



**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**SCHOOL OF ARTS AND SOCIAL SCIENCES**

**COURSE CODE: POL 301**

**COURSE TITLE: RESEARCH METHODOLOGY IN  
POLITICAL SCIENCE.**

**COURSE  
GUIDE**

**POL 301  
RESEARCH METHODOLOGY IN POLITICAL SCIENCE**

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## INTRODUCTION

This course is a three-credit units course for undergraduate students in Political Science. The materials have been developed with the Nigerian context in view. This course guide gives you an overview of the course. It also provides you with information on the organisation and requirements of the course.

## COURSE AIMS

The aims are to help you understand the basis and foundation of public policy analysis, approaches and issues, what they are and how they can be applied in everyday government activities. It also aims to help you develop skills in the Research Methodology in Political Science. You can also apply the principles to your job as business managers, top management of corporate organisations in both the private and public enterprises.

## COURSE OBJECTIVES

To achieve the aims set out above, this course has overall objectives. In addition, each unit also has specific objective. The unit objectives are at the beginning of each unit. It is advisable that you read them before you start working through the unit. Reference may be made to them in the course of study of the unit as self-assessment strategy.

Here are the wider objectives for the course as a whole. By meeting the objectives, you should be regarded as having met the aims of the course. On successful completion of the course, you should be able to:

- explain the meaning, purpose and scope of Research Methodology in Political Science
- explain the origin and nature of Research Methodology in Political Science as a discipline
- discuss the development of Research Methodology in Political Science as an activity
- describe the approaches of Research Methodology in Political Science
- explain Research Methodology in Political Science and its environment
- discuss the decision making process in Research Methodology in Political Science
- list the phases in Research Methodology in Political Science
- define the concepts and strategies of planning for a Research
- explain the role of research planning in the Third World countries

- list the tools of political research
- discuss the constraints of Political Science Research.

## **WORKING THROUGH THIS COURSE**

To complete the course, the student is required to read the study units and other related materials. It is also necessary to undertake practical exercises for which the student needs a pen, a note-book, and other materials that will be listed in this guide. The exercises are to aid the student in understanding the concepts being presented. At the end of each unit, the student will be required to submit written assignments for assessment purposes. At the end of the course, a final examination shall be written.

## **COURSE MATERIALS**

The major components of the course include the following:

1. Course guide
2. Study units
3. Assignments file
4. Relevant textbooks including the ones listed under each unit
5. Student may also need to listen to government policies and programmes and news reports on electronic media.
6. In addition, the student also needs to read newspapers, news magazines, academic Journals and interact with computers for Internet facilities.

## **STUDY UNITS**

There are 21 units (of five modules) in this course as listed below:

### **Module 1 Foundation Knowledge in Political Science Research**

- Unit 1 Nature of Political Science Research
- Unit 2 Meaning, Types and Importance of Political Science Research
- Unit 3 Philosophical Approaches in Research
- Unit 4 Conceptual Foundation of a Research
- Unit 5: Relationship between Research and Theory

### **Module 2 Conducting a Research Project**

- Unit 1 Choosing a Research Topic
- Unit 2 Writing Research Proposal
- Unit 3 Statement of Problem in Research



## TUTOR-MARKED ASSIGNMENT

You will have to submit a specified number of the (TMAs). Every unit in this course has a Tutor-Marked Assignment. You will be assessed on four of them but the best three will be used for your 30% grading. When you have completed each assignment, it should be sent together with a Tutor-Marked Assignment Form, to your Tutor. You are advised to make sure that each assignment reaches your Tutor on or before the deadline for submissions. If for any reason, you cannot complete the work on time, contact should be made with the Facilitator for a discussion on the possibility of an extension. Extensions will not be granted after the due date, unless under exceptional circumstances.

## FINAL EXAMINATION AND GRADING

The final examination for this course will take three hours. All areas of the course will be examined. You should find time to read the unit all over before the examination. The final examination will attract 70% of the total course grade. The examination will consist of questions, which reflect the kinds of self-assessment exercises and Tutor-Marked Assignment previously encountered. And all aspects of the course will be assessed. You should use the time between completing the last unit, and taking the examination to revise the entire course.

## COURSE MARKING SCHEME

The following table lays out how the actual course marking scheme is broken down.

**Table 1: Course Marking Scheme**

<b>Assessment</b>	<b>Marks</b>
Assignments (Best Three Assignments out of Four marked)	30%
Final Examination	70%
<b>Total</b>	<b>100%</b>

## PRESENTATION SCHEDULE

The dates for submission of all assignment will be communicated to you. You will also be told the date of completing the study units and dates for examinations.

## COURSE OVERVIEW

This table brings together the units, the number of weeks you should take to complete them and the assignment that follows them.

**Table 2: Course Overview**

<b>Units</b>	<b>Title of work</b>	<b>Weeks Activity</b>	<b>Assessment (End of Unit)</b>
Course Guide			
<b>Module 1</b>	<b>Foundation Knowledge in Political Science</b>		
Unit 1	Nature of Political Science Research	Week 1	Assignment 1
Unit 2	Meaning, Types and Importance of Political Science Research	Week 2	Assignment 2
Unit 3	Philosophical Approaches in Research	Week 2	Assignment 3
Unit 4	Conceptual Foundation of a Research		
Unit 5	Relationship between Research and Theory		
<b>Module 2</b>	<b>Conducting Research Project</b>		
Unit 1	Choosing a Research Topic	Week 3	Assignment 1
Unit 2	Writing a Research Proposal	Week 3	Assignment 2
Unit 3	Statement of Problem in Research	Week 4	Assignment 3
Unit 4	Formulating and Testing Hypothesis	Week 5	Assignment 4
<b>Module 3</b>	<b>Research Designs</b>		
Unit 1	Research Methods in Political Science	Week 6	Assignment 1
Unit 2	Scientific Research Method Process	Week 6	Assignment 2
Unit 3	Conceptualisation and Operationalisation of Variables	Week 7	Assignment 3
Unit 4	Levels of Measurement	Week 8	Assignment

	and Scaling		4
<b>MODULE 4</b>	<b>Data Collection Tools</b>		
Unit 1	Sample and Sampling Techniques	Week 9	Assignment 1
Unit 2	Research Instruments	Week 9	Assignment 2
Unit 3	Literature Review and Theoretical Framework	Week 10	Assignment 3
Unit 4	Ethics in Political Science Research	Week 10	Assignment 4
<b>Module 5</b>	<b>Political Data Analysis</b>		
Unit 1	Quantitative Data Analysis	Week 11	Assignment 1
Unit 2	Qualitative Data Analysis	Week 12	Assignment 2
Unit 3	Combination of Quantitative and Qualitative Data Analysis	Week 13	Assignment 3
Unit 4	Writing Research Report	Week 14	Assignment 4
	<b>Revision</b>		
	<b>Examination</b>		
	<b>TOTAL</b>		

## HOW TO GET THE MOST FROM THIS COURSE

In distance learning, the study units replace the conventional university lecture. This is one of the great advantages of distance learning; you can read and work through specially designed study materials at your own pace, and at a time and place, that suits you best.

Each of the study units follows a common format. The first item is an introduction to the subject matter of the unit, and how a particular unit is integrated with the other units and the course as a whole. Next to this is a set of learning objectives. These objectives let you know what you should be able to do by the time the units have been completed. These learning objectives are meant to guide you in your studies. The moment a unit is finished, you must go back and check whether you have achieved the objectives. If this is made a habit then, you will significantly improve your chances of passing the course.

## **FACILITATORS/TUTORS AND TUTORIALS**

Information relating to the tutorials will be provided at the appropriate time. Your tutor will mark and comment on your assignments, keep a close watch on your progress and on any difficulties you might encounter and provide assistance to you during the course. You must take your Tutor-Marked Assignments to the study centre well before the due date (at least two working days are required). They will be marked by your tutor and returned to you as soon as possible.

Do not hesitate to contact your tutor if you need help. Contact your tutor if:

- You do not understand any part of the study units
- You have difficulty with the assignments/exercises
- You have a question or problem with an assignment or with your tutor's comments on an assignment or with the grading of an assignment.

You should try your best to attend the tutorials. This is the only chance to have face-to-face contact with your tutor and ask questions which are answered instantly. You can raise any problem encountered in the course of your study. To gain the maximum benefit from course tutorials, prepare a question list before attending them. You will learn a lot from participating in discussion actively.

## **SUMMARY**

The course guide gives you an overview of what to expect in the course of this study. The course teaches about the research methodology in Political Science.

Wishing you success in this academic programme and hoping that you will find it both interesting and useful.

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## **MODULE 1      FOUNDATION KNOWLEDGE IN POLITICAL SCIENCE RESEARCH**

Unit 1	Nature of Political Science Research
Unit 2	Meaning, Types and Importance of Political Science Research
Unit 3	Philosophical Approaches in Research
Unit 4	Conceptual Foundation of a Research
Unit 5	Relationship between Research and Theory

### **UNIT 1      NATURE OF POLITICAL SCIENCE RESEARCH**

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	3.2 Why the Study of Political Research
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6.0	Tutor-Marked Assignment
7.0	References/Further Reading

#### **1.0 INTRODUCTION**

Politics is about power. Studying the distribution and exercise of power is, however, far from straightforward. Politics refers to the subject matter to the “what”. Science refers to the method, to the “how” of research. The subject matter of political science, therefore, presents particular problems for the researcher. The ability to research, and therefore provide evidence to corroborate a particular view of the world, is clearly vital to the discipline of political science. In fact, we would claim that critical reflection on method is one of the hallmarks of the discipline, separating the academic study of politics from political journalism. Methods, after all, are intrinsically linked to research findings. Without the interview, how could we question leaders on events of the day? Without analysis of documents and archives, how could we piece together the complex chain of past events? Without surveys and statistical analysis, how could popular opinion be judged and the claims of the government be assessed? In short, without carefully designed research methods, serious political science would be

impossible. In this unit, we shall examine the nature of political research in the context of searching for knowledge that will give meaning and understanding to the world around us.

## 2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain the nature of Political Science as a dynamic discipline in today's world
- recognise the importance of plausible, valid and reliable evidence in political science research and
- discuss the importance of theory, of the view that all knowledge is conceptually formed.

### 3.1 Nature of Political Research

Political Science today is a dynamic discipline. Its substance, theory and methods have all changed radically in recent decades. It is much expanded in range and scope and in the variety of new perspectives – and new variants of old ones – that it encompasses. The subject matter of political science, therefore, presents particular problems for the researcher. The ability to research and provide evidence to corroborate a particular view of the world is clearly vital to the discipline of Political Science. In fact, the critical reflection on methods is one of the hallmarks of the discipline. Methods are intrinsically linked to research (Burnham, *et al.*, 2004:1). The methods of seeking scientific knowledge in Social Sciences are grounded in “reasoning and experience” (Nachmias and Nachimas, 2009:19). Reasoning as a method of seeking knowledge consists of “three types, namely: deductive reasoning, inductive reasoning, and the combined inductive-deductive approach” (Cohen and Manion, 1980:13). On the other hand, experience is a useful tool for gaining knowledge. An individual accumulates body of knowledge and skills derived or gained from encounter and acquaintance with facts and event in one's environment (Cohen and Manion, 1980). The search for knowledge is the fundamental step in gaining meaningful knowledge. Research, therefore, is a higher step in the search for knowledge.

What then, is research? Research can be defined as deliberate seeking of knowledge through “empiricism, fideism, rationalism and science” (Obasi, 1999:11). This scientific knowledge seeking through research is purposeful and goal-directed activity. It is inquisitive-searching for answers to specific questions-especially “why?” and “how”? Scientists employ the criteria of logical validity and empirical validation to evaluate claims for knowledge. These two criteria are translated into the

research activities of scientists through the research process. The research process is the overall scheme of activities in which scientists engage in order to produce knowledge. It is the “paradigm of scientific inquiry” (Nachimias and Nachimias, 2009:20). However, there has been a debate as to the scientific status of political science research, especially because of the “complexity of political phenomena, human behaviour problem as subject of research and the question of values in most political science research” (Obasi, 1999:15).

In the natural and physical sciences, scientific methods and procedures in the conduct of research is not in doubt. The situation is different in social sciences where there are competing epistemologies which in turn give rise to methodological crisis in political science. However, three major competing epistemological approaches can be identified in the field of political science: traditionalists, behaviouralists and Marxists (Obasi,1999:17). The methodological approaches correspond to three modes of social research, namely: interpretive, positive and critical modes (White, 1986a: 15). The traditionalists are more historical, normative, descriptive as well as largely qualitative. They try to interpret political actions in order to enhance understanding by applying logic. The behaviouralists on the other hand, apply the positivistic method which emphasises the application of the scientific method to the study of political phenomena. They lay emphasis on observation, verification and measurement. The positivists are more analytical, quantitative and theory-building conscious. Finally, the Marxists, on their part, adopt the method of historical-materialism, which among other things recognises the primacy of economic determinism in political actions. It is equally critical in its methodology and in its effort to unearth the hidden forces behind the actions of political actors (Obasi, 1999:17). Though, scholars in political science research have problems with these competing methodologies, they recognise their existence and try to maximise the benefits associated with each of them in theoretical frameworks by embracing eclectic approach. In other words, Political science research can be conducted by combining the complementarity of competing methodologies to produce more reliable knowledge.

### **3.2 Why the Study of Political Research?**

The systematic study of politics involves the assembly of evidence and subjecting it to various forms of tests of its reliability and validity. Broadly speaking, the study of political science enables us to know whether the research is replicable and whether it offers a means of studying the theories and concepts being analysed. Unlike the situation in natural science where, it is often argued, there are standardised and accepted measures, social scientists are more aware that there is a range of techniques that they can choose from and a particular problem does

not necessarily suggest a particular method. In this sense, we would agree with the position taken by Marsh and Stoker (2002:4) that 'Political science is enriched by the variety of approaches that are adopted within the discipline'. Political science research has come of age. The behavioural revolution which ushered in a period of application of scientific method, also ushered in a period of resilience in subjecting political phenomena to scientific analysis. Specifically, the objective of political research is to develop theories that can describe, explain, analyse and predict political phenomena. . However, empirical research in political science goes far beyond the passive role of verifying and testing theory, it does more than confirm or refute hypotheses. Research in political science plays "an active role; it performs at least four major functions which help shape the development of theory. It initiates; it reformulates; it deflects; and it clarifies theory" (Merton, 1968:103).

### **3.3 The Inevitability of Conceptualisation in Political Research**

Any serious consideration of method in social science quickly runs into the thorny question of the relationship between empirical observation and theory or conceptualisation (Sayer, 1992:45). Once it is accepted that facts do not 'speak for themselves' (Carr, 1964), but that all understanding takes place within a conceptual framework, we have begun to cross the divide between common sense understandings of the world and social science. But what is meant by theory? Sayer, (1992:50) indicates that the term is used in at least three important senses: as an ordering framework or set of background assumptions; as conceptualisation, in which to theorise'; as means to prescribe a particular way of thinking about the world; and as a hypothesis, explanation or testable proposition. Theory means different things to different people. Some social scientists would identify theory with any kind of conceptualisation. Such concepts as "power", "social status", "democracy", "bureaucracy" and "deviance" when defined and used in interpretations of empirical phenomena, are sometimes equated with theories. In a broad sense, "any conceptualisation, as opposed to observation, is theory"(Nachimias and Nachimias, 2009: 36). Other social scientists equate theory with the "history of ideas". Still others view theory in "a narrow sense: a logical-deductive system consisting of a set of inter-related concepts from which testable propositions can be deductively derived" (Nachimias and Nachimias, 2009: 36).

However, the term is now widely accepted that there can be no 'theory-neutral' interpretation of events.

In short, political science is not simply ‘story-telling’. Rather, systematic analysis, as Hay (2002:64) points out, is based on an assessment of what’s out there to know about, what can we (hope to) know about it, and how can we go about acquiring that knowledge. This means that methodology (a study of the principles and theories which guide the choice of method) can be distinguished from particular research methods. Although, as Sayer (1992:3) cautions, ‘methodologists need to remember that method implies guidance, research methods are the medium and outcome of research practice in the world today.

### **SELF-ASSESSMENT EXERCISE**

Describe the nature of political science research?

## **4.0 CONCLUSION**

In this unit, we have been able to discuss the nature of political science research in today’s world. In the case of political science research, the range of concern is wide and the boundaries of the subject are often ill-defined, while the discipline itself is, to a considerable degree, internally fragmented. Its eclecticism has both strengths and weaknesses. It has allowed the discipline to remain open to theories, perspectives and methodologies from a range of other social science disciplines.

What is evident from this is that political science research has been ‘more eclectic than most disciplines in borrowing the approaches of other disciplines (Peter, 1999:20). Hence, political science is now understood within the broader context of social sciences’ methodologies.

## **5.0 SUMMARY**

There are methodological problem which the political science shares with the other social sciences. It borders on methodological pluralism. Methodological pluralism, in the sense of enabling all approaches to flourish, though, to be encouraged (Bell and Newby, 1977); it must be distinguished from the slide into the theoretical morass of eclectic pragmatism where ‘anything goes’ and perspectives are sampled regardless of methodological consistency. Appreciating the historical development of the discipline and its links between epistemology/social ontology and research methods is the necessary first step towards becoming a competent political researcher. Its substance, theory and methods have all changed radically in today’s world.

## 6.0 TUTOR-MARKED ASSIGNMENT

1. Describe the nature of political science research?
2. Why do we use social science research methodologies to study political science?

## 7.0 REFERENCES/FURTHER READING

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## **UNIT 2 MEANING, TYPES AND IMPORTANCE OF POLITICAL SCIENCE RESEARCH**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Meaning of Research
  - 3.2 Types of Research
  - 3.3 Importance of Research
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

Recently, the conduct of political science research has followed the process obtainable in other social sciences. However, a critical element in political research is the actual inquiring employed by investigator in seeking answers to questions (Eneanya, 2012:11). In this unit, we shall examine the meaning of research and the key features of research specific to politics.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain the meaning of research
- identify the different types of research and
- list the benefits of research.

### **3.0 MAIN CONTENT**

#### **3.1 Meaning of Research**

Research is defined as “a systematic inquiry whose objective is to provide information to solve problems and meet the challenges of a fast-paced decision-making environment” (Eneanya, 2012:11).

It is any organised inquiring that can be used to solve social problems. It is essentially a process of systematic meaning.

According to Pierce (2009:3), its core activities are:

- (i) goal orientated and purposeful
- (ii) inquisitive- searching for answers to specific questions-especially “why?” and “how?”
- (iii) Careful, systematic and methodical
- (iv) Original

Research, therefore refers to a systematic process of collecting and analysing information to establish facts about a social phenomenon.

### **3.2 Types of Research**

Basic and Applied Research are the two main types of research but may not necessarily be the classification of research.

#### **Basic Research**

Basic Research is a fact -finding research that explores a situation of study. It explores the situation in order to learn about it and answer any questions relating to it. The attention of the researcher here is focused on the question, what is or what are, e.g. what are the factors affecting the outcome of the study? What is the attitude of the employees when Management fails to pay Christmas bonus?

#### **Applied Research**

Applied Research explains or exposes a situation in order to enable the researcher understand it better. It aims at discovering why certain events, situation or phenomena occurs. Thus it answers why? Example, why is there high labour turnover in company AZ.

Other types of research are: experimental research, survey research, comparative research, longitudinal research, action research, and so on.

Experimental research is rarely used in political science research. This is because of using laboratory-type experimental and control groups. The survey makes use of sampling techniques through questionnaire to collect data. Comparative research is the approach most widely adopted by comparative politics, international relations, public policy and developmental politics. Longitudinal research also called survey research enables researchers to monitor changes in behaviour or opinion over time. Finally, action research essentially involves the researcher obtaining data through direct participation in a group of actors experiencing particular conditions. The method, therefore, allows one to

share and experience the institutional and other barriers a group faces in the struggle towards transformation (Pierce, 2008:52).

In research therefore, the major questions to answer are what? And why? A truly scientific study or research carried out on where? When? which? E.g. how did it happen? Is close to the question, why did it happen?

### **3.3 Importance of Research**

- Research can be applied in personnel functions in the recruitment and selection of new employees
- It can be used to generate information to guide in promotion and preparation of job analysis and job evaluation
- To generate information for decision making
- To collect, organise, analyse, present and interpret the available information
- To introduce the readers to the logic and skills of social research
- To enable the readers to be able to evaluate effectively the findings of other researchers
- To explain ways of examining and understanding the operation of human affairs
- To enable a manager plan ahead through the amassed substantial data that may be used in many ways
- Research is needed to generate information for decision making in business. It helps in finding the best way to gain competitive advantage, make more profit and expand the business
- By a way of systematic gathering and storage of information used by the organisation, research helps in planning (small, medium and long term) and decision making.

Research does not only provide firms with the necessary decision making tools but also helps them amass substantial data that may be used in many ways.

### **4.0 CONCLUSION**

In this unit, we have examined the meaning, types, and benefits of research. Research is any organised inquiring that is carried out in order to provide information that can be used to solve problems.

Research will help us understand the material facts better.

## 5.0 SUMMARY

The essence of research is not only the accumulation of knowledge in academic disciplines, but also includes a systematic process of attaining knowledge. Though, politics is an academic discipline in the family of social sciences, it also uses scientific research techniques as other social sciences. Essentially, it involves a systematic process.

## 6.0 TUTOR-MARKED ASSIGNMENT

1. What is a research?
2. What are the benefits of research?

## 7.0 REFERENCES/FURTHER READING

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## **UNIT 3      PHILOSOPHICAL APPROACHES IN RESEARCH**

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  - 3.3 Elements of Philosophy in Research
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

No research takes place in a philosophical vacuum. Research in political science is rooted in different research philosophies. There are also certain philosophical elements which set aside one discipline from the other, that need to be understood. In this unit, we shall examine philosophical approaches and elements in the context of political research.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain the main philosophic and theoretical principles underlying research approaches, including positivism, empiricism, behaviouralism, empiricism, post-modernism etc.
- distinguish between ontology, epistemology and methodology.

### **3.0 MAIN CONTENT**

#### **3.1 Philosophical Approaches**

Research in political science is rooted in different research philosophy. It is based on reasoning (theory) and observation (data or information). Although, many researchers conduct sound research without a thought for underlying philosophical considerations, some knowledge of

research philosophies is beneficial for a researcher as it helps to clarify the research design and facilitates the choice of an appropriate methodology.

The following are some philosophical research approaches:

### 3.1.1 Positivism Approach

Positivism is a research adopted from the natural science methods, such as “mathematics, physics, chemistry, astronomy and quantitative biology. It’s basic principles are (Blumberg *et al.* 2005:18):

- (i) the social world exists externally and is viewed objectively
- (ii) research is value-free, and
- (iii) the researcher is independent, taking the role of an objective analyst.

To positivism, knowledge develops by investigating the social reality through observing objective facts. This view has important implications for the relationship between theory and observation as well as how a research is conducted. Theory development starts with the “hypothesising fundamental laws and deducing what kind of observations support or reject the theoretical predictions of the hypotheses” (Blumberg *et al.*, 2005: 19).

A scientist following this research tradition believes (assumes) that observable facts are objective are external, that is, we cannot influence them and the research is conducted value free.

Other types of positivism include: **logical empiricism** and **behaviouralism**.

**Empiricism** is the doctrine that the only source of real knowledge (facts) is experience gained by the senses through observation and experiment and that only the observable can be observed and measured.

Behaviourism is associated with psychology. Its key tenet is that only observable behaviour may be scientifically studied.

**Behaviouralism**, on the other hand, is associated with social and political scientist for the application of positivism and empiricism to test and extend explanatory theory at the level of state, party or other group or individual (Blumberg *et al.*, 2005:25).

Positivists believe that the research process starts with identifying causalities forming the bases of fundamental laws. Then, research is

conducted to test whether what was observed of the world indeed fit the derived fundamental laws and to assess to what extent detected causalities can be generalised (applicable to the whole world) (deductive reasoning).

### **3.1.2 Interpretivism Approach**

Unlike positivists, interpretists hold the view that the social world cannot be understood by applying research principles adopted from natural sciences and purposes that social sciences adopt a different research philosophy.

Interpretivists argue that simple fundamental laws are insufficient to understand the whole complexity of social phenomena. They also reject the notion that research is value-free. According to interpretists, as researchers offer an interpretation of how people interpret the social world, the researchers' interpretation is also socially constructed, reflecting their motives and beliefs.

To interpretivists, gathering and measuring facts will not disclose the essence of a social phenomenon, rather researchers need to explore why people have different experiences and to understand how these differences result in the different constructions and meanings people give to the social world (inductive reasoning).

### **3.1.3 Realism Approach**

Realism is a research philosophy sharing principles of positivism and interpretivism. Its exponent believes that social sciences can rely on the research approach dominant in the natural sciences. More specially, it accepts the existence of a reality independent of human beliefs and behaviour. It also concedes that understanding people and their behaviour requires acknowledgement of the subjectivity inherent to humans. To realists, there are social processes and forces operating beyond the control of humans, which affect their beliefs and behaviour (Blumberg et al. 2005:20). Thus, in the view of realists, research is not value-free and, therefore, requires the identification of external forces describing general forces and processes influencing humans, as well as the investigation of how people interpret and give meaning to the setting they are situated in.

## **3.2 Research Implications of Positivism, Interpretivism and Realism Philosophical Approaches**

The positivists believe that researchers should investigate a research problem by testing whether theoretically derived hypotheses hold for the

situations investigated. If the objective facts support the hypothesis, the underlying fundamental laws are applicable and their validity is enforced (quantitative method). The interpretivist, on the other hand, is interested in subjective meanings and interpretations of phenomena to detect what is happening in a specific situation.

As each observation is subjective, he or she relies ideally on multiple sources and different methods to collect information on the phenomena (qualitative method).

A perfect research study should combine the positivistic emphasis on quantitative method and interpretivist and realist emphasis on subjective and interpretation of phenomena.

### 3.3 Elements of Philosophy in Research

Sometimes, many researchers regard quantitative method (from positivist approach) and qualitative method (from interpretivist and realist approaches) as alternative sets of designs out research. On the contrary, both quantitative and qualitative methods “stem from fundamentally divergent **“ontological and epistemological paradigms”** having their roots in philosophy (Pierce, 2009:22). **Ontology** is a branch of philosophy devoted to the nature of being. Ontology is the set of specific assumptions underlying a theory or system of ideas (what can be known) Eneanya, 1012:16).

In contrast, **epistemology** is the branch concerned with theories of knowledge. Epistemology concerns itself with such issues as the degree of certainty we might legitimately claims for the conclusions we are tempted to draw from our analysis; the extent to which specific knowledge claims might be generalised beyond the immediate context in which our observation are made and in general terms, how we might adjudicate and defend a preference between contending explanations (Eneanya, 2012: 16).

So, theory of knowledge refers to a statement of general principles of the underlying relationships in phenomena or events.

Theory may be expressed as laws, propositions, arguments or hypotheses (tentative explanations). Theory can be descriptive and explanatory of relationships. Some descriptive theories have been elevated to the status of laws (for example, Newtons law).

Alternatively, a theory may be normative, where it proposes what ought to be the relationship. A proposition, for example, is an improved, generalised explanation. A paradigm is a related set of principles,

doctrines and theories that help to structure the process of intellectual inquiry. In effect, a paradigm constitutes the framework in which the search for knowledge is conducted.

A hypothesis is a specific proposition which is presented for testing research. It can be derived from other theory or a researcher's "hunch" (Pierce, 2009:23).

Finally, methodology relates to the choice of analytical strategy and procedures which can be used to investigate a phenomenon (with the framework dictated by epistemological and ontological ideas) (Eneanya, 2012:17).

In summary, **ontology** relates to the nature of the social and political world; **epistemology** to what we can know about it and **methodology** to how we might go about acquiring that knowledge (Eneanya, 2012:17).

#### 4.0 CONCLUSION

In this unit, we have examined the role of philosophy in research. No research takes place in a philosophical vacuum. Our belief systems influence our research methods. Understanding philosophical approach is important as it provides the researcher a base on which to focus his/her research as well as its theoretical context in which to justify the findings.

#### 5.0 SUMMARY

We have learnt that research is rooted in different research philosophy. The three prominent ones include: positivism, interpretivism and realism. Positivism starts from the idea that the world can be described by objective facts, which are then investigated. On the other hand, interpretivist is interested in subjective meanings and interpretations of phenomena to detect what is happening in a specific situation. As each observation is subjective, the researcher relies ideally on multiple sources and different methods to collect information on a phenomenon. Most realists accept that these subjective interpretations are not unique and that people share similar interpretation, partly because the external forces at macro-level influence everyone. Thus, research requires the identification of external factors describing general forces and processes influencing humans, as well as the investigation of how people interpret and give meaning to the setting they are situated in.

## 6.0 TUTOR-MARKED ASSIGNMENT

1. What is positivism? Describe its strengths and weaknesses.
2. Critically examine the role of philosophy in the conduct of research.

## 7.0 REFERENCES/FURTHER READING

Blumberg, B., Cooper, D.R. & Schindler, P.S. (2005). *Business Research Methods*. New York: McGraw-Hill Education.

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## **UNIT 4      CONCEPTUAL      FOUNDATION      OF      A RESEARCH**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Meaning of Theory
    - 3.1.1 What a Theory is not
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    - 3.1.3 Theory and Research
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### **1.0 INTRODUCTION**

When we do research, we seek to discover what we need to know in order to understand, explain and predict phenomena. We might want to answer the question: what will the student's reaction be on increase in school fees? Why did government reduce subvention on education funding? When dealing with such questions, we must agree on definitions, which employees? What kind of reaction? What are the normal indicators? To do this requires the use of concepts, constructs, models and theories. In this unit, we shall examine these tools of political analysis.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain the meaning of a theory
- list the components of a theory
- discuss the relevance of these basic foundational concepts in political analysis.

### 3.0 MAIN CONTENT

#### 3.1 What is a Theory?

A theory consist of constructs or concepts, definitions and prepositions (hypotheses) and all these are put together to present a systematic view of a phenomenon, specify relationships between the concepts and constructs or variables of the phenomenon explained and possibly predict embodiment of all components of scientific thinking.

##### 3.1.1 What a Theory is not

A theory is not:

- description of data
- inductive generalisation from observations
- a general statement to observable properties
- logical conclusion
- simply an attempt to generalise or describe real world in terms of observables
- list of factors that may influence a given phenomenon, no matter how complete and exhaustive the list may be
- merely “approaches” to a discipline or topic – a suggested framework for investigation.

##### 3.1.2 What a Theory is

- A theory is an abstract and symbolic construction
- It is a conceptual structure or framework– using abstract, symbolic terms – in which empirical generalisations find a place through their relationship to these symbols. The observable referents of the symbols are imprecise. The symbol is “more general” than the observables it implies in a theory. This is the reason why theories are powerful explanatory tools. Furthermore, in conceptual framework, descriptive categories are systematically placed in a broad structure of explicit propositions, statements of relationships between two or more empirically properties, to be accepted or rejected (David Easton’s,1979). Conceptualisation of politics is a fruitful example of a conceptual framework. Easton identifies the major functions of political systems as the “authoritative allocation of values”(Easton, 1979:21-32)
- A theory not only explains, it is a guide to research; a means of substantiating other theories

- It is an aid to discovery – opens new lines of inquiry and suggests new relationships and generalisation
- A theory relates to general statement by appealing to underlying similarities
- A theory could certainly be constructed within this framework.
- A theory can function with any kind of generalisation, whatever the terms they employ
- A theory is definite and particular.

### 3.1.3 Theory and Research

Scientists have established systematic links between the empirical and the conceptual worlds with the aid of two general strategies: theory-then-research and research-then-theory.

- **Theory before Research**

Karl Popper (1902-1994) developed this strategy (Popper, 1961). The strategy involves the following highly simplified five stages (Reynolds, 1971):

- (i) Construct an explicit theory or model
- (ii) Select a proposition derived from the theory or model for empirical investigation
- (iii) Design a research project to test the proposition
- (iv) If the proposition derived from the theory is rejected by the empirical data, make changes in the theory or the research project and return to stage 2
- (v) If the proposition is not rejected, select other propositions for testing or attempt to improve the theory.

- **Research before Theory**

In sharp contrast to the theory-then-research strategy, Robert Merton is the proponent of research before theory. According to him, “empirical research suggests new problems for theory; calls for new theoretical formulations; leads to the refinement of existing theories; and serves the function of verification” (Merton, 1968: 103).

The research-then-theory strategy consists of the following four stages (Reynolds, 1971:140-144):

- (i) Investigate a phenomenon and delineate its attributes
- (ii) Measure the attributes in a variety of situations
- (iii) Analyse the resulting data to determine if there are systematic patterns of variations

(iv) Once systematic patterns are discovered, construct a theory.

Clearly, both strategies regard theory as a manifestation of scientific progress. It shows that in research process, theory and research interact continuously. Empirical research goes far beyond the passive role of verifying and testing theory, it does more than confirm or refute hypotheses.

Research plays “an active role; it performs at least four major functions which help shape the development of theory. **It initiates; it reformulates; it deflects; and it clarifies theory**” (Merton, 1968:103).

### 3.2 Components of a Theory

The components of theory are:

#### Concepts

Concepts are class names which may refer to objects, properties of objects (colour, for example), events, properties of events, and finally to relationships among objects or events. A concept is our perception of reality to which we have attached some word labels for the purpose of identification. A concept therefore, expresses an observation formed from our generation of different forms of reality. Ultimately, it is important to define the concept we are to measure, including hypothesised relations among observables. This is to permit unequivocal interpretation of validity evidence of all relevant observations and determine values to be assigned to each type of observation.

To understand and communicate information about objects and events, there must be some common ground on which to do it. Concepts serve the purpose. Classifying and categorising objects or events that have common characteristics beyond any single observation create concepts. We use a host of concepts in our everyday thinking, conversing and other activities. The success of research hinges on how clearly we conceptualise and how well others understand the concepts we use.

Concepts are the tools, with which we think, criticise, argue, explain and analyse. Merely perceiving the external world does not in itself give us knowledge about it. In order to make sense of the world we must, in a sense impose meaning upon it and this we do through the construction of concepts. Concepts help us to classify objects by recognising that they have similar forms or similar properties. Concepts are also of “general” nature, they can relate to a number of objects, indeed to any object that complies with the characteristics of the general idea itself.

It is no exaggeration to say, that our knowledge of the political world is built up through developing and refining concepts which help us make sense of that world. Concepts, in that sense are building blocks of human knowledge.

However, the use of concepts presents difficulties that accentuated in a research setting, as people may differ in the meanings attach to particular concept. The problem with concepts is that the political context we seek to understand is constantly shifting and is highly complex. Hence, Max Weber tried to overcome the problem by recognising particular concepts as “ideal types”. This view implies that the concepts we use are constructed by singling out certain basic or central features of the phenomenon in question, which means that other features are down-graded or ignored altogether.

A further problem is that political concepts are often the subject of deep ideological controversy. A single term can represent a number of rival concepts, none of which can be accepted as its “true” meaning. For example, it is equally legitimate to define politics as what concerns that state, as the conduct of public life; as debate and conciliation; and as the distribution of power and resources.

### **Constructs**

A construct is simply defined as a concept or idea that is deliberately invented for a particular scientific purpose, which becomes a concept when formalised. We build constructs especially when the idea or image we intend to convey is not directly subject to observation. Thus, there is a line between concept and construct. For example, negritude, the study of black philosophy is a construct formed from the concept Negro (black). Nigerianisation is also a construct derived from the concept Nigeria and it connotes the idea of making a thing Nigerian.

### **Definition**

If concepts are to serve the functions of communication, sensitivity to and organisation of experience, generalisation, and theory construction, they have to be clear, precise, and agreed upon. To achieve clarity and precision in the use of concepts during research, scientists employ two major types of definitions: conceptual and operational (Nachimias and Nachimias, 2009).

In conceptual definition, we substitute the concept or construct with other concepts or constructs. For example, the conceptual definition of “power” is conceptually defined as the ability of an individual, a group, or the state to get another to do something that the latter would not

otherwise do. In this example, concept of power can be defined by still other concepts.

Operational definition shows how a variable can be measured. For example, "Reference" can be defined in terms of output of product per given time or period. An operational definition sets forth a set of procedures that describe the activities a researcher needs to perform to empirically establish the existence or degree of existence of a phenomenon described by a concept. That is, they define what to do and what to observe in order to bring the phenomenon to be studied within the range of the researcher's experience and understanding. Such definitions make the meanings of concepts concrete by laying out the measuring procedures that provide the empirical criteria for the scientific application of concepts. Operational definitions, therefore, make it possible to confirm the existence of concepts that have no direct observable characteristics (Nachimias and Nachimias, 2009).

### **Proposition**

Proposition is defined as a statement about concepts that may be judged as true or false if it refers to observable phenomena. A proposition is a provisional statement which makes predictions about empirical data. Before the researcher collects and analyses data, he frequently makes a prediction derived from his theoretical propositions. These predictions state specifically what he expects to find and are called hypotheses. Propositions are of great interest in research because they may be used to assess the truth or falsity of relationships among observable phenomena. When we advance a proposition for testing, we are hypothesising. In other words, when a proposition is formulated for empirical testing, we call it a hypothesis.

### **Hypothesis**

The scientist cannot study a situation, a problem or a phenomenon without making a conjectural statement that will direct his investigation and after the investigation, enable him make deductions including conclusions and recommendations.

A hypothesis is, therefore, a tentative statement about relationships that exist between two or among variables. It is a conjectural statement about relations and need to be tested and subsequently accepted or rejected. It is a statement that put together all the concepts, constructs and variables and gives the researcher a clearer view of the problem under study.

In research, it guides the direction of the study and provides a framework for organising empirical facts.

Hypothesis can be formulated through:

- (a) intuition
- (b) deduced from findings of other studies and
- (c) theory.

