 month	Semester 1, year 1
Preparing and measuring weights of waste types to be pyrolysed	2 weeks	Semester 1, year 1
Preparing pyrolysis system and running the pyrolysis process on the various feedstock as per the experimental design	8 months	Semester 2, 3 of year 1 and 2
Continuation of the running of the pyrolysis process, recovering, testing and measuring of the process outcome.	12 months	Semester 2, 3, 4 of year 1 and 2
Modelling of pyrolysis process with the data collected	1 month	Semester 5, year 3
Dissertation write up and publications	4- 36months	Semester 2,3,4,5,6 of years 1, 2,3

(G) Limitations for the Study

The availability of equipment for running of the pyrolysis system and the recovery and testing of products obtained from the process are likely to be the major constraints of this study.

(H) Expected Outcomes

At the end of the study the following outcomes are expected to be realized:

1. Come up with a built model for predicting the outcomes and cost effectiveness of pyrolysing the waste types.
2. Establish the cost effectiveness of managing waste (both organic and inorganic) in the country via pyrolysis.
3. Recover energy and other useful raw materials such as biofuel, activated charcoal for industrial and household use for wealth creation from waste.

4. Establish if the energy generated is substantial to complement the energy needs of the country.
5. Appraisal of the pyrolysis system for managing waste and recommend designs and improvement for cost effectiveness.
6. Recommendation on how to reduce waste volumes to prevent filth related diseases (such as cholera, malaria etc) in the country.
7. There would also be research articles published in reputable journals for the dissemination of findings.

(I) Conclusion

At the end of the study, it is envisaged that a model would be built on the use of pyrolysis for management of waste types under consideration which can be used for predicting the quantity of products realized during pyrolysis. The energy and other raw materials expected to be derived from the process can be used as sources of wealth creation and also complement the energy needs of the country aside aiding manage waste to reduce or ward off filth related diseases.

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1.4 A Sample of a Business Proposal

Proposal for Organizing of Remedial Training for the Students Enrolled via the Access Course Arrangement and ‘Unqualified’ Accra Polytechnic Applicants.

1.4.1 Background

Accra Polytechnic is one of the tertiary institutions in Ghana mandated to teach,

conduct applied market driven research, and provide service to the community – their immediate environ and beyond. Sequel to this mandate, the Institution is to produce well-baked graduate capable of serving as middle level management personnel poised for national development.

Every year the Polytechnic receives large numbers of applications from prospective students seeking admission into the various programmes run in the Institutions. However based on the facilities available and the stipulated minimum entry requirements of obtaining at least C6 in the core subjects (English, Mathematics, Integrated Science and Social Studies) set by the National Accreditation Board (NAB) for students to be admitted into tertiary programmes in Ghana, majority of the applicants are unable to obtain admissions. In the quest to give leverage to students to gain admissions into the HND programmes, the NABPTEX in consultation with the NAB, came up with an access course as a way of bridging the gap, but not a substitute for the WASSCE entry requirements. This presupposes that, all polytechnic students who gain admissions into the system via the access course arrangement will be required in the future to write or meet this inevitable requirement of NAB if they have to further their studies in any of the universities in Ghana. It thus seeks to suggest that the access course arrangement is serving as a respite and not a mitigation of the problem.

This proposal is geared towards creating a platform for the remedial training of the unqualified applicants and those deemed qualified through access arrangement to meet the minimum NAB set entry requirements of obtaining at least C6 in the core subjects (English, Mathematics, Integrated Science and Social Studies) for admission into any tertiary institution in Ghana.

1.4.2 Justification

There is keen competition for tertiary education in Ghana among students. In

recent times, the competition for entry into universities is becoming tougher and keener not only because of the teeming growth in student population but the continual change in the entry requirements for admission of students into the various programmes on offer. The West Africa Senior Secondary Certificate Examination (WASSCE) conducted by the West Africa Examination Council (WAEC) remains the main entry certification aside other known ones like the A-level certification; professional qualifications etc.

However, the WASSCE is the main examination required for entry to the tertiary institutions in Ghana. Matured students and professional students are all required to have satisfied the minimum requirement set by the NAB. NAB quite recently came out with a new requirements to allow students to be admitted into a tertiary programme into any of the tertiary institutions in Ghana with a minimum of grade C6 in their core subjects - English, Mathematics, Integrated Science and Social Studies, depending on the programme offered by the individual at the Senior High School level. It therefore presupposes that any other arrangement that allows an individual entry into any tertiary institutions apart from that of NAB is not national in character and is likely not to stand the test of time. The Polytechnic Access Course is not national in character since the training colleges and the universities could have organized similar arrangements but for their strict adherence to the directives of the authority – NAB. It thus suggests that the Polytechnics are likely to be making themselves an “island” which eventually will limit the progression of their students, if no timely antidote is sought to make all of its students meet the NAB set minimum requirement before their graduation, especially those admitted via the access course arrangement.

Notwithstanding Accra Polytechnic receives many applications from prospective students seeking admission into various programmes, infrastructure and other factors pose limitation to the number of student intake. The lists of the rejected applicants are expunged from the Institution’s system with no alternative

arrangements currently put in place by the Polytechnics for the betterment of their grades to enhance their subsequent enrollment into the system for the purpose of creating revenue and jobs for its staff as well as provide service to the public.

1.4.3 Objective

The proposal seeks to achieve the objectives outlined below:

1. To offer remedial training for the writing of WASSCE core subjects by the unqualified applicants who sought admissions from the Institution.
2. To offer remedial training for the writing of WASSCE by students deemed qualified via the access course arrangement.
3. Generation of revenue through teaching of candidates.
4. Creation of employment for the staff or other individuals.
5. Satisfying the set target of NAB to avoid jeopardizing the future of Accra Polytechnic graduates who gain and completed their studies through the access course arrangement.
6. To train and redirect the ‘unqualified applicants’ for re-admission into the Institution.

Project Execution Procedure

The remedial training shall be organized for students admitted via access course arrangement; Pre-HND students; and the unqualified applicants who sought admission at the Institution.

Students admitted via Access Course Arrangement

Despite the fact that the access course has been started and students have been

given conditional admission, there is a need for a directive to be given by the Institution, that apart from passing the access course which would enable them to be enrolled into the HND programmes, they are expected to meet the minimum entry requirement set by the NAB before they can be awarded their certificate. This caveat must be stated on the admission letters of prospective students to be enrolled via the access course arrangement; and be made to know the Institution's arrangement for their participation in the WASSCE. For students who have already been enrolled and status yet to be confirmed based on their results, the same directive can be communicated to them highlighting in order the consequences of flouting the stated directive.

Pre-HND and Diploma Students

All Pre-HND and Diploma students must be informed on the directive prior to their enrollment into the HND programmes on conditions that the Pre-HND and Diploma examination do not satisfy the NAB set minimum entry requirement for admission of students into tertiary programmes.

The Unqualified Applicants who sought Admission at the Institution

The term 'unqualified applicants' here refer to prospecting students who sought admission at the Institution but were not admitted on the ground of not meeting the requirements. Instead of the Institution expunging their names from the system, a platform can be created to offer them remedial training alongside those admitted conditionally via the access course arrangement at a charged fee to allow for their integration into the Institution through re-admission.

The Remedial Training Process

Accra Polytechnic as a way of offering a platform for the remedial training of the students enrolled into the access programme, Pre-HND and Diploma courses

as well as ‘unqualified applicants’ can come up with a ‘Remedial School’ within the Institution. This ‘Remedial School’ set up will be responsible for the enrolment, training and registering of the mentioned categories of students to re-sit their WASSCE in order to enable them meet the minimum set entry requirement by the NAB. If time and space would be a problem, the Institution can hire a space in another institution preferably a secondary school, where top notch teachers or lecturers in the core subject areas will be recruited to train these remedial students. The fees charged students will include: student registration fee; tuition for the subjects registered; course materials; user facilities; and examination registration fees. All students enrolled into the access programme, Pre-HND and Diploma courses within the Institution will be entreated to register.

Duration of Remedial Training

The remedial course training duration must be at least six (6) months before the sitting of the examination and the training is expected to take place once every year at the time WAEC calls for students’ registration.

Budget

EXPENDITURE ESTIMATION			
Cost Items	Number	Unit Cost (GH¢)	Total Cost (GH¢)
Design and Printing of Registration Form	2500	1	2,500.00
Printing of Course Materials	2500	25	62,500.00
Call Credits for Calling ‘Unqualified applicants’	2500	1	2,500.00
Payment of Teachers / Lecturing Staff	13	6 month @ 2000 per month	117,000.00
WAEC Registration Fees	2500	100 per subject	250,000.00
GRAND TOTAL			434,500.00

REVENUE ESTIMATION			
Revenue Items	Number	Unit Cost (GH¢)	Total Cost (GH¢)
Student Registration Fees and Sales of Forms	2500	50	125,000.00
Tuition for the Subjects Registered	2500	150 / subject and 50 / each extra subject for 6 months	375,000.00
Sales of Course Materials	2500	50	125,000.00
Examination Registration Fees.	2500	200	500,000.00
GRAND TOTAL			1,125,000.00

1.4.4 Cost-Benefit Analysis

ITEM	AMOUNT (GH¢)
Expenditure	434,500.00
Revenue	1,125,000.00
NET PROFIT	690,500.00

1.4.5 Expected Benefits to be Derived from Implementation of the Proposal

The following tangible and intangible benefits are expected to be derived from the Institution of this partnership:

1. Provide remedial training for students admitted into the Institution via access course arrangement, ‘unqualified students who seek admission at the Institution as well as the Pre-HND and Diploma students in order to satisfy the minimum requirements set by NAB.
2. Create employment for teachers / teaching staff.
3. Creation of Internally generated income for the Institution.
4. To provide service to the public by retraining students to meet the requirement needed for admission of students into tertiary institutions in Ghana.

1.4.6 Conclusion

This proposal when implemented will provide the opportunity for the numerous unqualified applicants who are rejected yearly to be retrained for admission into the Institution. It will also offer an antidote to help the students enrolled into the Institution via the access arrangement to achieve the minimum set requirement set by NAB to offer them progression into other analogous institutions in the country. Also, the cost-benefit analysis makes it worth implementing.

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Chapter Two

Writing of Final Research Report



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 measurable using any of the levels of measurement known. Also, they 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 then 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.

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Chapter Three

Referencing in Research Report Writing



Referencing in Research Report Writing

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Abstract

Referencing forms an important aspect of research report writing which cannot be ignored by the researcher or students. There are so many referencing styles, and its adaptation may vary from one institution to another. To be well versed in a particular writing style can be acquired with the frequency of writing using a particular style. However, researchers need to understand and know how to use a particular style and later master more of the styles. This paper thus explores the use of the American Psychological Association format (APA). This format has been thoroughly discussed and explained with examples to enable would-be researchers and students to use it.

Keywords

References, In-Text, Out-of-Text, Format

3.1 Introduction

Referencing is a standardized method of formatting the information sources one has used in a written work. Referencing is a critical path in research write up for publication. One can use good experimental designs, appropriate hypotheses testing procedures and have excellent diction BUT one work would remain on the table in his room if he or she does not work on referencing.

3.2 Reasons for Referencing

1. Acknowledges the source (avoiding plagiarism).
2. Allows the reader to trace the source.
3. Shows adherence to academic writing standards.
4. Provides evidence that you have read and considered the relevant literature.
5. Allows validation and confirmation of sources used in your work.
6. Gives credibility to one's work.

3.3 The APA (America Psychological Association) Style of Referencing

The APA is used for reference in the social sciences: psychology, economics, sociology, social work etc. Since most works done in these areas are research base and these researches are improved upon year by year or with time, the APA system adopts the Author-Date style of referencing with the main text. It thus presupposes that any work done later must be an improvement over a similar work done earlier, hence the need for the date. It requires that tables, figures, charts, graphs, tables etc used for illustration and explanation must be well

labeled and be as close as possible to the information they explain or illustrate.

The following are the guidelines to follow for in-text citations when using the APA format for referencing.

(A) A Work by One or More Authors

Whenever the work of an author is cited, he or she must be referenced in-text using the last name and the date of publication of the article cited. When the name of the author is captured in the signal phrase, the year of publication is placed immediately in parenthesis after it. However, if the name of the author is not captured in the signal phrase or opening statement, the name of the author and the year are placed in parenthesis with each separated by a comma at the end of the statement. If a direct quotation is cited, then, the author's name, year of publication and the page number(s) are placed in parenthesis with each separated by a comma at the end of the statement. In the case of direct quotation, only put the page(s) number preceded by p. or pp. in parenthesis at the end of the statement.

An Author

Eg. Kittie (1920) shows that money is life.

Two Authors

Eg. Rockson and Techie (1820) reveal that hands must thoroughly be washed before eating.

Three to Five Authors

Eg. Rockson, Techie, Kyei and Keni (1988) conclude that

A MUST for the first time, but for subsequent citations in the same work use.

Eg. Rockson et al. (1988) conclude that ...

Six and more Authors

Eg. Max et al. (1997) indicate that

For a direct Quote:

E.g. According to Kittie (1920), “Some bacteria are only harmful to us if they make exotoxins” (p.76).

If the authors for a work are not identified in a signal phrase or opening statements, then below are ways of going about the in-text citation:

An Author

Eg. Money is life (Kittie, 1920).

Two Authors

Eg. Hands must thoroughly be washed before eating (Rockson and Techie, 1820).

Three to Five Authors

Eg. Teachers are well respected all over the world (Rockson, Techie, Kyei, and Keni, 1999).

A MUST for the first time, but for subsequent citations in the same work use:

Eg. Teachers are well respected all over the world (Rockson *et al.*, 1999).

Six and more Authors

Eg. Some bacteria are only harmful to us if they make exotoxins (Max *et al.*,

1997).

Direct quotes must be handled as below:

Eg. We need fear some bacteria only “if they make exotoxins” (Kittie, 1997, p. 23).

(B) Citing From Two or More Works by an Author Published in the Same Year

The same procedure is followed as in the case of citing from a single work with same author, the only difference in this case is to distinguish the works by placing a lower case letter starting from a...z after the year of publication to indicate the order in which the various works were published within the year. This letter should be used in ordering the list of cited work by the author at the bibliography where the entries arranged alphabetically by title. The name of the author should be followed by a comma; the year and lower case letter also by a comma apart from the last as illustrated in the example below.

Eg. Thirty percent of men who date are likely to be men who have married (Baffour, 2000a, 2000b, 2000c, 2000d).

Eg. Climate change is a global problem that can be solved with all hands on deck (Danso, 1997b, 1997c, 1997e).

(C) Citing from an Unknown Author

If the author is unknown, use the first two or three words of the entry as listed on the reference page in the author’s position or place or shortened version in parenthesis, along with the date. The title must be italicized or enclosed with quotation marks.

Eg. According to *Institute of Economic Affairs Abstract* (2001), Ghana's population stood at twenty-five million as at 1995.

Eg. In 1995 Ghana's population stood at 25 million ("Global Trends," 2003).

(D) Citing from an Organizational or Corporate Author

The name of the organization, association, foundation or corporation must be spelt out. However if the name can be abbreviated and remain identifiable spell out the name first time and put the abbreviation immediately after it, in brackets. Use the abbreviation for subsequent citation of that same source.

Eg. In 1995 Ghana's population stood at 25 million (Polytechnic Teachers Association of Ghana [POTAG], 1993).

Eg. According to POTAG (1993), technology can greatly enhance the performance of students.

(E) Authors with the Same Last Name

If one cites from two different works with authors bearing the same last names, the initials of the authors first names of the authors are put along the their surnames to distinguish between them. Below is an example to how such a situation should be handled.

E.g. In 1990 the literacy rate for Mexico stood at 75 percent (C. Miller, 1998; S. Miller, 1994).

(F) To Cite Two or More Works by the Same Author

When citing two or more works of the same author, put the author's last name in a parenthesis followed by a comma, and then the years of publication of the various works alongside in the parenthesis. Note that each year must be separated

with a comma apart from the last in the parenthesis. An example of above case is given below:

E.g. Many experimental designs are not analyzed well (Kittison, 1924, 1999).

However if the books were written in the same year then add small case letters to the year from a – z.

E.g. Many experimental designs are not analyzed well (Kittison, 1999a, 1999b).