If several hypotheses derived from a theory are conclusively supported by a vast amount of research, they may take the status of laws. A hypothesis if it is true, states a law. A law is defined as a statement of invariant relationship among observable or measurable properties. Law in this context connotes law of science. The term law usually refers to a regular, predictable relationship among empirical variables. To some, it also means a strongly established theoretical or abstract principle. However, his skeptical scientific attitude permits the researcher to reject or qualify a law, should additional data appear which contradicts it.

### **Variables**

At the empirical level, where propositions are converted to hypotheses and testing occurs, the scientist is likely to be dealing with variables. A variable is a construct or concept on which numerical values can be assigned. Numerical values are assigned to variables based on properties. For example, values such as: 1year, 2years, 3years and so on. When a concept or construct takes different values, it is said to vary.

Numerical values cannot be assigned to most concepts because they do not vary. Concepts that are invariable are known as constants or parameters. There is need to identify the concepts that vary and those that do not vary, so as to know how to manipulate them and obtain desired results for any scientific tests. Some variables are dichotomous, that is, have only two values, reflecting the presence or absence of a property, for example, male/female, employed/unemployed. Continuous variable may take values with a given range or test scores, for example: 0 to 100; age 20 to 40 years; income N20,000 to N100,000. Independent variable causes dependent variable to occur. Intervening variable is a conceptual mechanism through which the independent variable and moderating variable might affect the dependent variable.

Moderating variable or interaction variable is a second independent variable that is included because it is believed to have a significant contributory or contingent effect on the original independent variable and dependent variable relationship.

The intervening variable can be defined as a factor which theoretically affects the dependent variable but cannot be observed or has not been

measured. Its effect must be inferred from the effects of the independent and moderator variables on the observed phenomenon.

Thus, definition of variables in hypothesis is very important in scientific inquiry. Variables generate data for analysis and it is necessary that the researcher defines his variables clearly to enable him test his postulations about relationships or any other form of analysis.

### **Parameter**

A parameter is a characteristic of a population which helps to summarise information about the population with regard to the variable and measures of dispersion.

### **Paradigm**

A paradigm is a related set of principles, doctrines and theories that help to structure the process of intellectual inquiry. Examples of a Paradigm are: political ideologies- liberalism, conservatism, socialism, fascism, feminism and so on. In effect, a paradigm constitutes the framework within which the search for knowledge is conducted. In economics, this can be seen in the replacement of Keynesianism by monetarism and perhaps the subsequent shift back to neo-keynesianism. Thus, a paradigm in a general sense is a pattern or model that highlight relevant features of a particular phenomenon, rather in the manner of an ideal type.

## **3.3 Meaning of Models**

The term model is used in various fields of business and allied disciplines with little agreement as to its definition. However, most definitions agree that models represent phenomena through the use of analogy. A theoretical model is a conceptual analog used to suggest a framework for empirical research. For our purpose, a model is defined as the representation of a system that is constructed to study some aspects of that system or the system as a whole. It is a theoretical representation of empirical data that aims to advance understanding by high-lighting significant relationships and interactions of the reality they seek to explain. They are merely devices for drawing out understanding.

They are reliable knowledge.

Models can be useful in comparative analysis, because every political system is unique. Because of the uniqueness of each system, data from different political system would be difficult, unless a common framework is used to compare them.

The major types of models are (Eneanya, 2012):

- Descriptive models – describe the behaviour of elements in a system where theory is inadequate or non-existent.
- Explicative models – extend the application of well-developed theories or improve our understanding of their key concepts.
- Simulation models- clarify the structural relationships of concepts and attempt to reveal the process relationships among them.

Models differ from theories in that a theory's role is explanation, whereas a model's role is representation. A model is not an explanation; it is only the structure and/or function of a second object or process. A model is the result of taking the structure or function of one object or process and using that as a model for the second. When the substance, either physical or conceptual of the second object or process has been projected onto the first, a model has been constructed. Models may be used for applied or highly theoretical purposes. In other words, model is a framework for collection and organisation of data. Models provide the criteria for selection of data. That is, model provides standards for distinguishing facts which will be excluded or ignored. The number of "facts" about a state that one can choose and observe is too many. Unless one could reduce them by some sort of selection process, analysis would be impossible.

### **3.4 Relationship between Models and Theories**

A theory as systematic conceptual organisation is closely related to the concept of models. Theorists often attempt to provide conceptual organisation by using models. Models and theories are broader than concepts. They comprise a range of ideas rather a single idea. In social sciences, models usually consist of symbols rather than physical matter; that is, the characteristics of some empirical phenomenon, including its components and the relationships between the components, are represented as logical arrangements among concepts. Thus, for social scientists, a model is an abstraction from reality that orders and simplifies our view of reality by representing its essential characteristics. Theories and models are both conceptual constructs used as tools of political analysis.

### **3.5 Role of Theory and Models in Political Science Research**

A theory should also be differentiated from a model. A model is not an explanatory instrument, in the sense that theory explains generalisation. Models are aids to understanding and they may contribute indirectly to explanations, but, they do not have a part in the process. A model, generally, is an analogy, an isomorphic construction that is similar in

some, but not all, respects to the theory or phenomenon for which it is a model. To use a model is to use an analogy and it is subject to all of the limits imposed on analogous reasoning. In no case is the model casually related to the theory or object and in all cases the model is a simplification, a partial isomorphs (Kaplan, 1964).

Models are very useful tools and can aid the exploration of observable phenomena and relationships. A model is not an explanatory tool. Models are used to gain insight into phenomena that the scientist cannot observe directly, such as power. In Policy analysis, for example, researchers construct models of the structures and processes of decision making, and deduce propositions relating to the behaviour of the decision makers. They then evaluate these propositions against the empirical data. Political analysts also use models to estimate the consequences of alternative courses of action that a decision maker might select. The models, therefore, provide a more systematic basis for policy choice than do subjective judgment (Nachimias and Nachimias, 2009).

Thus, a theory offers a systematic explanation of a body of empirical data. In contrast, a model is merely an explanatory device; it is more like a hypothesis that has yet to be tested. In that sense, in Politics, while theories can be said to be more or less “true”, models can only be said to be more or less “useful”. However, theories and models are often interlined: broad political theories may be explained in terms of a series of models. For example, the theory of pluralism encompasses a model of the state; a model of electoral competition; a model of group politics and so on. In the same way class theories of politics advanced by Marxists are based on broader theories about history and society. Indeed, they ultimately rest upon the validity of an entire social philosophy.

There is, therefore, a sense in which analytical devices, such as models and micro-theories are constructed on the basis of broader macro-theories. These major theoretical tools of political analysis are those which address the issues of “power” and the role of the state: pluralism, elitism, class analysis and so on.

At a still deeper level, many of these macro-theories reflect the assumptions and beliefs of one or other of the major ideological traditions called paradigms

### **SELF-ASSESSMENT EXERCISE**

What is a theory?

## 4.0 CONCLUSION

In this unit, we have discussed concepts, models, theories and other devices used as tools for political analysis. They provide the building blocks of knowledge. However, they are only analytical devices. Although, they help to advance understanding, they are more rounded and coherent than the unshapely and complex realities they seek to describe. Sets of interrelated concepts, definitions and propositions that are advanced to explain and predict phenomena are called theories.

Models differ from theories, in that models are analogies or representations of some aspect of a system or of the system as a whole. Models are used for description, explication and simulation.

## 5.0 SUMMARY

Ultimately, all political and social inquiries are conducted within a particular intellectual framework or ideological paradigm. However, virtually all conceptual devices, theories and models contain values or implicit assumptions. This is why it is difficult to construct theories that are purely empirical; values and normative beliefs invariably intrude. Models and theories contain a range of biases. For example, it is difficult to accept the claim that rational choice theories are value neutral, as they are based on the assumption that human beings are basically egoistical and self-regarding. No wonder they often reach policy conclusions that are politically conservative. In the same way, class theories of politics, advanced by Marxists are based on broader theories about history and society and indeed, they ultimately rest upon the validity of an entire social philosophy.

Hence, models and micro-theories are constructed on the basis of broader macro-theories. These major theories may be explained in terms of series of models or micro-theories. For example, theory of pluralism may be explained through a model of a state; a model of group politics. Or role of state and power can be explained in terms of elitists or class analysis.

## 6.0 TUTOR-MARKED ASSIGNMENT

1. What is the relationship between a theory and model in political science research?
2. What is the role of paradigm in political science research?

## 7.0 REFERENCES/FURTHER READING

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## **UNIT 5      ROLE OF THEORY IN RESEARCH**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Meaning of a Theory
  - 3.2 Role of Theory in Research
    - 3.2.1 Inductive Research
    - 3.2.2 Deductive Research
  - 3.3 Application of Grounded Research to Deductive Research
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
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### **1.0 INTRODUCTION**

Academics have debated the relationship between explanatory and predictive research studies; in terms of which one should precede the other. Both types are grounded in theory and theory is created to answer “why” and “how” questions. In this unit, we examine the relationship between research and theory.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain the meaning of theory
- discuss the role of theory in research study; and
- discuss the linkage between two reasoning philosophical approaches when choosing research to be used.

### **3.0 MAIN CONTENT**

#### **3.1 Meaning of a Theory**

A theory is a set of systematically inter-related concepts, definitions and propositions that are advanced to explain and predict phenomena (facts) (Blumberg et al, 2005:39). In this context, we have many theories and we use them continually to explain or predict what goes on around us. To the degree that our theories are sound and fit the situation at hand, we are successful in forming explanations and predications. When we are too theoretical, this is likely to mean that the basis of explanation is not

sufficiently attuned to specific empirical conditions. Although, this may be so, it does not prove that theory and fact are opposites. The truth is that fact and theory are each necessary for the other to be of value. Our ability to develop scientific knowledge is measured by the degree to which we combine fact and theory. Therefore, our challenge as researchers is to build a better theory and to be more skillful in filling together theory and fact.

### 3.2 Role of Theory in Research

In research, theory serves the following objectives (Blumberg, *et al.*, 2005:40):

- narrows the range of facts we need to study
- suggests which research approaches are likely to yield the greatest meaning
- suggests a system for the researcher to impose on data in order to classify them in the most meaningful way
- summarises what is known about an object of study and states the uniformities observation
- can be used to predict any further facts that may be found.

The role of theory in research is directly linked to two different reasoning approaches in philosophy (Blumberg *et al.*, 2005:22-24):

- (a) Inductive research and
- (b) Deductive research

These approaches generally follow explanatory theory.

#### 3.2.1 Inductive Research

This research approach has been defined as, “the inference from the particular to the general” (Honderich, 1995:403). It is used to “build” theory and is traditionally the methodology used in the natural sciences where observation of phenomena is followed by a search for new explanatory theory. Inductive research can also be adopted to find answers and then explanations for questions of “what of”?

Thus, the idealised inductive research process may be illustrated as (Pierce, 2009:32):

- (1) Select the topic
- (2) Choose the research question
- (3) Collect data (through repeated observation of phenomenon)
- (4) Interpret the data

- (5) Develop a theoretical explanation of data
- (6) Collect modified data to test initial explanation
- (7) Reiterate (repeat) until conclusions can be made which best meet the test of falsifiability.

### 3.2.2 Deductive Research

Conversely, deductive research can be explained as seeking influences from the general to the particular. It is the methodology adopted by positivist, empiricist and behaviouralist researchers. While this methodology is associated with quantitative enquiry, it is widely used in political research to apply and test the applications of theoretical models to new contexts.

This approach is illustrated as follows (Pierce, 2009:33):

- (i) Select the theory
- (ii) Frame the research questions
- (iii) State the hypothesis
- (iv) Collect selected data relevant to the research question
- (v) Analyse and interpret the data
- (vi) Confirm or infirm (disprove) the hypothesis.

### 3.3 Application of Grounded Research to Deductive Research

Grounded research was proposed by Glaser and Strauss, 1995 as a reaction to the inability by social researchers to develop new theory that would explain the new social dynamics of fast-changing urban societies, where the findings would be entirely grounded in the data collected” (Pierce, 2009:34).

According to Glaser and Strauss, (1995), the essence of grounded theory lay in the selection by researchers of almost semi-randomised variables. Rather than hypothesise specific causal relations, the researchers should first seek out evidence of any relation. The initial sample and data would be limited. Their findings would be grounded in that data, tested and reformulated in further samples until “theoretical saturation” was reached, when the additional data failed to reveal any further significant findings.

The idealised grounded research model is (Pierce, 2009:34):

- (1) Select the variables
- (2) Collect data from a small sample
- (3) Advance an explanation

- (4) Test against larger samples
- (5) Revise the initial explanations
- (6) Reiterate until theoretical saturation is reached.

Thus, grounded research has great appeal to political researchers because it can avoid number-crunching and can be cited to justify a “thin” theoretical review and limited immersion in the field. Most researchers develop variants appropriate to their research questions. One noted variant of grounded research is its application to deductive research by adopting small, iterative samples to test hypothesis.

### **SELF-ASSESSMENT EXERCISE**

What is the role of theory in research?

## **4.0 CONCLUSION**

The distinctions between deductive and inductive researches are nevertheless blurred in practice. Induction and deduction are used in research reasoning in sequential manner. Both approaches may also be combined (qualitative and quantitative) depending on the context of the research.

## **5.0 SUMMARY**

In this unit, we have examined the role of theory when choosing a research philosophy to be used. The role of theory in a research is directly linked to two different reasoning approaches: deduction and induction. “In deduction, the conclusion must necessarily follow from the reasons given. On the other hand, induction refers to drawing a conclusion from one or more particular facts or pieces of evidence. The conclusion explains the facts, and the facts support the conclusion. However, induction and deduction can be combined in a systematic way to illustrate the scientific method. Nonetheless, grounded theory emerged in order to explain new social dynamics of fast-changing urban societies.

## **6.0 TUTOR-MARKED ASSIGNMENT**

1. What is inductive research?
2. Explain the linkage between research philosophical reasoning and theory?

## 7.0 REFERENCES/FURTHER READING

Blumberg, B, Cooper, D.R. & Schindler, P. S. (2005). *Business Research Methods*. New York: McGraw-Hill Education.

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## **MODULE 2      CONDUCTING A RESEARCH PROJECT**

Unit 1	Choosing a Research Topic
Unit 2	Writing Academic Research Proposal
Unit 3	Statement of Problem in Research
Unit 4	Formulating and Testing Hypothesis

### **UNIT 1      CHOOSING A RESEARCHABLE TOPIC**

#### **CONTENTS**

1.0	Introduction
2.0	Objectives
3.0	Main Content
3.1	Approaches of Choosing Research Topics
3.2	Techniques of Choosing Research Topics
3.3	Sources of Researchable Topics
3.4	Evaluating the Research Topic for Scope, Clarity and Unambiguity
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

#### **1.0      INTRODUCTION**

The choice of correct research topic will improve the chances of a successful outcome. In other words, the topic you choose for a research has a great influence on how well you succeed in carrying out the investigation and in writing up your work. Students who are faced with choosing research projects always find themselves choosing research topics that are not researchable, too broad, too vague or controversial subjects. In this unit, we shall examine how students can choose a researchable topic for their researches.

#### **2.0      OBJECTIVES**

At the end of this unit, you should be able to:

- identify the approaches of choosing researchable topic
- list the techniques of choosing research topics.

### **3.0 MAIN CONTENT**

#### **3.1 Approaches of Choosing Research Topics**

In terms of approach, some institutions prescribe some topics from which students may choose their topics. Others restrict students to a list of options. Another approach is that the institution or department provides a list of broad topics but leave the students to choose the detailed perspective that they wish to pursue.

Yet, another approach of choosing a research topic is the open – choice case, where the student is expected to make a selection largely on the basis of their personal interests within the disciplines. This may involve presenting a written proposal justifying the research topic and methods of research approach to be adopted. This then goes to the supervisor assigned to the students or panel of academics for consideration and approval (Ajala, 1996; Eneanya, 2012).

#### **3.2 Techniques of Choosing Research Topics**

In any case, the following techniques would assist the student in choosing research topics.

##### **1. Background Study**

It is necessary to do background reading of the topic. Discuss the topic with assigned supervisor to avoid choosing un-researchable topics or technical topics that are difficult to research.

##### **2. Past Research Work**

Research project reports produced by students in previous years will help you gain insight into the style and standard of a research project.

##### **3. Personal Interest**

It is interesting that you find your study area interesting and that there is enough about the topic that is novel and challenging for you. This will act as motivation and sustain you through any problems you encounter.

##### **4. Research Feasibility**

The student will also think about the feasibility of his/her research project. This is a matter of common sense and experience. A beginner is, however, unlikely to be aware of this. Such problems that may need to be considered by the researcher are (Eneanya, 2012):

- ***Scope of Research Problem***

The researcher should choose topics which that can be manageable in terms of availability of materials (data), and support by the supervisor. At all levels of study, writing research project is a major task and you will not be expected to do it alone. There is need for support by the supervisor assigned for the research project.

- ***Depth***

Your research topic will need to offer sufficient depth to allow you show off you skills. These depend on your discipline, but might include the ability to think critically through analysis and evaluation or the ability to design a survey and report it professionally. Avoid choosing a well-worked area or even one that you feel is likely to provide easy result, if it will not allow you to demonstrate advanced skills.

- ***Money***

For everything that requires investigation, it has financial implication. Therefore, the student research should think about the money to pay assist field interviewers (if any), use of computer and other logistics. Unless the researcher has a sponsor to fund the research project, the topic chosen should be of manageable size.

- ***Time***

There is also need to think about the time. In choosing a topic, it is particularly important to guard against being over-ambitious, ensure that you will have enough time to be able to demonstrate through your written work that you have completed the task required and submit research report within the specified period.

- ***Cooperation from Target Population***

It is necessary to think about your target population when choosing topic. Will you get the required cooperation in data collection and personnel involvement? However, such difficulties may be discovered during pilot study and revision or modification of the topic made as soon as possible.

- ***Finding a Topic for Yourself***

When choosing a topic, the researcher's personal interest should be the deciding factor. There is need to review relevant literature on similar topic, discuss with people who have had experience in that area and

reflect on your own experiences. According to Ajala (1996:6), the following preparatory steps may be useful in arriving at a topic:

- i. Make a survey of the material on your general subject.
- ii. Become familiar with the general subject through the reading of introductory sources but post-pone note-taking.
- iii. Restrict the general subject as quickly as you can. Remember your reading does not become fully pertinent until you have decided the question you wish to answer or specific phase of the subject that you wish to develop.
- iv. When you feel that your subject is becoming specialised, prepare working bibliography and begin to take notes. Browse journals and books within your discipline or websites to obtain ideas.
- v. Continue to restrict your subject as soon as the results of your specialised reading suggest further restriction.
- vi. When you feel that the restriction of the subject is complete and that you have found your real subject, decide what precisely you intend to do with it.
- vii. Note that your choice of topic may influence the selection or allocation of the person who will act as your supervisor. Sometimes, the approval of a research project topic requires approval of written research proposal.

### **3.2 Guidelines for Selecting a Researchable Topic (Sources and Procedures)**

Many students, after much exploration, abandon their topic and start afresh, while others continue despite its unsuitability and end up having nothing worthwhile but the satisfaction of having met another requirement. Inability to select a researchable topic is a common weakness of student who engaged in a research study.

### **3.3 Sources of Researchable Topic**

There are many sources of researchable topics, some of which are listed below (Ajala, 1996):

- Literature e.g. journals, books, newspapers, magazines, reports of researches conducted for professional studies and texts etc.
- Personal experience (influenced by researcher's value judgment)
- Experts in the field e.g. consultation with lecturers of research and chartered personnel in different fields
- Research Institutions
- Friends and contemporaries

- The prevailing social, political and economic conditions (changes or innovation) and the researcher's environment
- Theoretical sources e.g. discovery of a gap in the knowledge of theories by a researcher.

### **3.3.1 Procedures of a Researchable Topic**

The procedure or steps in selecting a researchable topic are listed below;

- The topic must be of interest to the researcher in order to develop familiarity with the topic.
- The topic should be sufficiently original that it does not involve objectionable duplication.
- The topic must be researchable not of a philosophical nature that can only be discussed but to the point where objective evidence can provide a solution.
- The topic must be significant, having capability of adding new information to the present state of knowledge.
- The research in the problem must be feasible, that is there are sufficient data for the situation the researcher finds himself.

### **3.4 Evaluating the Research Topic for Scope, Clarity and Unambiguity**

A research topic is the subject matter for scientific investigation. The topic tells at a glance what is being investigated or what has been investigated. A research topic is quite different from the title of a story or a book, and it is never written in a "question form" rather it is written in a statement form e.g. Effect of Motivation on Job Performance.

#### **3.4.1 Evaluating Research Topic**

There are two main types of relevance to check when evaluating a research topic. These are:

- Relevance to the researcher area of discipline or specialisation
- Usefulness of such research topic to the society, organisations or discipline.

The research topic must convey without ambiguity, the objective of the researcher.

Knowledge of independent and dependent variables are very important in topic selection. Fagbohunge (2002) observed that some research students state their topic as if it is a seminar paper, for example, "The Roles, the Prospect of Reinsurance in Nigeria". The above topic will

sound more of a research topic if it is stated thus “The impact of Reinsurance on the Nigeria Economy”. The topic must be framed in such a way as to enable a reader, a measure of predication of what to expect in the research work.

### **SELF-ASSESSMENT EXERCISE**

What are the sources of research topics?

## **4.0 CONCLUSION**

In this unit, we have discussed how a researchable topic can be chosen. Social research is the application of scientific procedures toward acquiring answers to a wide variety of research questions in order to make intelligent decisions. A research topic is the subject matter for scientific investigation. The topic tells at a glance what is being investigated or what has been investigated. A research topic is quite different from the title of a story or a book.

## **5.0 SUMMARY**

A research helps us use scientific principles in responding to everyday questions. A research seeks to inform, solve problem, describe structures in an accurate and clear manner, generate new idea, test hypothesis and pose new questions for research.

When choosing a topic, the researcher’s personal interest should be the deciding factor. There is need to review relevant literature on similar topic, discuss with people who have had experience in that area and reflect on your own experiences. The topic must be researchable, not of a philosophical nature that can only be discussed but to the point where objective evidence can provide a solution. The topic must be significant, having the capability of adding new information to the present state of knowledge.

## 6.0 TUTOR-MARKED ASSIGNMENT

1. What are the approaches of choosing research topics?
2. How do we evaluate the appropriateness of a research topic?

## 7.0 REFERENCES/FURTHER READING

Ajala, V. O. (1996). *Scholarly Writing Guide for Researchers*. Ibadan: University of Ibadan Press.

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Fagbohunge, O. B. (2002). *Research Methods for Nigeria Tertiary Institutions*. Lagos: Ade-Ola Printing Press Ltd.

## **UNIT 2 WRITING ACADEMIC RESEARCH PROPOSAL**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Techniques for Producing a Good Proposal
  - 3.2 Benefits of Writing a Good Research Proposal
  - 3.3 Components of Research Proposal
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

Research proposal is a document which will outline the scope and a method of the research you intend to carryout and in some cases, will indicate how you plan to organise your writing.

At the early stage in the research proposal, a supervisor assigned to you would approve it, offer feedback in form of advice and give a go-ahead to proceed with your studies. In this unit, we shall examine how students can write good research proposals.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain how to write good research proposals
- list the benefits of writing good research proposals
- highlight the components of a research proposal.

### **3.0 MAIN CONTENT**

#### **3.1 Techniques for Producing a Good Proposal**

According to McMillan and Weyers (2007:26), the following techniques would assist a researcher to produce a good research proposal.

1. Carry out an appropriate amount of background reading beforehand and selecting the sources carefully. Try to gain an up-date of key topics and trends in your chosen field. Choose

recently published reviews of the area especially those likely to prompt ideas about key aspects that need to be looked at in more detail

2. Try to formulate a key hypothesis or idea to investigate. Use brainstorming techniques as you read sources to help you develop your ideas and potential topics
3. Remember that your proposal is only a proposal. You do not need to write the complete work at this stage. You merely need to establish for the benefit of the reviewing group, that you have chosen a reasonable topic and are likely to succeed in producing a dissertation or project report that meets that regulations or learning outcomes of your discipline
4. Discuss your proposal with your supervisor beforehand
5. Get feedback from your peers. Show an early draft of the proposal to a friend or colleague. Ask for comments and respond to them
6. Use appropriate language. Your proposal should be clear to the non-specialist, but include appropriate terminology to show that you understand key concepts
7. Set yourself realistic aims and objectives, bearing in mind the need for originality in your work. The difference between aims and objectives is confusing. However, widely accepted definitions generally suggest that aims are statements of intent or purpose that are broad in nature and hence defined in general terms, perhaps relating to an overall outcome, while objectives (goals) are outline in more specific terms and tends to relate to individual achievable outcome that are required to achieve the ultimate aim.

### **3.2 Benefits of a Research Proposal**

A research proposal guides a researcher in the following ways:

- It helps the researcher execute his research plans.
- It helps the researcher plan the use of resources and literature materials.
- Enables the researcher to focus his thoughts on the research objectives and means of achieving these objectives.
- Helps to outline the scope and methods of the research you intend to carry out.
- It will help indicate how you plan to organise your writing.
- It enables feedback to be given and advice or direction to follow.

### 3.3 Components of an Academic Research Proposal

There is a difference between academic research proposal and project research proposal. The following are typical components of academic research proposal.

However, the choice of each component depends on the discipline and level of study. For political science discipline, the following components are outlined (Eneanya, 2012:137-148):

#### I) Introduction/Background of the Study

The researcher introduces the subject matter of the research, the background, essential components of the topic and the build up to the identifies problem area should be stated; his interest in the research area, particular circumstances surrounding the problem, but without giving a complete history of the particular subject matter involved.

After giving the general background of the study, the researcher carefully establishes the need for the study, telling why the information resulting from the study is needed.

#### II) Statement of the Problem

The statement of the problem serves to elaborate upon the information implies in the title of the study. There should be a clear statement of the research problem. The statement of the problem should be set forth in brief but quite specific terms so that even an uninformed reader may secure an idea of the problem which underlies the rationale of the study. When researchers define the research problem, they already need to be thinking about the unit of analysis. This is because the unit of analysis is closely linked to all parts of the research process. The unit of analysis is a key concept in research and its choice determines what kind of problem and question the research can investigate and how the results of the research can be applied.

#### Criteria of Good Research Problems and Problem Statement

According to Kerlinger (1986), there are three criteria of good research problems and problem statement:

- 1) The problem should be stated clearly and unambiguously in question form. Instead of writing, for instance, the research problems are....” ask questions. Questions have the virtue of posing problems directly.

- 2) The problem should express a relation between two or more variables. For example, what relation exists between two or more variables? Or questions like: Is A related to B? How are A and B related to C?
- 3) The third criterion is often difficult to satisfy. It demands that the problem and the problem statement should be such as to imply possibilities of empirical testing. A problem that does not contain implications for testing its stated relation or relations is not a scientific problem. This means that not only that an actual relation is stated, but also that the variables of the relation can somehow be measured.

So, to find a good research problem, do what experienced researchers do: talk to teachers, friends, colleagues, classmates and anyone who might be interested in your topic. Look for problem as you read previous studies on the subject. As you read, look critically for incomplete explanations, contradictions or inconsistencies. Read areas for future research, where researchers suggest more questions than answers, especially area of future studies.

### **III) Objective(s) or Purpose of the Study**

This entails listing of specific outcomes; the researcher expects to fulfill in order to achieve the objectives. It is written in clear and concise manner. The language must be as coherent and simple as possible. Objectives of study flows naturally from the problem statement, giving the reader specific, concrete and achievable goals. It is best to list the objectives either in order of importance or in general terms first, moving to specific terms (that is, research question followed by underlying investigative questions. Objectives of study are the basis for judging other components of the study – the research design, data analysis, results and conclusions. It should be noted that the purpose or objectives of study depends on research design. For example, the essential difference between a descriptive study and a casual study lies in their objectives. If the research is concerned with finding out who, what, where, when or how much, then the study is descriptive. The objective of the study determines the research designs. Research on crime, for example, is descriptive when it measures the types of crimes committed, how often, when, where and by whom. It becomes causal study if one variable produces changes in another, for example, why crime rate is higher in City A than in City B. The research objective becomes correlational study, if it tries to explain relationships among variables.

### **Significance of the Study**

This gives indication of the value of the research for others. The contribution to be made by the study to knowledge, society and company should be unambiguously stated.

### **IV) Literature Review**

a) Usually, the review of literature serves two purpose:

- To set the theoretical base of the research and
- To set the current research into perspective to show the “state of the art in the discipline.” Literature review shows how present research fits into the whole scheme of things. The review of literature surveys the research previously done on the problem and evaluates what the research has and has not accomplished in solving the problem currently understudy (gap to be filled or new area to be explored).
- The review of related literature should be in an organised form, with appropriate subheads to indicate the areas or topics covered. There should be a short introduction to the body of the chapter and a short summary at the end.

### **Theoretical Framework**

In selecting the theoretical framework, the investigator would have reviewed research theories of past work, and identify the theory or theories or construct models that are relevant to his study and test of research questions or hypotheses.

### **Research Questions**

Having covered some literature and interacted widely with the problem area, the researcher is expected to be able to guess or make some conjectural statements or questions bordering on the problem. A problem really cannot be scientifically solved if it is not reduced to hypothesis form because a problem is a question, usually of a broad nature and is, in and of itself not directly testable. Answering research questions enable us to define the unit of analysis. The unit of analysis is derived from the research questions. To answer and measure our research questions, we define the unit of analysis by:

- identifying the information needed to answer the research problem – that is, what variables do we need.

- Then, we have to determine which objects (decisions, individuals, organisations, employees, etc) are described by the variables we want to measure.

These points help us know what to do with the results and who to address in our conclusions and recommendations.

## Hypothesis

Hypothetical statements are in the form of relationship statements between known variables or construct; or it could be directional statement. A hypothesis is a conjectural statement of the relation between two or more variables. Hypotheses are always in declarative sentence and they relate either generally or specifically, variables to variables. The importance of hypothesis or research question is to give the study a focus or direction.

### What Makes a Good Hypothesis?

A good hypothesis should fulfill three conditions. It should be (Blumberg et al, 2005:38-39):

- **Adequate for its Purpose for a Descriptive Hypothesis**

Adequacy for its purpose means that it clearly states the condition, size or distribution of some variable in terms of values that are meaningful to the research task. If it is an explanatory hypothesis, it must explain the facts that gave rise to the need for explanation. Using the hypothesis, plus other known and accepted generalisations, one should be able to deduce the original problem condition (Blumberg *et al.*, 2005:38-39):

- **Testable**

A hypothesis is testable if it meets the following conditions:

- it does not require techniques that are currently unavailable
- it does not require an explanation that defies known physical or psychological laws
- there are consequences or derivatives that can be deduced for testing purposes.

- **Better than its Rival**

Generally, a hypothesis is better than its rivals if it:

- has a greater range than its rivals

- explains more facts than its rivals
- explains a greater variety of facts than its rival
- is simple, requiring few conditions or assumptions.

### **Operational Definition of Terms**

The researcher is expected to explain or properly define the technical terms, concepts, variables or constructs used in the proposal. These definitions are given according to what they mean in the study.

### **Delimitation and Limitation of the Study**

The researcher is supposed to express the scope of his study, where the study should start and end should be categorically stated. The possible problems to be encountered while undertaking the study should also be stated such as constraint of time, money, material, equipment, location or logistic. The researcher is also expected to explain how those limitations were overcome by his/her study to achieve the objectives of the study.

### **Research Methodology**

The research methodology is the crux of the research proposal. It is the background against which the reader evaluates the findings and conclusions.

Research methodology involves step-by-step procedures, so that another researcher could replicate the study in another situation. It involves:

- Design of study
- Population and sample size
- Sampling procedures
- Data collection instruments
- Data presentation analysis and interpretation
- Research design.

### **Chapterisation**

This is the synopsis of the organisation of the study and contents of each chapter. This would high-light a brief review of contents of each chapter and help the reader understand how the study is organised.

### **Appendix**

Materials that are related to the study, but which would make the body of the study bulky or awkward are placed in the appendix. These may

include questionnaires, interview guides, detailed explanation of statistical tests used in the study, tables, supplementary materials and related items.

### **SELF-ASSESSMENT EXERCISE**

What are the techniques of producing a good academic research proposal?

## **4.0 CONCLUSION**

In this unit, we have examined how to write a good academic research proposal. Research proposals are usually the first serious exercise towards conducting a research study. Proposals are made up of statements of intention of the researcher meant to show the detail research plan of action, focus of study and the intended research method insight. The essence is to ensure that the research study is properly focused and that the essential parts of the research work are properly structured from onset.

## **5.0 SUMMARY**

Without a research proposal, the assumptions of the researcher which may be wrong would not have an opportunity of correction before the main work is executed. The research proposal assists the researcher to be adequately prepared for the research proper. The researcher outlines his research execution plan. The researcher plans the use of resources and his literature material in his sourcing approach. This enables the researcher to focus his thoughts on the research objectives and means of achieving these objectives.

## **6.0 TUTOR-MARKED ASSIGNMENT**

1. Describe the techniques for producing a good academic research proposal?
2. What are the benefits of producing a good research proposal?

## **7.0 REFERENCES/FURTHER READING**

Blumberg, B., Cooper, D.R. & Schindler, P.S. (2005). *Business Research Methods*. London: The McGraw-Hill Companies.

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## **UNIT 3 STATEMENT OF PROBLEM IN RESEARCH**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Meaning of Problem Statement
  - 3.2 Generating Problem Statement
  - 3.3 Criteria for Making Problem Statement
  - 3.4 Importance of Statement of Problem in Research
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

Problem identification is vital in research. When a problem is properly defined and all aspects of the problem properly known, then solution to the problem will commence. Problem definition is very significant in problem solving. By problem definition, it is expected that the magnitude, direction and coverage of the problem are ascertained. Stating hypotheses or guessing solutions to the problem emanate from a good understanding of the problem. In this unit, we shall discuss the relevance of statement of problem in a research.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain the meaning of statement of problem in a research
- discuss how to generate statement of a research problem
- identify the criteria of generating problem statement
- state the importance of problem statement.

### **3.0 MAIN CONTENT**

#### **3.1 Meaning of Statement of Problem**

A problem is an interrogative sentence of statement that asks: what relation exists between two or more variables? The answer to this question is what is being sought in the research. If the problem is a scientific one, it will always contain two or more variables.

### 3.2 Generating the Statement of the Problem

When beginning any type of research, the first step is to determine the problem area, the subject to be examined. There are various reasons or motivations for choosing a topic: it might have been suggested by a lecturer or assigned in a class. Whatever is the reason for choosing the topic, the choice itself is ultimately based on the researcher's value preferences (personal opinion). Naturally, interest in a topic can enhance motivation, so also will it lead to bias in analysis.

So, once the problem area has been designated, the problem should be stated as clearly and precisely as possible. It is often helpful to do this in the form of one or more questions that the research will be directed at answering. The questions should be specific in content, limited in scope and empirical in nature. Broad and very general questions are difficult to answer precisely, largely because such questions are themselves frequently unclear. Questions that ask for value preferences cannot be examined by empirical research.

Asking good questions is difficult. It requires considerable knowledge. A researcher who knows relatively little about a subject cannot do research because he does not know where to begin or what to look for. As a consequence, it is often necessary to engage in an exploratory study prior to designing a research project. One way to do this is to review some of the literature and/or talk with people who have had some experience with the problem.

A good place to begin this review is with a text that is well documented or has a good bibliography. Presumably, the author of the text will have cited the most important works in the field. Reviewing these works should provide the researcher with some understanding of what has been done, how it has been done, and what substantive conclusions have been advanced.

Armed with these types of information, he can then begin to design a feasible and hopefully a worthwhile project.

### 3.3 Criteria of Problem Statement

There are three criteria of good problems and problem statements (Eneanya, 2012:53-54):

- 1) The problems should express a relation between two or more variables. For example, it asks questions like: is A related to B? How are A and B related to C? Is A related to B under conditions C and D? There are exceptions to this dictum, but they are rare.

They occur mostly in taxonomic research. Taxonomy consists of a system of categories constructed to fit empirical observations in such a way that relationships among the categories can be described. Taxonomic research does not provide explanations; they only describe empirical phenomena by fitting them into a set of categories. For example, government spending and their distributions (for example, how much is being spent on various programmes) is not equivalent to explaining or predicting why government spends more on defence than on education.

- 2) The problem should be stated clearly and unambiguously or in question form. Instead of saying, for instance: “The problem is ....” or “the purpose of this study is ...,” ask a question. Questions have the virtue of exposing problems directly. The purpose of a study is not necessarily the same as the problem of a study, the best way to state a problem is to ask a question or questions.
- 3) The problem and problem statement should be such as to imply possibilities of empirical testing. A problem that does not contain implications for testing its stated relation or relations is not a scientific problem. This means not only that an actual relation is stated, but also that the variable of the relation can somehow be measured. For example, philosophical, theological and metaphysical questions cannot be empirically tested because some of them are not having relations of variables and the constructs are difficult to define and measure. Examples of such questions are: “How do you know that Peter Robbed James?” “Does democratic education environment improved leaning”? These are epistemological questions and are difficult for empirical testing.

The above three main criteria may not be the only way to formulate problem. A researcher, for example, approach problem formulation through historical analysis, that is, looking back at the course of history to the problem at hand. Alternatively, a researcher can approach it through argumentative approach, that is, by raising doubts to what apparently exists or be declarative in approach by starting with assertive statements. Whichever style one adopts at the end of day, the statement of problem is reduced to specific researchable questions of say three to five or more in number.

Thus, problem statement should be devoid of these philosophical, theological or metaphysical questions, research problem should be clearly and completely stated. In other words, the researcher must know what he is trying to find out and when he finally knows this, the problem is a long way toward solution.