(G) More than One Work in a Citation from Different Authors

In the above case, arrange the authors' last names in alphabetical order followed by a comma; add the year and separate them by semicolons as show in the example below:

E.g. Some bacteria are only harmful to us if they make exotoxins (Didion, 2010; Kattens, 1999).

(H) Quotation from a Secondary Source (Indirect Source)

This situation occurs or confronts an author when he or she reads from a particular source and in doing so finds a piece of information of interest that he would like to quote when the author whose work he or she is reading also quoted from another source.

In this case he or she captures the name of the author of the book he or she read but puts “as cited in” in parenthesis together with the name of the secondary source followed by a comma and then the year of publication as illustrated in the example below:

E.g. Kov Kittie of FAO feels that international agriculture has reached its limit (as cited in Mann, 1993).

(I) Electronic Texts

These are treated in-text in the same way as print sources: use author, title of text or Website, and page number.

Known author

E.g. According to Mann (1994), water helps all animals to digest food easily.

Unknown author

E.g. Water helps the food eaten to digest (Compost Microbes, 1993).

Direct quotation from website

E.g. “There are many disease causing microbes in the soil” (Soilmicrobes.com, 1993, p. 23).

The following are the entry formats for building a list of cited works under the APA style of referencing for the various types of materials.

For the entry formats, we use the following keys:

| = a space o = no punctuation

— = Underline → = indent ½ inch

(J) Books

Author / editor(s).| (Year of publication). | *Title of the Book*. | Place of Publication: |

→ Publisher.

E.g. Kwabison, W., Larley, R. H., and Maln, A (Ed.). (2009). *The Poisoned*

Chalice. Achimota: Vintage-Press.

(K) Journal Articles

Author(s). (year of publication). | Article Title. | *Journal Title*, | volume number (issue → number), | inclusive page numbers.

E.g. Kwei, F. (1997). The Challenge of Diversity. *ADE Bulletin* 88(1997), 246-250.

(L) Magazine and Newspaper Articles

Author(s). (year of publication – 1990, May 25 or n.d.). | Article Title. | *Publication Title*, | →inclusive page number.

E.g. Adams, K. 1998, Feb. 23). Mangled. *Ghanaian Times*, pp.12, 16.

(M) Electronic Sources

Author(s). | (Date of electronic publication). | *Title of Site*.| Date of access, from electronic →address

E.g. Arthur, S., and Zain, T. (2008). *Four Project Page*. 11 Jan. 2008, from www.soil.edu.com.

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Chapter Four

Introduction to Aspects Involved in Research Article Publication



Introduction to Aspects Involved in Research Article Publication

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Abstract

There are few variations between research project or thesis write-up and writing of articles to be published in journals. These variations stem out from the formats for the two categories of write-ups. While the former would have a format determined by institutions to which the project report; writing of research articles for publishing in a journal requires that the acceptable formats given by the authorities of the journal must be religiously adhered in order to get them published. Most authors face numerous times of article rejections getting their research articles published in peer-reviewed journals because they have not acquainted themselves with acts of writing for publication; and also imbibe techniques and tenets that lead to successful article publication in journals. This paper examines the elements required in articles been prepared for publication.

Keywords

Research Article, Publication, Peer-Reviewed Journals, Formats

4.1 Introduction

There are many aspects involved in research articles publications and these serve as elements that should be considered whenever one wants to publish an article. However, it should be noted that journals vary considerably in scope and format. As such, not all these aspects or elements can be included in an article. These are thus, general requirements that should be tackled among which some would be needed in the write-up of articles to be published in various journals. An author's knowledge on all these aspects involved in research publication is important but the need for their inclusion in an article write up is contingent on the format or requirement of journal the article is to be published.

The manuscript thus elucidates and explains things to be considered on all the following aspects involved in Research Article Publication.

4.2 Title of Paper (Article)

The first item on a research paper is the title of the paper. A research paper (article) title should reflect the paper. It should be as short as possible; not convoluted to get one's audience confused. It is recommended that the important words in the title should be capitalized, but this also depends on the journal type.

The title of a research paper is the name by which a paper is to be called. It is the name that would be indexed for archival purposes. It therefore suggests that a research paper must depict their names. The article title is supposed to be in bold fonts but this also depends on journals guidelines and formats.

4.3 Authorship and Affiliations

The second item seen on research papers are the authors and co-authors names

and their respective institutions that they are affiliated to. Other journals require the title of the authors to be stated as well. In addition to this is the contact of the corresponding author. How the names of authors and co-authors are to be written should be specified in the guidelines of the journal or seen in papers in the journal's archive. All those whose names appear on the paper are expected to make diverse contributions to the writing of the paper. It is thus expected that, each of the authors have a good knowledge of the content of the paper.

4.4 Abstract

The abstract is a summary of the work and serves as a teaser which should whet the audience appetite to read the entire paper. It differs from what is called executive summary. The latter gives summary of a document or manuscript chapter by chapter. The abstract should give a brief background to the study summary of the methodology employed – sampling size and technique, experimental design, salient result, recommendations and conclusion. It should however be noted that, each journal has specific number of words to be accepted. Authors are to adhere to the number of words prescribed per a journal's guideline. One mistake authors often make in writing an abstract is the use of paragraphs. Abstract are not supposed to be paragraphed.

4.5 Keywords

Keywords are the most important and technical used words / jargons that run through the research paper. The maximum number of words allowed as keywords depend on each journal.

4.6 Introduction of an Article

The introduction to the paper should give a background information to the write-up of the articles; identifying gaps that existed in the subject area and the need to address those gaps. These are to be followed logically to allow easy comprehension of the ideas for which the paper is being written. The introduction should rekindle the interest of the audience.

4.6.1 Problem Statement

Problem statement in research may not necessarily refer to a problem. It is a technical jargon used to denote the main gap to be addressed. As a statement, it should be specific. It should target the main and sub-problems which are not at variance with each other (related). It should not only state an observation. When it does, it is regarded as a weak problem statement. Rather, it should be a statement that compares and contrasts an observation.

Authors are to note that the problem statement should not be lengthy or convoluted as to confuse.

4.6.2 Hypothesis

Hypothesis is a scientific guess hazard or a statement made by a researcher at the start of a research with the aim of proving whether it is supposed to be rejected or otherwise (failed to be rejected). It is in two forms; the null hypothesis and alternate hypothesis. The null hypothesis is the generally accepted statement and its converse the alternate hypothesis, the claim of the researcher. It can be stated or expressed verbally and mathematically as done below.

E.g. the study put forth the following hypothesis:

Null hypothesis (H_0): There is a relationship between student-lecturer ratio and student performance.

Alternate hypothesis (H_1): There is no relationship between student-lecturer ratio and student performance.

Mathematically expressed as:

$$H_0: \text{Rel (S - L and SP): } 1 \leq r \leq 1$$

$$H_1: \text{Rel (S -L and SP) = 0}$$

Where r = correlation coefficient

S - L = Student Lecturer ratio

SP = Student Performance

Whenever a hypothesis is put forward, the study must be designed in such a way that data can be collected appropriately to test the hypothesis. It should however, be noted that it is not every journal that requires a sub-heading for hypothesis in papers published in them.

4.6.3 Research Questions

Research questions are raised once gaps have been identified in a study. The import of the questions raised is to help the researcher so that in finding answers to these questions would lead eventually to bridging the identified gaps. It thus prompts and guides the researcher in the pursuit of the study to achieve the objectives of the study or research. The questions must be asked chronologically. Research questions may not be a sub-heading for many journals.

4.6.4 Objective of the Study

The objectives of a study are what the study target to achieve. There could be a main objective and outline of specific objectives.

The objectives are supposed to be action oriented and therefore each of the objectives must be positioned as such. They are to be preceded by the preposition ‘to’ as below.

The study seeks to achieve the following specific objectives:

1. To determine.
2. To explore.
3. To measure.
4. To quantify.

4.6.5 Significance / Justification of the Study

The significance justification of the study normally deals with the need or the import of undertaking the study. These needs can be supported in literature by citing the relevance of the study in supporting or providing or making available literature to expand the frontiers of knowledge.

In the selection of players for a tournament, players are allowed to compete for position in what mostly is referred to as “justifiers”. Likewise, this portion justifies why the research needs or ought to be conducted by indicating the relevant impact it is likely to make.

4.6.6 Theoretical Framework

Theoretical framework refers to the framework of theories that are related to

the study. This is the part of the paper where the various theories that relates and underpins the study/ topic are well articulated and discussed. This actually forms part of the literature review but some journals require that they are given subheading in their papers. The theoretical framework of the study helps link the various related theories with the study being undertaken in order that the study is founded on a sound scientific basis for the purpose of contextualizing findings appropriately.

4.6.7 Conceptual Framework

It is derived from the word concept and concept is idea that is vague to everyone apart from the originator of the idea. For the concept to be understood by everyone or audience, a link or an indicator should be established to convert the concept to variable which then can be measured and how the variable measured become known to the audience. The act of doing this is what is referred to as developing the conceptual framework of a study. For example, taking the concept 'wealth'.

Wealth could be interpreted differently and for the author to make himself understood, he / she needs to develop a link between wealth and what he / she meant by wealth. Thus one can refer to wealth as the number of properties, amount of money or number of cattle one possesses and thus proceed further to illustrate how these can be measured.

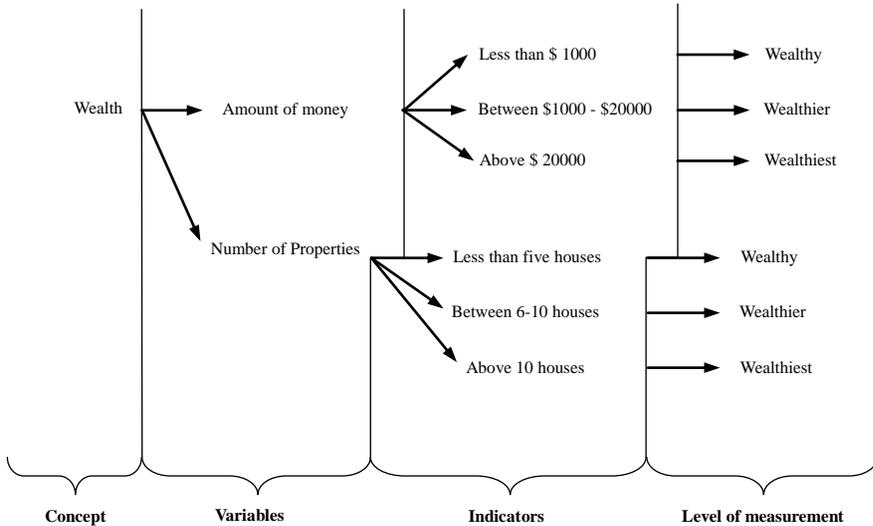


Diagram 1: Illustration of Concept.

Wealth is a concept which can be measured in many ways. Once a researcher wants to work on such a concept, it behooves the researcher to indicate how he or she intends the concept to be measured, or else, it would remain vague. The concept of wealth can be reduced to variables such Amount of money, and Number of properties. These two variables are linked to the concept ‘wealth’ with indicators in order to reduce it to variables as seen in the diagram. These indicators thus would enable the variables to be measured into wealthy, wealthier and wealthiest.

4.7 Methodology

It is one of the most important part of the paper and the author must make sure he does due diligence to this particular portion of the paper. When anything goes wrong here, it eventually affects the quality of the information as well as the accuracy of the findings churned out from the study. This part of the paper should clearly give the audience how the whole study was carried out. It should cover the

sampling size (if sampling size was done), and the sampling technique adopted or otherwise if it is experimental, then the experimental design used stating clearly the conditions under which the study was conducted.

In addition, this part should include how the data was collected (the particular type of instrument used either via questionnaire and interview guide in the case of survey and type of instrument used for measuring in the case of experimental data. The statistical application used in analyzing and summarizing data should be well documented. The methodology should be well written to enhance the understanding of the audience. It should also show where appropriately how hypothesis are to be tested and the conclusion made.

4.8 Results and Discussion

4.8.1 Results

This part of the paper in some case depending on a journal is combined with the discussion. However, when the heading stands as only result, it means the presentation of the results using statistical tools like tables and charts to summarize them. The tables and charts must be well labelled. It should be noted that, the researcher should use one statistical tool, either a table or chart to summarize result of a dataset collated, not both. When the dataset collated contains more variable it is appropriate to use a table since when chart are used it becomes a bit complicated and difficult to understand. The tables and charts also must be placed and labelled according to the requirements of the journal the article or paper is to be submitted. Usually the labelled of tables are written above them while chart of figures are written underneath them. Inner gridlines in tables and the borderlines of figures or charts must be avoided but these again depend on the type of journal.

4.8.2 Discussion

Many at time, authors make the mistake of thinking that discussion is just stating the percentage in terms of responses given in a survey or the inferential statistics churn out from data processed or analysed. Discussion goes way beyond just stating this values and leaving them like that. In any case, that would lead to mere repetition of values already presented as results and would make the discussion the same as the results. In the discussion, meanings are given to values or trends or patterns the results tend to show. Reasons are to be given to anomalies and explanations for deviations. This is where findings or results are to be contextualized. Contextualizing findings means supporting or disagreeing with result cited in literature. Therefore, a good discussion can be done only if literature review is well done.

4.9 Conclusion and Recommendation

4.9.1 Conclusion

The conclusion of the paper is to be likened to an executive summary highlighting on every bit of the introduction, methodology, result, and discussion. It should be the same as the abstract. Normally, abstracts are the last bits of the paper to be written and so extracted rather from the conclusion of papers. Usually conclusions on papers are supposed to be tied well so as to make the papers complete. Authors are not to make statements that have not been found in the study. If unsure, use appropriate words such ‘may’ ‘could’ ‘might’ etc.

4.9.2 Recommendation

Once one sets to tackle and address specific issues, other issues or problems emerge and if the research does not remain focus on solving the targeted issues, he/

she is likely to be led astray by the other attendant issues, thus leading to failed research projects. It is good that despite the attendant problems that emerge in solving the main problem be noted alongside so that suggestions made in the form of recommendations by the author at the end of the paper. Recommendations also include how the findings are supposed to be utilized appropriately.

4.9.3 Acknowledgement

This is where all those who assisted in kind or cash as well as laboratories or research sponsoring institution or persons are acknowledged for the immense support. Apart from the authors, anyone who assisted can be acknowledged here.

4.9.4 References

Referencing in research article writing borders on in-text referencing and listing of references which is also known as bibliography. Apart from these, there are several reference styles such as APA, CMS, AP etc. Most journals either accept articles submitted using the specified referencing style or a modification of the specific known style clearly stated in the author's guideline for article submission.

In-text referencing

In-text referencing involves how to handle citations within the main text of a manuscript or article. With regards to in-text referencing, there are two main ways of handling them. Either citing authors using an active or passive voice.

Active voice

With the active voice, the lead (first) author's surname and the year of publication of the work cited are put in parenthesis at the end of the statements made.

Example 1: Student performance is affected by Lecturer-Student ratio; resources available to students; lecturers knowledge of the subject area taught (Sundong and Opoku, 2013).

Example 2: The weight of two boxes of A4 sheets is equal to the weight of a standard cement block (Blockewaah, 2013).

Passive voice

In this case, author's name and year of publication of the article precedes the work or statement cited. It denotes a reported speech. Examples of these are given below:

Example 1: Sundong and Opoku (2013) reported that student performance is affected by lecturer –student ration; resources available to students; lecturer's knowledge in the subject area taught.

Example 2: According to Blockewaah (2013) the weight of two boxes of A4 sheets is equal to the weight of a standard cement block.

4.9.5 Preparing of List of References / Bibliography

The list of references / bibliography refers to the list of all cited works used in the articles. They are normally listed in alphabetical order or numerically, according to the order in which they appear in the manuscript. How the list of referencing is done depends on the journal type and the referencing style that should be used.

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Chapter Five

Selecting of Journal for Publication



Selecting of Journal for Publication

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Abstract

Selecting a journal for publication of one's article can be tiresome and difficult as one need to verify the source of the journal, prove its authenticity and also the scope of the journal among other things. Writers come across so many journals part faced with the challenge of pinpointing the appropriate journal for their written article. This paper examines the methods and criteria that must be used to select an appropriate journal for article publication.