### 3.4 Importance of Research Problem

Problems and hypotheses have powerful virtues in common, namely:

- 1) They direct investigation. The relations expressed in the hypothesis tell the investigator what to do, in effect.
- 2) Problems and hypotheses. As they are ordinals generalised relations statements, enable the researcher to deduce specific empirical manifestation implied by the problems and hypotheses. A problem cannot be scientifically solved if it is not reduced to hypothesis form because a problem is a question, usually of a broad nature and is not directly testable. The relations between variables, stated by the hypotheses are what is tested. For example, one does not test the question: "Does anxiety affect achievements"? But one may test hypotheses implied by this question, for example, "Anxiety provoking test situations will depress achievements test scores" (Eneanya, 2012:54).

#### SELF-ASSESSMENT EXERCISE

What do you understand by the term "statement of the problem"?

### 4.0 CONCLUSION

In this unit, we have discussed the relevance of problem statement in a research. A problem is an interrogative sentence or statement that asks: what relation exists between two or more variables? The answer to this question is what is being sought in the research. If the problem is a scientific one, it will always contain two or more variables.

When beginning any type of research, the first step is to determine the problem area, the subject to be examined. There are various reasons or motivations for choosing a topic. It might have been suggested by a lecturer or assigned in a class. So, once the problem area has been designated, the problem should be stated as clearly and precisely as possible. It is often helpful to do this in the form of one or more questions that the research will be directed at answering. The questions should be specific in content, limited in scope and empirical in nature. Broad and very general questions are difficult to answer precisely, largely because such questions are themselves frequently unclear. Questions that ask for value preferences cannot be examined by empirical research.

## 5.0 SUMMARY

A researcher, for example, approach problem formulation through historical analysis, that is, looking back at the course of history to the problem at hand. Alternatively, a researcher can approach it through argumentative approach that is, by raising doubts to what apparently exists or be declarative in approach, by starting with assertive statements. Whichever style one adopts at the end of day, the statement of problem is reduced to specific researchable questions of say three to five or more in number. A researcher who knows relatively little about a subject cannot do research because he does not know where to begin or what to look for. As a consequence, it is often necessary to engage in an exploratory study prior to designing a research project. One way to do this is to review some of the literature and/or talk with people who have had some experience with the problem.

A good place to begin this is to review a text that is well documented or has a good bibliography. Presumably, the author of the text will have cited the most important works in the field. Reviewing this work would provide the researcher with some understanding of what has been done, how has it been done, and what substantive conclusions have been advanced.

Armed with this type of information, he can then begin to design a feasible statement of the research problem and hopefully conduct a worthwhile research project.

## 6.0 TUTOR-MARKED ASSIGNMENT

1. Describe the criteria for generating statement of problem in a research?
2. What is the importance of problem statement in a research?

## 7.0 REFERENCES/FURTHER READING

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## **UNIT 4 FORMULATION AND TESTING OF HYPOTHESIS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Meaning of Hypothesis
  - 3.2 Sources of Generating Hypothesis
  - 3.3 Importance of Hypothesis
  - 3.4 Criteria of Good Hypothesis
  - 3.5 Formulation of Hypothesis
  - 3.6 Hypothesis Testing
  - 3.7 Making Inferences from Hypothesis Results
- 4.0 Conclusion
- 5.0 Summary
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### **1.0 INTRODUCTION**

A statement of hypothesis explains the relationship between two variables. After a proper understanding of the problem area, the researcher tries to formulate some hypotheses to draw, two logical processes of deduction and induction emphasising the relationship between the variables. Hypothesis can be derived from literature review, other findings, studies, theory or even from intuition. In this unit we shall discuss the issue of formulating and testing hypothesis in research project.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain how to formulate research hypothesis
- discuss how to test research hypothesis
- explain the types of hypotheses
- discuss the importance of testing hypothesis in research.

### **3.0 MAIN CONTENT**

#### **3.1 Meaning of Hypothesis**

Some of the definitions of hypotheses given are as follows (Eneanya, 2012, 53):

- A proposition stated as a basis for argument or reasoning.
- A premise from which a conclusion is drawn.
- A conjecture that accounts, within a theory that can be used as a basis for further investigation.

These definitions of hypotheses point to the fact that hypothesis is a tentative generalisation or temporary guesses or solutions to the problem that can only be accepted when it conforms with empirical evidence and previous knowledge. Hypotheses give research a sense of direction and purpose and they are particularly necessary in cause and effect relationship studies.

Thus, a hypothesis is a conjectural statement of the relation between two or more variables. Hypotheses are always in declarative sentence form and they relate, either generally or specifically variables to variables.

Hypotheses take the form of causal statements. Every hypothesis must have an “INDEPENDENT” and a “DEPENDENT” variable. The independent variable (x) is the presumed cause (the factor responsible for what happened); the dependent variable (Y) is the effect (the consequence of what happened). An example of hypothesis is “political partnership influences voting behaviour”. Here, political partnership is the independent variable, while voting behaviours is the dependent variables. However, certain factors may appear to intervene between cause and effect; factors that account for difference in the behaviour of the dependent variable. These short run factors may be referred to as intervening variables. For example, if “political partnership influences voting behaviour”, what might explain the defection of ANPP (All Nigeria Peoples Party) members to PDP (Peoples Democratic Party) in 2007 general election.

#### **3.2 Sources of Generating Hypotheses**

##### **1. Hypotheses Formulated from Observation and Experience**

In the positivists’ tradition of research methodology, knowledge is gained from observation and experience. In his work on methodology for behavioural sciences, Kaplan (1963:34) asserts that, “it is by experience that information about the world is received”. Observation

has the characteristics of experience and induction in formal logic. Inductive reasoning, with its associated hypothesis is the process of reasoning from particulars to a whole group of ideas, phenomena, or situations. When experience and observation lead to the formulation of a hypothesis, social research becomes more scientific.

## **2. Hypotheses and Theory**

A second source of hypothesis is theory. Many hypotheses in the field of economics directly support economic theories. This accounts for why hypotheses are often confused with theory and both terms are frequently used inter-changeably by many social scientists.

However, a theory is more embracing than a hypothesis. A hypothesis is a single statement that attempts to test the validity, or establish and explain functional relationship, or predict one single event, or explain the behaviour of variables. On the other hand, a theory may comprise a set of inter-related constructs, definitions, propositions, or hypotheses. A theory may be an entire system of thought that presents a systematic view of any given phenomena or variables by specifying relationships among them with the specific objective of explaining and predicting their behaviour in a deductive and logic manner. In this sense, a theory can be defined as “an exposition of the abstract principles of a science or art.....” This distinction shows that a hypothesis or many hypotheses can be used to support a theory. It also means that they must be testable for the purpose of establishing the validity of the theory that they purportedly support.

## **3. General Data as a Source of Hypothesis**

General data, that is, data collected from different sources and for diverse purposes, is the third source of hypotheses to be noted. In research, the act of searching for new hypotheses in existing data is called secondary analysis.

## **4. Research Problem as a Source of Hypothesis**

Finally, the most important source of hypothesis is the title of research or research problems. The technique of formulating hypotheses from research titles or research problems is of concern to the researcher.

### 3.3 Importance of Hypothesis

The following are the importance of hypothesis:

- Guiding the conduct of research by giving it direction
- Delimiting the scope of the inquiry to eliminate groping
- Acting as a point of reference and
- Guiding the collection of data to prevent “information-overload”.

### 3.4 Criteria of a Good Hypothesis

There are two criteria for “good” hypotheses and hypothesis statements.

- (i) Hypothesis must be on relations between or among variables and
- (ii) There must be opportunity for testing to assess the stated relationship(s).

These criteria mean then, that hypothesis statements contain two or more variables that are measurable or potentially measurable and that they specify how the variables are related. A statement that lacks either or any of these characteristics is not hypothesis in the scientific sense of the word.

### 3.5 Formulation of Hypothesis

A good source of hypotheses is the problem of research. A researcher who wants to solve a problem must generally know what the problem is. Therefore, research problems must be clearly stated.

The task of formulating hypotheses from research problems/titles is made easy if the problem statement has the following:

- Expresses a relationship between one or more variables (Is A related to B? Is A related to B under conditions C and D?).
- Can be stated clearly and unambiguously in question form and
- Can be stated such as to imply possibilities of testing hypotheses empirically.

Hypotheses are stated in different forms and for different reasons, depending on the objective of the study. Often hypothesis are stated in the null or negative form and in the alternative or positive form. Consequently, these two forms constitute the types of hypotheses:

- a) Null or negative hypothesis ( $H_0$ )
- b) Alternative or positive hypothesis ( $H_i$ )

### **Null or Negative Hypothesis ( $H_0$ )**

The null hypothesis is very commonly used in research studies because of “there is no difference” status. Because the null hypothesis assumes that there is no difference, they are usually numerically precise and are invariably obvious and useful. Consequently, they are usually easier to formulate and test statistically.

### **Alternative or Positive Hypothesis ( $H_1$ )**

The alternative hypothesis often denoted as ( $H_1$ ) is the proposition that may be accepted if the statistical null hypothesis is rejected by the sample evidence. Alternative hypothesis is the opposite of the null hypothesis and it is often of advised that hypotheses be stated in the alternative forms in order to bring out the research interest. The alternative hypothesis describes the expected result and points to the direction of the study.

Example of “null and alternative hypothesis”

$H_0$	:	Human resource training does not enhance personnel productivity
$H_1$	:	Human resource training enhances personnel productivity

### **3.6 Hypothesis Testing**

To test hypothesis, it is necessary to operationalise the variables to be examined. In other words, the variables must be translated into observable phenomena. All hypotheses must be operationalised before they can be tested. A hypothesis is a tentative statement about relationships that exist between two or among many variables. It is a conjectural statement about relationships and used to be tested and subsequently accepted or rejected. This definition suggests firstly, that hypothesis is made up of variables. Secondly, the variables may or may not be related. Thirdly, there is a guess about the relationship that may exist between or among the variables.

The following procedures should be followed when testing hypothesis:

- 1) State the hypotheses being tested ( $H_0$  and  $H_1$ ) from research problem.
- 2) To test hypotheses, it is necessary to operationalise the variables to be examined. In other words, the variables must be translated into observable phenomena. All hypotheses must be operationalise before they can be tested.

- 3) Identify the appropriate sampling distribution: that is, the distribution from which the sample statistics will be drawn.
- 4) Select a random variable of items from the population and compute the appropriate sample statistic.
- 5) Determine the level of significance (i.e. the probability of rejecting the null hypothesis when it is true).
- 6) State a decision rule indicating what value or values of the sample statistic will lead to a rejection of the null hypothesis.
- 7) Make the statistical decision and formulate a conclusion to be acted on by the appropriate decisions – makers.

### 3.6.1 Errors in Hypothesis Testing

There is the tendency to have a wrong decision in the hypothesis testing procedures. If  $H_0$  is rejected when it is true or accepted when it is false, an error has been made. There are two types of errors, these are:

**Types I Error:** Rejecting  $H_0$  when it is true and supposed to be accepted.

**Types II Error:** Accepting  $H_0$  when it is actually false.

### 3.6.2 Levels of Significance Testing

The confidence with which an investigator rejects or retains a null hypothesis depends upon the level of significance adopted by him. In hypothesis testing procedures, the probability of rejecting a null hypothesis that is true is called the level of significance of a hypothesis test. Once a hypothesis test has been completed, only one type of error is possible.

commonly used levels are 0.05, 0.01, 0.025, 0.001.

This means these levels are the rejection region and “confidence levels” are: 95% (0.05), 99% (0.01), 97.5% (0.025).

### 3.6.3 Directions or Tails of Hypotheses

A hypothesis test may be one-tailed (directional) or two-tailed (non-directional), depending on the nature of the null hypothesis and the alternative hypothesis.

#### 3.6.3.1 Non-Directional Hypothesis

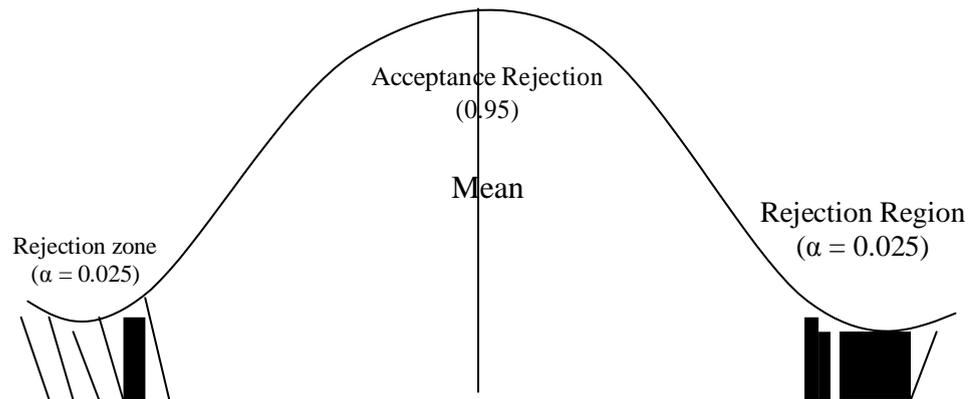
When the null hypothesis states that “there is no difference between the sample means ( $M_1M_2$ ), it shows that the test is non-directional or two-sided (two-tailed).

**Example:**

$$H_0 = M_1 = M_2$$

$$H_1 = M_1 \neq M_2$$

If 0.05 (5%) is the chosen as the level of significance, a graphic distribution will show that 0.05 (5%) rejection zone can fall on each side of the graph, giving a two-tailed as diagram below;



### 3.6.3.2 Directional Hypothesis

Directional or one-tailed test is the one in which the null hypothesis has a specific direction either greater than or less than. Thus:

**“Greater than”**

$$H_0: M_1 > M_2$$

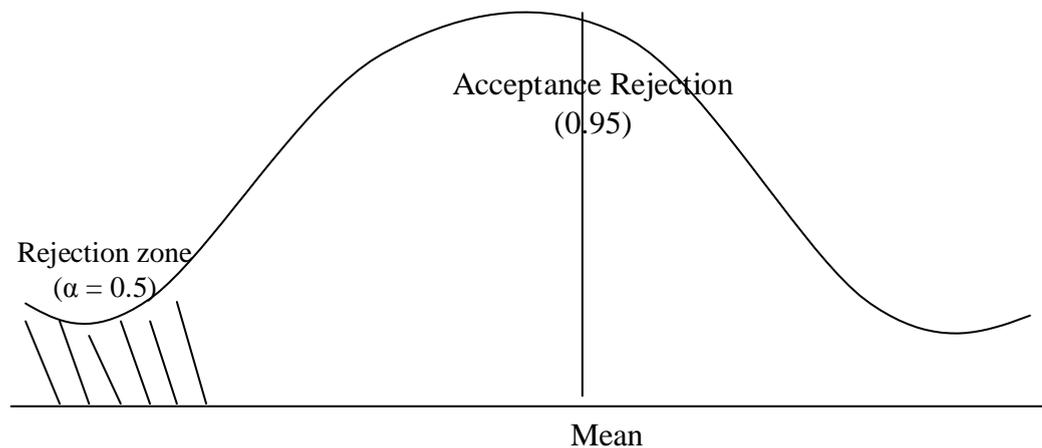
$$H_1: M_1 < M_2$$

**“Less than”**

$$H_0: M_1 < M_2$$

$$H_1: M_1 > M_2$$

Graphical distribution of data with the directional hypothesis will show:



The graph will show that the value will fall on one side of the graph at a time, making it directional or one-tailed.

### **3.7 Making Inferences from Hypothesis Results**

Inferences or conclusions are drawn from hypothesis results based on the following:

- the stated hypothesis being tested
- the null hypothesis – its direction
- critical value/rejection region
- calculated value from the sample statistic
- table value or value of the population
- decision rule – decision rules are stated to know when the null hypothesis will be rejected. The significance level, to a great extent determines the degree of acceptance or rejection of the value of the sample statistic. Setting a high level of significance tends to prevent type I errors.

The result of testing a hypothesis is one of the three outcomes:

- The evidence clearly confirms or supports the hypothesis
- The evidence clearly disconfirms or rejects the hypothesis
- The evidence partially supports or disconfirms the hypothesis.

However, the results of testing a hypothesis are frequently mixed and do become the ground for future inquiries and hypotheses construction.

### **SELF-ASSESSMENT EXERCISE**

What is a hypothesis? How relevant is hypothesis to research?

### **4.0 CONCLUSION**

In this unit, we have discussed the meaning, types, importance of research hypothesis. We also discussed the formulation and testing of hypothesis. Hypothesis is a conjectural statement of the relationship between two or more variables. Hypothesis is essential in research as it gives it a sense of direction and purpose.

### **5.0 SUMMARY**

Hypothesis is a tentative conjecture or temporary “hunches” to a problem that can only be accepted when it conforms to empirical evidence and previous knowledge. Hypothesis gives research a sense of

direction and purpose. It is particularly necessary in cause and effect relationship studies. It transforms a researcher's ideas into testable forms. Hypothesis helps to specify what variables are to be measured or collected by the researcher in order that he may have the expected results or discoveries. A hypothesis test may be one-tailed or two-tailed, that is, directional or non-directional. Inferences are drawn from hypothesis test results.

## **6.0 TUTOR-MARKED ASSIGNMENT**

1. What the characteristics of a good hypothesis?
2. Explain what you understand by type 1 and type 2 errors?

## **7.0 REFERENCES/FURTHER READING**

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## **MODULE 3 RESEARCH DESIGN**

- Unit 1 Research Methods in Political Science
- Unit 2 Scientific Research Method Process
- Unit 3 Conceptualisation and Operationalisation of Variables
- Unit 4 Levels of Measurement and Scaling

### **UNIT 1 RESEARCH DESIGN IN POLITICAL SCIENCE**

#### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
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    - 3.2.1 Appropriateness
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  - 3.3 The Role of a Research Design
  - 3.4 Types of Research Designs
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#### **1.0 INTRODUCTION**

Research design is the blueprint for fulfilling objectives and answering questions. Selecting a design may be complicated by the availability of a large variety of methods, techniques, procedures, protocols and sampling plans. However, by creating a design using diverse methodologies, researchers are able to achieve greater insight than if they followed the most frequent method encountered in the literature or suggested by a disciplinary bias. In this unit, we shall discuss the role of research design in research.

## 2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain research design
- discuss the unit of analysis of the study
- explain how planning research design entails understanding all types of the research.

## 3.0 MAIN CONTENT

### 3.1 Nature of Research Design

When a researcher must have gone through the stage of formulation of research questions and hypotheses, the next task that awaits him is to construct a design for the investigation. A research design is a plan of study or a lay out of the structure and strategy adopted for a particular inquiry. The design must be construed in such a way as to obtain answers to the research questions and hypotheses, at the same time, minimising the variance among the variables. As an overview of an entire study, a research design must furnish the reader with the following: what and where the subjects of the investigation are: who did what? How was it done? What is the pattern of the study what control obtains, and what tools are employed during the investigation. An investigator chooses a research design which he considers as appropriate to his problem of study. Inappropriate or faulty designs result in imperfect research enterprise.

In designing a research project, a number of basic questions must be resolved at the outset.

Research design is the logical structure of the research enquiry that the political scientist is engaged upon. It is the plan, the structure and the strategy of the investigation, so conceived as to obtain answers to research questions or problems (Kerlinger, 1986). Research design thus provides the framework for the collection and analysis of data according to the priorities set by the researcher (Bryman, 2001). Hakim argues that 'research design is the point where questions raised in theoretical or policy debates are converted into feasible research projects and research programmes that provide answers to these questions' (Hakim, 2000). The researcher observes a phenomenon that he or she feels is interesting, puzzling, neglected or difficult to understand, and then speculates about its possible causes. Naturally, the researcher's training and culture helps that person to develop a number of possible explanations, but it is the role of all scientists to question most of the explanations of phenomena in their field. It is part of their training to subject these explanations to

rigorous testing and research. The aim of the research is to generate new knowledge about the phenomenon and to apply, test and refine theories to explain its occurrence and operation.

In deciding how to research a phenomenon, the political scientist, like any social scientist, is confronted with a large number of possible research strategies and methods. The key question is, which research method will provide the best test of the research hypothesis or the best answers to the research questions? In practice, a combination of methods may be used, such as observation, interview and a survey. The use of such a combination methods may provide complementary data which can strengthen the findings. This strategy of cross-checking data by using a variety of research methods is known as 'triangulation' (Burham *et al.*, 2004:31)

A distinction is often made between qualitative and quantitative research. Qualitative research is very attractive in that it involves collecting information in depth but from a relatively small number of cases. Examples might be a detailed case study of a revolution, or in-depth interviews with political leaders or members of international organisations, or participant observation of a new social movement. Qualitative research's emphasis on knowledge in depth is at the expense of being able to make generalisations about the phenomenon as a whole. Thus a revolution studied in-depth cannot be taken as typical of all revolutions: it may be completely unrepresentative. This is also true for a participant observation study or focus group research. Statistical analysis, based perhaps on a survey of all revolutions, or more likely on a random sample of revolutions, would be needed to provide data from which generalisations could be made about all such events. However, surveys are expensive and often provide relatively limited information. The analysis of survey information also requires specific statistical skills. The best strategy is therefore one that provides the best evidence to test the research hypotheses and one which the researcher is competent to undertake. The research questions and hypotheses will provide an excellent guide to the methods needed to collect the appropriate data. Ackoff (1953) argues that the ideal research design is 'the optimum procedure that could be followed where there is no practical restriction'.

Whatever the research strategy adopted, whether it is a sample survey, comparative analysis, a case study or participant observation, the political scientist has to consider what is the most appropriate and logical structure for the research project about to be started. Whatever the practical considerations, it would be disastrous to be forced to adopt an inappropriate research design. A content analysis, for example, of party documents would be unlikely to shed much light on why people

joined the party. Interviews with party members, particularly those who had recently joined, would provide the most valuable evidence. Many researchers feel that it is essential to use several methods to collect data so that material collected by a survey may be supplemented by observations and in-depth interviews to check the accuracy of the data and to verify that people behave in the ways that they say they do.

The first function however is equally important. The researcher must develop the research questions, transform them into hypotheses, and organise these in a logical and consistent way so that they form a theoretical framework for the research. Key concepts will have to be defined. The objective is to develop a clear and logical framework for the research project. In addition, there are a number of practical considerations which play a major role in the decision about which research strategy to adopt. It is very rare for a researcher to have the luxury of being able to choose the ideal research design. Usually, the researcher has limited funds and limited time to do the research.

A major practical consideration in choosing a research design is provided by the research training and skills of the researcher. It is natural for a behavioural political scientist trained in statistical analysis to formulate research problems and research designs amenable to survey research, because this methodology is closely associated with voting behaviour and opinion polling, which are central areas of the behavioural approach. Similarly, an economist may design mathematical models to test and illuminate the research problems, while an anthropologist may prefer participant observation and a historian may be most attracted to a project based on documentary analysis. Political science as a 'junction' discipline is not associated with a particular research method, and so its practitioners use a wide variety of methods and research strategies. This makes research design even more important as a guide for selecting appropriate methods for research.

The overall research plan or research design thus provides the framework for the research project. It involves spelling out the research questions, defining key terms and developing hypotheses. In the example of a project to explain why people are attracted to political parties, key terms to be defined would include the party itself and the concept of membership. Pilot interview could be carried out to develop hypotheses about why people were attracted into membership: whether, for example, they were attracted by its policies, its literature, friendships with party members, its social events, frustration at government failures, or particular incidents which galvanised them into political activity.

Research design thus specifies the kind of evidence needed to answer the research questions, test the hypotheses and evaluate the issues that

may arise in the course of the research. It determines the research methods and techniques used. It describes how the research will be conducted and carried out. It should do this in a way that will convince a sceptical audience that the researcher has adopted an appropriate methodology and one that will provide convincing data. The choice of research design is thus closely linked to decisions about the appropriate ways to collect the evidence needed to test the hypotheses and to provide answers to the research questions.

### **3.2 Unit of Analysis**

Clear definitions have their first applicability when a study delineates its specific phenomena of interest (unit of analysis). Is it to be an individual or a single state or a group of states, a town or community? Is it gross classes (world human population or sub-classes, such as income of a population? Is the unit of analysis to be examined at a certain point in time (cross – sectional study) or even a period of time (longitudinal study)? Is it to be studied individually (case study) or collectively (comparatively study)?

In order to increase accuracy and precision, therefore, a satisfactory unit of scientific analysis should possess at least five clarifying attribute:

- a) Appropriateness
- b) Clarity
- c) Measurability
- d) Comparability and
- e) Reproducibility

#### **3.2.1 Appropriateness**

The unit selected must focus attention upon the essential object of study. For example, analyses of income differences need to prescribe whether “income” shall mean the gross salary and earnings or the take-home pay after taxes. Another could be comparative of all the females in two cities –is it single or all married females? Appropriateness of a unit will be determined by its role in the total study design. However, it is important to note that clearly defined research question and formulated hypothesis are necessary before the appropriateness of the units can be determined.

#### **3.2.2 Clarity**

The unit of analysis must be clear. Essentially, this is a problem of precise and unambiguous definition.

### **3.2.3 Measurability**

A unit of analysis must be measurable. Essentially, this means that one should strive constantly to devise units which permit quantification and therefore mathematical manipulation. In any event, a unit of study is improved to the extent that it can be defined in measurable terms.

### **3.2.4 Comparability**

A unit of analysis must be comparable. This means essentially that the units to be studied and compared should be of a like order. Thus, it is necessary that the researcher demonstrate at the outset the comparability of his units.

### **3.2.5 Reproducibility**

Since science is concerned with general and not with unique phenomena, any study which employs units that cannot be reproduced defiles verification.

A competent scientist deals only with demonstrably reproducible phenomena and employs them in such manners or designs that both the phenomena and the design can be reproduced by other investigators interested in verifying these conclusions.

Though, “replication” studies are rare in the social sciences, they are very common in the natural sciences.

## **3.3 The Role of a Research Design**

Some of the uses of a research design are stipulated as follows:

- (i) It helps to clarify the research method, enabling an objective evaluation of the appropriateness of the methodology employed as well as the reliability of the forthcoming results of the study.
- (ii) Research design identifies the research instruments used during the course of the study and the type of analysis to be employed.
- (iii) It also identifies and defines the key variables of the investigation.
- (iv) It depicts the population, the sample size, the sampling method and procedure. It describes the study setting and the area covered by the study.
- (v) Research design also makes easier an identification of the problem of validity and reliability and helps to spell out how to tackle them.
- (vi) It helps to provide answers to research question and hypotheses.

- (vii) It facilitates and controls the variance ensuing in the investigation.
- (viii) Research design fulfills two principal purposes, namely: to provide answers to research questions and hypotheses and to minimise errors of variance.

### 3.4 Types of Research Design

There are five major types of research design, namely- experimental design, cross-sectional design, longitudinal design, case study design and comparative design. Let us examine each design:

#### A. Experimental Design

Experiments are widely considered to be the way of determining cause and effect in scientific research. Experimental method involves a “sample of two”, (a control sample and an experimental sample) drawn (ideally randomly) from the population under study. Experimental sample is made subject to a change in some independent variable whilst conditions are held constant in the control sample. Experimental research is rarely used in politics research. However, one particular type of experimental research is the Pilot project where a change of policy is tested on a particular group or area before the initiative is rolled out (extended).

#### B. Cross-Sectional Design

As experiments are so difficult to carry out in real life, social scientists have adapted cross-sectional design as one of their most popular research designs. Cross-sectional design involves the collection of information on a large number of cases at a single point in time. This is to accumulate a body of quantitative or qualitative data in relation to a number of variables in order to discover patterns of association (Bryman, 2001). Cross-sectional design is strongly associated with quantitative analysis due to the large number of cases on which the data is collected and the ease of carrying out statistical test on them. The data is collected over a short period of time and then analysed for patterns of association between the variables. In Political Science, social surveys are used with great frequency. A major limitation of this kind of cross-sectional design is that the information is collected at a particular point in time and so quickly becomes out of date and is overtaken by new events. It is, therefore, impossible to make generalisations over time and to explain the changes that may have taken place. In order to overcome the time limitations of cross-sectional design, social scientists often use longitudinal design.

### C. Longitudinal Design

Longitudinal method seeks data from the observations of a Cohort, a group of people, states or organisations, etc., sharing one or more common characteristics over an extensive period of time. The common characteristics may include age, education, place or specific condition. Usually, longitudinal design is an extension of survey research. A sample is selected and interviewed at a particular time, t1 and the identical sample as far as possible, is re-interviewed at subsequent intervals, perhaps a year later, t2, and then a year after that, t3. The researcher can then compare the data from different periods and discover what changes have taken place. He/she will then attempt to explain why the changes have taken place. Two main types of longitudinal design are often used. The first is the Panel study which has already been described. A sample is drawn from a population and interviewed on a topic or series of topics, and then at a later time the identical sample is re-interviewed. It is difficult in practice to re-interview the whole sample as some may have moved, may refuse to be interviewed a second or third time, or may be ill. Those most interested in the research topic are most likely to stay in the panel and these may become more knowledgeable as a result of the interviews. The second method is to select a group which forms a "Cohort", that is, they are people with a similar characteristic or experience. They may have all been borne on the same day or belong to the same class or at school or belongs to the church, or have been married on the same day. The researcher may wish to interview the Cohort about, for example, their occupations, or their experiences of family life. These data may be related to their parents' background, the area they come from and other factors. However, Cohort studies are frequently based on age cohorts: that is, groups of people born at around the same time. Data collected can be used for research on child development, health, education progress and attainment (Burnham, *et al.*, 2004:50-52).

### D. Case Study Design

Case studies are extremely popular form of research design and are widely used throughout the social sciences. Case studies enable researchers to focus on a single individual, group, community, event, policy area or institution, and study it in depth, perhaps over an extended period of time. The researcher will usually have a number of research questions or hypotheses to give focus to the research and organise the data collection, analysis and presentation of the material. This approach is closely associated with historical study. While both quantitative and qualitative data can be generated by case study design, the approach has more of a qualitative feel to it as it generates a wealth of data relating to one specific case. The data cannot be used to generalise about the

population as a whole as the case study is unique and not a representative sample of the institution or policy area. Some researchers, therefore, argue that case studies should be used only to generate hypotheses and theories which then require testing by generating data through other forms of research design, which then may lead to wider generalisation. The attractiveness of case studies is that data on a wide range of variables can be collected on a single group, institution or policy area. A relatively complete account of the phenomenon can thus be achieved. This enables the researcher to argue convincingly about the relationships between the variables and present causal explanations for events and processes. These explanations and generalisations are limited to the particular case study at the particular time of the investigation so a wealth of detailed information is collected which is specific to the particular case study. It may be possible to replicate the research at a later date but it may be impossible to know whether changes in an institution are due to personnel or external developments such as new government policies. Despite the limitations of case study design, it has had considerable influence in social science research (Burnham, *et al.*, 2004:53-54).

### **E. Comparative Design**

Comparative research or method is the approach most widely adopted by comparative politics, international relations, public policy and developmental politics. In this approach, political events and processes are often clarified and illuminated by comparison with similar events and processes in other contexts. The major difficulty with comparative design is in finding comparable cases: that is, examples which are similar in a large number of respects to the case which the researchers want to treat as constant, but dissimilar in the variables that they wish to compare to each other. The major methodological task in comparative research is to devise and select theoretical problems, conceptual schemes, samples and measurement and analysis strategies that are comparable or equivalent across the societies involved in a particular study (Armer, 1973:51).

Comparative design thus presents the researcher with considerable challenges, especially when different countries are being compared. The researcher must select a theoretical problem that is best illuminated by comparative research. Relevant and equivalent data should then be collected and hypotheses tested. Comparative analysis sharpens our understanding of the context in which theoretical problems occur and enables causal inferences to be drawn. However, as comparative analysis usually involves only a relatively limited number of cases, caution has to be maintained about the levels of generalisation that can be made (Burnham *et al.*, 2004:55-57).

### 3.5 The Components of a Research Design

In project writing, a research design tends to occupy the shortest chapter in the presentation of the report, a reader usually looks for specific information about the plan of study, exhibited by the investigator and the sort of information desired under the research design is as follows:

- (a) Specification of the population, which is the subject of the investigation in its entirety.
- (b) Specification of the sample, the proportion of the population involved in the inquiry.
- (c) Indication of the instrumentation or the apparatus employed:

This includes the data collection instruments, the measuring instruments, as well as their functions in the research process.

- (d) A research design should also indicate the method of analysis of the data collected from the field of inquiry and the modes of their presentation on the report. Here, the researcher also discloses the plan for statistical analysis of the data that will lead to objective confirmation or rejection of the hypothesis earlier stated.

### 3.6 Some Inadequate Research Designs

There are some research designs that are faulty, but are still commonly used in behavioural research. It is necessary that one should be able to recognise them and understand why they are inadequate. There are about four inadequate designs in use. These inadequacies are basically structural weaknesses that lead to no control or poor control of the independent variables.

**One Group Design:** In this design, the researcher tries to conduct a study with one group of subjects. This has also been called "One-shot Case Study". It takes the form of:

Treatment ————— Post-test

What makes the one group design scientifically inadequate is that there is no control group which can act as a comparing group in order to establish that whatever difference observed in the Post-test is from the effect of the treatment alone.

**One Group Pre-test and Post-test Design:** In this design, one group is used and both pre-test and post-test are given, including the treatment:

Pre-test ——— Treatment ——— Post-test



As already highlighted, Research designs serve the purposes of: providing answers to the research questions or hypotheses, controlling the variance, allowing for generalisability of the research findings and ensuring the internal and external validity of the results of the research.

### **SELF-ASSESSMENT EXERCISE**

What is a research design?

## **4.0 CONCLUSION**

In this unit, we have been able to give an insight into the role of research design in empirical studies. Every research project has an implicit or explicit logic that provides the framework for the research and guides the research strategy. The research design will set out the priorities of the research: for example, describing the hypotheses to be tested, listing the research questions, and specifying the evidence needed to provide a convincing test for the research hypotheses and the data needed to answer the research questions. These priorities will determine whether the evidence should be predominantly qualitative or quantitative and how it should be collected and analysed.

## **5.0 SUMMARY**

The planning and execution of a research project are critical to its success. This plan or research design involves determining the objectives of the research, developing research questions, transforming these questions into hypotheses, and deciding on the appropriate research strategy to test the hypotheses and convince a skeptical audience that the evidence is appropriate and valid and that the conclusions drawn from the analysis are accurate. This unit has also described the five major types of research design.

## **6.0 TUTOR-MARKED ASSIGNMENT**

List the types of research designs and discuss two of them in details.

## **7.0 REFERENCES/FURTHER READING**

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## **UNIT 2      SCIENTIFIC RESEARCH PROCESS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Scientific Research Process
  - 3.2 Components of a Scientific Research Process
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

A research is an organised enquiry that aims at providing information for solving identified problems. One of the major functions of empirical research is “testing and verification” of hypotheses. In this research, the investigator begins with a hunch or hypothesis, and from this, he subjects the hypothesis to empirical test which confirms or refutes the hypothesis.

To understand the meaning of research, it is necessary to understand what science is because research itself is a part of science. There are two views of science, namely; static and dynamic views. The static view identifies science as an activity that aims at gathering and classifying information. The dynamic view of science goes further to emphasise the importance of discovering new ways and ideas, a breakthrough and the genesis of a new scientific theory.

Both views, however, show that science is an activity involving gathering and use of information. However, not all processes involving the gathering and analysis of information or data can be described as scientific (Eneanya, 2012). In this unit, we shall examine the process of scientific method of research.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain the process of scientific research method
- list the components of scientific research.

### **3.0 MAIN CONTENT**

#### **3.1 Scientific Research Process**

A research process can be scientific if and only if it follows the steps of scientific enquiry which include:

- (1) identification of the problem area
- (2) postulation of research question/working hypotheses
- (3) specification of the levels and units of analysis
- (4) literature review
- (5) research method
- (6) data collection and categorisation of data
- (7) analysis of data
- (8) presentation and interpretation of data and
- (9) reporting of results.

#### **3.2 Components of a Scientific Research Process**

The above procedures constitute scientific research process and will be explained one after the other for better understanding, as illustrated below:

##### **(1) Background and Introduction of Study**

Here, the researcher discusses the background of the study and illuminates the circumstances and concerns of the organisational, national or international community leading to the current research efforts.

##### **(2) Identification of Problem Area**

A problem is an interrogative sentence of statement that asks: what relation exists between two or more variables? The answer to this question is what is being sought in the research. If the problem is a scientific one, it will always contain two or more variables.

When beginning any type of research, the first step is to determine the problem area, the subject to be examined. There are various reasons or motivations for choosing a topic: it might have been suggested by a lecturer or assigned in a class. Whatever is the reason for choosing the topic, the choice itself is ultimately based on the researcher's value preferences (personal opinion). Naturally, interest in a topic can enhance motivation, so also will it led to bias in analysis.

So, once the problems area has been designated, the problem should be stated as clearly and precisely as possible. It is often helpful to do this in the form of one or more questions that the research will be directed at answering. The questions should be specific in content, limited in scope and empirical in nature. Broad and very general questions are difficult to answer precisely, largely because such questions are themselves frequently unclear. Questions that ask for value preferences cannot be examined by empirical research.

Asking good questions is difficult. It requires considerable knowledge. A researcher who knows relatively little about a subject cannot do research because he does not know where to begin or what to look for. As a consequence, it is often necessary to engage in an exploratory study prior to designing a research project. One way to do this is to review some of the literature and/or talk with people who have had some experience with the problem.

A good place to begin this review is with a text that is well documented or has a good bibliography. Presumably, the author of the text will have cited the most important works in the field. Reviewing these works should provide the researcher with some understanding of what has been done, how it has been done, and what substantive conclusions have been advanced.

Armed with these types of information, he can then begin to design a feasible and hopefully a worthwhile project.