Keywords

Submission, Publications, Scope, Articles, Impact Factor

5.1 Introduction

Prior to the publication of an article, a researcher needs to select an appropriate journal to submit his/ her article for publication. The author would have to surf the net in order to select among the many journals that are available that matches with the article to be published. It should be noted that not all the journals are of standard. Some are scammers and predators who act on the innocence of authors. They accept papers with the view of reviewing articles submitted to them for publication but never do it. Some of these types of journal give quick notice to authors on the acceptance of their manuscripts. This topic of selecting journals for publication outlines and expatiates various things a would-be author should consider when he / she wants to select a journal for an article publication.

The following are the vital point one needs to consider in selecting a journal for publication.

5.2 Scope of a Journal

It refers to the subject area on which journal focuses on or covers. Authors are thus expected to tailor their articles so that it neatly fits into their subject matter under focus. Each and every journal has its scope and all authors who want their articles to be published in any journal should do the due diligence in knowing its scope before structuring their respective articles to be submitted for publication. The scope of a journal could be the subject matter of general science or particular topics in science, For example, a journal on renewable energy generation and storage. In this regard, the focus is not on energy but rather renewable energy generation and storage.

5.3 Standard of a Journal

Numerous authors are concerned with the journals in which they should publish their articles with regards to standards. There are many journals such that would be authors become sharply divided on how to select a standard journal. Some journals called predatory journals have also flooded the web charging huge amounts for publication without doing reviewing of papers submitted to them. Realizing that people really need their papers for promotion, they try as much as possible to exploit them allowing paper to be accepted within sometime 2 -3 days. Some of such journals are likely not to do quality jobs or in better words, the review of such journal, might not be thorough. Authors are to consider the following in trying to judge the quality or standard of a journal.

5.3.1 Impact Factor

The impact factor is a conventional method used in ranking a journal to be of high quality or not. The higher the impact factor of a journal, the higher its ranking as such the quality of papers published in them. The impact factor looks at the ratio of the number of articles a journal has published within a stipulated period to the ratio of the number of citations made from the articles published. Pundits are however of the view that, the fact that an article is published in a high impact factor does not mean that the article is necessarily of high quality, because an article can be published in a high impact factor journal without being cited.

However, for now it remains one of the methods used in ranking journals. Some journal deliberately put high impact factors on their journals in order to get authors to publish with them.

5.3.2 Journal Published by Reputable Institutions

Some journals are published by reputable and well-known institutions such as tertiary institutions universities, polytechnics, research institutions and foundations, etc. This institutions because they have worked hard to build the reputation, they would always want to maintain or improve upon the quality or standards they are associated with, hence would go all the length to make sure articles published in their journals are of the standards they require. A would be author can therefore trust such journals and publish their articles with them.

For instance, if Accra Polytechnic comes out with a journal in order not to dent the reputation of the institution, a rigorous quality assurance operations would be established, hence papers to be published in such a journal would have to be standardized. However, would be authors should be made aware that there are plenty scammers around who could set up websites using name of reputable institutions to run journal for their mischief. Would-be authors are highly entreated to check for the official websites of these institutions for their journals available if they wish to publish their articles.

5.3.3 Length of Review Process

Though this might not be a very good measure or strategy to adopt in deciphering the quality or standard of a journal, it should however be note that, a considerable time is needed for reviewers to assess manuscripts for editors. If authors should send their work to editors and within 1 - 3 days receive letters of acceptance, one should be suspicious of the review process and their journal quality. This is because 1-3 days is relatively a short time for an article to be sent to editors, reviewed and notice of acceptance given to authors. It does automatically mean the journal might not be of standard but only raise doubts as to whether due diligence is done.

5.3.4 Journals Included in Directory of Open Access Journal (DOAJ)

There is a directory called (DOAJ), consisting of compiled journals that allow people to access their articles freely online. These groups of journals are scrutinized before added to the directory; hence one can be assured that they are not predatory.

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Chapter Six

Overview of Formats of Some Journals



Overview of Formats of Some Journals

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Abstract

Every journal has its formats and guidelines that would-be authors need to study and tailor their articles to. Oftentimes authors write their articles without following these guides given by the editors of the journals and thus find their articles rejected. This closely examines two different formats as an illustration and overview for would-be authors to understand the various types that do exist. It also looks critically at what is expected from authors post submission of their articles to a journal for publication.

Keywords

Formats, Author's Guide, Templates, Journals, Instructions, Review

6.1 Introduction

There are several journals around the globe that are specialized in publishing peer-reviewed research journals. Some are open access and online; others are not open access and not online. Whether open access or not, online or not, all have their respective formats required by authors to meet before their articles are published. While others give their formats and templates, others have only the author's instruction guides which is expected to contain and give the author good idea of the format required. As mentioned earlier, journals differ in terms of their formats. This paper thus presents an overview of some of the journals and the formats they adopt.

6.2 Journal Type One

Let us look at format of some journals. Some have their own given formats and templates. Also present on their websites are the author's guide or instructions as well as archives from which would-be authors can download articles, study and format their articles accordingly before submission. The journal is expected to have all or some of the following items explained briefly or in details.

6.2.1 Authors Instructions

For every given journal, there are guidelines for authors to follow in order for their articles to be accepted and published. Would-be authors are expected to religiously follow the guidelines enshrined in what is called the 'Authors Instruction'. This gives a detailed description of how authors are to prepare their manuscripts prior to submission, and sometimes post-submission to acceptance. However, some journals do not have detailed author's instruction, for such journals, there would be a need to go into their journals archives to download

articles published in them in order to use them to structure ones' manuscripts. Also, sometimes, instead of the author's instructions or guide, some journals rather provide a template that pin- point how the author should format the article to be submitted. Some require that the template are downloaded and used for the write-up.

6.2.2 A Format to be Followed

This spells out and order the main components expected in one's manuscript: Titles; Authors Affiliation; Introduction; Methodology; Results and Discussions; Conclusion; and Recommendation; Acknowledgement and List of References. Formats differ from one journal to another. The guide has detailed or brief information on information expected under each of the components indicated in the format.

6.2.3 The Font Type and Size to be Used

The guide gives direction and indicates the font type and size to be used at various sections of the manuscript. Failure to apply the recommended fonts type and size would lead to the rejection of the article.

6.2.4 Type of Referencing Adopted by the Journal

There are different types of reference styles such as America Psychological Association (APA), Chicago Medical Society (CMS), Harvard Style, etc. Some journals adopt wholistically these formats others adopt these styles with slight modifications. However, the guide given would provide and illustrate how references are to be made in manuscript. That is, both in-text referencing, and the list of references.

6.2.5 Size of the Manuscripts (Number of Words / Pages)

Each journal has the total number of words or pages allowed for a manuscript / article. Failure to comply would lead to rejection or other times paying extra charges. Though the whole article is expected to have a specific number of words, sections like the abstract and keywords are also required to have specific maximum number of words depending on each journal.

6.2.6 Use of Journal's Template

As earlier mentioned, some journals have designed template and authors are required to download using a specified link to their websites to enable authors structure their manuscripts using the template.

6.2.7 Periodicity

It refers to the number of times / frequency of time the journal accepts submission and also the periods within which a journal accepts submissions. Some journals accept submission monthly, others bimonthly, quarterly or twice yearly. Periodicity of acceptance of submission varies from one journal to the other, and thus the author who wants to publish with a journal should know.

6.2.8 Mode of Submission

When one talks about mode of submission, it refers to whether a journal accepts and closes submission for its publication; or it allows continuous submission. With the former mode, a deadline is given for articles to be submitted for consideration after which all articles submitted would be rejected, but with the continuous submission mode, all submissions made after the deadline are not rejected but rather considered for subsequent publication.

6.2.9 The Review Process Adopted and the Duration

There are three main review process or method namely open review, single / blind and double blind. A journal can adopt one of the review methods. That would be at the discretion of the journal.

Open Review

With the open review method, the names of the reviewers are made known to the authors and vice-versa by the editor. In this case authors are likely to be victimized or favoured should human factor can to bare.

Single / Blind Review

In the case of single or blind review, the author's name is made known to the review only and not vice-versa. This also can allow victimization or favoritism by the reviewer.