### **Criteria of Problems and Problem Statements**

There are three criteria of good problems and problem statements:

- 1     The problems should express a relation between two or more variables. For example, it asks questions like: Is A related to B? How are A and B related to C? Is A related to B under conditions C and D?  
      There are exceptions to this dictum, but they are rare. They occur mostly in taxonomic or methodological research.
- 2     The problem should be stated clearly and unambiguously or in question form. Instead of saying, for instance: "The problem is ...." or "the purpose of this study is ....," ask a question. Questions have the virtue of exposing problems directly. The purpose of a study is not necessarily the same as the problem of a study, the best way to state a problem is to ask a question or questions.
- 3     The problem and problem statement should be such as to imply possibilities of empirical testing. A problem that does not contain

implications for testing its stated relation or relations is not a scientific problem. This means not only that an actual relation is stated, but also that the variable of the relation can somehow be measured. For example, philosophical, theological and metaphysical questions cannot be empirically tested because some of them are not having relations of variables and the constructs are difficult to define and measure. Examples of such questions are: “How do you know that Peter robbed James? Does democratic education environment improved learning? These are epistemological questions and are usually difficult for empirical testing.

Problem statement should be devoid of these philosophical, theological or metaphysical questions, research problem should be clearly and completely stated. In other words, the researcher must know what he is trying to find out and when he finally knows this, the problem is a long way toward solution.

### **(3) Objective of the Study**

What is the objective of the study? Is it description, analysis or both? Is the aim simply to describe characteristics of a group, or is it to describe and analyse these characteristics? Is it to determine the prominent socio-economic and political characteristics, such as sex, age, religion, race, type of community, education, occupation, income and partisanship or is it to discern which of these characteristics tend to be most closely associated with certain political attitudes?

Description is a pre-requisite to analysis. It is employed to discern “who” and “what” – the significant characteristic involved. These characteristic are referred to as variables because they are capable of changing over a period of time. These changes presumably account for other changes – in terms of cause and effect. The objective of research then is to describe and analyse the change. This is done by examining relationships among variables. To do this, hypothesis about the relationship between variables or what causes something else to happen must be postulated and tested.

### **(4) Research Questions**

The problem statement should be stated as clearly and precisely as possible. It is often helpful to do this in the form of one or more questions that the research problem area has been designated, and the problem should be directed at answering. The questions should be specific in content, limited in scope and empirical in nature. Broad and very general questions are difficult to answer precisely, largely because

such questions are themselves frequently unclear. Questions that ask for value preference cannot be examined by empirical research of the dependent variable. These short – run factors may be referred to as intervening variables.

### **(5) Literature Review**

A literature review is a piece of academic writing and it must be logically structured and clear. A review is not a survey of individual or chronological of previous studies on the subject. Rather, in literature review, it is better to adopt a thematic approach or where applicable, theoretical or conceptual categorisation. Here, the researcher analyses the chosen theory in terms of its elements, and shortcomings. Analysis should also include previous positions of earlier reviewers or critics. A review must use clear, simple and courteous language.

According to Blumberg *et al.*, (2005:154) a literature review must satisfy the following purposes:

- Establish the context of the problem or topic by reference to previous work
- Understand the structure of the problem
- Relate theories and ideas to the problem
- Identify the relevant variables and relations
- Show the reader what has been done previously
- Show which theories have been applied to the problems
- Show which research designs and methods have been chosen
- Rationalise the significance of the problem and the study presented
- Synthesise and gain a new perspective on the problem
- Show what needs to be done in light of the existing knowledge.

In any case, there is no best structure for a review. However, a good literature review must contain the following ingredients:

- (1) Ensure that the literature mentioned and discussed relates to the problem statement of the study
- (2) Ensure that different theoretical ideas mentioned contribute to further exploration or explanation of the study's problem statement
- (3) Summarises previous studies addressing and investigating the current study's problem statement
- (4) Discusses the theoretical ideas mentioned against the background of the results of previous studies
- (5) Analyses and compares previous studies in the light of their research design and methodology

- (6) Demonstrates how the current study fits in with the previous studies, and shows its specific new contribution(s)
- (7) Use literature from the internet cautiously and judiciously and do not use the literature obtained from internet as yours
- (8) When writing an academic literature review, it is worth considering the main points of effective criticism:
  - You should base your criticism on an assessment of weaknesses and strengths
  - You should criticise theories , arguments, ideas and the methodology, but not the authors or their motives
  - You should reflect on your own critique, providing reasons for the choices you have made and recognising and pointing out any weaknesses in your criticism
  - You should treat the work of others with due respect, that is, give a fair account of the views and arguments of others when summarising
  - Further, you must always provide reasons for your disagreement with a certain view or argument, just stating that you disagree is wrong and insufficient
  - Finally, you should focus on the major parts of an argument if you have your criticism on minor details or construct hypothetical examples to show that under very specific circumstances the argument might not hold makes your criticism not to be strong.

Finally, a conclusion to a literature review is mandatory. It is here that the researcher now shows the limitations of previous works as far as his topic is concerned, the missing gaps to be filled and what theory perspective or theoretical framework he wishes to adopt in his own work in order to fill those gaps. Therefore, the theoretical framework comes after the review as part of the conclusion. In several cases, the theoretical framework is particular to the topic at hand and not a universal one.

## **(6) Research Methodology**

The research methodology is the crux of the research report. It is the background against which the reader evaluates the findings and conclusions.

Research methodology involves step-by-step procedures, so that another researcher could replicate the study in another situation. It involves:

- Design of study
- Population and sample size
- Sampling procedures

- Data collection instruments
- Data presentation analysis and interpretation
- Research design.

The research design is the plan of attack: what approach to the problem will be taken? In any research study, the researcher must conceptualise the research problem and then put it into a perspective that will guide him in the data collection and analysis. Such a plan and structure of research is usually known as the research design.

- **Population**

Population is the designated part of a universe from which a sample is drawn. Since it is not possible to study the entire population, the sample size selected is the representative of the population.

- **Sample Size**

The obvious question is how big would the sample size be? A number of factors must be taken into account in determining the size of a sample for any given study. While it is true that the more closely the sample size approximate that of the large population, the closer the values of the two are to be (Galtung, 1967:60). Size in itself is not the determining factor for representativeness. Variability is the most important determinant of representativeness. If there is no variability within the population on the dimension you are interested in, a sample of one element will be sufficient. In other words, the more homogeneous the population, the smaller the sample can be without loss of accuracy.

A second factor is the type of sampling procedure employed. Generally, for degree of precision, a stratified sample requires the smallest number of cases, a simple random sample requires more, and a cluster sample, requires the greatest number of cases.

The third factor is available resources in terms of time, money and personnel. Interviewing for example, that is professionally executed cost a lot of money, especially if elements of the population desire sampling across widely dispersed geographic areas. Usually, the researcher will aim to achieve the largest sample compatible with the resources available, however, it may be that a smaller sample is desirable of the study to concentrate on complex characteristics, which would require, for example, an “in-depth interviewing”.

The fourth factor is with a sizeable number of categories, a larger sample is needed. The variability within the population counts.

However, it is difficult to set a hard-and-fast rule on requisite number of cases to make up a sample size.

However, the sample size should be related to the number of variables and values examined. For example, a minimal frequency in a cross-tabulation is about ten and preferably twenty. Thus, if we were interested in three variables each having three values and a minimal frequency of twenty, the number of cases for the sample required would be  $3 \times 3 \times 20 = 540$ . Statistical requirements may offer guidelines on this. Finally, the overall consideration to take into account in determining sample size is the degree of accuracy and precision required. Accuracy requirements depend partly on the purpose for which a given study is undertaken and the significance of results. For example, if the study deals with allocation of fund to federal, state and local government. Obviously, government census statistics would be used as requirements for allocation accuracy.

In brief, the designed sample size depends on the anticipated heterogeneity among the units in the population from which the sample is drawn and the degree of error, you are willing to tolerate, the sampling design or strategy you intend to employ, whether simple random sample or more complex strategy such as stratified or cluster sampling. The size of the sample also depends on the type of analysis you plan to pursue once the information has been collected. Multiple regression techniques are more efficient than cross-classification tables, including the same number of controls.

- **Sampling Procedures**

Is the selection of a sample of individuals or measurements from the total population to be studied? Sampling techniques include; random, stratified random, purposive, clusters sampling. Whichever is chosen must be clearly described under the heading, “sampling procedures”.

- **Data Collection Instrument**

These are the methods by which data are to be obtained. The instrument chosen should be able to provide the needed data. Examples of data collection instruments are: questionnaire, telephone interview, structured interview and coding sheets (for content analysis).

- **Pilot Study**

It is essential that the pilot study is carried out on a sample of the actual population that the researcher will investigate in the main survey. Pilot tests on other groups may not uncover the problems that the actual population will have with the survey. Once, the pilot studies have been carried out, the design of the final versions of the data collection instruments can proceed.

### **Use of Pilot Study**

Pilot studies enable the researcher to do the following:

(1) test the questionnaire in order to:

- Reveal ambiguous, meaningless or embarrassing question
- Covert open-ended questions into closed questions if only a limited range of answers is given
- Discover whether new issues are raised during the pilot test and new questions need to be developed.

(2) rehearse the actual survey:

- Provide training for interviewers
- Alert them to difficulties that were unforeseen
- Give them an opportunity to discover how the respondents will react to the survey and thus estimate the level of non-response
- Test the accuracy of the sampling frame.

- **Administration of Research Questionnaire**

If questionnaires are to be used, it is advisable to describe clearly how you administered the questionnaire. Whether you had to explain the questions to the respondents; whether you were helped by research assistants; whether you marked the questionnaires; whether you left the copies with someone and later picked up the responses and how much time was expended on the administration of the instrument, should be described in your report under this heading. This description gives confidence to your reader that your research was thoroughly conducted and could be replicated elsewhere.

- **Rate of Return of Questionnaires**

If sampling procedures and administration of the questionnaire were used, it is advisable to calculate the rate of return. Rate of return of questionnaire is calculated, thus;

$$\frac{\text{Number of responses received}}{\text{Total no of copies of questionnaires administered}} \times \frac{100}{1}$$

High response rates to questionnaire, ranging from 70 – 90% are possible. It is advisable to add under this section at least two reasons why the return rate is high or low.

- **Data Collection**

This stage is the actual collection of data. Once the data are collected, it needs to be coded so that analysis of the results can take place more efficiently.

- **Data Analysis and Interpretation of Results**

The researcher should also prepare readers mind for the plan of data analysis in the proposal. At undergraduate levels, methods often used are simple count (frequency) and percentages and are usually presented, using tabulation and cross – tabulation.

At post-graduate level (dissertation and thesis), more sophisticated statistical test (for examples, t-test, correlation tests, Chi-test, regression, ANOVA etc.) of significance are used to test hypotheses and the method so used should be mentioned.

After the data have been retrieved, the researcher undertakes data analysis and interpretation.

All these data analysis procedures were described earlier under descriptive and inferential statistics.

The purpose of the analysis is to summarise the collected data in such a manner that they yield answers to the research questions or test of significance of hypotheses were tested.

### **Discussion of Findings**

A bare statement of the findings is usually not enough to convey their meaning; usually the reader is interested in their implications for the general understanding of human behaviour in the area of your study. Discussion of these implications is sometimes combined with the presentation of the data. Discussion usually includes statement of the inferences drawn from the findings in this particular situation which may be expected to apply in similar circumstances.

The researcher may link inferences/interpretations drawn with those of other studies, to verify if the findings are different or if they confirm findings from previous studies.

The discussion of implications of findings will usually include relevant questions that are still unanswered or new questions strained by the study. This will lead to a presentation of kinds of research that would come in under “Recommendation for further studies”.

Most research studies seem to raise more questions than they answer and these questions lead to recommendations for further study. These may be simply enumerated or they may be presented in a discussion if the ideas lead to a more complex research study.

As a qualification of these inferences and interpretations, a researcher must not make sweeping statements as if he studied the whole world. His inferences should always be limited to the organisation/community under study.

### **Summary of Findings**

The summary serves the purpose of a synopsis, which many individuals will read first in order to see if the study is worth reading further. The summary should not duplicate the findings discussions or repetition of previous chapters. The procedures should be summarised in general terms, with only enough detail given for the reader to obtain a general picture of what was done, yet with sufficient detail so that he will know if he wants to read the entire study.

The summary of the findings should be presented in summary table in such a way that findings lead the reader naturally to the conclusion. Summary tables are a convenient, meaningful, efficient way to present findings in research report, especially in summarising results of a questionnaire or other survey or descriptive study.

### **Recommendations/Implications**

The recommendations should have as a base, the findings of the study. As the researcher is now an authority in the area, he/she makes recommendations to policy or decision-makers in government and/or corporations to help improve the social problems.

Generally speaking, the recommendations and the implications section allows the researcher some freedom in his writing, allow him to speculate and allow him to use his creative ability to pinpoint the

possible uses of the findings and in raising further questions for investigation.

### **Contribution to Knowledge**

In this section, the researcher should discuss the results to support his hypothesis. The researcher will want to consider the relationship between his results and past research and theory. If the results do support the original ideas – the “gap” he/she want to fill in his study, the researcher should discuss how his findings contribute to knowledge of the problem that he investigated. If the researcher did not obtain the expected results, he would want to discuss possible explanations. The results will probably have implications for further research. If so, the researcher should discuss the direction that future research might take.

### **Conclusion**

The conclusions the researcher draws must derive directly from the reported findings. For this reason, the researcher must have carefully presented in detail the procedures, so that the reader can see that the findings are logical and that, in turn, the conclusions are logically derived from the findings. The number of conclusions depends upon the questions asked in the statement of problem. Such conclusions may be listed or presented in long prose.

Conclusions are not the same as findings and should not, therefore, be a re-statement of the findings. This is not to say that findings are not mentioned in the conclusion section. Conclusions should be supported by the findings, but a separate conclusion need not be drawn for each finding. It is the sum of the evidence that leads to the conclusions.

### **Reporting Research Findings**

Dissemination of knowledge is one professional responsibility of researchers. The contribution of scholars in various fields adds to the growing body of knowledge in any discipline and leads to the development of new theoretical constructs that guide future inquiry.

Researchers must provide all relevant information concerning design, sampling and analysis – so that findings may be judged accordingly. Research information permits investigators work to be evaluated by professionals within the discipline who judge both its theoretical and methodological soundness as well as its relevance to the discipline.

### **SELF-ASSESSMENT EXERCISE**

What is scientific method of research?

#### **4.0 CONCLUSION**

In this unit, we have discussed the process of scientific method of research. Scientific method of research is dominated by scientific work. It supplies an appropriate framework within which fundamental philosophical problems of science can be discussed, each in a setting that indicates the relevance of such examinations. In every inquiry within the social as well as the natural sciences, scientific method concentrates on steps of scientific procedures in conducting research.

#### **5.0 SUMMARY**

Scientific method of research supplies the type of knowledge that can be transmitted from any person who has such knowledge to any other person who does not have it but who can grasp the meaning. In order to engage in scientific research, the investigator must always begin by forming in his own mind some tentative ideas about: the objective of the inquiry, that is, the question for which the answers is sought; the relevance of this question for human knowledge.

In every inquiry within the social and natural sciences, scientific method of research concentrates on scientific actions, scientific operations and scientific procedures.

#### **6.0 TUTOR-MARKED ASSIGNMENT**

1. Explain what you understand by scientific method of research?
2. What are the components of scientific research method?

#### **7.0 REFERENCES/FURTHER READING**

Blumberg, B., Cooper, D.R. & Schindler, P.S. (2005). *Business Research Methods*. London: McGraw-Hill Education.

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## **UNIT 3      CONCEPTUALISATION AND OPERATIONALISATION OF VARIABLES**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Definition of Concepts
  - 3.2 Meaning of Variables
    - 3.2.1 Types of Variables
    - 3.2.2 Mode of Variation in Variables
    - 3.2.3 Identification of Variables in Hypothesis
    - 3.2.4 Specification of Relationships between or among Variables
    - 3.2.5 Operationalisation of Variables
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

Since science strives to achieve accuracy, every field of scientific endeavour develops a continuously refined set of concepts, which mean the same thing at all times under stated conditions. It is, therefore, imperative at the outset of any research effort to define clearly every concept- that is, an idea or (generalised idea of a class of objects) or construct (that is, an idea expressing an orderly arrangement of concepts into a single whole) that would be employed. It is also important that the variables in the hypothesis have to be operationalised in order to be tested and measured. In this unit, we shall discuss the relevance of concepts and variables in empirical research.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- define concepts and variables
- explain their relevance in empirical research.

### **3.0 MAIN CONTENT**

#### **3.1 Definition of Concepts**

A concept is an idea or a generalised idea of a class of objects. It can also refer to construct-an idea expressing an orderly arrangement of concepts into a single whole. Specifically, a construct is often employed to refer to abstract or purely synthetic formulations having no counterpart in observable reality. For example, “force”, “symbiosis”, “status”, “value”. We treat such abstractions as though they do exist in tangible form (Lastrucci, 1970:72). However, the problem of accurate definition is of fundamental importance in science. One of the basic rules of definition is that a definition can be neither true nor false. That is, it is not a factual proposition. A definition is simply an explicit declarative statement or resolution. It is a contention or an agreement that a given term will refer to a specific object.

#### **Rules of Definition of Concepts**

In order to promote clarity and precision, several basic rules of definitions are consistently followed by all competent scientists in accordance with accepted principles of logic. According to Lastrucci, (1970:72), the four rules of definition of concepts are:

- a. A definition must denote the unique or distinctive qualities of that which is being defined. The term employed must be the symbolic equivalent of the thing it stands for; it must be applicable to every instances of that thing and to nothing else. In other words, it must be inclusive of all things denoted by it.
- b. A definition must not be circular, that is, it must not contain within itself either directly or indirectly any part of the thing being defined. This would reduce the error of tautology.
- c. A definition should not be stated negatively when it can be stated positively.
- d. A definition should be expressed in clear and unequivocal terms, not in obscure or figurative terminology.

Thus, concepts and constructs should be defined either objectively or operationally. Objective definition is in terms of empirically verifiable and standardised referents such as rulers, thermometers, scales, etc, which leave little room for dispute among competent observers. Operational definition is in terms of specific operations, behaviours, processes or effects, which likewise leave little room for serious dispute. However, a particular problem of definition arises in the employment of measuring instruments. The standard practice is to define an instrument in terms of two qualities: validity and reliability. An instrument (a

scale, ruler, balance, meter, questionnaire, attitude test, etc.) is said to be valid when it measures that which it is purported to measure. Validity could be established by consensual definition – a standard measurement approved by professional Association or Agency of government. An instrument is also said to be reliable, when it gives consistent results under comparable conditions.

### **3.2 Meaning of a Variable**

A variable is a symbol to which numerals or values are assigned. Scientists tend to call the properties they study “variables”. Examples of important variables in social science inquiry are: attitude, sex, income, education, age social class, productivity, intelligence etc. These variables may take on any justifiable set of values, for example, scores on an intelligence test or an attitude scale. In the case of intelligence, a set of numerical values are assigned to it. These are numerical values yielded by the procedure designated in a specified test of intelligence. This set of value, often called I.Q’s, ranges from low to high, from say 50 to 150.

Again variable “x” for example, may have only two values. If sex is the construct under investigation, then x can be assigned “I” for male and “O” for female. Examples of two-valued variable are: alive – dead, citizen – noncitizen, teacher – non teacher and so on. Such variables are often called dichotomies or dichotomous variable.

Variable is a central issue in quantitative research. It can be expressed in figures in quantitative research, while variables can be expressed in words, pictures or objects. In quantitative inquiry, researcher focuses on the variables and relationships among variables, such as: income, age, wealth, sex, socio-economic settings, etc.

Variables can take on two or more values. Values of a variable are its attributes. For example, gender is a variable. Male or female are attributes of gender. Marital status is a variable. Married, single, divorced or widowed are attributes of marital status. That is to say, that variables and attributes are related, but they have different missions (Neuman, 1994:97).

#### **3.2.1 Types of Variables**

Variables can be classified in several ways:

- Independent variables
- Dependent variables
- Intervening variables

- Dichotomous variable
- Active and attributes variables
- Continuous variables and
- categorical or discrete variables

### **Independent and Dependent Variable**

The most important and useful way to categorise variable is as independent and dependent. This categorisation is highly useful because of its general applicability, simplicity and special importance in conceptualising and designing research and communicating the results of research. An independent variable is the presumed cause of the dependent variable, the presumed effect. The independent variable is the antecedent; the dependent is the consequence. When we say: if A, then B, we have the conditional conjunction of an independent variable (A) and a dependent variable (B). The terms “independent variable” and “dependent variable” come from mathematic, where X is the independent and Y the dependent variable.

In experiments, the independent variable is the variable that identifies conditions that act on something else; the dependent variables, Y, is the presumed effect, which varies concomitantly with changes or variations the researcher wishes to explain.

### **Intervening Variable**

Intervening variable comes between the independent and dependent variables and shows the link between the two. The intervening variable specifies the mechanisms that account for the causal relation. The intervening acts as a dependent variable vis-à-vis an independent variable toward the dependent variable. For example, we may hypothesize thus: “the introduction of a six day working week(IV) will lead to higher productivity(DV), by increasing job satisfaction(IVV).

### **Active and Attribute Variables**

When planning and executing research, it is important to distinguish between active and attribute variables. Manipulated variables are usually called “ACTIVE” variables and measured variables are called “ATTRIBUTES” variables.

### **Continuous Variables**

A continuous variable is capable of taking on an order set of value within a certain range. This means that the values of a continuous variable reflect at least a rank order, a larger value of the variable

meaning more of the property in questions than a small value. The values yielded by a scale to measure dogmatism, for instance, express differing amounts of dogmatism from high through medium to low. Secondly, continuous measures in actual use are contained in a range and each individual obtains a test “score” within the range, such as: 0 to 100 or age from 2 to 35, which is expression of something that is on - going.

### **Categorical or Discrete Variables**

Categorical or discrete variables belong to a kind of measurement called nominal. In nominal measurement, there are two or more subsets of the sets of objects being measured. Individuals are categorised by their possession of the characteristics that define the subset. The individual being categorised either has the defining property or does not have it; it is an all-or-none sort of thing. The simplest examples are dichotomous categorical variables; sex, white – black, polynomials, variables with more than two subsets or partitions, are common especially in sociology and economics; religious preferences, rationality, occupational choice and so on. Discrete variables also take on values that represent the addition of further categories, such as: the demographic variables of race or religion. All variables that produce data that fit into categories are said to be discrete, since only certain set of values are possible.

#### **3.2.2 Mode of Variation**

There are two easily recognisable modes of variation. They are variation in kind and variation in degree.

- a) **Variation in Kind:** Variation in kind is qualitative, nominal and often discrete. Examples of variation in kind include leadership style (which can vary from autocratic and democratic to laissez faire) or which may be married or widowed or divorced.
- b) **Variation in Degree:** Variations in degree are quantitative, ordinal and continuous. Examples of variation in degree include motivation (degree of which is shown as being either highly motivated or not motivated).

#### **3.2.3 Identification of Variables in Hypothesis**

The simplest forms of hypothesis contain two variables, X and Y, which are independent and dependent variables, respectively. The dependent variable Y represents the outcome or effect and the independent variable X represents the treatment, the cause or the factors explaining Y hence, it is called an explanatory variable.

Simply put X and Y are the cause and the effect variables, respectively.

**Example:**

Hi: the higher the degree of employee motivation, the higher his productivity.

The two variables in the hypothesis are:

X = the degree of motivation (variation in degree)  
 Y = production (variation in kind or quantity)

Thus, X variable (the cause), triggers Y variable (the effect), to happen. In the above example, it is very easy to identify both dependent and independent variables.

### 3.2.4 Specification of Relationships between or among Variables

A hypothesis must specify how the variables should relate; how X should relate to variable Y; or how variable  $X_1$  should relate to variable  $X_1$ ,  $X_2$ ,  $X_3 - X_{12}$ . Specification of relationships of variables in hypothesis is related to the mode of variation anticipated, either in kind or in degree.

The following are different modes of variation for pairs of variables:

- Where both variables differ in degree
- Where one variable differs from the other in kind
- Where both variable differ in kind

Both variables differing in degree where both variable differ in degree, the student should find out if the relationships between X and Y are direct or inverse.

a) A Direct relationship, predicts e.g., the higher the sales volume of a product, the higher the profitability of that product.

- The larger the  $X_1$ , the larger the Y
- As X decreases, Y decreases
- The more the value of X, the more the value of Y.

All the variations of hypotheses predict direct relationships.

## b) Inverse Relationship

An inverse relation indicates that as values for one variable are associated with low values for the other. For example:

- The more the value of X, the less the value of Y e.g. the lower the cost of production of a product, the higher the profitability of that product.
- One Variable differing in kind e.g. the higher the level of the organisation's hierarchy ( $X_1$ ), the less the practice of democratic leadership (Y).

### 3.2.5 Operationalisation of Variables

To test a hypothesis, it is necessary to operationalise the variables to be examined. In other words, the variables must be translated into observable phenomena. Once we clarify what we mean by certain terms, we can then measure the referents of those terms. The process of devising steps or operations for measuring what we want to study is called operationalisation.

Operationalisation specifies the exact procedures that will be used to measure the attributes of variables. It involves a series of inter-related choices: specifying the range of variation that is appropriate for the purpose of the study; determining how precisely to measure variable; accounting for relevant dimensions of variables; clearly defining the attributes of variables and their relationship; and deciding on an appropriate level of measurement.

Operationalisation begins in the design phase of a study and continued throughout the phases of the research project, including the analysis of data.

Researchers must choose from the four types of measures that capture increasing amounts of information these are: nominal, ordinal, interval and ratio. The most appropriate level depends on the purpose of the measurement.

Criteria of quality measures include precision, accuracy, reliability and validity. Reliability means getting consistent results from the same measure, while validity refers to getting results that accurately reflect the concept being measured.

Researchers can test or improve the probabilities of measures through the test-retest method, split-half method, use of established measure and the examination of work performed by research workers.

The yardstick for assessing measures validity include face validity, criteria – related validity, construct validity and content validity.

This specifies the exact procedures that will be used to measure the attributes of variables.

Operationalisation involves a series of inter-related choices: specifying the range of variation that is appropriate for the purpose of the study; determining how precisely to measure variable; accounting for relevant dimensions of variables; clearly defining the attributes of variables and their relationship; and deciding on an appropriate level of measurement (Eneanya, 2012).

### **SELF-ASSESSMENT EXERCISE**

What are the basic rules to be considered in the definition of concepts?

## **4.0 CONCLUSION**

In this unit, we discussed operationalisation of concepts and variables. Operational definition describes or prescribes the steps or procedures required to carry out the idea in question. Both should be defined in terms of empirically verifiable and standardised referents, such as rulers, thermometers, scales, etc. A variable is either a concept or construct capable of taking different values, that is, it varies. A variable is defined as a construct or concept of which numerical values can be assigned. Concepts that do not vary are known as constants or parameters. In scientific investigations, invariable and variable concepts and constructs are usually identified in order to ease the process of investigation.

## **5.0 SUMMARY**

Researchers and Students carrying out scientific investigation on social phenomena often come across the terms “concepts”, “constructs” and “variables”. Concept is not merely the name of a thing. Some abstractions without definite names are often used in research, such as: behaviour, attitude, politics, etc, So, a concept is seen as our perception of reality to which we have attached some word label for the purpose of identification. Researchers use concepts to create a mental image of reality. For instance, a concept such as “anxiety” is an abstraction of the behavioural state of an individual. Constructs, on the other hand, is a concept which has been given a definite meaning in a specific scientific investigation. For example, attitude in a scientific study is better seen as a construct since it is give a specific meaning. The difference between a concept and a construct lies on the specific meaning given to a construct and its measurable quality. Finally, a variable is either a concept or construct capable of taking different values (that is it can

vary). Variable is defined as a construct or concept of which numerical values can be assigned (Ihenoch, 2004:24). In scientific investigation, concepts, constructs and variables are usually operationalised or defined to create mental image of reality and ease the process of investigation.

## **6.0 TUTOR-MARKED ASSIGNMENT**

1. Describe different types of a variable.
2. Explain the terms “concepts”, “constructs” and “variable”.

## **7.0 REFERENCES/FURTHER READING**

Eneanya, A. N. (2012). *Research Methods in Political Science and Public Administration*. Lagos: University of Lagos Press Ltd.

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## **UNIT 4 LEVELS OF MEASUREMENT AND SCALING**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Nature of Measurement
  - 3.2 Types of Measurement
    - 3.2.1 Techniques of Measurement
    - 3.2.2 Classification of Measurement Scales
      - 3.2.2.1 Measurement of Data Properties
  - 3.3 Scaling
    - 3.3.1 Meaning of Scaling
  - 3.4 Indices
  - 3.5 Characteristics of Sound Measurement
    - 3.5.1 Validity
    - 3.5.2 Reliability
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

In everyday usage, measurement occurs when an established yardstick is used. We measure casually in daily life, but in research, the requirements for measurement are rigorous. Measurement in Oxford dictionary means to discover the extent, dimensions, quantity or capacity of something, especially by comparison with a standard. In this unit, we shall discuss the nature of measurement and its role in empirical research.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- differentiate between measuring objects, properties and indicants of properties
- explain the similarities and differences between the four scales types used in measurement and when each is used
- discuss how to select an appropriate measurement scale.

### 3.0 MAIN CONTENT

#### 3.1 The Nature of Measurement

Measurement in research consists of numbers to empirical events in compliance with a set of rules. In everyday usage, measurement occurs when an established yardstick verifies the height, weight or properties of physical objects. Variables being studied in research may be classified as objects or as properties. Objects include the things of ordinary experience, such as tables, people, books and cars. Objects also include things that are not as concrete as these, such as attitudes, opinions and peer group pressures. Properties are the characteristics of the objects. For example, a person's physical properties may be stated in terms of weight, height and posture. Psychological properties include attitudes and intelligence. Social properties include class affiliation, status, number or kind of friends. These and many other properties of an individual can be measured in a research study. However, researchers do not measure either objects or properties. They measure indicators of the properties or indicants of the properties of objects. In social research, measurement enables researchers to quantify or operationalise concepts and promotes the reliability and validity of research findings and conclusions. Measurement enhances the exactness of accuracy of calculations (Blumberg, et al. 2005).

#### 3.2 Types of Measurement

Essentially, there are two main types of measurement:

- a. Qualitative classification – that is, assigning of individuals to classes or categories. For example, ethnic groups, religion, income, sex, age, etc.
- b. Quantitative measurement is operationalisation of concepts. It involves pinning numbers or weights on concepts. However, such weights must be justified.

##### 3.2.1 Techniques of Measurement

There are four main techniques in measurement:

- (a) **Classification** - is the simplest form of measurement. It means the assigning of individuals to classes or categories on the basis of a specific trait or attribute, for example, age, income group, marital status, etc.
- (b) **Quantification/Operationalisation** – Quantification is the pinning of numbers/weight on concepts, variables, or observations, such as: attitudes, the good life, etc. Here, the

concepts, observations or variables are operationalised before weights or numbers are assigned.

- (c) **Use of Statistical Coefficient** – By measuring relationships or associations between variables through statistical computations, one arrives at coefficients. For example, the correlation coefficient( $r$ ) tells us whether two variables are correlated or not. It also tells us the direction or strength of the relationship between the variables. Chi-square ( $\chi^2$ ) is a measure of association for discrete variables, such as: sex, state, religion, education, etc.
- (d) **Indexing** - is the use of index to represent a set of data. It enables the researcher measure one dimensional concept through a single figure, such as: Human Development Index (\*HDI) shows the level of development of a country in social welfare programmes (access to pure water, electricity, life expectancy, mortality etc).

### 3.2.2 Classification of Measurement Scales

#### 3.2.2.1 Measurement of Data Properties

Measurement scales may also be viewed in terms of the data properties generated by each scale. Here, various properties may be separated and the participant asked to judge each specific facet. The assumptions underlying each data type determine how a particular measurement scale's data can be handled statistically. There are four levels of measurement:

- i) Nominal data
- ii) Ordinal data
- iii) Interval data and
- iv) Ratio data

#### **Nominal Data**

Measurement is defined as the assignment of numbers to objects or characteristic of objects. In nominal measurement, these numbers have no real meaning except that they enable us partition responses or categories objects, according to their group membership. Nominal scale is, therefore, only a label.

#### ***Example:***

Suppose we want to study some characteristics of different managers. To enable us make a fair comparison, we categorised a manager as either entry level manager; middle level manager and top level manager.

To numerically identify these three levels, we assign the number 1 to top level manager; 2 to middle level manager and 3 to entry manager. Thus, each numbers 1, 2, 3 identifies a level to which a manager belongs. Outside this purpose, the numbers have no further meaning to us. In processing the responses based on the foregoing example for analysis, we shall have this type of format:

**Table 4.1**

Managerial levels	No of managers
1	20
2	15
3	10

The commonest example of the use of nominal scale is in the researchers attempt to differentiate between male and female respondents. He may establish the following measurement rule; assign 0 if a respondent is female and assign 1 if respondent is male.

### Ordinal Data

Variables with attributes we can logical rank – order are ordinal measures. Ordinal scale enables us to have a fair appreciation of the feeling or the perception of the respondents for the objects or characteristics.

Ordinal scales deal with rank ordering which makes it useful for statistical analysis requiring ranking or rank ordering, for example: Median, Spearman rank order Correlations and Kendals T, etc,

The rank ordering may be for two responses, thus; 7, 2, 3,5,1,6 and 4 for responses one; and 3, 1, 4,6,5,7 and 2 for response two.

Or it may start with assumed origin in a five – point ordinal scale measuring responses between two extremes, very good to very bad, for example:

**Table 4.2**

Very good	Good	Neutral	Bad	Very bad
2	1	0	-1	-2

**Table 4.3**

Strongly agree	Agree	Undecided	Disagree	Strongly disagree
5	4	3	2	1

### Interval Data

It is the level of measurement describing a variable whose attributes are rank-ordered and have equal distances between adjacent attributes. The interval scales are without origin except one is assumed for them. It can be used in both natural and behavioural science research. All measures of central tendency and other descriptive statistics can be applied to interval measurements. In like manner, most inferential statistics including “t” and “f” tests and Pearson product moment correlation can be comfortably applied to interval measurement.

**Table 4.4**

Strongly approve	Approve	Undecided	Disapprove
5	4	3	2

### Ratio Data

It has all the attributes of a good scale. Ratio scales define the absence of an object or characteristics as absolute zero and graduates the presence or the possession of it from any value 0 to 100% or 1 as the case may be. In business research, ratio scales are widely used in accounting and finance areas. Examples include; interest rates, depreciations, rates of returns, financial ratio etc.

Statistically, ratio scale defines all elements in a population as 100% or unity and this enables us to statistically manipulate them for useful results.

The implications of levels of measurement appear primarily in the analysis of data. Certain quantitative analysis techniques require variables that meet certain minimum levels of measurement. To the extent that the variables to be examined in a research project are limited to a particular level of measurement, say, ordinal. You should plan your analytical technique accordingly. More precisely, you should anticipate drawing research conclusions appropriate to the levels of measurement used in your variable.

The level of measurement you will seek is determined by the analytical uses you have planned for a given variable, keeping in mind that some variables are inherently limited to certain level.

### 3.3 Scaling

When you develop measurement questions for your research, you will often be called upon to choose between standardised scales and custom-

designed ones. When what you measure is concrete, you choose standardised measures, like tape. On the other hand, when what you measuring is abstract and complex construct, such as customer's attitude on product, you need to develop a customised scale to measure the construct.

### 3.3.1 What is Scaling?

Scaling is a procedure for the assignment of numbers (or other symbols) to a property of objects in order to impart some of the characteristics of numbers to the properties in question (Philips, 1971:205).

Measurement scales are of three types: rating, ranking and categorisation.

- (i) **Rating Scales-** You can use rating scales to judge properties of objects without reference to other similar objects. These ratings may be in such forms as “like-dislike”, “approve-indifferent-disapprove” other classifications using even more categories.
- (ii) **Ranking Scales-** In ranking scales; the subject directly compares two or more objects and makes choices among them. Frequently, the participant is asked to select one as the “best” or “most preferred”. When there are only two choices, this approach is satisfactory, but it often results in “ties” when more than two choices are found. By using paired-comparison scale, the participant can express attitudes unambiguously by choosing between two objects.
- (iii) **Categorisation-** Here participants put themselves or property in groups or categories. For example, the simple category scale (dichotomous scale) offers two mutually exclusive response choices. They are either yes or no, but they could just as easily be important and unimportant, male and female, or another set of discrete categories. This response strategy is particularly useful for demographic questions or where a dichotomous response is adequate. However, when there are multiple options for the rater but only one answer is sought, the multiple-choice, single-response scale is appropriate. The multiple response scale called the Checklist allows the rater to select one or several alternatives. This scale generates nominal data. Answers to a multiple-response scale can be transformed in one single numeric score by assigning unique values to each answer category, following the numeric series  $2^x$  (that is, 1,2,4,8,16.....) and then adding the values of all ticked answer categories.

Another variation of the rating scale is Likert scale. It is the most frequently used variation of the summated rating scale. Summated

scales consist of statements that express either a favourable or unfavourable attitude towards the object of interest. The participant is asked to agree or disagree with each statement. Each response is given a numerical score to reflect its degree of attitudinal favourableness, and the scores may be totaled to measure the participant's attitude. Likert scales help us compare one person's score with a distribution of scores from a well-defined sample group (Blumberg, et.al. 2005:398).

### **3.4 Indices**

Indicators help us to understand the reality of the social condition of people. Conceptualising indicators gives definite meaning to a concept by specifying one or more indicators of what we have in mind. Social researchers are given to words and actions by the people under study. Doing so can often clarify the behaviour observed. A complete conceptualisation involves both specifying dimensions and identifying indicators for each. Specifying the different dimensions of a concept often paves the way for a more sophisticated understanding of what we are studying, example, the quality of life of the people (e.g. multiple indicators).