Double Blind Review

This ensures that both the names of the reviewer and authors are not made known to each other. This confidentiality is kept and so the element of victimization and favoritism is reduced if not totally eliminated.

In terms of duration of the review process, some journals state it but others are silent on it. It is good that the author knows about the duration of the review process so that he/ she follow up on it and prompt editors in the case of excessive delays. The length of review differs from one journal to another.

6.3 How Authors are Informed About Acceptance of Articles

Often times, authors are informed by editors of acceptance of their articles via letters of acceptance to corresponding author's email. Some journal editors sent only letters of acceptance while others sent letters of acceptance breaking down the cost charged for the publication as follows; printing charges; plagiarism charging; processing charges.

6.4 Fees Charged and Payment Mode

Some journals charge publication fees while others do not, but the latter ones are in contemporary times uncommon. Most journals require authors to pay publication fees to help defray the cost of printing and reviewing of articles. It behooves an author to know the amount of fees charged by a journal before submitting the articles for publication. This would help the author to prepare towards the payment, way ahead of acceptance as it is a prerequisite for publishing of acceptable articles. Journals often delay the publishing of articles accepted but whose fees have not been paid for subsequent editions, if authors are unable to meet deadlines given. Moreover, the deadlines given for payment are often short, thus making it very vital for authors to have a fore knowledge of the publication fees. As regard the mode of payment, most journals use wire transfer, western union, credit card or paypal.

6.4.1 Wire Transfer

Journal's bank account information is given to authors to enable them transfer money from their bank into a journal's bank account.

6.4.2 Western Union

Some journals also give addresses where money can be sent for publication through Western Union money transfer.

6.4.3 Credit Card / Paypal

Other journals also allow the use of credit cards and other foreign payment modes.

However, the author should know of the payment modes that the journal require and check whether they are available in his or her location / country prior to submission as this can later on hinder the publication of his / her articles even though it has been accepted.

6.5 Journal Type Two

The second type of journals to be considered for our overview are those without authors' guides or instructions published on their websites, or do not have at all. With these type of journals, would-be authors are expected to download articles from the journals' archives in order to tailor their papers accordingly.

However, it should be noted that these types of journals are not common, and articles are likely to vary in terms of their formats.

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Chapter Seven

Working Example: Converting Research Report to Publishable Article for Submission to Peer Review Journal



Working Example: Converting Research Report to Publishable Article for Submission to Peer Review Journal

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Abstract

Converting research projects or thesis into a publishable standard is a difficult a thing to most students and would-be researchers who have no experience. Achieving this though not difficult requires a skill that needed to be learned and mastered. This is because every research article carries pieces of information targeted for the consumption of certain clientele, and thus must be disseminated through publication in a peer reviewed journal. This article explains how research reports or theses are converted into articles for publication.

Keywords

Publishable Articles, Research Reports, Theses, Articles, Journals, Peer - Review

7.1 Introduction

This paper is aimed at helping the readers learn the various rudiments involved in converting research projects or reports into publishable articles in order for them to be submitted to peer review journals. It presents a sample of a research report that has been done and needed to be converted into a publishable article for a submission to Science Innovation Journal Published by the Science Publishing Group, a publisher of so many journals. The research project to be converted is found on pages 34 to 45. It is research project that was prepared which does not follow format of any journal and therefore cannot be accepted unless the research selects a journal for which article falls neatly within its scope. The article then can fine-tuned according to the journals format using the provided template and author's guide before submitting to the journal's editor for onward submission to reviewers for review for their decisions: either acceptance; acceptance with minor corrections; acceptance with major decisions; or outright rejection.

7.2 Sample of Unpublished Paper

Science Innovation

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Published online March 20, 2014 (<http://www.sciencepublishinggroup.com/j/si>)

doi: 10.11648/j.si.20140201.11



Promotion of academic scholarship and entrepreneurship through the writing and publishing of syllabi-based course textbooks for polytechnics in Ghana

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Abstract: Quality education is the bedrock on which a country's developmental agenda rests. Its delivery requires several resources but importantly availability of trained staff and the requisite teaching materials needed to facilitate the impartation of knowledge. The study appraised three suggested projects namely: Project A, Subcontracting Printing of Textbooks; Project B, owing a Printing Press together with printing of Textbooks; Project C, owing Printing Press and Bookshop together with Printing of Textbooks, on the need for writing of syllabi-based course textbooks by academics as a way of promoting scholarship through entrepreneurship using Accra Polytechnic in Ghana as a case study. Cost estimates used in the projects were done using the Ball pack Technique NPV method with selected discount factor of 28% and 32% were used rating the three projects in terms of viability and profitability. The analysis revealed that all the projects were viable and profitable as well as enhance promotion of research, scholarship among the academia, facilitate the delivery of quality education as well as income generation for staff and the Institution. Projects B, C and A ranked profitable in the order 1st to 3rd from the NPV analysis.

Keywords: Net Present Value, Syllabi-Based Course Textbooks, Projects, Research, Entrepreneurship, Profitability

1. Introduction

Education of the citizenry of a country is the lynch-pin on which the industrialization and

development of a nation is linked. There is therefore the need for the educational institutions in a country to provide quality to its citizenry through the provision of

up-to-date standard materials that would equip students, who would eventually offer the skilled man power for developmental take-offs with the necessary and needed contemporary knowledge and skills to withstand the competitive global challenge in various fields of endeavour.

Accra Polytechnic is one of the tertiary institutions in Ghana with the core mandate of training students to acquire technical and vocational skills to provide the needed middle man power to propel the country's developmental process. Sequel to this, syllabi have been developed and approved by National Accreditation Board of Ghana which are followed to provide tuition and training of students pursuing diverse programmes. The core mandate of Accra Polytechnic is to provide quality tuition to students. Oguntuase and Falaiye (2004) revealed that the most effective way to mobilize people is through the provision of required information in the most useable form and that such information should be provided for the benefit of a large number of people. There is no doubt however that the target of the syllabi cannot be achieved without the provision of quality course books to help lecturers research and impart students with the information as prescribed by the syllabi as well as aid students understand and apply the lessons received. Popoola (1998) also revealed that the provision and efficient use of information resources are central to any meaningful research and teaching in Nigeria.

Year in year out, frontiers of knowledge are being expanded by the creation of knowledge pool which can be utilized to solve contemporary challenges the world is faced with. To provide quality education to students in order for them to keep abreast of current trends, there is the need to embrace contemporary innovations and technologies encapsulated in up-to-date books or materials. Nicholas and Rowlands (2008) found that students tend to economise by not purchasing the books that they have been recommended to read. Some students are also charged by their own University for coursepacks of research content. A study in the US found that sometimes the cost of these coursepacks rivals

that of the textbooks, but they have no resale value to mitigate the cost (Baker 2007).

Study and teaching materials are the resources required by students for their study. They consists of recommended textbooks, books to support class texts, journals, past examination papers, reference books, monograph etc. while the research materials are used by higher degree students and lecturers. These are made up of periodicals, documents of different kinds, treaties, manuscripts, pamphlets, government publications conference proceedings and papers etc. (Fayose, 1995).

Lecturers employed to teach various courses are expected to have built expertise through their research works which should make them capable of writing course text books in their respective jurisdiction of service provision. These can be tailored to meet syllabi requirement, reviewed by expert reviewers, published, and then accepted and recommended as standard course textbooks or material by the Polytechnic in the delivery of standard quality education.

1.1. Problem Statement

In Accra Polytechnic, most lecturers compile handouts for the various taught courses which are sold to students as course materials. Since these handouts or materials are not peer reviewed and so their contents can be said not to be standardized. These are likely to contain mistakes and other anomalies. Some of these hand outs produced by the lecturers of the Polytechnics in Ghana fall into the public domain via students. It therefore makes it needful for the Institutions to find a way to aid the rewrite and upgrade of these materials into reviewed and publishable standards for approval and recommendation of the Institution as course based-textbooks for students, and promotion materials for their respective lecturers.

1.2. Objectives of the Study

The main import of this study is to help stem out handouts by aiding lecturers in the Institution to write course based-textbooks to be reviewed and published by the Institution to

assure delivery of quality education to student; and to serve as promotion materials for lecturer, thus generating funds for lecturers and the Institution through the sales of published books.