Indicators may be:

- Access to healthcare facilities
- Access to good sanitation
- Access to good drinkable water
- Access to good roads or electricity etc.

Indicator is an observation that we choose to consider as a reflection of a variable we wish to study. Thus, for example, attending a church may be an indicator of spirituality (single indicator).

### **3.5 Characteristics of Sound Measurement**

#### **3.5.1 Validity**

Is defined as the degree to which a measuring instrument measures what it is designed to measure. Every measuring instrument is designed for a specific measurement. If it is correctly designed, it measures what it is supposed to measure. If it is faulty, then it measures something which may not be what it is supposed to measure.

Similarly, a research design may be said to be valid, if it enables a researcher elicit the correct responses from the sample subjects, otherwise, it is a faulty design and may not lead to correct findings. The

concept of validity can be applied in two areas of research: validity of findings and validity of measurements.

Validity of findings is used as a test for research designs. It refers to the problem of the adequacy of a research design in eliciting the type of responses that it is designed to generate. In some cases, such designs are faulty and consequently, lead to findings that are not valid. There are two main validity problems associated with validity of findings.

They are:

### 1) **Internal Validity**

Internal validity addresses the question, “Did the research design actually elicit the appropriate responses for which it was designed?” However, certain circumstances which may frustrate the internal validity of the research design include:-

- a) **History:** History refers to specific random events, possibly external to the design and which are beyond the control of the researcher. Such events occur between the first and second measurements using the research design.
- b) **Maturation:** The subjects being measured may become tired, bored, wiser, or may be influenced by incidental learning or experiences.
- c) **Testing:** Testing may sanitize the subjects being tested or measured (found in pre-test, post-test). This effect may diminish after six months.
- d) **Instrumentation:** Unreliable test instrument may produce distorted results.
- e) **Differential Selection of Subject:** This is also known as selection bias. This occur when intact groups or classes are used as experimental or control groups without proper randomisation.
- f) **Experimental Mortality:** This is loss of subjects from the sample due to resignations, apathy or death. It is likely to occur in long term experiments.
- g) **Statistical Regression:** Subjects who score higher on a pre-test, may score lower on the re-test. Subjects who score lower on pre-test may score higher on re-test. Scores at extremes tend to go towards the mean.
- h) **Placebo or Hawthorne Effect:** This is a bias in favour of the experimental group because of the observed (subject) reaction to the unaccustomed attention they received.

## 2) EXTERNAL VALIDITY

External validity is concerned with the question of representativeness. The problems of external validity are also the problems of validity of findings caused by external factors.

They are:

- a) **Reactive or Interactive Effects of Testing**  
This is a type of bias introduced when a pre-test might serve to increase or decrease the respondent's sensitivity to the experimental variable. This gives an unrepresentative result of the effect of the treatment.
- (b) **Reactive Effects of Experimental Arrangements**  
This restricts generalisation of results to the subject within the sample and precludes such generalisation to subjects in non-experimental setting.
- (c) **Differential Selection Experimental Variable Interaction**  
This problem arises when volunteers are used to represent a group and they may give responses unrepresentative of the group.
- (d) **Multiple Treatment Interference**  
When many experimental treatments are consecutively applied to the same group of respondents, multiple treatment interference may occur because the effects of a previous treatment may not have vanished before another treatment is applied.

### Validity of Measurement

Validity of measurement is defined in relation to the measuring instrument. Validity of measuring instrument is then defined as the ability of the instrument to measure what it is supposed to measure.

Validity can be classified into; content validity, face validity construct validity, predictive validity and concurrent validity.

#### 1. Content Validity

Content validity deals with the issue of whether the instrument contains test items that are representative of all the skills or characteristics being studied. The difficulty of adequately sampling the item is a major issued in validation. The content validity of an instrument can be determined by the designer of the instrument in any of the following ways:

- By ensuring that all the questions asked in the questionnaire fully exhaust all that are implied by the research questions and hypotheses.

- By using a panel of judges who would vet the questions in the questionnaire objectively, paying particular attention to their relevance to the subject matter and their coverage of the entire topic of study.

## 2. Construct Validity

Construct validity focuses on a broader, more enduring and more abstract kind of behaviour description than other types of validity. It requires the gradual accumulation of information from a variety of sources. A test with high construct validity should accurately measure the diverse phenomena that are presumably associated with that construct.

An instrument is designed to measure data and test hypotheses based on the construct (concept) and to investigate whether the results generated through the instrument confirm to the hypotheses.

Suppose we want to test for the construct validity of an instrument designed to measure “motivation”. We must first determine the various dimensions of the concept of motivation and design instrument to generate data on each dimension and then test for correlation among them. The assumption here is that different measures of the same construct should be correlated fairly highly.

## 3. Face Validity

When a test, by virtue of its appearance seems to be appropriate for its main purpose, then it is said to have face validity. In real sense, it may not have actual value if demonstrated statistically. To be able to allow face validity to pass the test of validity, the test assessors must be experts and professionals who are quite knowledgeable and vast in the area under discuss.

## 4. Criterion – Related Validity

Some concepts or variables are known or have been determined to be a good measure of other variable or attributes. These variables (concepts) otherwise known as criteria, can be used as basis for judging the validity of a newly designed study instrument.

There are two types of criterion – related validity. These are:

- a) **Predictive Validity** – which measures how the newly designed measuring instrument adequately predicts certain attributes, it is

designed to measure. The emphasis here is more on the predictive ability of the instrument than on what the instrument measures.

- b) **Concurrent Validity** - which measures other current behaviours or variables. It attempts to answer the question; does the instrument adequately and correctly measure the existence of some current conditions or criteria?

To determine criterion – related validity, the researcher must be able to determine the appropriate criteria that are being measured or against which the instruments outcome is to be compared. For example, company X has over the years come to associate the performance success of their managers with certain criteria, such as the type of university the employee attended and his ability to communicate fluently in English language. These two criteria have been measured over the years for every newly employed manager.

### 3.5.2 Reliability of Measuring Instruments

Reliability is the accuracy or precision of a measuring instrument. It is the consistency between different researchers under the same assumption and conditions.

A researcher who designs a measuring instrument should be concerned about how consistent the results he obtains with the instrument are. He will want to ensure that the instrument gives similar, close or the same result, if the study to which the instrument is applied is replicated. In other words, will the instrument give the same or similar results when it is used by different researchers under the same assumptions and conditions?

#### Test of Reliability

There are four ways a researcher can possibly test for reliability, these are:

##### i. Test – re – Test Reliability

In test – re – test reliability, the same measuring instrument is used to take two separate measurements on the same population at different times. The higher the correlation between the two measurements, the higher the reliability of the measuring instruments.

The problem with test – re – test reliability is that the first measurements may sensitise the respondents and make them appear to be consistent. This may lead to some spurious reliability.

## ii. Multiple (Alternate) Forms

Multiple forms reliability test is similar to the test of construct validity. It attempts to test for reliability through the use of the same measuring instrument administered on different dimensions of the same variable. These are a measure of the equivalence of the forms, and a high association among the forms a high reliability of the instrument.

Low association between the forms simply shows that the forms are not equivalent and may indicate how reliability.

## iii. Split – Half Technique

In split – half technique, the assumption is that the measurement items can be randomly assigned to two equal parts. That is, the measurement items can be randomly split in half and each half is now treated as an alternative form of the same measurement. The reliability co-efficient formula used to calculate the reliability reads.

$$rtt = 1 - \frac{ve}{vt}$$

Where  $rtt$  = the reliability coefficient  
 $Ve$  = total expected variance between the measures  
 $Vt$  = total variance between measures of the forms.

## iv. Cranach's Alpha Test

This test proceeds by associating each measurement items with every other measurement item and obtaining the average inter-correlation for all the paired associations. The computation is usually very long and tedious.

### SELF-ASSESSMENT EXERCISE

Describe four scales for measuring data properties?

## 4.0 CONCLUSION

In this unit, we have discussed measurement and scaling in empirical research. We measure things casually every day. Research measurement is more precise and controlled. In measurement, one settles for measuring properties of the objects rather than the object themselves. An event is measured in terms of its duration. What happened during it, who was involved, where it occurred, and so forth, are all properties of

the event. To be more precise, what are measured are indicants of the properties. Thus, for duration, one measures the number of hours and minutes recorded. For what happened, one uses some system to classify the types of activity that occurred. Measurement typically uses some sort of scale to classify or quantify the data collected.

## **5.0 SUMMARY**

Measurement in research consists of assigning numbers to empirical events in compliance with a set of rules. Researchers measure indicants of the properties of objects using scales. Scaling describes the procedures by which we assign numbers to measurements of opinions, attitudes and other concepts. There are four scale types. In increasing order of power, these are nominal, ordinal, interval and ratio. Nominal scales classify without indicating order, distance or unique origin. Ordinal data show magnitude relationships of more than and less than but have no distance or unique origin. Interval scales have both order and distance but no unique origin. Ratio scales possess all of these features.

A sound measurement must meet the tests of validity, reliability and practicality. Validity reveals the degree to which an instrument measures what it is supposed to measure to assist the researcher in solving the research problem. Three forms of validity are used to evaluate measurement scales. Content validity exists to the degree that a measure provides an adequate reflection of the topic under study. Criterion-related validity relates to our ability to predict some outcome or estimate the existence of some current condition. Construct validity is the most complex and abstract. A measure has construct validity to the degree that it conforms to predicted correlations of other theoretical propositions. A measure is reliable if it provides consistent results. Reliability is a partial contributor to validity, but a measurement tool may be reliable without being valid. Three forms of reliability are stability, equivalence and internal consistency. A measure has practical value for the research if it is economical, convenient and interpretable.

## **6.0 TUTOR-MARKED ASSIGNMENT**

1. What do you understand by the terms “measurement” and “scaling”?
2. What are the characteristics of a good measurement scale?

## 7.0 REFERENCES/FURTHER READING

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## **MODULE 4      DATA COLLECTION METHODS**

Unit 1	Sample and Sampling Technique
Unit 2	Research Instruments
Unit 3	Literature Review and Theoretical Framework
Unit 4	Ethics in Political Science Research

### **UNIT 1      SAMPLE AND SAMPLING METHOD**

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3.2.1	Reasons of Sampling
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3.3.3	Other Sampling Methods
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#### **1.0      INTRODUCTION**

Research is all about problem-solving and the selection of a problem area for research is the first step towards the identification of the research population. The research problem gives an idea of all the prevalence area of the problem which in turn point to the relevant subjects. The entire population of the problem area can hardly be studied in a research. In most cases, a sample is drawn from the population and studied in the research. The sample is part of the research population. The process of selecting a sample is called sampling and there are different techniques of selecting the sample. In this unit, we shall discuss the concepts of sample and sampling methods.

## 2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain the meaning of sample in a population
- give the reason for sampling
- explain how sampling error occur
- list the types of sampling techniques.

## 3.0 MAIN CONTENT

### 3.1 Population and Sample

Research is all about identifying problem areas in a population. After problem selection, the researcher is expected to define the characteristics of the population from where the sample will emerge. Population refers to all conceivable elements, subjects or observations relating to a particular phenomenon of interest to the researcher. A research sample is part of the research population. The research sample is very vital to research result because it must be a representative of the entire population. Instead of studying the entire population, a small part or fraction of the population is selected and studied, and the result or outcome of the study is generalised to the entire population.

#### 3.1.1 Characteristics of a Good Sample

- a) The best sample is a complete census of the population itself because every element of the population is represented in the population itself.  
This makes sample characteristics valid estimates of the population characteristics.
- b) A good sample must be quite a representative of the population. Representativeness is directly related to;
  - i. Precision by which we ensure that random fluctuations or error variance or sampling error is minimal.
  - ii. Absence of systematic variance or sampling bias which is caused by some known and unknown influences that cause the scores to tend more to one side than the other.

#### 3.1.2 Sample Size

Sample size is the determination of the proportion of subjects; members draw from a population through qualitative means. Factors to be considered are:

- i) The distribution of traits (sex, race, etc) among the population
- ii) The nature of decision to be made with the result
- iii) The amount of sampling error that he is ready to accommodate.

### **3.2 Sampling**

Sampling is taking any portion of population or universe. Sampling process comprises the following:

- Defining the population
- Making the list of all units in the population
- Determining the size of the sample in line with all characteristic of the population
- Drawing the sample units from the list so that they are representative of the entire population.

It, therefore, reduces time and money that would have expended in studying the whole population. The success of any sample lies in the accuracy with which it reflects the true state of affairs in the whole population.

#### **3.2.1 Reasons for Sampling**

- a) To reduce the data to a manageable proportion
- b) To reduce the cost and time spent
- c) It gives room for a thorough study
- d) It encourages fast results
- e) It provides accurate measurement

#### **3.2.2 Sampling Error**

A sampling error occurs when the complete survey of the entire population is not carried out; rather a sample is used to estimate the characteristics of the population. Therefore, the difference in the result obtained from a sample and that obtained from the entire population is called the sampling error. Usually, sampling error is measured statistically by standard error in terms of probability under normal curve. The smaller the sampling error, the greater is the precision of result obtained from the representative sample.

### 3.3 Sampling Methods or Techniques

Sampling approaches are sometimes called sampling designs, or methods or techniques. Furthermore, these approaches have been further dichotomised into probability and non-probability samples.

#### 3.3.1 Probability Sampling

Fagbohunge (1993) defines probability sampling as one in which every member of the population has a known chance of being selected. These type of sampling uses some form of random sampling in one or more of their stages.

Probability sampling includes:

- (a) Simple Random Sampling
- (b) Systematic Sampling
- (c) Stratified Sampling
- (d) Cluster Sampling or Area Sampling

##### (a) Simple Random Sampling

It adopts the principles of randomisation that is every subject or unit in the population has an equal chance of being selected in the sample and all combination must be equally probable. This involves assigning numbers to all members of the population or assigning a piece of paper with a number on it to represent each member. Then, putting all the process in a round cage and mixing thoroughly. Thereafter, selecting one after the other the required sample. Remember to mix thoroughly after each selection. Also a table of random number can be used for the selection.

##### (b) Systematic Sampling

It involve the selection of the  $X^{\text{th}}$  subject or item from serially listed population subjects or units; where  $n$  is any number usually determined by dividing the population by required sample size. For instance if 'N' is the population sample and 'n' is the sample size, which is determined by the researcher; the  $X^{\text{th}} = N/n$ .

##### (c) Stratified Sampling

This procedure is an applied random sampling method in which the population is grouped into some definite characteristics called strata. Sample is chosen from the strata by applying random selection technique on each stratum. The sample here can either be proportional or disproportional e.g. Male = 200, Female = 400. Under the first we can have 10% that is 20 males and 40 females under the second or equal members. Stratified Sampling is superior to the simple sampling procedures because it uses extra method of representativeness.

(d) **Cluster/Area Sampling**

This is the most used method in surveys. It is used when the researcher recognises that some populations are distributed in cluster of settlement and he wants to use the cluster as a basis for selection. We first pick the cluster at random then select individuals from the group at random. This is then cut down into the size used in sampling, but it becomes difficult to measure the sampling errors involved.

### 3.3.2 Non-Probability Sampling

This method does not guarantee randomness that is the element of the population does not have the privilege of having equal chance or known probability of being selected in the sampling process. It includes:

- (a) Quota Sampling
- (b) Accidental or Convenience Sampling
- (c) Judgmental Sampling
- (d) Panel Sampling

(a) **Quota Sampling**

Knowledge of strata of the population (e.g. sex, age, etc.) is used to select sample members that are representative of the quota or populations. It enables the researcher to have a good representation of the sampling units. Unlike the methods used in stratified and cluster sampling (probability sampling), the determination of sample estimation is based on the researcher's opinion.

(b) **Accidental/Convenience Sampling**

The researcher decides to use as subjects, those that have the characteristics of his target population. It is convenient for him to use the sample he accidentally comes across. Like all non-probability sampling methods, it lacks precision but it is cheap and simple to use.

(c) **Judgmental Sampling**

A sampling is judgmental when a researcher is guided by what he considers typical cases which are most likely to provide him with the requisite data or information. This makes the method consuming. Most authors have a common name for judgmental sampling which is purposive sampling.

(d) **Panel Sampling**

Asika (1991) defines Panel Sampling as a permanent sample whose members are used repeatedly for successive interviewing. This method of sampling is guided and also the data collected are limited to certain opinion.

As a distinction, the non-probability sampling methods do not guarantee randomness, meaning that the elements or subjects of the population do not have the privilege of having equal chance of being selected as part of the sample as in the probability samples. In research studies, certain situations could necessitate the use of non-probability sampling method, such as: when the researcher cannot reach the sample subjects or elements, then he is left with what is available; and when random sampling technique may not likely guarantee the inclusion of the main cases or targets of study. Other reasons could be because of time and cost or statistical method of analysis involved (Ihenacho, 2004:131).

### **3.3.3 Other Sampling Methods**

There are also other sampling methods, namely:

- Multi-stage sampling
- Double sampling

(i) **Multi-Stage Sampling**

When a research study requires precision and thoroughness with different categorisations and stages, one technique of the probability approach will not be adequate hence the combination of different methods. The different techniques or methods will certainly be employed at different stages of the study before the final research result. This type of sampling where different techniques are used at different stages of the study is called a multi-stage sampling technique.

(ii) **Double Sampling**

Double sampling involves the successive use of two different sampling techniques to select a sample for the research study. First, the researcher

uses the first technique to select large sample of subjects that he needs, then he uses a second technique to sample the already selected large sample so as to get the exact number of subjects in his sample. Double sampling requires money and time and it gives the sample higher quality and precision. Sometimes, it is used in place of multi-stage sampling.

### **SELF-ASSESSMENT EXERCISE**

What do you understand by sampling designs or method?

## **4.0 CONCLUSION**

In this unit, we have discussed samples and sampling techniques or methods. A research sample is part of the research population. Specifically, the sample is the limited members of the population that are subjected to the research study. Usually, instead of studying the entire population, a small part is selected and studied. Sampling is the process of drawing up a representative sample from the population or universe of elements. Sampling approaches can be categorised into probability and non-probability. The sampling method or technique is used to select sample of the population and the result or outcome is generalised to the entire population.

## **5.0 SUMMARY**

So far we have been able to examine the meaning of population, sample size, sampling error and the categorisation of sampling techniques. The sampling techniques or methods are categorised into probability and non-probability sampling. Probability samples include: random sampling, systematic sampling, stratified sampling and cluster or area sampling. Non-probability samples include: accidental or convenience sampling, quota sampling, judgment sampling and panel sampling. Others sampling methods include: multi-stage sampling and double sampling. It is pertinent to understand and properly appreciate these techniques so as to be able to apply them when necessary. The whole essence of sampling is to obtain a representative sample from the population of interest. In research, no sampling method technique is exclusive. Sometimes, researchers combine techniques to obtain a good representative sample.

## **6.0 TUTOR-MARKED ASSIGNMENT**

- (1) What is sampling and sampling error?
- (2) Differentiate with example probability and non-probability sampling?

## 7.0 REFERENCES/FURTHER READING

- Asika, N. (1991). *Research Methodology in Behavioural Sciences*. Lagos: Longman, Nigeria Plc.
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## **UNIT 2 RESEARCH INSTRUMENTS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
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    - 3.1.1 Questionnaire
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### **1.0 INTRODUCTION**

In virtually all researches, research instruments are used for collection of data. These instruments are varied and solely depend on the type of research and the design of research in use. Different types of instruments are used in experimental researches, survey researches, quasi-experimental researches and observational studies. In this unit, we shall examine research instruments as tools of gathering data.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- define and identify research instruments
- identify validity and reliability of research instrument
- design statistical instruments.

### 3.0 MAIN CONTENT

#### 3.1 Measuring Instruments

There are four main procedures for collecting data or information, which are; questionnaire, interview, observations and experimentation. For instance, while an experiment requires weighing instrument, a survey will require a questionnaire, an observational study will require an observation schedule, etc. It is always important to distinguish the different types of research instruments that could be used in any of these different research designs.

##### 3.1.1 Questionnaire

Fagbohunge (1993) defines questionnaire as forms of any form used for securing answers to specific questions. The questionnaire method is perhaps the most widely used method of data collection in today's scientific research. The researcher should, however, note that when designing the questionnaire, the following errors should be avoided:

- a) The statements, questions or expected answers should not be too lengthy
- b) Items of questions should be simple and accurately worded
- c) Avoid double-barrel questions.

There are three general types of questionnaire commonly in use, they are;

- i) Open-ended questions
- ii) Close-ended questions
- iii) Scale items.

##### (i) **Open – ended Questions**

These are questions, which give the respondents the opportunity to express themselves freely or without leaving a choice from alternate responses. A minimum restraint is place on their answers or how they are expressed, for example, what is your opinion on government intention to bring private ideas into the Unity Schools? What do you think are the reasons for Government NEEDS program (National Economic Empowerment and Development Strategies)?

##### (ii) **Close-ended Question**

These are specific questions, which are prepared with a choice of possible answers or options. It offers the respondent a choice among two alternatives but, it may be superficial, may force an answer and lastly it may irritate the respondent e.g. Motivation can increase productivity (True or False; Agree or Disagree; Yes or No).

(iii) **Scale Items**

These are questions where the respondent is expected to take a definite position and this is expressed by choosing one from the number of fixed alternative answers. It enables the respondent to be placed at some point on the scale. This is commonly used for attitudinal studies. For example, Professional/University education is a waste of time (Strongly Agree, Don't Know, Disagree, and Strongly Disagree).

**Construction of Questionnaire**

Most questionnaires should have a covering letter, which identifies the person, or Organisation sponsoring the research. The covering letter should state in some general form the purpose of the research and depending on the topic, a guarantee of anonymity.

In constructing the questionnaire, three types of information are usually sought. These are:

- Respondents' characteristics
- Administration information
- Data on relevant variables.

(i) **Respondents' Characteristics**

This type of information usually comes first in any questionnaire. They are necessary for the classification of the respondents and this facilitates the analysis of their responses in the questionnaire e.g. age, sex, marital status, number and sexes of children, family income, social class and status, ethnic origin, educational background etc.

(ii) **Administrative Information**

This is general information that will eventually help the researcher in the various analyses. Information sought under this section includes the respondent's questionnaire identification number, date, place, conditions of the interview (if interview was used). It also includes the computer code numbers of the questions in the questionnaire if it will be computer analysed.

### (iii) **Data on Relevant Variables**

The information that comes under this section forms the main body of the questionnaire. They are questions on facts, preferences, views, expectations, attitude etc. They are directly drawn from the research questions and hypotheses discussed earlier, and they are meant to gather the various quantitative and qualitative data for the actual analysis that will give answer to the research questions and help in the testing of the hypotheses of the study.

### **Qualities of a Good Questionnaire**

- It should have reliability and validity as a research instrument
- The question should not be a leading question nor demand or assume knowledge that the respondent does not have
- It must have bearing on the statement of the problem and hypotheses or research questions
- The question should be appropriate, clear and unambiguous.

### **3.1.2 Mail Questionnaire**

Mail is self-administered from the standpoint of the respondent; it is often called interviewing by mail because it contains carefully worded questions and instructions for the respondent who may not have the opportunity of seeing and asking for clarification from the interviewer.

### **Advantages and Disadvantages of the Various Data Gathering Instruments**

#### **Questionnaire**

##### **Advantages**

- It is cost effective
- It enables the researcher to reach respondents who are otherwise inaccessible.

##### **Disadvantages**

- It has low response rate
- The rate of response is influenced by the nature of subject of study and the interest it elicits from respondents

- It has limited amount of information i.e. it does not have the opportunity to clarify some vague response.

### **3.2 Interview**

There are three main purposes of interview as follows;

- a. Exploratory device designed to give insight
- b. Main instrument of research (data collection)
- c. Supplementary of other methods.

According to Fagbohunge (1993), interview is a situation in which one person, the interviewer asks a person being interviewed, which is, the respondent, questions designed to obtain answers to the research problem.

There are two broad types of interviews:

- Structured or Standardised
- Unstructured or Unstandardised.

In the structured interview, the interviewer is forced to follow the interview schedule on ground. While in the unstructured interview questions are more flexible and open, although the research purpose determines the type of questions to be asked, the content of the question, their sequence and wordings are entirely in the hand of the interviewer.

#### **Interview**

##### **Advantages**

- Skillful interviews make uninterested respondent willing to answer the questions
- A high response rate
- It gives room for more information to be collected based on interviewer's self-disposition
- The interviewer who has a psychological attitude is able to deduce when information is faulty
- The interviewer has control over the type of response he receives, the conditions of the interview and the type of respondent he wants.

##### **Disadvantages**

- Information collected is not quantifiable
- Few respondents may not reveal confidential information

- It is quite expensive, e.g. telephone interview
- Respondent appearance may cause biasness in judgment unknowingly
- Lack of co-operation, and trust from potential respondents can reduce response rate e.g. personnel interview.

### **3.3 Observation**

Fagbohunge (1993) defines observation as method of data collection in which the researcher or his collaborators records information as he witnesses events occurring in the study system. The features measured in this method are usually the time of occurrence of the event and the nature of the event under investigation.

There are usually two more problems involved as follows;

- a) Observation without interference, i.e. observing the subjects without the subject knowing. As this may be difficult to achieve, we might inform subject they are being observed without stating observation reasons.
- b) What to observe in terms of behaviour must be clearly defined and classified or else the researcher will have problems of quantifying his observation.

#### **Participant Observation**

There are some unique study situations where the only method of gathering information is for the person seeking the information to participate and observe. In a situation in which one wants to study the behaviour of drug traffickers, for instance, the most effective means is by participation though it could be disastrous, if the criminals discover the researcher's motive.

#### **Non-Participant Observation**

- **Structured Observation**

This is usually applied within an experimental setting. When some variables affecting a particular behaviour of the respondent are identified and all but one are controlled to enable the effect of that one variable on behaviour manifest itself sufficiently, in this situation, the researcher is involved in structured observation.

- **Direct and Indirect Observation**

Participant and structured observation are direct observation method. However, when the recording of observations involves the use of mechanical aids, the method of observation is an indirect method; for example, motion picture camera, hidden camera, and automatic counters are used in departmental stores to observe customer's movements and behaviours.

## **Observation**

### **Advantages**

- Observation are made and information recorded independent of the observed
- Information is recorded as the event unfolds, hence the validity could be very high
- It is particularly useful for studies carried out in a natural habitat
- It is particularly handy where language is a barrier
- It may also provide information which at the time of recording may look insignificant but may later on prove very crucial for data analysis.

### **Disadvantages**

- It may prove inadequate when the goal of the research is to test hypothesis derived from theory, except the observation is carried out under strict experimental conditions
- The group or event that one wishes to study may be so large that observation alone cannot cover everything. Observation under this situation may not provide a highly valid data
- It provides unreliable data in a research situation in which the observed adjust their behaviour because they become aware they are being watched.

## **3.4 Experimentation**

This type of research explores whether relationships exist among some identical variables and the nature of the relationship. In experimentation, the key word is control. There are three categories of experimentation in behavioural science research as listed below;

- Laboratory experiment
- Field experiment
- Field studies.

### **(i) Laboratory Experiments**

The behavioural sciences try to create a situation similar to the natural science laboratory where truly scientific experiments can be performed with social variables. These experiments in business administration are particularly relevant to organisational and interpersonal behaviour. The control group is the group that receives no experimental treatment and the experimental group receives the experimental treatments.

### (ii) **Field Experiments**

Asika (1991) defines field experiment as a laboratory experiments which are performed live on sites. These are more common in behavioural science research than laboratory experiments because they are closer to reality than laboratory experiments. Field experiment uses control as in laboratory experiment and also experimental groups to properly measure the effects of experimental treatment on the samples subjects.

### (iii) **Field Studies**

In field Studies, though the existence of variables is fully recognised, there is however, no attempt to manipulate them unlike laboratory and field experiments. The focus is to discover the relationships and interactions among the variables that are of interest to the researcher.

There are two types of field studies:

#### (a) **Exploratory Field Studies**

- To discover some variables of interest in the field situation
- To discover relationship among them
- To lay the foundation for hypothesis testing

#### (b) **Hypothesis Testing Field Study**

- To predict what should be tested.

## **3.5 Task Analysis**

A potential weakness of methods such as interviews or questionnaires is that they are based on the activities and views of individuals on their own rather than as part of a wider social-technical situation. Also group techniques are useful for getting opinions efficiently from a set of people. The main principle is that each participant can act to stimulate ideas in the other people present, by a process of discussion. It is well-known that the collective view is greater than the individual contributions.

There are various means of managing group sessions. The simplest is to have the group meet and discuss all aspects of the problems being addressed. Alternative approaches are, for instance, Focus groups. In order to encourage discussions, the group members should be assured that their contributions will remain confidential. If any recording is made, members should also be assured that this will remain confidential. In the domain of information systems, groups may be of use in understanding social issues affecting the system and the design and the evaluation of possible design solutions.

### **Advantages**

- Group techniques allow the rapid collection of a wide variety of views from a range of people.
- Group discussion helps to summarise the ideas and information held by individual participants.
- Meanings can be recorded for future analysis.

### **Disadvantages**

- Some shy participants may be inhibited by other group members.
- One member of the group may appear highly confident and persuasive and may influence the opinions of the other group participants.
- Some people may also not think creatively in a group setting and prefer to be interviewed or to complete a questionnaire.

## **3.6 The Delphi Technique**

When mail questionnaire is used in panel technique, the method becomes known as Delphi Technique. Panel technique is a process where the respondents are interviewed many times on the same subject matter. The objective is to study changes in behaviours and attitude over time.

Delphi technique uses specially designed questionnaires which are distributed to specially selected respondents who are known to be experts in the area or subject being studied. This is administered to the respondent-experts about three times. At the end, the final round of administration is analysed and a trend in the opinion of respondents is plotted and some statistical analysis is carried out.

### **The Delphi Technique**

#### **Advantages**

- It is more accurate, since the questionnaires are administered to the respondent experts about three times.

### **Disadvantages**

- Any form of contact among respondents is eliminated to avoid biasness.
- Most sophisticated method of panel technique

### **SELF-ASSESSMENT EXERCISE**

What do you understand by research instruments?

## **4.0 CONCLUSION**

In this unit, we have discussed the relevance of research instruments in research. In virtually all researches, measuring instruments are used for data collection. These instruments are varied and solely depend on the type of research and the design of research in use. Different types of instruments are used in experimental researches, survey researches, quasi-experimental researches and observational studies. However, it is noteworthy that measuring instruments should be valid and reliable.

## **5.0 SUMMARY**

It is always important to distinguish the different types of instruments that could be used in any research designs. Different types of instruments are used in experimental researches, survey researches, quasi-experimental researches and observational studies. For example, while an experiment requires weighing instrument; a survey will require a questionnaire; an observational study will require an observation schedule, etc. An adequate and proper choice must be made among identified methods of measurement in each type of research design. Data quality is seriously threatened when the wrong instrument is used for collection of research data. In survey, a rating scale could be more adequate than a questionnaire, or a questionnaire could be more adequate than a structured interview. It should also be noted that the validity and reliability of research data must be ascertained to ensure data quality. Validity of instrument is said to be valid if it enables a researcher elicit the correct responses from sample subjects, otherwise, it is a faulty design and may not lead to correct finding. On the other hand, research instrument is reliable if the instruments are structured in a way that research data collected through them maintain a certain level of consistent result anytime such an instrument is used for data collection. Reliability is therefore, seen as the consistency between independent

measurements of the same phenomenon. Reliability is then the stability, dependability and predictability of a measuring instrument. It is noteworthy that an instrument could be reliable but not valid. An instrument can measure the wrong thing consistently and accurately. In this case, the instrument can be said to have reliability of measurement but cannot be said to have a valid measurement. Oftentimes, it has been found that when the validity of a measuring instrument is ascertained, the likelihood of its reliability is high. Therefore, validity of a measuring instrument is more important than its reliability but the two must go hand in hand.

## **6.0 TUTOR-MARKED ASSIGNMENT**

- (1) Describe the different types of research instruments you know?
- (2) What do you understand by validity and reliability of research instruments?

## **7.0 REFERENCES/FURTHER READING**

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## **UNIT 3 THE LITERATURE REVIEW/THEORETICAL FRAMEWORK**

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- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

A literature review is a detailed and organised step-by-step search for all the materials available on a topic. The purpose is to identify the existing information sources and resources most relevant to the topic to be studied. In this unit, we shall discuss the literature review aspect of research.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- define literature review
- determine the purpose and scope of literature review
- conduct a literature search as basis to other studies on the subject
- identify theories on the subject
- adopt the theory or theories that would be used for analysis.

### **3.0 MAIN CONTENT**

#### **3.1 Meaning and Purpose of Literature Search**

According to Fagbohunge, (1993) literature review can be defined as the critical evaluation of past but relevant works to the research under study with a view to identifying areas of convergence and divergence in such past work. Hassan (1995) defines literature review as an essential step in research activities. It is a process involving the systematic identification, location and analysis of documents containing information relevant to the research problem areas of interest.

The purpose of literature review is to:

- To determine what has already been carried out in the past that relates to the problem of the study.
- To enable researchers to clarify underlining process, ideas and findings.
- To enable the researchers to critical study the findings of other research work.
- To make it possible to determine the meaning and relationship between variables.
- To facilitate interpretations of research findings.
- To point out research strategies, specific procedures and measuring instruments which have and have not been found to be productive in investigating the problem.
- To achieve the purpose of replication.
- To permit meaningful synthesis of existing work, thus leading one to gain perspective of the current study.
- To help the research delimit and define the problem.
- To find out whether the methodology used in the study or the techniques developed from the study of one problem may be applied to the investigation of another problem.
- To help the researchers in identifying variables which have proven important and unimportant in a given field of study.

Generally, using published literature connects you to the great scholarly chain of knowledge and provides added benefits since you might find information about the topic which hitherto is not known before committing yourself to the time-consuming research work.

### **3.2 Scope of the Literature Review**

Literature review is usually divided into various sections that serve as the researcher's justification for understanding the study.

The order which the review of the relevant qualitative materials should follow is:

- Conceptual definition of the variables of issues of interest.

- Problems with identifying, observing or measuring variables or issues.
- Explanation of the importance or usefulness of the variables or issues.
- Underlying theories that explain the important role or functions of the variables or issues.
- The invitation to current or future research.

**The Literature Review Includes the Following Topics;**

- Definition of any key concept presumed in the article.
- Explanation of underlying theoretical foundation that underlies the methods used to approach communication and any adaptation the author believes should be made in applying these systems.
- Identification and justification for examining the communication domain chosen including discussion of the potential value of such a study and other invitation to current or future research in the area.
- Background for the communication pattern to be studied, including historical or social information.

It can be very helpful to provides summaries in the form of conclusions and priorities at the end of the literature review for future inquiry especially when researchers have reviewed a fairly large body of research and thinking related to a subject. The hypotheses can only be stated where the researcher is clear about the accuracy of the related literature. There must be links between the literature review and hypotheses.

With all these mentioned above, literature review also attempts to tell the reader the essential things he or she should know about the subject and how far the knowledge is about the matter.

The strategies for organising the review are;

- a) An introduction that justifies the study of the topic in the field and previews the rest of the paper.
- b) The content of the problem that isolate the role of the concepts in communication problem. By such methods is meant quoting authoritative sources that refer to past research work that calls for new work or arguing directly for a need for this work.
- c) The background definition of terms which provides the meanings to technical words, including problems that the researchers have faced when measuring or observing the concept or variable.
- d) The relevant theories reviewed to explain how and why the variable or concept works.

- e) The research survey usually is the longest part of the study.
- f) A list of the opportunities for future research that gives the significant merit of the research.
- g) A conclusion that summarised the main point and state a bottom – line conclusion.

### 3.3 Systemising the Search

The various steps that are involved in the process of carrying out literature review are:

- a) Defining the research problem: The researcher has to identify the research problems by defining it in a clear, exact and definite manner.
- b) Giving an outline of the theme and the sub theme: The researcher has to break the problem into manageable units or he needs to convert the problem statements into key words or terms that can easily be identified in the subject made or preliminary sources. The hypotheses to be tested may be used in this case to enable the researcher focus on the main variables that constitute the problems. Reading the topics relating to the research in the secondary source will enable the researcher have a swift overview of the research.
- c) Identifying material for view: Having identified the themes or key words as the topic, the researcher has to seek for the materials that are relevant to the problems. These will guide him in categorising the items under which he can classify the identified references using the variable of the study. The information from preliminary sources can be searched for manually as first hand investigation, computer information or communication technology e.g. the Goggle for browsing. While reading the materials, the researcher should prepare a bibliography for each book or article containing materials relevant to the research.
- d) Searching for relevant titles and abstract: As earlier mentioned, a thorough search for sources of information should comprise three major categories of document, namely:
  - i) Published articles
  - ii) Unpublished articles
  - iii) Research projects

The specific topics and abstracts of these previous works that are relevant to one's study will serve as useful reference materials. Hence, the researcher can obtain these by merely reading through the index of all titles written between them.

- e) Reading and locating primary source documents: The researcher should read primary sources that are related to the research problem.

Such pieces of relevant information that have been read should be outlined as note cards. A note card usually contains such information as name of author, title, place, and date of publication of the research. It also contains the statement of the problem procedure, findings, conclusion and comments. As titles and abstracts do not provide adequate information on past work, primary source documents as journals and dissertations will do so. Articles in the journals must therefore be located from where they appeared and when this is done, the articles should be photocopied so as to provide ready accessibility to the document. Undoubtedly, journal articles are very rich in terms of quality, conciseness and technicality in any area of interest, be it either for publication or research work.

- f) Abstracting and writing the report: There is need to provide an abstract once the researcher has identified the primary source of references related to the study, using the appropriate indexes, or reviewing, summarising, and classifying one's references into appropriate categories. The process of abstracting starts by looking for articles or materials that are most recent in an area which must have gained momentum from past research work that is yet to be identify.