1.3. Justification for Study

Every staff and student is a stake holder of the Institution. Information that would be put in the public domain by any staff will not affect the reputation of the that staff alone but would have either a positive or negative impact effect on the Institution as well as the entire staff and students. It therefore becomes prudent and necessary to regulate and standardize course materials that are sold to student which inevitably become public due to its mobility and transfer among students.

2. Methodology

2.1. Charting of the Procedures and Processes Involved in the Publication of Syllabus – Based Course Textbooks

The chart and procedures on which the study is based is shown in figure 1.

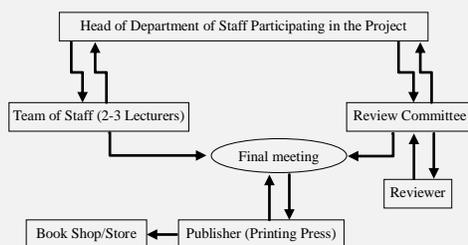


Figure 1. Project Organizational Chart.

2.2. Roles and Responsibilities for Involved in the Syllabus - Based Course Textbook Production Process

2.2.1. Head of Department of Participating Staff

The Head of Department of the participating staff is to constitute a team of lecturers with expertise in a particular course to be mandated to come up with a draft syllabus based course textbook which is to be submitted within a given duration of 3 – 6 months. Logistics needed are to be provided to the lecturers in

order to deliver to the stated mandate.

2.2.2. Team of Staff (Lecturers)

Staff constituting a team can further do a breakdown of course into subtitles, for which they can share and write on. Each of them can write on the subtitles and later on come together to compile them. The team would consist of between 2-3 members with expertise in the course under consideration. They are expected to exhibit teamwork in preparing the draft copy by organizing series of brainstorming meetings and researches to come up with the needed facts. They are to compile all their written works together for the draft copy as well as do an internal peer reviewing of the constituents of the draft copy. The team would submit their draft copy to their respective Heads of Departments between a stipulated duration of 3-6 months.

2.2.3. The Review / Editorial Committee

The draft work of the team submitted to their respective HODs would be forwarded to the editorial Review Committee as soon as received. The Review / Editorial Committee would be tasked to do internal editing and corrections, and then look for reviewers for the draft course book under consideration. This is to be done within a span of three weeks. The Committee is expected to give the duration of one month for the review.

2.2.4. The Reviewer

The reviewer is expected to be an expert in the course under consideration and an individual who has vast experience and has published a lot of materials in the field. An organization with high reputation can be contracted to do such a review if need be. A reviewer is to deliver to his given mandate within the duration of one month.

2.2.5. Final Book Copy Committee Meeting

This would include the Management of the Institution, the Review/ Editorial Committee, the Team. It is at this meeting that everything about the book would be finalized. They are also to look for a publisher to do the printing depending on whether it is to be subcontracted or an internal press is to be used. The cost of

the final book is also to be decided at this meeting.

2.2.6. The Publisher

The Publisher is the organization or press that would do the final printing when the drafts have been approved at the final meeting. The Publisher is to be given a duration of two weeks to deliver to that mandate.

2.2.7. Bookshop / Store

The printed books are to be delivered to a bookshop or store after the inspection of copies by members of the Final Book Copy Committee. The books would be sold and distributed at this point.

2.3. Process Flow of Project

The process would be initiated at the departmental level. The HODs (Heads of Departments) would have to form a 2-3 member teams with expertise in a named course taught within the department and mandate them to prepare a draft copy of a syllabus-based course textbook. Duration of 3-6 months would be given them to submit a draft copy of the book for onward submission to a Review / Editorial Committee for scrutiny, correction and subsequent submission to an Appointed Reviewer.

The Appointed Reviewer would be given one month to complete the review and return the copy with comments. The Review / Editorial Committee having received the reviewed copy from the Appointed Reviewer, would take note of the comments and then pass it on through the HODs to the Team. The Team would be given a month to do the necessary corrections as per the comments and resubmit the corrected work through their HODs to the Review / Editorial Committee who would in turn peruse and check thoroughly to ensure corrections are done accordingly.

After these checks have been done in accordance with the Appointed Reviewer's comments, the Final Book Committee Meeting would be organized to decide on the printing, the book cost and the Publisher to be appointed (if the printing would be subcontracted), or else approval given for the internal printing press to print copies to be presented to the

Final Book Copy Committee Members before the mass printing is done. The publisher would then be given two weeks to deliver.

2.4. Costs Estimation and Appraisal of Projects

2.4.1. Costs Estimation

Ball pack estimate method was used in estimating the various cost estimates involved in the process in terms of printing and making of photocopies involved in the preplanning process; manpower requirements; building of press; bookshop; cost of equipment for the press summarized in tables below:

For the purpose of estimating cost involved in the process, an average of five (5) courses per department for fifteen (15) departments was considered. A total of Seven thousand (70000) book copies of averagely two hundred (200) page books are expected to be printed at the cost of Eight Ghana Cedis per book annually for Students within the Institution. This means a total of 70000 copies of books would be printed annually for an average of five courses per each department considering each of the three projects. The cost of typing a page is estimated at 0.50 Ghana Cedis. The estimated amount of One thousand Cedi (GH ₵1000) per book is to be paid to a reviewer. A total of GH ₵1,125 is expected to be used in making photocopies of materials from writing to printing of the books. The cost of printing the total number of 70,000 book copies is higher for Project A (GH ₵560,000) as compared to each of the two other projects (GH ₵210,000) partly because it is expected to be subcontracted and the differentials (GH ₵350,000) is the estimated cost to be paid to the subcontractors. The man power charges were estimated as the same for all the three projects while no building, and machinery and equipment cost was charged for Project A because the printing work is to be subcontracted. The difference in the building cost for Project B (100,000) and Project (C) is that, the former is expected to be the cost of a building a print room whiles the latter a building a print and a bookshop.

Table 1. Estimated Costs for items.

List of items	Cost GH ₵
Building	200000
Machinery /Equipment	700000
Photo copies	1125
Printing of materials	560000
Manpower	101000
Total	1562125

2.5. Cost Benefit –Analysis of Projects

The appraisal was done using a cost discounted technique known as Net Present Value (NPV) for the three different projects considered: Project A, Subcontracting Printing of Textbooks; Project B, owing a Printing Press together with printing of Textbooks; Project C, owing Printing Press and Bookshop

together with Printing of Textbooks. This was to enable the researchers compare and select the most profitable project. Two different discounting percentages of 24 and 28 were used because of the prevailing interest rate in Ghana. According to Lin and Nagalingam (2000), Net present value (NPV) of a time series of cash flows, both incoming and outgoing, is defined as the sum of the present values (PVs) of the individual cash flows of the same entity. NPV compares the value of a dollar today to the value of that same dollar in the future, taking inflation and returns into account. If the NPV of a prospective project is positive, it should be accepted. However, if NPV is negative, the project should probably be rejected because cash flows will also be negative (INVESTOPEDIA, 2013).

Table 2. Cost Estimates Collected for the various Project under Consideration.

Items	Project A Cost		Project B Cost		Project C Cost	
	GH ₵	US \$	GH	US \$	GH	US \$
photocopies	1125		1125		1125	
Printing of materials	560000		210000		210000	
Manpower	101000		101000		101000	
Building	-		100000		200000	
Machinery /Equipment			700000		700000	
Total	662125		1112125		1212125	

3. Results and Discussion

The cost collected for each of the projects was appraised using the Net Present Value (NPV) technique at a discount factor of 28% and 32% respectively for each of the three Projects – A, B and C. The results for the projects discounted at 28% are summarized in

tables 3, 4 and 5 respectively for Projects A, B and C. The NPVs of the three projects at 28% were A (654796.64), B (1072180.83) and C (994055.82) as shown in tables 3, 4 and 5 respectively. These show that the Project B is the most viable, and Project C is the least viable on the basis of their NPVs at 28% (NPV of B > C > A).

Table 3. Project A Cash Flows Discounted at 28%.