### **3.4 Reading the Literature Review and Making Notes**

Some hints on a good review of related literature will be of immense benefit to researchers who intend to conduct meaningful studies;

- a) A researcher should start by gathering previewing relevant literature before real research work begins. A record file of press cuttings and for jotting may be kept for this purpose.
- b) As literature review is imperative, the researcher should survey existing written materials such as textbooks, journals, magazines, newspapers, reports, projects, recordings etc., that have direct and indirect bearing with his research.
- c) Aspect of the relevant literature to be reviewed should be properly sectionalised and appropriately headed or sub-titled. Such review should be concise, business – like, relevant, meaningful and inter-connected. There must be link between one section and another.
- d) The language used and referencing style adopted must conform to the house – style or the approved institutional style. Thus, the old

style of using references to relevant works is no longer popular. The modern style of referencing authors is; Ajayi (2006:120), Okafor (2007:150) as publications of Ajayi and Okafor of 2006-page 120 and 2007-page 150, respectively.

- e) These should be full details of the books reflected in the bibliography.
- f) The ideas of the authors should as much as possible be paraphrased but given the source. Where the actual words of an author are used, they should be quoted if the words are not more than two consecutive lines. When quoted words run into more than three lines, they should be rendered in set style and in single line spacing without the insertion of question marks.

Making notes; this may be summarised as follows:

- i. Note that all investigation or research requires evidence of reading. From this reading one may get some ideas about the methods of data collection and analysis.
- ii. Make a critical review of the literature if need be, but where the review is produced, it should include only relevant items.
- iii. Locate the nearest library and negotiate access.
- iv. Decide exactly what you ought to know prior to the search for the literature.
- v. Select an appropriate topic or theme/sub themes.
- vi. Define the correct terminology by choosing or selecting the synonyms for some difficult words.
- vii. Define the parameters in setting the range and types of materials to use. For instance, to consider the research work done from the year 2001 to date and if foreign authors only.
- viii. Select sources, Library catalogues, bibliographies, abstracts, indexes, etc.
- ix. Locate appropriate materials.
- x. Write up as work progresses, but you must note methods of investigation and classification of data and items of certain information for the research.

### **3.5 Theoretical Framework**

Theoretical reviews that form the background of an on-going study are usually an essential part of literature reviews. Theoretical reviews give a study impetus and a firm foundation to take-off and also act as a guide towards meaningful contribution of the research work. The significance of theoretical reviews are seen in the fact that it reviews some already known theories that gives the present study a pedestal to take off. In doing this, a researcher tries to show relevance of the theory or theories to the present study, explain the research interest and objectives with

established theoretical framework. Furthermore, it tries to show the shortcomings of the theory and how the study aims at correcting the anomalies or shortcomings (Ihenacho, 2004: 57-58). However, it is pertinent to note that theories are reviewed because of their relevance to the current study.

## **SELF-ASSESSMENT EXERCISE**

What do you understand by literature search?

## **4.0 CONCLUSION**

The term literature review was defined using a critical analogy from various definitions. The unit highlights the areas dealt with when gathering various literature to be studied and provides some checklists to guide the researcher when writing as well as the purpose, division and sequence of literature review.

## **5.0 SUMMARY**

Literature review is an essential part of research study which constitutes the information store house of the study. The relevance of literature could be ascertained by relating every information with the major concept, constructs, or variables in the study. These constructs or variables give the research problem a researchable look. Without the constructs or variables, the research problem will not be appropriately manifested in both quality and quantity. It is usually advised to properly define and understand research constructs or variables in order to conduct a good literature review.

## **6.0 TUTOR-MARKED ASSIGNMENT**

1. What is the need for literature review in research?
2. Why do you review theories in literature search?

## **7.0 REFERENCES/FURTHER READING**

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## **UNIT 4 ETHICS IN POLITICAL SCIENCE RESEARCH**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Ethics in Political Science Research
  - 3.2 Practical Tips for Avoiding Plagiarism
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

Political research cannot be properly conducted in a moral vacuum. This is because it has consequences for those who participate in the research and those who are influenced by it. Political science research brings with it special challenges that are not encountered in the same degree as in other disciplines. The relationship between the practice of politics and its analysis can be fraught with “fraud and plagiarism” problems. Professional codes of conduct are often too generally worded to provide much help, but the increasing resort to ethics committee in universities may restrain research as well as guide it. In this unit, we shall discuss the relevance of ethics in political science research.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- explain the nature of ethical problems in empirical research
- discuss the basic ethical principles in research
- explain how to avoid unethical conduct in empirical research.

### **3.0 MAIN CONTENT**

#### **3.1 Ethics in Political Science Research**

In political science research, certain unethical behaviours occur in scientific research. Barnes (1979:16) defines ethical problems as “those that arise when we try to decide between one course of action and another, not in terms of expediency or efficiency, but by reference to

standards of what is morally right or wrong.” Decisions as to what is wrong or right is not only influenced by traditional culture, but guided by individual choices. Moreover, it is also suggested that researchers should be guided in their professional lives by codes of conduct drawn up by associations representing their disciplines.

In political science research, there is unethical behaviour a researcher should avoid and it can be classified as:

## **1. Fraud**

Fraud entails tampering with data to make results look more convincing or even creating fictitious interview results. A more common form of fraud is plagiarism. This means the act of stealing or presenting someone’s idea or work as yours (Grix, 2001:120). Rosamond (2002:166) notes that “plagiarism is widely thought of as perhaps the most grievous academic crime”. It has become an increasing problem for universities as Web technology has allowed access to a wide range of papers without charge, and using same as one’s paper.

## **2. Plagiarism**

Plagiarism is failing to acknowledge the source of material used in your research report or assignment, and therefore, taking credit for other peoples’ work (Pierce, 2008:108). It is a form of cheating and can attract heavy penalties. A similar offence is to include reference to textbooks and sources which you have not actually read. The regulations normally prescribe a range of penalties depending on the severity of the case, from a simple reduction in marks, to the ultimate sanctions of exclusion from the university or refusal to award a degree.

You will find the exact penalties for your institution specified in institutional regulations.

Plagiarism is, thus, something to be avoided, and it is assumed that no one would deliberately set out to cheat in this way. The problem is that it is easy to “plagiarize” unwittingly, especially with researchers involved in internet research. However, there is also “unintentional plagiarism” researcher may find themselves involved.

Regarding such “unintentional plagiarism”, you should note the following:

- The concept of “work” in the definition of plagiarism given above includes ideas, writing or inventions, and not simply words.

- The notion of “use” in the definition does not only mean “word for word” (an exact copy) but also “in substance” (a paraphrase of the notions involved).
- Use of another’s work is acceptable, if you acknowledge the source.
- Good paraphrasing involves a significant rewrite of the original that retains the meaning, and possibly, adds extra points.

The first two of these aspects give an indication of the potential dangers for students, but the third and fourth provide remedies. To avoid the risk of unintentional plagiarism, adopt the following advice: if you think a particular author has said something particularly well, then quote them directly and provide a reference to the relevant article or book beside the quote. Note that the convention in academic writing is to use inverted commas (and sometimes italics) to signify clearly that a quotation is being made.

### **3. Redundant Publication**

When two or more articles with similar data, hypotheses, discussion points, conclusions etc., without full cross-reference or other appropriate disclosure emerge from a source. Can published articles be republished? Can article in English be republished in French? Can a published abstract at a conference be later presented elsewhere for publication? For these and similar situations, full disclosure is necessary and clearly, redundant publication is an unethical practice.

### **4. Data Fabrication**

This refers to any intentional misrepresentation of research result through making up of social data for analysis and deceptive interpretation for research reports. It is highly unethical and already illegal in some countries. Examples include: drylabbing (reporting experiments that were never conducted); forging (massaging and manufacturing of scientific/experimental/social data) etc. This has consequences ranging from dismissal of tenured faculty, blacklisting, forfeiture of research grants and even withdrawal of academic credentials.

### **5. BIAS**

Is essentially a predisposition or prejudice for or against a theory, person, group or institution which may distort or skew cognizance and interpretation of phenomena. However, your greatest source bias may be your very own researcher’s bias.

## Ethical Principles

According to Burnham, *et al.* (2004: 253), five basic principles can be discerned:

- Beneficence or the avoidance of harm: researchers ought to seek to do good rather than cause harm.
- Veracity or the avoidance of deception: they ought to tell the truth and keep promises.
- Privacy or autonomy: individuals have a right to limit access to information about them.
- Confidentiality: closely related to the notion of privacy, the right to control the use of information about oneself.
- Consent: the notion of informed consent, often recommended as an operational principle for the conduct of the research.

## Professional Code of Conduct

Professional associations of Social and Political Scientists now generally provide “Code of Conduct” or “ethical guidelines” for their members. The codes of conduct for members are (PSA, 2002; APSA 2002):

- Upholding scientific standards
- Compliance with the law
- Avoidance of social and personal harm
- Upholding trust and confidentiality principle between interviewer and interviewees
- Observing legislative changes in human rights (right to privacy) and data protection
- Avoidance of deception – they ought to tell the truth and keep promises
- Obligations to the society (citizens)
- Consent – the notion of informed consent, often recommended as an operational principle for the conduct of research
- Obligations to sponsor’s (funders) and employer
- Ethics Committees and a standard protocol for checking ethical considerations in universities.

Each of the codes has something to say on the subject in relations with sponsors. The codes emphasise that research cannot be exempted from quality assurance procedures. High quality research demands high

qualities in ethical standards and to ensure that procedures agreed to at the design stage are maintained throughout the project.

### **3.2 Practical Tips for Avoiding Plagiarism**

#### **Avoid copying material by electronic means**

You may do this if you are prepared to quote the source. If you use the material in your work, and fail to add an appropriate citation, this would be regarded as cheating. The practice of cutting (copying) and pasting electronically (for example, taking material from websites) and using this in a project or dissertation without citing it, is regarded as plagiarism and will be punished if detected. Academics now have sophisticated electronic means of identifying where this has occurred.

#### **When making notes, always write down your sources**

You may risk plagiarising if you cannot recall or find the source of a piece of text. Avoid this getting into the habit of making careful note of the source on the same piece of paper that you used to summarise or copy it out. Always use quote mark “.....” When taking such notes verbatim from texts and other materials, to indicate that what you have written down is a direct copy of the words used, as you may forget this at a later time. You do not need to quote directly in the final version of your work, but if you paraphrase, you should still cite the source.

#### **Try not to paraphrase another person’s work too closely**

Taking key phrases and rearranging them, or merely substituting some words with synonyms is still regarded as plagiarism. Three good reasons for paraphrasing:

- it shows that you understand the concepts and ideas from the original text
- it gives your reader a broad idea of the key ideas or argument without having to read all the source material
- it demonstrates your capacity for critical thinking.

Follow the academic custom of quoting sources. You should do this even if you prefer to use your own wording rather than a direct copy of the original. The reference to the source signifies that you are making that statement on the basis of the ideas reported there.

#### **Avoid overuse of quotations**

Plagiarism still occurs if a considerable percentage of your report or dissertation is comprised of quotations. In general, quotations should be used sparingly.

### **Double-check on your “original ideas”**

If you have what you think is a novel idea, do not simply accept that your brainwave is unique. It is common for people to forget the original source of an idea, which may resurface in their mind after many years and perhaps in a different context – this may have happened to you. Think carefully about possible sources that you may have forgotten about; ask others (such as your tutor or supervisor) whether they have come across the idea before; and consult relevant texts, encyclopaedia or the Web (Eneanya, 2012).

## **SELF-ASSESSMENT EXERCISES**

What do you understand by plagiarism and how do you overcome it in research?

## **4.0 CONCLUSION**

In this unit, we have discussed ethics in political science research. In recent years, ethical considerations across the research community have come to the forefront. Ethical consideration may arise when we try to decide between one course of action and another by reference to standards of what is morally right or wrong. Political research cannot be conducted in a vacuum. Professional associations of social and political scientists now generally provide codes of conduct or ethical guidelines for their members. Though the Social Research Association code is not specifically written for political scientists, it is seen as offering a “gold standard” in terms of its detailed but also very balanced advice.

## **5.0 SUMMARY**

For academic research project, all institutional regulations require it to be original. Originality of the research in this context means that it was conducted by the student independently and honestly using some research resources and acknowledging them in the study. Political research can no longer be conducted in a moral vacuum. Researchers are now guided by basic ethical principles and code of conduct drawn up by associations representing their disciplines. These research code of conduct and ethical principles now guide researchers against certain forms of conduct, such as: plagiarism, fraud, dishonesty, bias, individual privacy, confidentiality and avoidance of deception. These ethical

problems often occur in the course of research and researchers should avoid them.

## 6.0 TUTOR-MARKED ASSIGNMENT

1. What do you understand by the nature of ethical problems in empirical research?
2. How do you avoid unethical conduct in empirical research?

## 7.0 REFERENCES/FURTHER READING

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## **MODULE 5      POLITICAL DATA ANALYSIS**

Unit 1	Quantitative Data Analysis
Unit 2	Qualitative Data Analysis
Unit 3	Combination of Quantitative and Qualitative Data Analysis
Unit 4	Writing Research Report

### **UNIT 1      QUANTITATIVE DATA ANALYSIS**

#### **CONTENTS**

1.0	Introduction
2.0	Objectives
3.0	Main Content
3.1	Quantitative Data Analysis
3.2	Descriptive Studies
3.3	Univariate Data Analysis
3.4	Causal Studies
3.5	Testing Causal Hypothesis
3.6	Interpreting and Reporting Results
3.7	Merits of Quantitative Research
3.7.1	Criticisms against Quantitative Research
4.0	Conclusion
5.0	Summary
6.0	Tutor-Marked Assignment
7.0	References/Further Reading

#### **1.0      INTRODUCTION**

When researchers engage in quantitative research, their goal is to either falsify, modify or provide support for existing theory. They accomplish this goal deductively by deriving hypotheses from theory and using the data they collect to statistically test the hypothesis. In this unit we shall examine quantitative research method.

#### **2.0      OBJECTIVES**

At the end of this unit, you should be able to:

- explain the nature of quantitative research methods
- describe its characteristics
- list its strengths and weaknesses.

### **3.0 MAIN CONTENT**

#### **3.1 Quantitative Data Analysis**

Quantitative research method originated in nature sciences and has its philosophical roots in positivism. Quantitative research relies on quantitative information, such as numbers and figures. It is also based on statistical analysis, and measurement of properties inherent in the phenomenon of the case being studied. Social scientists use quantitative research method to “describe, explain, analyse, compare and summarise numerical information or data for decision-making” (Eneanya, 2013:339).

Data is defined as quantitative information. Similarly, analysis may be defined as the breaking down and ordering of the quantitative information gathered through research or other means of data gathering, while interpretation is the explanation of the associates and relationship found among the data or groups of data, this also includes inferences and conclusions drawn from these relationships discovered among data or group of data.

Analysis of research data is made up of the following elements: data preparation, data tabulation and data presentation and analysis. Elementary data analysis include: basically the measure of central tendency and the measures of dispersion. These are basically deceptive analysis (e.g Mean, Percentile, Standard deviation etc.).

Some elementary analysis could only produce limited information about the research; there is the need to proceed to the higher and more complete data analysis. The researcher has the responsibility of choosing, the appropriate statistical analysis, which can be influenced by the following factors;

- Nature and size of the sample being tested
- Hypothesis or research proposition being tested
- Design of the study itself
- Assumptions of the statistical test in-question.

#### **3.2 Descriptive Studies**

This branch of study includes any treatment designed to summarise or describe important features of a set of data without going any further or making any attempt to infer or generalise that pertains to more than the data themselves (Brownson-Oton, 2010:1). The objective of descriptive study is concerned with finding out who, what, where, when or how

much. For example, the research on crime is descriptive when it measures the types of crime committed, how often, when, where and by whom.

However, the study objectives of descriptive studies include (Blumberg *et al.* 2005:137):

- descriptions of phenomena or characteristics associated with a subject population (the who, what, when, where and how of a topic)
- estimates of the proportions of a population that have these characteristics
- discovery of associations among different variables.

Descriptive statistics is used to explain and describe the spread of the population as reflected in the sample. Usually after the conduct of research investigation, the generated data should reflect the characteristics of the population. Through descriptive statistical approaches, the peculiarities of the population sample will be easily known. Some of the numerical manipulations and graphical approaches of descriptive statistics are:

- Frequency Distribution
- Measures of Central Tendency
- Measures of Dispersion (variability)
- Percentages
- Graphs and Graphing.

Note that Statistics is used in research studies as an aid or instrument for actualising the objective of the research. Sometimes researchers who are very knowledgeable in statistical computations tend to dwell so much on them to the extent that the direction and focus of research is jeopardised. It must be stated therefore that the most ideal or best statistical method is the one that addresses the main purpose of the research. Sophistication of statistical computation does not make research superior. Basic knowledge of statistics is usually assumed for all researchers.

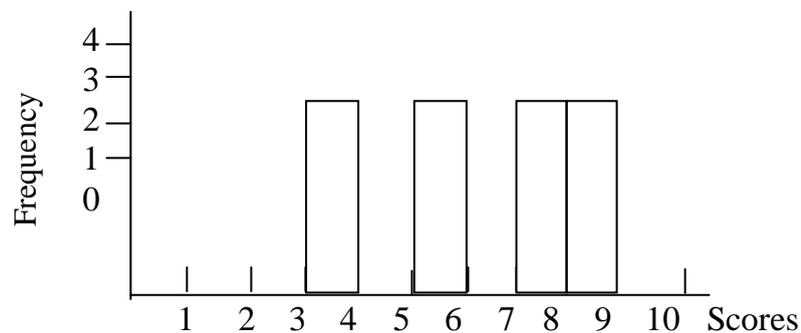
### **Frequency Distribution**

A frequency distribution consists of a count of the number of scores falling into a response category. Frequency distributions are usually represented graphically as a histogram. The response categories are placed along the x-axis and the frequency along the y-axis. The drawn bars represent the appropriate frequency. Example:

Frequency of table of the score: 4, 4, 8, 8, 6, 7, 9, 9, 9, 6, 5, 6, 4, 8.  
Should be:

<b>Score</b>	<b>Frequency</b>
4	3
5	1
6	3
7	1
8	3
9	3

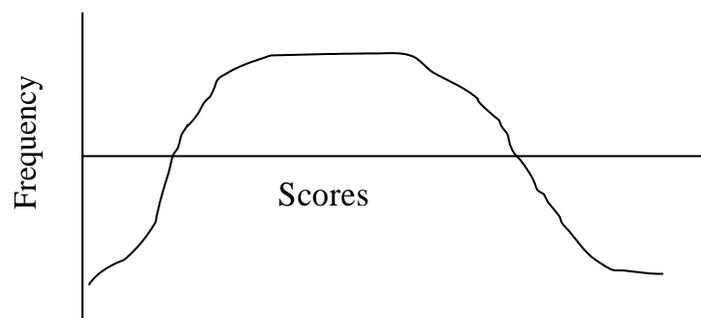
The graph-Histogram



### Normal Distribution

The normal distribution is a mathematical entity rarely seen in real life but it has useful properties for the statistical evolution of data. Sometimes, the frequency distribution is made to approximate the normal distribution, which has a shape resembling a symmetrical hill.

Example: Line graph

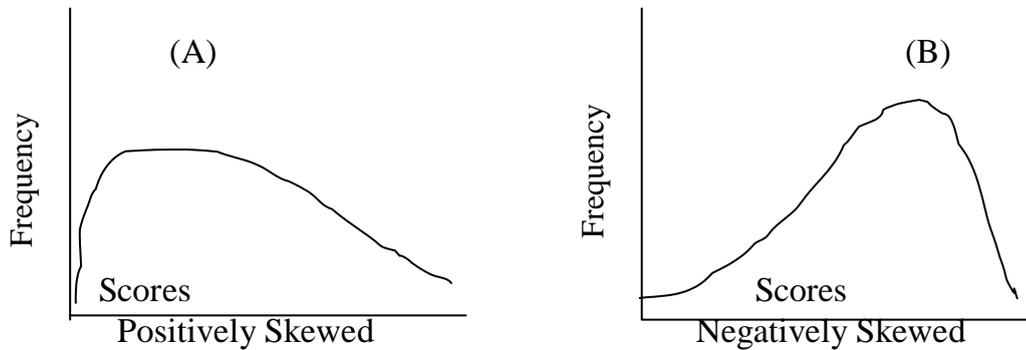


### Skewed Distributions

Skewed distributions are observed when the graph (histogram or line) is drawn. If most of the scores are located at the low end of the distribution and the long tail extends along the x-axis then it is positively skewed.

But if the opposite occurs i.e. most scores are located at the high end of the distribution and the tail extends to the zero end of the x-axis, then it is negatively skewed.

Examples: Line graphs



### Percentages

Percentages are often used in descriptive statistics to show the magnitude of the different response categories. It is usually presented with the frequency distribution table and that way the percentages of each of the distribution category are shown. An example of this is shown in the frequency distribution table shown below thus e.g. a score of 4 with frequency of 3 will have the percentage worked thus:

$$\frac{3}{14} \times \frac{100}{1} = 21.4286\%$$

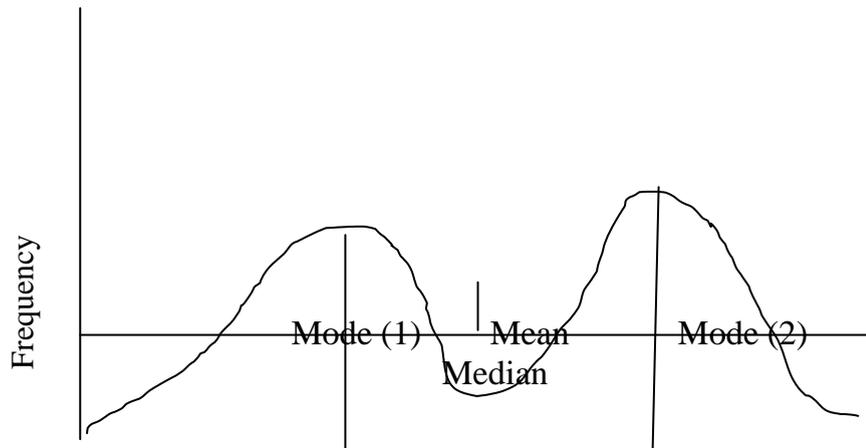
Scores	Frequency	Percentage
4	3	21.428%
5	1	7.143
6	3	21.4286
7	1	7.143
8	3	21.428
9	3	21.428
	14	100%

### Measures of Central Tendency

There are three principal measures of central tendency namely: The mode, median and mean. Measures of central tendency give a single score among the scores that represents the general magnitude of scores in a distribution.

**The mode** is the most frequent or most occurring score in a distribution. There are distributions with two modes called bimodal distributions.

Example: Bimodal distribution graph



The use of mode is not usually encouraged because it is limited since the scores outside the most frequent score (mode) are not represented or accounted for.

**The median** is the middle score in an ordered distribution. The median takes more information into account than the mode. But because the median does not take account of the scores below and above the middle score, it is usually termed insensitive. For instance, two distributions could have the same median but yet are different in character.

**The mean (average)** is usually the most sensitive and widely used measure of central tendency. The formula is:

$$\text{Means} = \frac{\sum X}{N}$$

Where  $\sum x$  = sum of the scores in the distribution

$N$  = the number of scores in the distribution.

The sensitivity of the mean arises from the fact that the magnitude of each score in the distribution affects it and therefore the mean is easily affected by extreme scores.

### Application to Research

The use of any measure of central tendency in research depends on two factors:

- (1) The scale of measurement
- (2) The shape of the distribution.

The four measurement scales – nominal (categories), ordinal (rank ordering), interval and ratio scales, to a great extent determine which measure of central tendency to use (Bordens & Abbott 1998).

When the research data are measured on a nominal scale, the researcher is limited to using the mode. For instance, it makes no sense to calculate the mean or median sex, when the sex is known to be categorised as either male or female.

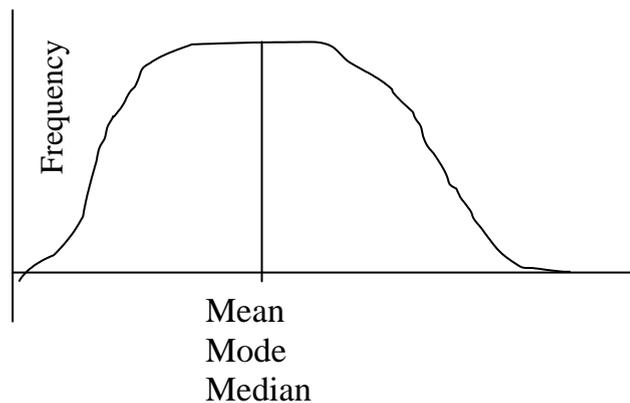
If the research data were measured on an ordinal scale, the mode or median could be used. The mean will be misleading since it is sensitive to distance between scores. With ordinal scale, the actual distance between points is unknown.

The mean can be used if the research data are scaled on either interval or ratio scale. This is because numbers on these two scales can be added, subtracted, multiplied or divided.

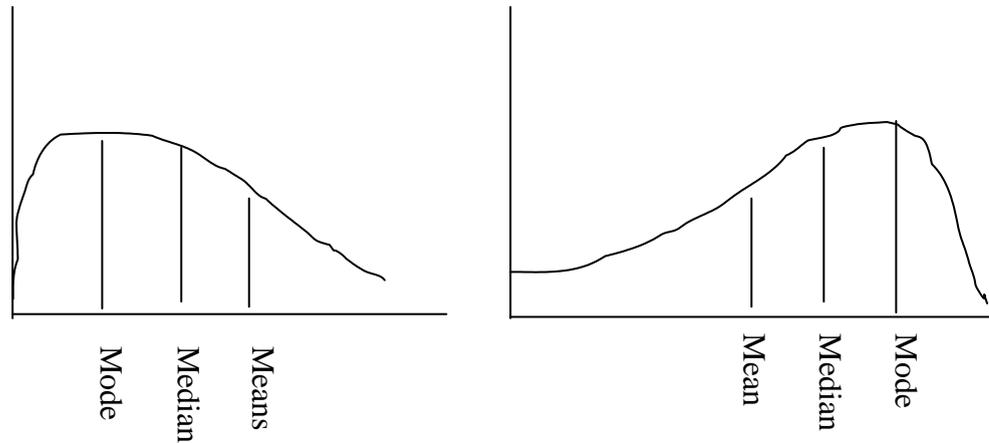
The mean can also be used when the scores are normally distributed, because the mean provides most information on other scores.

As the distribution deviates from normality, the mean becomes a less representative measure of central tendency.

When the distribution is skewed, the median is a better estimate of central tendency than the mean.



Normal frequency distribution Graph:



Positively Skewed

Negatively Skewed

### Measures of Dispersion or Variability

Usually the distribution of scores in a sample is varied hence the measure of variability in descriptive statistics. There are four measures of variability namely:

- (1) The range
  - (2) The semi-interquartile range
  - (3) The variance
  - (4) The standard deviation.
- The range is the least measure of variability calculated by simply subtracting the lowest score from the highest score.
  - The semi-interquartile range is calculated by following the sequence thus:
    - (i) Order the score in the tabulation
    - (ii) Divide the distribution in four equal parts i.e. quartiles
    - (iii) Find the score at 25% (Q1) to the lowest score and 25% (Q3) to the highest score. The interquartile range is  $Q3 - Q1$ ; then,
    - (iv) Divide the interquartile range by 2.

The semi-interquartile range is better than the range because it is less sensitive to the effects of a few extreme scores. It takes care of the scores in the distribution than the range.

- The variance is the average squared deviation from the mean. The formula is thus:

$$\text{Variance} = \frac{\sum(x-m)^2}{N-1}$$

Where

X = individual score

M = mean

N = number of scores.

Operationally, the mean for the distribution is obtained, then it is subtracted from each score in the distribution, each deviation scores is squared and a sum of the deviation scores is obtained. Finally the variance is obtained by dividing the sum of the squared deviation scores by N-1.

- Standard deviation is the square root of the variance. Because variance is usually expressed in units different from the summarised data, the standard deviation is used to convert the variance into the same unit of measurements as the original scores. This is done by finding the square root of variance (i.e. converting variance to standard deviation). Hence the standard deviation has become the most popular measure of dispersion or variability.

### **Application to Research**

The nature of the distribution of scores affects the type of measure of dispersion to be used in research. A distribution of scores that has more extreme scores will be more appropriate to employ semi-interquartile range than others. Also in a skewed distribution, the standard deviation is not appropriate since it uses the mean (inappropriate central tendency) to calculate the variance. The semi-interquartile range is also more appropriate.

A descriptive study may be simple or complex and may be done in many settings. The simplest descriptive study may concern a univariate question or hypothesis in which we ask about or state something about the size, form, distribution or existence of a variable. Data on such variable can be used for decision –making.

The analysis of survey data, for example, takes three basic steps: (1) univariate analysis (2) bivariate analysis and (3) multivariate analysis. The first step shows how the variables are distributed by themselves; the second step analyses a possible relationship between two variables; and the third step investigates the possibility of a spurious relationship.

### 3.3 Univariate Data Analysis in Descriptive Studies

In Survey research, description is a prerequisite to analysis. It is employed to discern “who” and “what” the significant characteristics involved. These characteristics are referred to as variable because they are capable of changing over a period of time. The univariate analysis of a variable involves summarising the answers of the respondents with respect to the variable. Such a summary may take a number of forms, depending on the level of measurement of the variable, such as: a graph from a frequency distribution, the mean, or the average, median or mode, referred to as central tendency. Normally, if the level of measurement of the variable is ordinal or nominal, the data may be presented in a univariate distribution which indicates the number of respondents in each category. For example, the distribution of the variable –religion is measured in three categories and may look like the following:

**Table 1.1**

<b>Religion</b>	<b>Number</b>	<b>Percent</b>
Catholic	157	34.9
Protestant	200	44.4
Others	93	20.7
<b>Total</b>	<b>450</b>	<b>100.0</b>

*Source:* Adapted from Eneanya( 2012). *Research Methods in Political Science and Public Administration*. Lagos: University of Lagos Press Ltd.

The second column shows the number of cases, which fall under each category, and (the third column expresses the numbers as a percentage of the total number). In presenting a distribution, it is often helpful to compute the percentages to facilitate interpretation and comparison. The main concern in computing the percentages is to decide what base number to use. A researcher may choose the total number of respondents for the base number.

Univariate distributions are largely descriptive in nature. They are highly informative of the characteristics of the survey sample. Before undertaking bivariate analyses, a researcher should familiarise himself with the univariate distributions of the major variables.

### 3.4 Causal Studies

The objective of the study determines whether it is causal or descriptive. If one variable produces changes in another, it is causal. For example, a causal study to explain relationships among variables for instance, “why is crime rate higher in city A than in city B?”

The essential element of causation is that “A produces B” or A forces B to occur. That is semantic. Empirically, we can never demonstrate an A – B causality with certainty. This is because we do not “demonstrate” such causal linkages deductively or use the form or validation of premises that deduction requires for conclusiveness. Unlike deductive syllogisms, empirical conclusions are inferences – inductive conclusions (Blumberg, et al. 2005:138). As such, they are probabilistic statements based on what we observe and measure. We cannot observe and measure all the processes that may account for the A – B relationship. Examples of causal studies are: hypothesis testing using t-test, z-test, chi-square, correlation; linear regression analysis, ANOVA and so on.

#### Measures of Relationships (Correlation etc.)

Measures of relationship deal mainly with correlation and related topics such as linear regression etc. The measures of correlation to be discussed are Pearson product-moment correlation, Spearman rank-order correlation and Point Biserial correlation. Also linear regression and coefficient of determination will be briefly explained.

#### Pearson Product – Moment Correlation

This is the most widely used measure of correlation and often used when the dependent measures are scaled on an interval or ratio scale. The Pearson correlation coefficient (Pearson  $r$ ) provides an index of the direction of the relationship between two sets of scores. Pearson  $r$  ranges from + 1 to – 1 through zero and a positive correlation indicate a direct relationship while a negative correlation indicates an inverse relationship. Scattergram graphs are used to illustrate correlations.

The magnitude of correlation coefficient tells the degree of linear relationship between two variables. A correlation of zero indicates that no relationship exists. As the strength of the relationship increases, the value of the correlation coefficient increases toward either + 1 or – 1. Both + 1 and – 1 indicate a perfect linear relationship. This sign is unrelated to the magnitude of the relationship but simply indicates the direction of the relationship. The statistical formula for Pearson product-moment correlation coefficient is

Covariance of x and y

$$r = \frac{\text{Covariance of } x \text{ and } y}{\text{Standard deviation of } x \times \text{Standard deviation of } y}$$

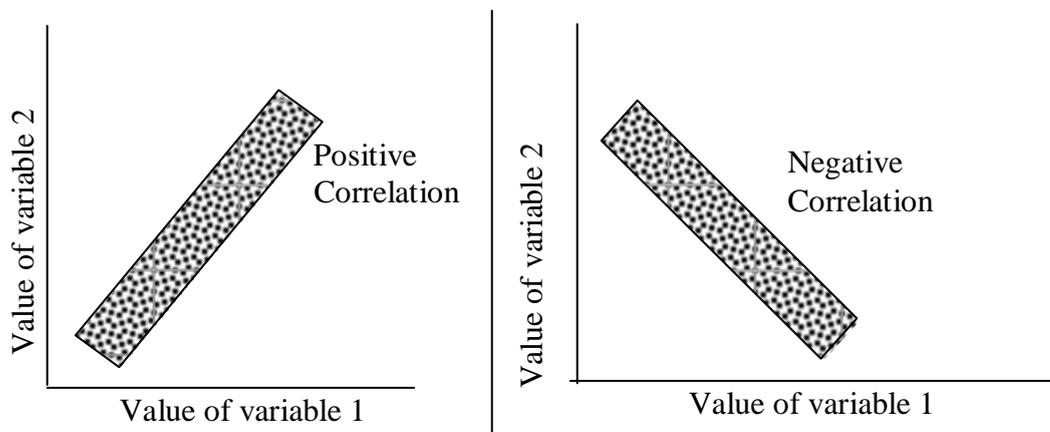
$$r = \frac{n \sum xy - \sum x \sum y}{\sqrt{n \sum x^2 - (\sum x)^2} \sqrt{n \sum y^2 - (\sum y)^2}}$$

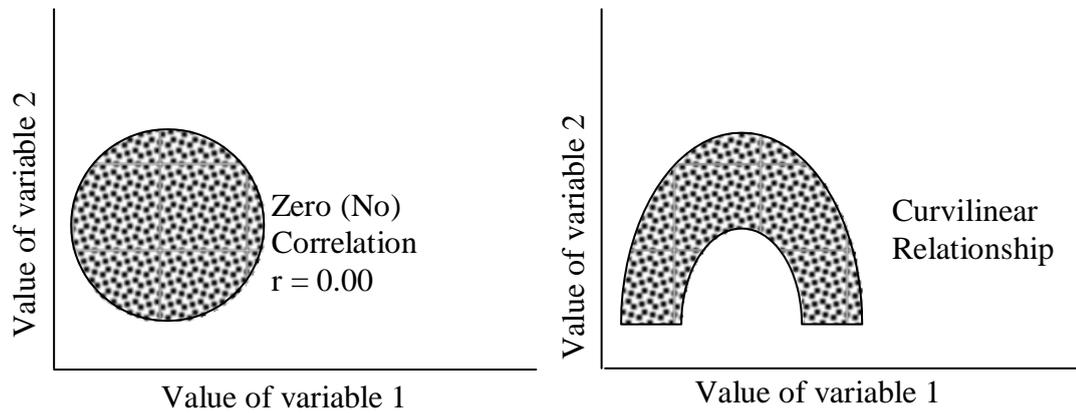
Where x and y are variables with scores in their distributions, and n is the number of scores in the distribution.

### Application to Research

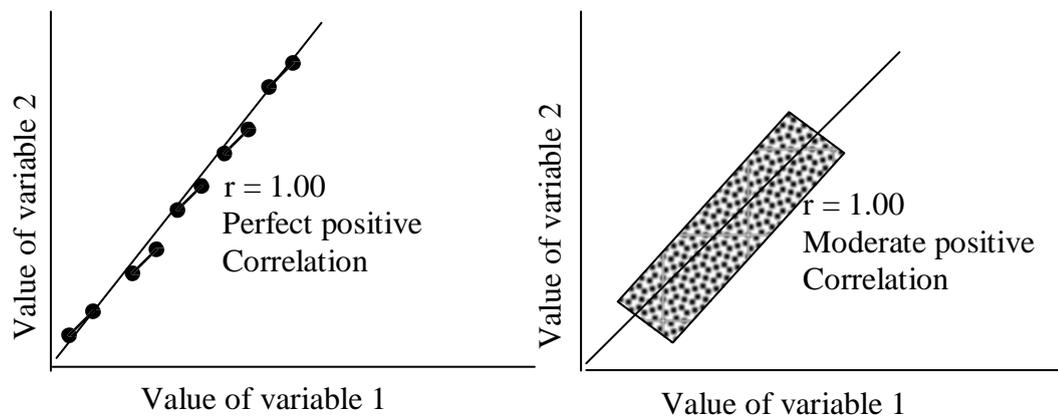
Since the application of Pearson r involves standard deviation and also the mean is implied, the data and the nature of distribution should be examined before Pearson r is used in research. Some of the factors that affect Pearson r are;

1. The presence of outliers or extreme scores in the data can drastically change the correlation coefficient and affect the magnitude of the correlation or its sign or both-especially in small distribution of scores.
2. The variability of scores within each of the distributions affects Pearson r because when the range of scores in one is restricted, the Pearson r underestimates the magnitude of the relationship between the variables. Therefore the standard deviation of the two distributions should be closely examined.
3. As earlier explained, the frequency distribution of the set of scores should be inspected to ensure that they are normal (or near normal) before the use of Pearson (r).
4. Pearson (r) reflects the degree of linear relationship between two variables; therefore care must be taken to ensure this linear relationship, especially through the construction of scattergram.





Examples: Showing scattargram of different forms of correlation graph



### Spearman Rank – Order Correlation

The spearman rank – order correlation (Spearman rho) is used when the data is scaled on an ordinal scale (rank ordered) or when the researcher wants to determine whether the relationship between variables is monotonic. The formula for spearman's rank correlation coefficient (R) is

$$R = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

Where d is the difference between the rankings of each item observed, n is the number of paired observations. Example can be tabulated thus:

Subject	1st Ranking	2nd Ranking	Difference in Ranking (d)	$d^2$
Tina	4	3	1	1
Ben	7	5	2	4
Okey	1	1	0	0
Ken	5	7	-2	4
Ayo	6	4	1	1
Yusuf	3	2	1	1

Ndu	2	6	-4	16
Total			0	30

Using the formular, we have:

$$R = 1 - \frac{6 \times 30}{7(49 - 1)} = 1 - 0.536$$

$$= 0.47 \text{ to 2 decimal places.}$$

The closer the agreement between the rankings, the nearer R is to 1. In the above hypothetical example,  $R = 0.47$  shows that the positive relationship between 1<sup>st</sup> and 2<sup>nd</sup> ranking is not strong, hence not much of agreement between the rankings. Beside ranking observations, the spearman rank correlation can also be used with any paired observations such as teaching method and students' performance, advertisement and sales, etc.

### **Point – Biserial Correlation**

Point-Biserial Correlation comes into use when one variable (out of the two) is measured on an interval scale and the other measured on a nominal scale. For instance, when the relationship between political behaviour (measured on a ten – point scale) and the political referendum (measured by Yes or No) is being sought. Because one measure is on the continuous scale and the other on a dichotomous scale, point – Biserial becomes ideal. Usually, the Pearson r formula is used to compute point Biserial correlation with the dichotomous variable coded as 0 and 1.

### **Phi Coefficient**

Phi Coefficient is often used when both of the variables being correlated are measured on a dichotomous scale. Because of the dichotomous nature of variables, dummy coding (ones and zeros) is used and then the resulting scores are plugged into the Pearson r formula. It has the same disadvantage of restricted range with the point-Biserial correlation.

### **Coefficient of Determination**

Coefficient of determination is simply the square of the correlation coefficient (whether Pearson r, spearman ranks etc). It provides a measure of the amount of variance shared by the two variables being tested. It indicates how much of the variability in one of the scores can be explained by the variability in the other score. For instance, the relationship between teaching method and students' performance investigated gives a correlation of 0.70. Then the coefficient of determination is  $0.70 \times 0.70$  or 0.49. This means that 49% of the

variability in students' performance can be accounted for by the variability in teaching methods.

## **Inferential Statistics**

The peculiarity of inferential statistics stems from the allowance they offer researcher to infer the characteristics of a population from the characteristics of the samples where the data emanates. Because these types of statistics assess the reliability of the researcher's findings, they are called inferential statistics. In research, inferential statistics are often employed in the testing of hypotheses, hence we are going to involve the relevant inferential statistics concepts already discussed such as: tailed tests, degree of freedom, significance level, critical region/value, type I and type II errors etc. while we still de-emphasise lengthy examples and cases studies, we shall be more concerned with the application and interpretation of the statistics while only emphasising formulas and relevant examples. For clarity and relevance, we have recognised the classification of inferential statistics as either parametric or non-parametric.

## **Parametric Statistics**

A parametric statistic estimates the value of a population parameter from the characteristics of a sample. To use parametric statistics, the researcher should make the following assumptions:

- (1) The sources or data were drawn from a randomly sampled group which is part of a population.
- (2) The sampling distribution of the mean is normal i.e. (normal frequency distribution).
- (3) There is no variation within the group i.e. within-group standard deviation is minimal.
- (4) The scores or data (especially the dependent variable) were drawn with an interval or ratio scale.

Complete negation of these assumptions may jeopardise the statistics result, hence could lead to committing the type I error (rejecting the null hypotheses when it is true). Examples of parametric statistics often common to researchers are;

- t-Tests
- Pearsons Product – moment correlation (Pearson r)
- Regression Analysis
- Analysis of variance (ANOVA), etc.

## **The t-Test: (students't-distribution)**

The t-test statistics is used when the researcher has only two groups in the experiment or design. It is also used when comparisons between pairs of groups are being made in more complex studies. Different versions of t-test are used in between-subjects and within-subjects designs. The formula for t-test is:

$$t = \frac{\bar{x} - u}{S/\sqrt{n}}$$

Where  $\bar{x}$  = mean of the sample

s = standard deviation of the sample

n = sample size

u = mean of a normal population.

Since t – test is a parametric statistic, it is only applied to samples taken from normal population and its shape is similar to a standard normal distribution. The shape of the t distribution depends on sample size (n), but t distribution table shows that t is tabulated according to the number of degrees of freedom (df) rather than the sample size (n).

The t – test can be used for (a) independent samples and (b) related samples. The t-test for independent samples is possible when data from the two groups for comparison are randomly assigned from independent samples to the two research groups. Here, t – test can use both equal and unequal number of subjects in each of the groups. Since t-test uses an error term, which is a composite of the variances from both groups, the difference in sample size between the groups kept as small as possible. Unequal sample size tends to increase the heterogeneous nature of variances from the two groups.

On the other hand, in related samples, the t-test formula must be adjusted to take into account any correlation between scores. When means are derived from matched-groups between-subject design, within-subject design, or a correlation study, the t-test should be adjusted and are called t-test for related samples or t-test for dependent samples.

It must be noted that t-test is often used when question as to whether the observed difference between means are reliable or whether they are caused by sampling error.

## Analysis of Variance (ANOVA)

When research involves more than two groups, the statistical analysis method is analysis of variance (ANOVA). Anova is concerned with analysing variance that occurs in the data. Usually the variance is caused by some factors and these factors are called the “sources of variance.” The source of variance is used to calculate the f-ratio which in turn is used as an ultimate check for the researcher to know whether the variation among means is statistically significant.

Variation in scores or variability of data can be traced to three sources namely:

- (a) Differences in independent variables
- (b) Individual differences of the subjects and
- (c) Differences arising from experimental error.

It should be noted that between-group variability can be caused by all these combined or any of the three factors. But within-group variability is usually caused by either individual's subject's differences or experimental error, or a combination of the two.

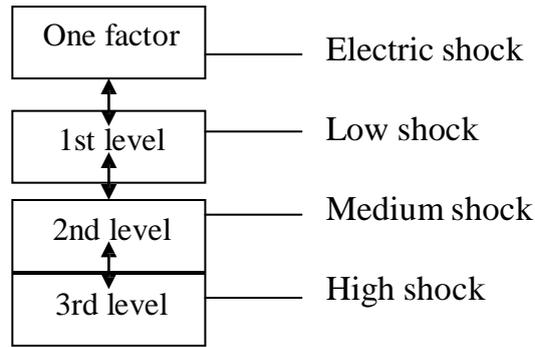
F-ratio is the statistic used to determine the statistical significance in ANOVA and it is simply defined as the ratio of between-groups variability to within-groups variability. Usually both variables are expressed as variances sometimes called mean square (ms). In research, when f-ratio is obtained, it is compared with a table of critical values to determine whether the results are statistically significant.

### Anova for Different Designs

It must be noted that there are different designs in experimental research studies which apply equally different modifications of the analysis or variance.

The following are the different designs:

- **One factor between subjects Anova:** When the researcher has one factor in the experiment with more than two levels and different subjects in each experimental condition than the one-factor between-subjects Anova will be used.

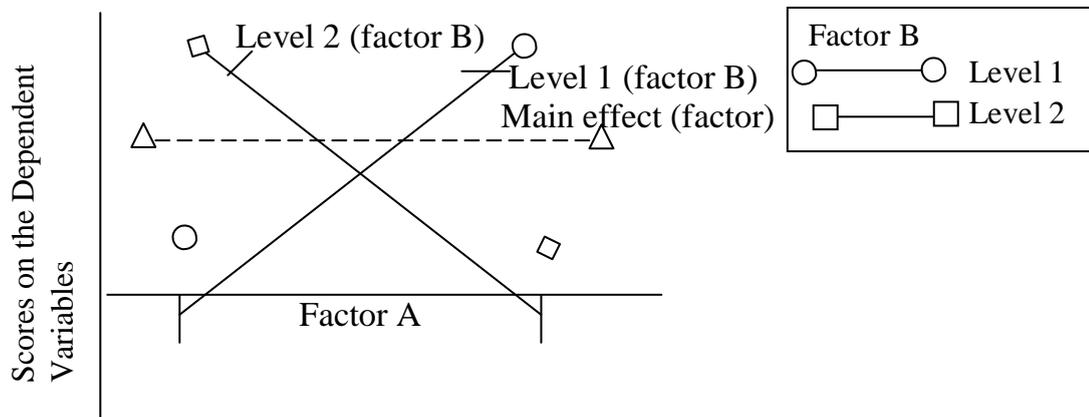


Usually these three levels represent three groups in the study and data for calculation of the f-ratio is gotten from the groups. A significant f-ratio tells us that at least some of the differences among the means are probably not caused by chance, but rather by variation in the independent variable. The f-ratio result will fail to indicate where the differences actually occur among the possible comparisons (groups).

- One-factor within-subject Anova:** When a multilevel within-subjects designs is used in an experiment, then the one-factor within-subjects Anova is used in the analysis of data. Here the same subjects (one group) are exposed to different experimental treatments. The two sources of variance are (a) variability within a particular treatment and (b) experimental error. Unlike the between-subjects analysis, individual differences no longer contribute to the treatments sum of squares, but if at all the contribution of individual differences is usually estimated by treating subjects as a factor(s) in the analysis. Then the factor(s) is subtracted from the within-subjects variance thereby reducing the error in the denominator of the f-ratio. A significant f-ratio suggests that significance differences exist among the means but again, it does not show or tell where these significant differences occur. To determine which means differ, further analyses of data are required.
- Two-factor between-subjects Anova:** A design that includes two independent variables and randomly assign different subjects to each condition in the different groups and hopes to extract the independent effect of each factor (independent variable) and the combined effect of the two factors on the dependent variable is a two-factor between-subjects design. The two-factor between-subjects Anova is the appropriate statistical analysis for this design.

It is noteworthy that the interpretation of main effect suggests that each independent variable have an effect on the dependent variable regardless of the level of the other independent variable. Nevertheless, the presence of an interaction provides evidence to the contrary. The interaction shows neither of your independent variables has a simple independent

effect. Consequently, the researcher should avoid interpreting main effects when an interaction is present (Abbot & Borden 1988). Sometimes interactions can cancel out main effects especially when statistical analysis fail to reveal statistical significant main effects of the independent variables even when they are effective. An example of this is depicted on the graph below:



*Source:* Adapted from Ihenacho, (2004). *Basic Steps for Quality Research Projects*. Lagos: Nobe-Alpha International.

This graph shows two-way interaction that masks main effects. Notice that factor A strongly affects the level of the dependent variable at both levels of factor B, but these effects run in opposite directions.

The dotted line which represents the main effect of factor A, are computed by averaging the upper and lower points to collapse across the levels of factor B. Since this dotted line is horizontal, it shows that there is no change in the dependent variable across the two levels of factor A. Although factor A has strong effects on the dependent variable at each level of factor B, its average (main) effect is zero. Therefore, it follows that “if the interaction of two variables is significant, then the two variables themselves have reliable effects.”

Consequently, if a significant interaction occurs, then main effects should be ignored. The factors involved in the interaction are reliable whether or not the main effects are statistically significant. Interactions tend to be inherently more interesting than main effects. They show how changes in one variable alter the effects on behaviours of other variables. When interpreting two-factor Anova, first consider the two main effects. The presence of a significant interaction suggests that the relationship between your independent variables and your dependent variable is complex.

- **Two-factor within-subjects Anova:** This is a situation where all the subjects in the within-subjects design are exposed to every possible combination of levels of the two independent variables. The two-factor within-subjects Anova is the appropriate analysis for this design. This analysis follows the same pattern with the one-factor within subject design.

Nevertheless, the two factor Anova is a bit more complex because it considers the interaction between each of the independent variables and the subjects factor (Axs and Bxs), and also the interaction between the independent variables (AXB). The interpretations of within subjects and between subjects Anova follow the same logic.

**Note:** There are different forms of ANOVA for analyses of different designs. Examples of these are (Ihenacho, 2004):

1. Three factor (factorial design) Anova, will have three main effects (A, B and C), Three two way interactions (AB, AC, and BC), and a three way interaction (ABC). As more factors are added, the Anova computations become more complex and may require the use of computer for computations.
2. Anova is also used in the computation of mixed designs. Examples “Mixed between – within or split plot design”.
3. In the computation of the different Anova designs, there are differences in the calculation of f-ratio. These differences must be noted in order to ensure clear and unambiguous research results. Take proper note of the steps in the computation of Anova.

### **Non-Parametric Statistical Tests**

In research situations where the dependent variable is scaled on a nominal or ordinal scale or when the assumptions of a parametric test are not met, then the non-parametric test is used. The chi-squared test and man-Whitney u-test are examples of the non-parametric test.

#### **Man-Whitney U-Test**

When the rest dependent variable is scaled on an ordinal scale, the man-Whitney U-test can be used to analyses the data. It is a good alternative to t-test when the data falls short of t-test requirements (i.e. parametric). The calculation procedure is as follows:

1. Combine the data from the two groups
2. Rank the scores from highest to lowest
3. Label the ranking according to the group e.g. (A, B)

4. If difference exists between groups, then the scores in the higher group should be consistently above the lower
5. A U – score is calculated for each group
6. The lower of the two U – scores obtained is then evaluated against critical values of U.

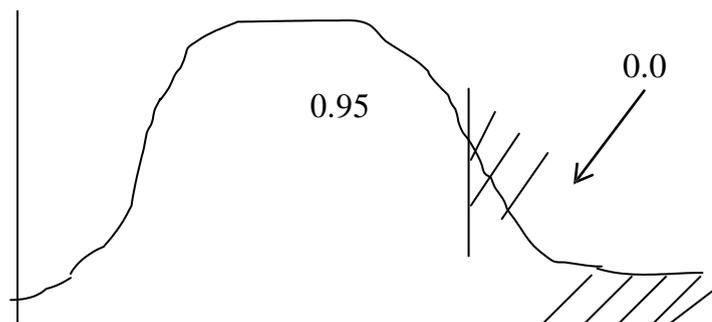
If the lower of the two U – scores is smaller than the tabled U-value, then it shows that the two groups differ significantly.

### Chi-Squared Test

When the dependent variable in a research study is scaled in nominal (dichotomous i.e. Yes/No, Male/Female) etc. or a frequency count of Yes or No, then the appropriate choice of statistic is the Chi-square ( $X^2$ ). Chi-squared tests are used to compare an observed frequency distribution or table with the distribution or table of frequencies expected, assuming the null hypothesis is true. The approach is to find the differences between the corresponding expected and observed frequencies. These differences are squared and divided by the expected frequencies. Then the quotients are added together to give a single statistic,  $X^2$  which is tested for significance. The formula is

$$X^2 = \sum \frac{(F_O - F_E)^2}{F_E}$$

When  $F_O$  = observed frequency,  $F_E$  = Expected Frequency. Chi – square cannot take negative values and its shape depends on the number of degrees of freedom. The shape of  $X^2$  is always symmetrical thus:



$X^2$  distribution graphs:

$X^2$

A chi-square test is always a one-tailed test and if the observed and expected frequencies exactly agree, the test statistic,  $X^2$  would be zero, so we are always testing to see whether the differences between the frequencies are so large as to have not occurred by chance (significantly greater than zero). When interpreting chi-square, the following examples will assist.

$\chi^2_{0.05} = 18.307$ , shows that an area of 0.05 lies under the  $\chi^2$  curve to the right of  $\chi^2 = 18.307$ .

$\chi^2_{0.01} = 23.209$ , shows that an area of 0.01 lies under the  $\chi^2$  curve to the right  $\chi^2 = 23.209$  etc.

After calculating the  $\chi^2$  if the value is large enough to lie in the critical region of the test, then we reject the null hypothesis and conclude that the postulated theoretical distribution is not good for the observed.

The two main types of Chi-squared tests are:

1. Goodness of fit test
  2. Contingency tables
- In the goodness of fit, an observed frequency is given and an expected frequency is constructed for comparison in assumption that the null hypothesis is true. There is usually a set of data (observed frequency) from which the expected frequency score are estimated for each corresponding observed frequency score.
  - In the contingency tables, the frequencies are classified in two ways rather than one and the degree of freedom (df) is gotten from the row and the column,

$$\text{thus } df = (R - 1) (C - 1)$$

Where R = Row groups, C = Column groups

- Remember that degree of freedom in goodness of fit is  $df = k - 1$ . Where k is the number of group.

Also in the contingency table, to calculate the expected frequencies for the corresponding observed frequencies, the formula is

$$\text{Expected frequency} = \frac{\text{Column total} \times \text{Row total}}{\text{Grand total}}$$

- Remember that when the calculated  $\chi^2$  value is greater than the critical value (i.e. falls within the critical region) the  $H_0$  (Null hypothesis) is rejected meaning that there is a positive relationship and that Alternative hypothesis is accepted.

### **Simple and Multiple Regression Analysis**

We have extensively discussed correlation and now we have to take a close look at regression which is a close associate of correlation. Situations arise when the researcher needs to go beyond a correlation

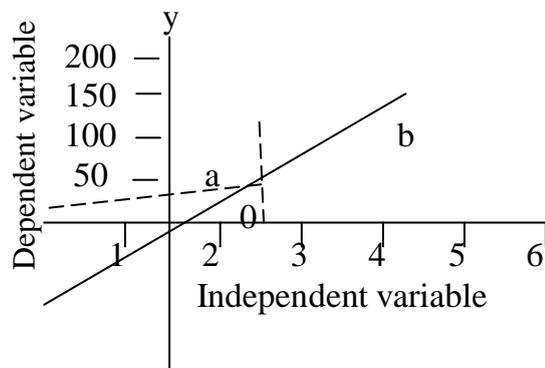
coefficient to write an equation that will allow him to predict a person's score on one variable from knowledge of that person's score on another variable. This situation is concerned with "Regression". When the coverage of regression is limited to best fitting line through the scatter diagram (scattergram), then the "Linear Regression" is in focus. Sometimes researchers are restricted to linear regressions because a high percentage of data in researches are basically linear.

### The Linear Regression

Our knowledge of simple statistics is required for a good understanding of regression equation just like other aspects of data analyses in research. The regression line equation is based on available data that relates Y (criterion variable) to X (Predictor Variable). Often times, Y is the dependent variable while X is the independent variable. The straight line equation  $y = bx + a$  or  $y = a + bx$  is familiar. Where:

- y = the value of dependent variable
- x = the value of independent variable
- b = the slope of the regression line
- a = the intercept

The slope (b) of the regression line is simply the amount of change in Y for one unit change in X, while the intercept (a) is the value of y when  $x = 0$



$$a = \text{intercept } (= 50)$$

$$b = \text{slope} = \left[ \frac{100}{3} \right] \text{ i.e. } \left[ \frac{(150-50)}{3} \right]$$

The slope should be seen as the measurement of the difference the researcher expects in Y (dependent variable) for a unit difference in X (the independent variable). It is important to know that there are errors of prediction in terms of  $Y - y$  deviations ( $y$  is the predicted value of Y). Usually the equation predicts  $y$  whereas  $Y$  is the value actually obtained in the score, then  $Y - y$  is an error of prediction which are seen as deviations from the actual value. It is advised that researchers using regression analysis should be well acquainted with its statistical approach.

## Multiple Regression

In research situations, it is possible to have more than one predictor and when such situation occurs, we have a linear combination of two, three or more predictors to predict the criterion. This is a multiple regression situation and it is an extension of the linear equation thus:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + \dots$$

Where  $b_1$ ,  $b_2$  and  $b_3$  are the slope coefficients for predictors  $x_1$ ,  $x_2$  and  $x_3$  respectively,  $a$  is the intercept. The multiple correlation coefficient ( $R$ ) is the correlation coefficient between the criterion and several predictor variables. For instance, if after a multiple regression calculation, the multiple correlation coefficient ( $R$ ) gotten is 0.75, the squared correlation coefficient ( $R^2$ ) should be 0.56. The interpretation is that 56% of the variability in the criterion variable ( $Y$ ) can be accounted for by variability in the predictor variables considered together ( $x_1 + x_2 + x_3$ ).

Regression coefficients are the slope coefficients corresponding to each of the predictor variables. Usually, the task of deciding on the relative importance of predictors is a difficult one and for predictors that are highly correlated among themselves, the regression may be meaningless. When the predictors are highly correlated with each other, the regression equation is usually very unstable from one sample of data to another. Multicollinearity is a situation in which the predictors are highly intercorrelated.

The following points should be noted about multiple regressions:

- A partial regression coefficient expresses the relationship between a particular predictor and the criterion controlling for, or partially out, the relationship between that predictor and all the other predictors in the equation.
- The number of regression equations that can be compared in a multiple regression increases exponentially with the number of predictors. For example with two predictors, there will be three regression equations as below:
  - 1.  $Y = a + b_1 + 1$
    2.  $Y = a + b_2 \times 2$
    3.  $Y = a + b_1 \times 1 + b_2 \times 2$

With three predictors ( $x_1$ ,  $x_2$ , and  $x_3$ ) the number of regression equations that will be considered is:

- 1)  $Y = a + b_1 x 1$
- 2)  $Y = a + b_2 x 2$
- 3)  $Y = a + b_3 x 3$
- 4)  $Y = a + b_1 x 1 + b_2 x 2$
- 5)  $Y = a + b_1 x 1 + b_3 x 3$
- 6)  $Y = a + b_2 x 2 + b_3 x 3$
- 7)  $Y = a + b_1 x 1 + b_2 x 2 + b_3 x 3$

- Multiple regressions often involve large number of predictors and sometimes the regression equations are of diverse nature. Selection of these regression equation approaches is a vital part of multiple regression decision (block wise) and the stepwise selection approaches. Also all the predictors could be entered into the regression equation, a situation known as standard multiple regressions.
- Regression is generally dependent on the variability of the variables involved unlike correlation coefficient. This attribute of regression makes it difficult to compare different variables. Because of this, sometimes scores on the criterion and predictor variables are standardised by expressing them as standard scores (z-scores with mean=0 and standard deviation = 1). When scores are standardised, the regression coefficient is the same as Pearson's correlation coefficient and ranges from + 1.00 through 0.00 to - 1.00.

**Note:** The researcher must acquaint him/herself with sufficient knowledge of statistical methods for the proper analyses of his/her research data. So far we have only tried to give reasonable insights and information that will assist in analyses and interpretation of research results. It must be understood that statistics is a tool for analyses of research data and the meaning of an analysed data solely depends on the researcher. Proper care must be taken when dealing with research data because they form the basis of the researchers result and interpretation. Remember that research results are for decision making and the consequences of a bad decision could be grievous when adequate precaution was not taken.

However, David Hume (1711-76) specified five precise conditions for causation to occur:

- (i) Co-variation
- (ii) constancy of association
- (iii) cause must take place before effect
- (iv) independent and dependent variables must be discrete (rather than continuous) and
- (v) non-spuriousness (Quoted in Glaser and Strauss, 1995).

Co-variation describes the phenomenon where two variables appear to change at the same time. For example, unemployment and poverty appear to increase or decrease at the same time. The co-variation can be plotted graphically and tested for association (degree of consistent relationship) by the statistical test of correlation. However, “association does not necessary equal causation”; and association does not identify the independent and dependent variable (Pierce, 2009:31).

The analysis of survey data takes three basic steps: (1) univariate analysis. (2) bivariate analysis, and (3) multivariate analysis. The first step shows how the variables are distributed by themselves; the second step analyses a possible relationship between two variables; and the third step investigates the possibility of a spurious relationship.

### **Bivariate Analysis**

One of the widely used methods' of studying survey data is contingency table analysis. It may be employed to study bivariate and multivariate relationships. In the simplest form, a contingency table has two variables, with two or more categories for each variable. The table has a number of boxes or cells. The raw number in each cell indicates the number of cases, which has a shared attribute as determined jointly by the two variables. Each case can only appear in one cell, depending upon which category the case belongs to with respect to the two variables. Table below is an example of a contingency table. It cross-tabulates two variables, attitude towards skill development by age.

**Table 1.2: Attitude towards Skill Development by Age**

"Do you approve or disapprove of developing skill by the organisation?"

	<b>Under 30</b>	<b>30 and over</b>
Approve (%)	56	68
Disapprove (%)	44	32
Total(%)	100	100
	(200)	(250)

*Source:* Adapted from Eneanya, (2012). *Research Methods in Political Science and Public Administration*. Lagos: University of Lagos Press Ltd.

To facilitate comparisons, it is always more convenient to convert the raw figures to percentages. There are two ways the percentages can run, either by row or by column. In other words, the percentages can add up to 100 percent either horizontally or vertically. The rule to follow is to compute the percentages in the same direction as the categories of the

independent variable. Thus, comparisons of the percentages can be made between the categories of the independent variable. In Table above, the dependent variable is attitude towards skill development, measured in terms of approval or disapproval in an organisation in respondent's community. The percentages add up to 100 percent in the direction of each category of the independent variable, age. The number at the bottom in parentheses shows the raw total on which the 100 percent is based.

The table shows that 56% of the respondents under 30 years of age approve of the statement, as compared to 68% of the respondents 30 years of age and over approving of it. Conversely, 44% of the respondents under 30 years of age disapprove of the statement, as compared to 32% of respondents 30 years of age and over disapproving of it. The latter statement is redundant in a two-by-two table because these percentages are implied in the former ones. The percentages indicate that older people are more likely to approve the development in their community. In other words, there is a relationship between age and attitude towards skill development.

The logic of comparison in contingency table analysis is quite straightforward. In comparing the categories of the independent variables, we are looking for changes in percentages with respect to the dependent variable. In the above example, we are saying that as we move from one age category to another, there is a change in the percentage of respondent approving or disapproving of the statement. Differences in percentages are "sometimes difficult to assess". How big a difference, for example, do we consider to be a "real" difference? There are statistical procedures which help us to make decisions regarding whether the differences are likely to occur by chance. There are also various measurements of association which tell us how strong or weak the relationship between two variables is. Discussions of these procedures may be found in a standard statistical textbook.

A bivariate table tells us whether a relationship exists or not, but, does not provide an explanation for the relationship. In the above example, it is not clear why younger people are more likely to disapprove of the development of skill. Do younger people have more concern about skill building? Do older people have something to gain by supporting a skill development in the organisation? These are some of the question which requires us either to refine or to explain the original relationship.

Table 1.2 cross-tabulates developed skill by the age of the respondent. It shows that 30% of the respondents under 30 years of age have benefitted from skill development, as compared to 72% of the respondents 30 years of age and over not trained for skill development. In other words, the

older people are more likely to support skill development, than the younger people. This table below provides same evidence to support our explanation.

**Table 1.3: Developed Skills by Age**

Did you benefit from skill development?

	<b>Under 30</b>	<b>30 and over</b>
Benefitted (%)	30	72%
Not Benefitted (%)	70	28
Total	100	100
	(200)	(200)

### **Multivariate Analysis in Causal Studies**

The logic of multivariate analysis is to control for those variables which we suspect may affect the relationship under study. In our example, we want to control for the variation in skill development to see whether it affects the original relationship between attitude towards skill development and age. Table below is an example of such a control table.

**Table 1.4: Attitude towards Skill Development by Age and Beneficiaries**

	<b>Benefitted</b>		<b>Not Benefitted</b>	
	Under 30	30 and Over	Under 30	30 and Over
Approve (%)	75	75	48	48
Disapprove (%)	25	100	100	100
	(80)	(190)	(120)	(60)

The original sample is divided into two groups; those who benefitted in skill development and those who do not. Within each group, we can cross-tabulate attitude against skill development and age. If for example, we find that there is no relationship between attitude towards skill development and age among the respondents who benefitted, then we know that age is really not the variable which explains the attitude.

The table shows that 75% of that younger age group, as compared to the same percentage of the older age group approve of the statement. Simply put, younger and older respondents who benefitted are just as likely to approve of the statement. We notice also that younger and older

respondents who do not benefit are just as likely to approve the statement as well. However, when we compare the first column to the third column, we find a change in percentages. The respondents in these two columns belong to the same age group, but differ in skill development. In other words, as we vary skill development, age being constant, we find that those who benefitted are more likely to approve skill development. Specifically, among those who benefitted, 75% of the people under 30 years of age approve of development. In contrast, among those who do not benefit, 48% of the people under thirty years of age approve of the development. In short, beneficiary of skill development, and not age, makes a difference in the response to the statement.

In contingency table analysis, we do not really control the independent variables in the same sense as in the experimental approach. Rather, we group the respondents having the same attribute of an independent variable together, and make comparisons on another independent variable. This procedure allows us to discuss how one independent variable affects the dependent variable, while holding a third one constant. By regrouping the respondents under different attributes, we can test a variety of variables as to how they may affect the original relationship.

However, there are several ways that variables may change at the same time. In social science, the “cause” is normally indicated as “x” and the “effect” y. Causes and effects are generally called variables, where, causes are termed independent variable or causal events, while effects are termed dependent variable (consequent events or outcomes).

The causal effect of independent variable x on the dependent variable y can be represented as illustrated before (Pierce, 2009:31):

$$X \rightarrow Y$$

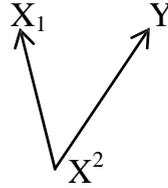
However, another independent variable,  $x^2$  may also be affecting y by the process termed “additivity”:

$$\begin{array}{ccc} X_1 & \rightarrow & Y \\ & & \uparrow \\ & & X^2 \end{array}$$

Alternatively,  $x^2$  may be affecting  $x^2$  may act as a type of catalyst on  $x_1$  and y. This is termed interaction:

$$\begin{array}{ccc} X_1 & \rightarrow & Y \\ & & \uparrow \\ & & X^2 \end{array}$$

Finally, the association between  $x_1$  and  $y$  may be a spurious relation where they are both being affected by  $x_2$ :



### 3.5 Testing Causal Hypotheses

However, in practice, few causal relations in politics involve only one cause. Most effects have many causes and these causes will affect many effects. There is also argument that, even so, causes are only the tangible manifestation and agent of the underlying distribution of power within society (Pierce, 200:32).

While no one can ever be certain that variable A causes variable B to occur, one can gather some evidence that increases the belief that A leads to B. In testing causal hypotheses, we seek three types of evidence (Blumberg *et al.*, 2005: 145):

1. Co-variation between A and B
  - Do we find that A and B occur together in the way hypothesised?
  - When A does not occur, is there also an absence of B?
  - When there is more or less of A, does one also find more or less of B?
2. Time order of events moving in the hypothesised direction
  - Does A occur before B?
3. No other possible causes of B
  - Can one determine that C, D and E do not co-vary with B in a way that suggests possible causal connection?

### 3.6 Interpreting and Reporting the Results

Once the data have been collected and analysed, the researcher has almost completed his task. He has tested the hypothesis and on the basis of this test can either confirm or invalidate it. If the data seem to support the hypothesis, the hypothesis can be advanced as a generalisation. If the data do not support it, the hypothesis will probably have to be rejected. However, other hypotheses may be suggested as a result of the study. Naturally, the generalisation will be limited to the

scope of the data. In order to enlarge the scope of the data, random selection from a larger universe is frequently employed. The more data are selected randomly, the greater the chances that the sample will be representative and, hence, the resulting generalisation accurate for that population.

At the end of the project, it is often customary to interpret the findings. In addition to reiterating the conclusions, a researcher may want to speculate on the reasons for the results turning out as they did. In explaining empirical findings within the context of our knowledge of reality, he will frequently be engaged in theory-building, in developing comprehensive explanations of the “how” and “why” variety. This type of explanation usually serves as an addendum to the study. It is normally not supported by the research itself, but may later become the subject of another study. In writing the research report, it is customary to separate the interpretation from the results of the analysis. The analysis constitutes the researcher’s substantive contribution; the interpretation presumably gives these results meaning.

After the researcher has generalised about his findings, he may wish to explain his results within a larger theoretical context. He might also want to suggest other hypotheses for future study. The research process is an ongoing effort. Knowledge accumulates but is never complete.

### **3.7 Merits of Quantitative Research**

- (1) The greatest advantage of quantitative method over other methods is its general acceptance by others as being rational, logical, planned and systematic. The findings are regarded as credible.
- (2) It is regarded as being straight –forward and provides facts.
- (3) It employs very large samples designed to reflect and be representative of the population being studied.
- (4) It enables geographically or immobile people to be surveyed either by the use of postal survey, telephone or internet.
- (5) It makes it possible for computers and other new technology to be used.
- (6) It makes it possible for data to be re-examined, audited and re-analysed or used for other purposes.
- (7) It enables research projects to be carried out by terms in which specialist talents can be properly exploited and work sub-contracted to agencies.
- (8) It is suitable for the development or grand, meta and micro theory by testing logical hypothesis.
- (9) It can be used to identify clusters of relatively small-scale phenomena and to analyse these statistically to identify whether

particular concentrations may be attributed to chance or potentially localised causes.

- (10) Quantitative method can be used to mine and analyse existing data banks.
- (11) Most concepts are capable of being represented by measurable indicators.

### **3.7.1 Criticisms against Quantitative Research**

The following are the criticisms against quantitative research;

- (1) The underlying doctrine of positivism is contestable in its application to social world.
- (2) It is too detached, remote and clinical to really understand and explore the complex social and political world.
- (3) Its use by the social sciences does not meet the high standards of the natural science in which its reputation and claims lie.
- (4) Quantitative research methods in politics relies on the ability to express concepts as measurable indicators.
- (5) The reliance on observation limits the range and depth of observable and measurable indicators.

### **SELF-ASSESSMENT EXERCISE**

Describe two categories of statistical analysis?

## **4.0 CONCLUSION**

In this unit, we have discussed two categories of statistical data analysis descriptive and causal studies. Descriptive statistics resolve complexity by summarising and compressing data to identify their essential characteristics to create a brief but relatively accurate impression to the observer. Examples of simple statistical measures used by researchers to describe are: arithmetic mean, median, mode, range, variance and standard deviation.

On the other hand, the concept of causality (cause and effect) is the basis of explanatory theory. Causality is central to all the main approaches used in politics where causes are sought to explain effects. Examples of statistical data analysis techniques are: t-test, Z-test, Chi-test, product-moment correlation coefficient, Regression analysis, Multi- Linear Regression analysis and ANOVA. However, our concern in causal analysis is with how one variable affects, or is responsible for, changes in another. The stricter interpretation of causation, found in experimentation, is that some external factor produces a change in the

dependent variable. In political research, we often find that the cause-effect relationship is less explicit. We are more interested in understanding, explaining, predicting and controlling relations between variables than we are discerning causes.

## 5.0 SUMMARY

Quantitative research is formalised studies that include descriptive and causal studies. They are studies with substantial structure, specific hypotheses to be tested or research questions to be answered. Descriptive studies are those we use to describe phenomena associated with a subject population or to estimate proportions of the population that have certain characteristics. Causal studies seek to discover the effect that a variable(s) has on another (or others) or why certain outcomes are obtained. The concept of causality is grounded in the logic of hypothesis testing, which in turn, produces inductive conclusions. Such conclusions are probabilistic and thus can never be demonstrated with certainty. It is difficult to know all the relevant information necessary to prove causal linkages beyond doubt. However, the relationships that occur between two variables may be symmetrical, reciprocal or asymmetrical. Of greatest interest to the researcher is the asymmetrical relationships – that is, postulating that changes in one variable (the independent variable) and responsible for changes in another variable (the dependent variable). We, therefore, test causal hypotheses by seeking to do three things:

- measure the covariation among variables
- determine the time-order relationship among variables and
- ensure that other factors do not confound the explanatory relationships.

In any case, causality is central to all the main approaches used in political research where causes are sought to explain (Pierce, 2009:30).

## 6.0 TUTOR-MARKED ASSIGNMENT

1. Describe any statistical tools used in descriptive studies?
2. What do you understand by causal studies?

## 7.0 REFERENCES/FURTHER READING

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## **UNIT 2      QUALITATIVE DATA ANALYSIS**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Qualitative Research Techniques
  - 3.2 Benefits of Exploratory Studies
  - 3.3 Recording, Analysis and Reporting
  - 3.4 Methods of Analysing Qualitative Data
  - 3.5 Benefits of Qualitative Research
  - 3.6 Weaknesses of Qualitative Research
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

This research approach is particularly useful when researchers lack clear idea of the problems they will meet during the study. It is appropriate for the total study in topic areas where the developed data are limited. In most other studies, exploration is the first stage of a project and is used to orient the researcher and the study. The objective of exploration is the development of hypotheses, not testing. However, both quantitative and qualitative techniques are applicable, although exploration relies more heavily on qualitative techniques. In this unit, we shall examine qualitative data analytic techniques.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- classify, code and interpret information
- use qualitative techniques to analyse information
- list the benefits of exploratory studies in research.

### **3.0 MAIN CONTENT**

#### **3.1 Qualitative Research Techniques**

Several techniques are adaptable for exploratory investigations. They include (Blumberg *et al.*, 2005: 132).

- Indepth interviewing (usual conversational rather than structured)
- Participant observation (to perceive at firsthand what participants in the setting experience)
- Films photographs and videotape (to capture the life of the group under study)
- Projective techniques and psychological testing (such as a thematic apperception test, projective measures, games and role-playing).
- Case study (for an indepth contextual analysis of a few events or conditions)
- Street ethnography (to discover how a cultural sub-group describes and structures its world at street level)
- Elite or expert (key informant) interviewing (for information from influential or well informed people in an organisation or community)
- Document analysis (to evaluate historical or contemporary confidential or public records, reports, government documents and options)
- Proxemics and kinesics (to study the use of space and body-motion communication respectively).