Years	Cash outflow	Cash inflow	Cash flow	Discounting Factor (1+i) ⁻ⁿ	Present Value (PV)
1	6621,25	840000	177875	0.78125	138964.8438
2	560000	840000	280000	0.610351563	170898.4375
3	560000	840000	280000	0.476837158	133514.4043
4	662125	840000	177875	0.37252903	66263.60118
5	560000	840000	280000	0.291038305	81490.72528
6	560000	840000	280000	0.227373675	63664.62912
				NPV	654796.6411

Table 4. Project B Cash Flows Discounted at 28%.

Years	Cash outflow	Cash inflow	Cash flow	Discounting Factor $(1+i)^{-n}$	Present Value (PV)
1	1112125	840000	-272125	0.78125	-212597.6563
2	210000	840000	630000	0.610351563	384521.4844
3	210000	840000	630000	0.476837158	300407.4097
4	106500	840000	733500	0.37252903	273250.0434
5	210000	840000	630000	0.291038305	183354.1319
6	210000	840000	630000	0.227373675	143245.4155
				NPV	1072180.829

Table 5. Project C Cash Flows Discounted at 28%.

Years	Cash outflow	Cash inflow	Cash flow	Discounting Factor $(1+i)^{-n}$	Present Value(PV)
1	1212125	840000	-372125	0.78125	-290722.6563
2	210000	840000	630000	0.610351563	384521.4844
3	210000	840000	630000	0.476837158	300407.4097
4	106500	840000	733500	0.37252903	273250.0434
5	210000	840000	630000	0.291038305	183354.1319
6	210000	840000	630000	0.227373675	143245.4155
				NPV	994055.8286

Again, subject the three projects to NPV analysis using a discount factor of 32% reveals a similar trend as the results obtained for the analysis using a discount factor of 28% as seen in tables 6, 7 and 8 (NPV for A, 598583.07;

NPV for B, 945515.0509; NPV for C, 869757.48). Comparing the NPVs for each of the three projects at 32% discount factor shows that Project B is the most viable while A is the least viable (NPV of $B > C > A$).

Table 6. Project A Cash Flows Discounted at 32%.

Years	Cash outflow	Cash inflow	Cash flow	Discounting Factor $(1+i)^{-n}$	Present Value (PV)
1	662125	840000	177875	0.757575758	134753.7879
2	560000	840000	280000	0.573921028	160697.888
3	560000	840000	280000	0.434788658	121740.8242
4	662125	840000	177875	0.329385347	58589.41858
5	560000	840000	280000	0.249534354	69869.61904
6	560000	840000	280000	0.189041177	52931.52958
				NPV	598583.0673

Table 7. Project B Cash Flows Discounted at 32%.

Years	Cash outflow	Cash inflow	Cash flow	Discounting factor $(1+i)^{-n}$	Present Value (PV)
1	1114400	840000	-274400	0.757575758	-207878.7879
2	210000	840000	630000	0.573921028	361570.2479
3	210000	840000	630000	0.434788658	273916.8545
4	106500	840000	733500	0.329385347	241604.152
5	210000	840000	630000	0.249534354	157206.6428
6	210000	840000	630000	0.189041177	119095.9416
				NPV	945515.0509

4. Conclusion and Recommendations

It is envisaged that at the end of the project, reviewed syllabus based text books would be developed for each course taught in the Institution to facilitate quality assurance; aid with accreditation and reaccreditation of programmes; generate substantial Internally Generated Fund through books sales to student; serve as promotional materials for staff and source of income. It would also boost the academic publishing output of the institution and raise its ranking higher. Appraisal indicates the viability of three projects.

Based on the study, the Project B is recommended, if polytechnics want to go into the production of a syllabusbased textbooks publication. Once these textbooks are published, sales of other materials such as handouts and pamphlets sales to students as course materials must ceased. This can only be enforced if management comes out with a regulation that would stem out this act. Also, there might not be initial fund to cover the printing of all the course materials at a go. This can however be done over a period of three years. The need to come up with new editions to keep up with up-to-date information of all the books published must be emphasized.

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After formatting the article and submitting it to the editor of the journal, it was given to reviewers who blind peer reviewed the article and made their comments encapsulated in the journal's reviewer's form as below:



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Article Title: Promotion of Academic Scholarship and Entrepreneurship through the Writing and Publishing of Syllabi-Based Course Textbooks for Polytechnics in Ghana

Overall Evaluation: Please put a check mark in the appropriate box.

- 1. Publish, no significant alterations suggested.
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Please provide a numeric rating on a 5-point scale for each evaluation item, along with a brief rationale for each 3-less-point rating.

<i>Questions</i>	<i>RatingResult</i> [Poor] 1-5 [Excellent]
1. The article title is appropriate.	5
<i>(brief rationale for 3-less point rating)</i>	
2. The abstract accurately reflects the content.	4
<i>(brief rationale for 3-less point rating)</i>	
3. There are few grammatical errors and spelling mistakes in this article.	3
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Please revise the English text with a native speaker. There are some errors such as “all the project were” in the Abstract, “syllabi cannot achieved” on p. 2, “by the lecturers Polytechnics” on p. 2, “would have a either a positive” on p. 2, “course materials that are sold to student which inevitably becomes public due to its mobility” on p. 2, “reviewer is expected to be an expertise” on p. 3, “Publisher to appointed” on p. 4, “print a copies” on p. 4, “The appraisal was done Cost – Benefit analysis was done using the a discounted technique” on p. 4, “enable compare and select” on p. 4, “books must to be emphasized” on p. 6, etc.	
4. The purpose or purported significance of the article is explicitly stated.	4
<i>(brief rationale for 3-less point rating)</i>	
5. The literature review and research study methods are explained clearly.	3
<i>(brief rationale for 3-less point rating)</i>	
You may want to add a literature reference to the Net Present Value (NPV) discussed in Section 2.5.	
6. The research study methods are sound and appropriate.	4
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7. All figures, tables, and photos are necessary and appropriate.	3
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Please improve the legibility of the figures in Tables 2 – 8. Could you include a separating comma in the numbers and decrease the number of decimal digits?	
8. The conclusions or summary are accurate and supported by the content.	4
<i>(brief rationale for 3-less point rating)</i>	
9. The references are comprehensive and appropriate.	3
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a) Please give a frank account of the strengths and weaknesses of the article (in 100-200 words):

The authors comment on three possible ways how polytechnics in Ghana may generate income by printing and selling syllabi-based textbooks to students. They give an example of the Accra Polytechnic and present a cost-benefit analysis of three specific scenarios: a) when the printing is subcontracted, b) when the printing is done in-house, and c) when both the printing and selling is done in-house. They calculate six-year discounted cash-flows for all three approaches given some estimated average inputs and outputs and conclude that variant is the most profitable.

The topic presented is interesting and important because it presents a way how academics and their institutions (not only in developing countries) may benefit from preparing course materials for their students.

I see the biggest weakness in the derivation of the estimated costs for items in Table 1 and how these estimates relate to the values given in the paragraph above it. Other minor problems include a few English errors, a lower quality (legibility) of Tables 2 – 8, and some small omissions in the references.

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- Please explain in detail how the values in Table 1 are calculated based on the data in the paragraph above it. (E.g. why is building worth 200000, machinery 700000, photo copies 1125, etc? You say “seven thousand (70000) copies” in the paragraph above Table 1. Should it be “seven thousand (7000) copies”?)
- Please improve the legibility of the figures in Tables 2 – 8. Could you include a separating comma in the numbers and decrease the number of decimal digits?

c) Minor comments (If any)

-Missing references, Stylistic problems, Typos, Misleading Captions, etc.

- You may want to add a literature reference to the Net Present Value (NPV) discussed in Section 2.5.
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- Please revise the English text with a native speaker. There are some errors such as “all the project were” in the Abstract, “syllabi cannot achieved” on p. 2, “by the lecturers Polytechnics” on p. 2, “would have a either a positive” on p. 2, “course materials that are sold to student which inevitably becomes public due to its mobility” on p. 2, “reviewer is expected to be an expertise” on p. 3, “Publisher to appointed” on p. 4, “print a copies” on p. 4, “The appraisal was done Cost – Benefit analysis was done using the a discounted technique” on p. 4, “enable compare and select” on p. 4, “books must to be emphasized” on p. 6, etc.

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Source: Canadian Journal of Pure & Applied Sciences (2012).

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Source: Standard Charted Bank Ghana Ltd. (2013)

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