When these approaches are combined, four exploratory techniques emerge with wide applicability for the political researcher:

- (1) Secondary data Analysis
- (2) Experience surveys – (Key informant or Elite or indepth interviewing)
- (3) Focus Groups
- (4) Two-stage designs (Blumberg, *et al.*, 2005:132).

### **Secondary Data Analysis**

The first step in an exploratory study is a search of the secondary literature. Studies made by others for their own purposes represent secondary data. It helps to discover a new information through collection of primary data or original research what has already been done and reported at a level sufficient to solve the research question. Within secondary data exploration, a researcher should start with an organisations own data archives. Reports of prior research studies often reveal an extensive amount of historical data or decision-making patterns. By reviewing prior studies, the researcher can identify methodologies that proved successful and unsuccessful. A search or secondary source will supply excellent background information as well as many good leads (Blumberg, *et al.*, 2005:133). Another source of secondary data is published documents prepared by authors, newsletter,

magazines, industry journal help us decide what needs to be done and can be a rich source of hypotheses.

### **EXPERIENCE SURVEYS OR INTERVIEWING (KEY INFORMANT, ELITE AND IN-DEPTH INTERVIEWING)**

Information from persons, who have experience in the area of study, would enable the researcher tap their collective experiences.

When we interview persons in an experience interview, we should seek their ideas about important issues or aspects of the subject, and discover what is important across the subject's range of knowledge. The investigative (interview) schedule we use should be enough to allow us to explore various interview. The product of such questioning may be a new hypothesis, the discarding of an old one or information about the practicality of doing the study. Probing may show whether certain facilities are available, what factors need to be controlled and how and who will cooperate in the study (Blumberg, et al, 2005).

Furthermore, discovering is more easily carried out if the researcher can analysis cases that provide special insight. In typical exploratory study, we are less interested in getting a representative cross-section than in getting information from sources that might be insightful.

### **Focus Groups**

A focus group study is a carefully planned series of discussion designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment. Each group is conducted with six to eight people by a trained interviewer acting as a moderator (Krueger and Casey, 2000). Focus Group Discussion should not be too small or too large as it would results in less effective participation. The meeting should last between 90 minutes to two hours. Members of focus group discussion should be homogenous. To facilitate such homogeneity, the sourcing of respondents is usually done through informal networks of colleagues, community agencies and the target group. There are different types of focus groups, they include: telephone focus group; on-line focus groups, video-conferencing focus groups etc. It is often preferable, depending on the topic to run separate focus groups for different sub-sets of the population. Following a topical guide, the moderator introduces the topic and encourages the group members to discuss it among themselves. The functions of focus group discussion are (Stewart and Shamdasani, 1990):

- Learning how respondents talk about the topic of interest and especially the strength of their feelings and priorities

- Generating new research hypotheses that can be submitted to further research and testing
- Stimulating new ideas
- Diagnosing the potential for problems with a new service or programme, or policy initiative
- Obtaining background information about a topic of interest and
- Interpreting previously obtained quantitative data.

In exploratory research, the qualitative data that focus groups produce may be used for enriching all levels of research questions and hypotheses and for comparing the effectiveness of design options. A prior focus group discussion of the research design and the instruments used in the research can improve the research considerably, as sources of error and misunderstanding are handled before the study is conducted. Using a focus group to assess the research design and instruments before they are put into a pilot test is advantageous because pilot groups usually only contain people who could be respondents.

Focus groups are also a useful approach in the research process regarding pre-testing questionnaire, experiment, etc.

### **Two –Stage Design**

A useful way to design a research study is as a two –stage design. With this design, exploration becomes a separate first stage with limited objectives:

- (i) Clearly defining the research question and hypothesis
- (ii) developing the research design.

For this two-stage approach, we should recognise that much of the problem is not known, but should be known before effort and resources are committed to the study. A limited exploration of such study enhances modest costs and carries little risk.

In a two –stage research procedure, the first stage is exploratory, aimed at formulating hypotheses, and developing the specific research design. The general research process contains three major stages (i) exploration of the situation, (ii) collection of data and (iii) analysis and interpretation of results.

In exploratory study, the following determines its conclusion:

- Once the major dimensions of the research task has been established
- A set of subsidiary investigative questions that can be used as guides to a detailed research design has been defined

- Several hypotheses about possible causes of the research problem have been developed
- Convinced that certain other hypotheses are such remote possibilities that they can be safely ignored in any subsequent study and
- Concluded that additional research is not needed or is not feasible.

The justifications cited for a mixed approach include: synergy, corroboration of sources and data triangulation (Pierce, 2009:48). Both methods can be combined, so long as one method is made to dominate, while the other is used in a secondary, supportive way.

### **3.2 Benefits of Exploratory Studies**

The following are the benefits of Exploratory Studies:

- (i) It is useful when researchers lack a clear idea of the problems they will meet during the study.
  - (ii) Through exploration, researchers develop concepts more clearly, establish priorities, develop operational definitions and improve the final research design.
  - (iii) Exploration may save time and money especially through pilot study if the problem is found not to be as important as it was first thought, so that subsequent formal studies can be called.
- (iii) Further, the area of investigation may be so new or so vague that a researcher needs to do an exploration just to learn something about the research problem. In this case, important variables may not be known or may not be defined thoroughly. Hypotheses for the research may be needed. Also, the research may explore to be sure that is practical to do a formal study in the area.

### **3.3 Recording, Analysis and Reporting**

The output of the session is a lot of ideas and behavioural observations, with recommendations by the moderator. These are often used for later quantitative testing especially using the combination of quantitative and qualitative methods.

In face-to-face settings, some moderation use large sheets of paper to record trends on the wall of the focus group room. Others use a personal note pad. Producing both video- and audiotapes enables a full analysis of the interview. This enables the researcher to identify contributions of each participation. The recorded conversations and moderator notes are

summarised across several focus group sessions using content analysis. This analysis provides the researcher with a qualitative picture of the respondents concerns, ideas, attitudes and feelings.

### **3.4 Methods of Analysing Qualitative Data**

There are three principal methods for analysing qualitative information. Most qualitative information takes the form of talk-and-text spoken or written words. The methods are: coding, content analysis and discourse analysis. Let us examine each of these:

#### **Coding Technique**

In qualitative research, inductive coding is used. When a study is exploratory or when there is little theory informing the researcher about the kind of responses to expect, inductive coding may be appropriate. In inductive coding, the researcher designs the coding scheme on the basis of a representative sample of responses to questions (particularly open-ended question), data from documents, or data collected through participant observation.

In inductive coding scheme, the responses mentioned most frequently are included in the coding scheme used to analyse the data. However, additional information can lead to a modified coding scheme.

Inductive approach enables the researcher to generate explanations from findings. Moreover, it allows researchers to apply a variety of coding schemes to the same observation and it often suggests new categories as well.

In quantitative research, deductive coding is also used. Deductive coding allows researchers to use theory to construct response categories before they administer the instrument to respondents. Researchers who engage in quantitative analysis generally test hypotheses derived from theory, and the coding system they use should be linked to the theory they hope to support or falsify.

An examination of the theory will provide the researcher with an idea of the types of responses they may expect from respondents. Each response should clearly fall into only one category. The categories, however, must not be too broad, that important differences are obscured (detail). However, issues are multi-dimensional and require a separate category for each dimension.

Deductive coding allows researchers to use theory to construct response categories before they administer the instrument to respondents.

Researchers using deductive coding often pre-test the instrument on a small sample of the population of interest.

### **Content Analysis Technique**

Qualitative content analysis is highly interpretive. It essentially involves the reading of texts, etc. to determine the extent of bias in terms of supportive, critical or (more or less) neutral accounts of organisations, institutions, concepts or figures (Pierce, 2009:264).

The approach is to select a sample to test over a long period of time for independent reading and analysis by a number of researchers whose own biases are recorded at the beginning of the exercise. The assessments are then compared.

Alternatively, qualitative content analysis can be used to compare different perspectives on the same topic by different speakers.

However, this rough and ready approach has been replaced by the development of discourse and narrative analysis as the principal method for qualitative analysis of text.

Discourse in this context is generally used to describe a discussion, conversation, talk or text. Essentially, discourse involves language.

### **Types of Content Analysis Techniques**

#### **Quantitative Content Analysis Technique**

Most content analysis is now entirely quantitative. It counts the incidence and frequency of words. Where uncommon words or phrases are used often in a text, then they express and reflect the greatest concerns of the communicator. These are termed key words. However, when using frequency counts, certain assumptions are made:

- (1) The study assumes that the frequency with which an attribute appears in message is a valid indicator of its intensity or importance.
- (2) It also assumes that each unit of content words or content should be given equal weight with every other unit, permitting aggregation or direct comparison. For example, intensity of a sentence could be identified and assigned equal weight, such as:

- (1) extremely
- (2) Moderately
- (3) or slightly

Quantitative content analysis can be either structural or substantive. Whichever you adopt, you must first clearly identify the population of texts and sample frame and justify fully the (random or non-random) sampling method you adopt (Pierce, 2008:266).

### **Structural Content Analysis Technique**

Structural content analysis is primarily concerned with how the text is presented and reported rather than the frequency of key words used. It seeks to measure: (Pierce, 2009:267):

- Space (or time) devoted to the text
- Volume: headline type and font size
- Position or prominence of the text
- Use of accompanying illustrations or photographs
- Indicators of direction or bias (for example, by stereotyping)
- Persistence over time for example, daily mails, campaign over asylum seekers and daily express.

Structural content analysis is widely used as a comparative technique by media watchers. It is also employed by political parties to make complaints of bias against public broadcasters and thus to secure better, corrective coverage. On the other hand, public broadcasters also use structural content analysis in the design of their programmes to rebut complaints. One very useful, simple and instructive exercise that you can perform is to track and compare the front page editions of all the national newspapers over one week.

### **Rather than Individual Words – A Mode of Communication**

In social sciences, language is political. It expresses systems of meaning, including all types of social and political practice, as well as institutions and organisations (Howarth, 1995). Discourse analysis can, therefore, be explained as analysing the way. Systems of meaning or “discourses” shape the way that people understand their roles in society and influence their political activity (Howarth, 1995). It is the examination of the relationship between units of talk, writing or other representational forms, and of the significance of these relationships for our subjective experience (Squire, 2002:53).

### **Substantive Content Analysis Technique**

Substantive content analysis analyses selected texts by counting the frequency and distribution of key words. Each sentence of key word is coded and counted under a category; the percentage devoted to each category is then calculated. In this way, the coverage given to any

category can be plotted over time by extending the analysis over all of the categories.

However, content analysis method cannot be used as principal research method, but a supplementary tool of analysis. New softwares are now available for quantitative content analysis, such as Hamlet II, etc. Each of these content analysis softwares performs wide range of functions like;

- using synonyms to categorise as one word, all others having the same meaning
- using cluster analysis to group together words used in similar contexts. (Pierce, 2009:270).
- their role in the political process.
- Stories as speech acts.

The final step is to publish the results.

### **Discourse Analysis**

Discourse analysis is characterised on one hand, by growing enthusiasm for its use by ambitious researchers; and at the other, by a variety of interpretations and advice from leading authorities. The paradox is that discourse analysis has many interpretations: there is a discourse on discourse. Some regard it as a method. Others conceptualise discourse as a discipline (Pierce, 2008:279). Discourse theory is an ever-evolving discipline. Its roots lie in linguistics, semiotics, philosophy, psychology and social theory. Political science (positivists and empiricists) see discourses as “frames” made by groups to interpret their worlds in the same way and for specific purposes. These frames legitimate or justify collective action. In everyday speech, discourse is generally used to describe a discussion, conversation, talk or text. Discourse is essentially a mode of communication. However, within the social sciences, a variety of explanations are given. The most readily understandable and succinct are:

- Language is political
- Language is used to ensemble ideas, concepts and categorisations that are produced, reproduced and transformed in a particular set of practices and through which meaning is given to physical and social realities (Hajer, 1995:44)
- Language is also used for referential and proposition.

Thus, Discourse analysis means analysing the way the systems of meaning or discourses shape the way that people understand their roles in society and influence their political activity (Howarth, 1995). It is an

examination of the relationships between units of talk, writing or other representational forms and of the significance of these relationships for our subjective experience (Squire, 1995). However, there are other modes of discourse, such as: sounds (referee's whistle), non-verbal communications (gestures), and signs(traffic lights) (Pierce, 2008, 281).

### 3.5 Benefits

The following are the benefits of qualitative research:

- (1) Qualitative method is useful because it is considered best suited to the study, understanding and explanation of the complexities of social and political life.
- (2) The strength of this method lies in its unique capacity, through in-depth interviewing and observation, to learn and understand the underlying values of individuals and groups.
- (3) It better enables theory to be created by induction. By learning the social meanings that the subjects apply to their world, researchers are better able to "see the world through the subject eyes" (Pierce, 2009:45).
- (4) It enables the focus to be shifted from the individual to the group(s) and to learn how meanings are negotiated between members and the group dynamics involved.  
This is because it allows comparison and distinction to be drawn between what the individual says in the privacy of a personal interview and what they say, or do not say in a group. It enables group behaviour to be studied.
- (5) It enables minorities to be researched who would otherwise be missed by sample surveys because they are either small in number (minorities) or might be unwilling to identify themselves; gang-members, terrorists, etc.
- (6) The method offers a greater focus on verbal and other communications and the application of linguistics to the analysis.
- (7) It allows recording devices to be shared with other researchers.
- (8) New miniaturised technology allows fieldwork to be carried out in the homes and workplaces of their subjects in a more surreptitious way, so that the subjects are not inhibited by the equipment and contingent variable are less affected (Pierce, 2009: 45:46).
- (9) Full transcripts and other records of interview and group meetings can be made available for audit purposes and external examination (Pierce, 2008:45-46).

### 3.7 Weaknesses of Qualitative Research

The following are the weaknesses of qualitative research:

- (1) Data collected is largely anecdotal or exaggerated
- (2) The research is weighed down by bias as a participant observer, determine or influence outcome rather than observe
- (3) Qualitative researchers adopt concepts which involve some form or proxy to make them intelligible to the subjects
- (4) There is also insurmountable problem of interpretation. The researcher must interpret in turn the interpretation by the subject of their world. Here, the chances of misinterpretation are inevitable
- (5) Concurrence of key words does not necessarily indicate causal link and meanings may change over time
- (6) Overall, the analysis is not really conclusive enough to provide sufficiently reliable evidence to confirm your research hypothesis (Pierce, 2008:276).

Content analysis can, therefore, arguably be recommended only as supplementary evidence to confirm your research hypothesis.

### 4.0 CONCLUSION

Despite these criticisms, Qualitative research provides high quality data and findings, and deep, meaningful insights into underlying values, fears and motivations of agents and actors in the political world.

In this unit, exploratory research has been examined. Exploratory research is appropriate for the total study in topic areas where the developed data are limited. Like in most studies, exploration is the first stage of a project, and is used to orient the researcher and the study. Thus, the objective of exploration is the development of hypotheses, not testing them.

### 5.0 SUMMARY

In this unit, we have examined exploratory study and found that it is particularly useful for qualitative research, it could also be used for quantitative studies. Moreover, exploratory study is particularly useful when researchers lack a clear idea of the problems they will meet during the study. Through exploration, researchers develop concepts more clearly, establish priorities, develop operational definitions and improve the final research design. Exploration may also save time and money, especially if the problem is found not to be as important as it was first thought, subsequent more formal studies can be cancelled. Though, social scientists link exploratory study to old biases, of subjectiveness,

non-representativeness, and non-systematic design, political researchers should not neglect it especially where the area of interest may be so new or so vague that a researcher need to do an exploration just to learn something about the research problem. Besides, important variables may not be known or may not be defined thoroughly. Hypothesis for the research may also be needed. Exploratory study is a necessity for political scientists.

## 6.0 TUTOR-MARKED ASSIGNMENT

(1) Describe two approaches you can adapt for explorative studies? (2) Explain the strengths and weaknesses of qualitative data analysis?

## 7.0 REFERENCES/FURTHER READING

- Blumberg, B., Cooper, D.R. & Schindler, P.S. (2005). *Business Research Methods*. London: McGraw Hill Inc.
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## **UNIT 3 COMBINATION OF QUALITATIVE AND QUANTITATIVE ANALYSIS (MIXED METHOD)**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Combing Qualitative and Quantitative Research Methods
  - 3.2 Similarities between Qualitative and Quantitative Analysis
  - 3.3 Differences between Qualitative and Quantitative Methods
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

Mixed methods have been advocated by scholars for a better result. There has been opposing views claiming that there is correspondence between ontology, epistemology and research methodology. Ontology relates to the nature of the social and political world; epistemology refers to what we can know about it and methodology relates to how we might go about acquiring that knowledge (Hay, 2002:64). In other words, before a researcher engages in research design or choice of methods, they must confront the question of what is the nature and purpose of political science (Hay, 2002:64). As such, mixing the two methods would culminate in theoretical weakness because there is lack of correspondence between their ontology, epistemology and research methodology. However, the criticism could be rebutted as being too esoteric, exaggerated and academic, thereby overlooking the advantages of bringing the two methods together. The justification cited for a mixed approach include: synergy, corroboration of sources and data triangulation (Pierce, 2008:48). In this unit, we shall examine the relevance of combining qualitative and quantitative analyses in research.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- combine qualitative and quantitative analytical techniques in research
- list similarities between qualitative and quantitative research
- differentiate between qualitative and quantitative data analyses.

### **3.0 MAIN CONTENT**

#### **3.1 Combining Qualitative and Quantitative Research Methods**

Though, some scholars still object to a “mix and match” approach, its use has been accepted as appropriate. Accordingly, if the approach is to be used, one method should dominate, while the other is used as secondary or supportive (Bryman, 1988:134). For example, through the combination of qualitative and quantitative methods, the findings from qualitative study will be revalidated by findings from quantitative studies. According to Bryman, (1988:134), qualitative research often acts as a precursor to the formulation of problem and the development of research instruments that is, scales and indices for qualitative research. In other words, a new investigation often starts with qualitative studies, exploring new phenomena and later on, quantitative tests follow to test the validity of propositions formulated in previous qualitative studies. The most obvious sense in which this is true is the way in which qualitative research findings act as “a source of hunches or hypothesis” to be tested by quantitative research (Bryman, 1988:134). For instance, Crafts, (1995) took a number of hypothesis developed by historians and political scientists and tested their adequacy using econometric investigation techniques. On the other hand, quantitative research may precede qualitative research, by providing data for qualitative studies. Bryman (1988:136-145) indicates that research by Whyte (1976) on “Peruvian villages followed this pattern with examination of survey data, leading to ethnographic research on village life”. In this way, qualitative research enables close investigation of statistical correlations, thereby furthering our understanding of complex relationships. Combining qualitative and quantitative studies can be stimulating, as it may generate a wider range of insights that would otherwise be possible. For example, fieldwork may be combined with game theory or statistical analysis combined with ethnographic studies. In fact, there appears to be an increased tendency for most policy-based studies to adopt some form of triangulation.

However, this range of evidence has to be integrated into a coherent explanation, that is, elegant and parsimonious. The disciplined use of theory is important here, as are the formulation of a clear central question and the use of research design to structure the project. All research needs to be carried out systematically. However, the combination of qualitative and quantitative data can be challenging. There are barriers to the combined use of qualitative and quantitative research techniques in terms of expertise, resources and compatibility of epistemological positions (Bryman, 1988:153). Although, each method qualitative and quantitative can compensate for the limitations of

another, mistakes in anyone method can also cumulate when methods are applied sequentially and build upon one another. In summary, the use of combined methods can be better accepted as appropriate where one method dominates and the other is used in a secondary or supportive way.

### 3.2 Similarities between Qualitative and Quantitative Analysis

The similarities between qualitative and quantitative analysis are:

1. Both involve making inferences
2. Both methods of analysis involve a public (transparent) method or process
3. Comparison is central to all analysis
4. Researchers strive to avoid errors, false conclusions and misleading inferences.

### 3.3 Differences between Qualitative and Quantitative Analysis

The differences between qualitative and quantitative analysis are:

Quantitative Analysis	Qualitative Analysis
<ol style="list-style-type: none"> <li>1. Use standardised, statistical techniques</li> <li>2. Delays analysis until all data collected</li> <li>3. Tends to test hypotheses</li> <li>4. Low level of abstraction</li> </ol>	<ol style="list-style-type: none"> <li>1. Less standardised</li> <li>2. Begins earlier before all data collected</li> <li>3. Can create new concepts and theories</li> <li>4. High level of abstraction</li> </ol>

Source: (Neuman, 2003:439-40).

### SELF-ASSESSMENT EXERCISE

What are the benefits of using combination of qualitative and quantitative research methods?

### 4.0 CONCLUSION

In empirical research, there is no general guideline as to when a qualitative or quantitative research approach is more appropriate. The quality of any research study does not so much depend on whether it is qualitative or quantitative, but rather it depends on the quality of its design and how well it is conducted (Burnham *et. al.*, 2008:334). Many

scholars believe that quantitative studies are more objective, systematic and scientific. There are many examples of poorly conducted quantitative studies. In scientific research, there are plenty of examples of excellent qualitative studies. So, the design and how well it is conducted is the determinant of quality of a research. Therefore, the mixed approach is not the solution of the quality of a research.

## 5.0 SUMMARY

In this unit, we have discussed the benefits of using the combination of qualitative and quantitative research. Given the opposition to the aspects of the lack of correspondence between their ontology, epistemology and research methodology, the justification cited for a mixed approach include: synergy, corroboration of sources and data triangulation. Bryman, (1988) suggests a number of ways in which quantitative and qualitative research has been combined to useful effect. First, the “logic of triangulation” points to the ways in which quantitative and qualitative methods may be used to examine the same research problem. In this regards, Burgess (1982:163, cited In Burnham, *et. al.*, 2004:277)) points out that “triangulation” or the use of multiple strategies is not confined to data triangulation (multiple sets of data) or theoretical triangulation (multiple theories), but can also encompass multiple investigators working in partnership across disciplines. Triangulation can overcome the problems associated with the “single-method, single-investigator, single-data, single-theory study”, but as Burgess (1982:166, cited In Burnham, *et.al.*, 2004:277) concludes, multiple strategies can also prove costly in terms of time and money. However, most “real world” research plays down the differences and calls for both qualitative and quantitative analysis, although usually in unequal measure (Ragin, 1987, Bryman, 1988; Robson, 1993). Thus, the received views among research practitioners is that the use of combined methods can be better accepted as appropriate if one method dominates and the other is used as secondary or supportive.

## 6.0 TUTOR-MARKED ASSIGNMENT

1. What do you understand by “mixed approach” in empirical research?
2. Why is it necessary to use the combination of qualitative and quantitative research techniques in research?

## 7.0 REFERENCES/FURTHER READING

- Bryman, A. (1996). *Quantity and Quality in Social Research*. London: Routledge.
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## **UNIT 4 WRITING RESEARCH REPORT**

### **CONTENTS**

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main Content
  - 3.1 Reporting Research Report
  - 3.2 Guaranteeing a Good Research Report
  - 3.3 Format of Research Report
  - 3.4 Style of Referencing in Research Report
    - 3.4.1 APA Style
    - 3.4.2 Kate Turabian (Chicago) Style
  - 3.5 End of Chapter Referencing
  - 3.6 Differences between APA and Turabian Style
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-Marked Assignment
- 7.0 References/Further Reading

### **1.0 INTRODUCTION**

Most academic research projects are carried out in higher learning. Cover colour of bound project differ from institutions to institution and sometimes from faculty to faculty within the same university. Report writing is not, or should not be, a frantic activity carried out at the end of the project. It is a process of varied stages, all of which need to be recorded at the time they are completed. The first drafts will certainly need to be revised and in some cases completely re-written but the foundations of the report should have been established at the planning stage. In this unit, we shall identify the essential contents of research report.

### **2.0 OBJECTIVES**

At the end of this unit, you should be able to:

- write a research report
- identify essential contents of a research report
- learn how to communicate you research so that it stand out from other research projects.

### **3.0 MAIN CONTENT**

#### **3.1 Reporting Research Findings**

Before undertaking the writing of a research report, the researcher should make sure that the data collection and analysis have been completed. The minimal requirement for a good research report is that the researcher has something important to say. If a research project produces trivial findings which are not worthy of reporting, neither the style nor the format of the report is going to improve the academic quality.

#### **3.2 What Actions Guarantee a Good Research Report?**

Blumberg *et al.*, (2005:14-15) suggest that a good research report should follow the characteristics of scientific method and also outline how a researcher can achieve each characteristic.

#### **3.3 Format of Research Report**

Academic research projects should contain the following information:

##### **1. Title Page**

This page is also called cover page. It contains these:

- Title of the research study
- Researcher's name in full
- Qualifications
- A statement indicating the department and faculty and
- The date (month and year).

##### **2. Abstract**

The abstract is a brief summary of the research, usually about 100 to 200 words in length. It should give information on the research problem that was studied; the method used to study the problem (including information on the type of subjects), the results and the major conclusions. The primary objective of an abstract is to communicate to the reader the essence of the report/paper.

The abstract should provide enough information so that the reader can decide whether to read the entire report and it should make the report easier to comprehend when it is read. Although the abstract appears at

the beginning of the report, it is not written until the body of the report is completed.

### **3. Certification Page**

This page contains the signatures(s) of project supervisors(s) and possibly committee members or head of department as endorsement or approval of the research work.

### **4. Dedication Page**

This is the author's page meant to specially express gratitude to people very dear to him or her.

### **5. Acknowledgement Page**

The author has this page to acknowledge the contributions and support of individuals and group during the period of the research study.

### **6. Table of Content, Tables and Figures**

These are pages where the entire content of the report are listed with their corresponding pages for easy reference and reading. Also the list of table and figures are properly outlined to assist readers.

### **7. The Main Body**

The main bodies of research report contain different chapters. It contains the following:

#### **a) Chapter One**

##### **Introduction**

The introduction is made up of background of the study; statement of the problem; aims and objectives, study researcher questions or relevance or significance of study, delimitation and limitation of study and operational definition of terms. This chapter stresses the rationale underlying the study and its social importance.

#### **b) Chapter Two**

##### **Review of Literature and Theoretical Framework of Analysis**

The chapter contains review or synthesis of related literature. It is also advisable to give the study good theoretical background by reviewing

some theories that properly explains the subject matter of the research. The source information is recorded under appropriate headings.

**c) Chapter Three**

**Research Methodology**

This presents in details steps taken by the researcher to arrive at the results. The chapter is broken down into the following subsections, as discussed in your research proposal:

- The study design
- Population and sample size
- Sampling procedures
- Research instrument
- Validation of instrument(s)
- Administration of the instrument
- Rate of return of questionnaire (if one was used)
- Proposed method of data analysis.

**d) Chapter Four**

**Analysis of Data, Discussions and Presentation of Results**

After the data have been retrieved, the researcher should then turn his full attention to analysis and interpretation. The purpose of analysis is to summarise the collected data in such a manner that they yield answers to the research questions or test of significance of hypotheses were formulated. Data analysis and presentation could contain both the descriptive statistical analysis of the various data gathered in the process of conducting the research and the inferential statistics for hypotheses testing.

**e) Chapter Five**

**Summary of Findings, Recommendations and Conclusions**

The findings and results recorded in chapter four are discussed in line with the purpose of the study and linking knowledge and postulations.

Discussion usually includes statement of the inference drawn from the findings in this particular situation which may be expected to apply in similar circumstances. The researcher may link inferences/interpretations drawn with those of other studies, if his/her findings are different or if they confirm those of previous studies.

The researcher is then expected to present specific conclusions drawn from his research. Such conclusions may be listed or presented in long prose.

Moreover, the discussion of implications of findings will usually include relevant questions that are still unanswered or new questions raised by the study. This will lead to a presentation of suggestions for the kinds of research that would help to answer them under a sub-section tagged "recommendation for further studies". These suggestions for further studies are made together with recommendations of the researcher.

Sometimes, academic research report may contain more than five chapters, especially in post-graduate dissertation or thesis.

### **3.4 Style of Referencing in Research Report**

According to Asika (1991), there are two widely used styles in research reporting. These are:

- The American Psychological Association (APA) method often called Harvard style
- The Kate Turabian Style of research reporting often referred to as the Chicago style.

#### **3.4.1 The American Psychological Association (APA) Style**

In reporting an author's contributions on the test using the APA style the following are essential;

- Author's name
- Date of publication
- Possibly page number of the statement being referred to be stated.

#### **Example of APA Style**

- (i) Some of the factors cited as causes of Japan's relationally low rate of labour turnover are status enhancement variables (Marsh and Mannari 1971)
- (ii) Abegglen (1958:17) stressed a deeper level of commitment to form, culturally distinctive for Japan and stated that the worker, whether labourer or manager, despite potential economic advantages is bound to remain in the company's employment.
- (e) Other determinants which may be a result of status in the organisation are job satisfaction, job challenge, job achievement and cohesiveness with fellow employees. These are agents negatively related to turnover and positively related to

commitment to the organisation (Kerr, 1947; Smith and Kerr, 1953; Silcock 1954; Herzberg, *et al.*, 1957; Hedbery, 1960; Hall and Schneider, 1972; Hrebiniak and Alutto, 1972; Buchanan, 1974).

### **In-Text Reference Citation using APA Style**

#### **Application**

#### **citation format**

#### **Single author**

##### **Author named in sentence**

One article:	Jones (1985)
Two articles (same year):	Jones (1985a, 1985b)
Two articles (different years):	Jones (1982, 1985)

##### **Author not named in sentence**

One article:	(Jones, 1982)
Two articles (same year):	(Jones, 1985a, 1985b)
Two articles (different years):	(Jones, 1982, 1985)

#### **Multiple authors**

##### **Authors named in sentence**

Two authors:	Smith and Jones (1978)
More than two authors:	Smith, Jones and Key (1982)

##### **Authors not named in sentence**

Two authors:	(Smith & Jones, 1987)
More than two authors:	(Smith, Jones & Key 1982)
Multiple citation for same idea:	(Smith & Jones, 1982; Harris, 1978; Jones, 1985).

#### **Main Advantages**

- They enable the reader to see immediately not only the author of the statement being referred to but also the date and page number of the publication from which the statement was drawn.
- This method helps the researcher to alphabetically arrange the author's names at the end of the chapter.
- It is an easy and elegant way of referencing.

### **3.4.2 Kate Turabian (Chicago) Style**

Footnotes are one method of referencing which appear at the foot of the page on which the statements they refer to are written. In footnoting,

every supportive statement or fact is numbered and at the foot of the same page details of sources (the author, the book journal publisher date of publication and page numbers) are stated. This means that there can be as many such footnotes as there are references made about sources on any particular page.

### **Disadvantages**

- It is cumbersome
- Inelegant
- Time wasting
- It create problem for both the writer and the typist who has to do some intricate arrangement on every page in order do accommodate memories footnotes.

### **3.5 End-of-Chapter Referencing**

It was because of the problems of footnoting that Kate Turabian suggested a method of ‘footnoting’ which would eliminate the drudgery of complex arrangements of footnotes on the main text on each page. In this method, which she called end-of-chapter referencing, she suggested that:

- (i) Instead of having footnote in every page of the test, every supporting statement or data could be numbered consecutively.
- (ii) At the end of the chapter, all the numbered statement could be noted according to the numbering and their sources given in a referencing fashion.

### **Examples**

Paul H. Rigby. *Conceptual Foundations of Business Research*. (New York: John Wiley and sons. Inc. (1965) pp. 20-27.

Norman Dalkay and Olaf Helmer. An Experimental application of the Delphi method to the use of Experts. *Management Science*. April 1983, vol. 9, pp. 458-467.

Using either APA or Turabian styles, footnoting is no longer necessary except where the writer wants to make an on-the-spot explanation of a very important statement. However, whether APA or Turabian style is used in the text, the sources are reported and arranged in a particular fashion at the end of each chapter.

**Note:**

Where there are two or more authors, only the last names of the first author is reported first. The names of the co-authors are stated first before their last names and the year of publication of the material comes in brackets immediately after authors' names.

**3.7 Differences between APA and Turabian Styles**

In APA style, the authors' last names or surnames are stated first before their other names, which are arranged alphabetically.

In Turabian style, on the other hand, the numbering notions of statements in the text are arranged serially, 1,2,3,4,5, etc. at the end of each chapter and the authors' names or sources of these statement are reported accordingly. Unlike in APA style, Turabian states the authors' first names or initials first and their last names come last.

**Examples**

1. APA style of end-of-chapter referencing
  - Blau, Peter M. and W. Richard Scott, (1962). *Formal Organisations*. San Francisco: Chandler Publishing Co.
  - Weick, Karl E. (1976). 'Educational organisations as loosely coupled systems'. *Administrative Science Quarterly* 21:1-9.
2. Kate Turabian (Chicago) style of referencing  
Within a chapter or text, the Kate Turabian (Chicago) style recommends the use of notation for every borrowed statement or quotation from authors and writers.

**Examples:**

- (i) Some of the factors adduced by Marsh and Mannari<sup>1</sup> as causes of Japan's relatively low rate of labour turnover are status enhancement variables.
- (ii) Abegglen<sup>2</sup> stressed a deeper level of commitment to firm culturally distinctive for Japan and stated that the worker whether labourer or manager, despite potential economic disadvantages is bound to remain in the company's employment.

At the end of the chapter, the notations, 1, 2 are translated into complete references as follows:

- (i) Robert M. Marsh and Hiroshi Mannari. 'Lifetime Commitment in Japan: Role, Norms and Values' *American Journal of Sociology* (1971) 76: 795-812.
- (ii) James C. Abegglen. *The Japanese factory* (New York: The Free Press, 1958).

## **Bibliography**

A bibliography containing fewer than 20 titles should not be sub-divided into categories; one that has 30 or more titles should be classified; and one containing 20 to 30 titles may or may not be classified. The following heading can be used where appropriate: Books, government publications, periodicals, unpublished materials and other publications. Be consistent when entering authors' names, followed by initials or full name first and middle names, not mixed (Eneanya, 2012: 531-542):

- **Books**

In case of single authors and for more than one work by the same author, substitute his/her surname with a long dash (-) followed by other publication details. However, the surname should be repeated if one of the books is co-authored.

In listing more than one work by the same author, use year of publication to distinguish between them. However, if the same author published two works or more in the same year, use lower case (a, b, c and so on) after the year to differentiate the works such as (2005a, 2005b, 2005c, etc.).

### **Examples:**

#### **i. One Author**

Oyebode, O. A. (2009). *Cognitive dissonance; thinking, learning and forgetting*. Lagos: Macmillan.

#### **ii. Two Authors**

Wimmer, Roger D. and Joseph R. Dominick (1991). *Mass Media Research: An Introduction*. 3<sup>rd</sup> ed. Belmont, California: Wadsworth Publishing Company.

### iii. Multiple Authors

For multiple authors, first author's name is typed in reverse order and that subsequent author's names are typed in the first, middle and last order.

#### Example:

Morrison, F., C. Draka, M. Brunswick and V. Mackenzie, 2001. *Europe of the Nations*. Edinburgh: Lothian Press.

- **Journals**

Start with last name, initial of first name, initial of middle name (Date of publication). Title of journal article. Name of journal, volume, pages. For example:

Okoye, A. (1995). "Effective Monitoring of Election Results" *Psychological Bulletin*, 80, 194 – 215.

Scott, R., 2004. "Informal integration: the case of the non-monitored economy". *Journal of European integration studies*, 3(2), 81 – 9.

- **Periodicals (whole article page numbers are used) example**

Quetch, John A. and Kristina Canno – Bonventre. "Better Marketing at the point of Purchase". *Harvard Business Review*, 61 (November/December 1983); 162 – 169.

- **Magazine Article**

Ahmed, Y. and Okoro, C. E. (1997, June, July). "Curbing Excesses of Trafice Wardens: Road safety and policy effort". *Tell News Magazine*, pp.65 – 70.

- **Newspaper**

For presentation of a newspaper article without a specified author, the entry should be alphabetised by the first words of the article title instead of the author's name. The entry should be:

"Good Governance and Democracy". *The Guardian*, June 5, 2009, p.A7.

- **Public Documents**

**Example:**

Federal Republic of Nigeria *Official Gazette*. Vol.77, No.37, Lagos, 26<sup>th</sup> July, 1996, P. A425.

- **Unpublished Materials**

Unpublished materials, such as: theses dissertations, long essays, company reports and formal interviews may be included in bibliographies, if these are accessible to readers.

**Examples:**

Eneanya, A. N.: Multinational Oil Companies and Indigenous Human Capital Development in Niger Delta Region of Nigeria” *Doctoral Thesis*, University of Lagos, Akoka, Yaba, Lagos, 2008.

- **Electronic Media**

Coker, Julie “Newslines” *NTA Network Wednesday* June 12, 2009.

- **Internet References**

- i. **E – Books**

**Example:**

Brandt, K. H. 2001. Working the System (Online. Available from <http://www.hvn.ac.uk/econ/trickco.htm> (accessed 1.4.01).

- ii. **E – Journal**

**Example:**

Ross, F; 2000. Coping with dementia. *Geriatric Medicine* (online), 5(14). Available form: <http://germed.ac.k/archieve.00000555/>(accessed 11.01.04).

**Appendices**

Materials that are related to the study, but which would make the body of the study bulky or awkward are placed in the appendix. These may include:

- Letters of introduction of researcher to relevant organisations
- Sample questionnaires/structured interviews
- Interview guides
- Detailed explanation of statistical tests used in the study
- Tables, sample forms
- Computer printouts
- Statistical formulas
- Map, advert copies, photographs
- Supplementary materials and related items.

It is pertinent to say that each of such material deserve a separate appendix and separate page. For example: appendix I: questionnaire; appendix II: letter of introduction to organisation etc. all such appendices should also be mentioned in the text and listed in the tables of contents (Eneanya, 2012:542).

#### **4.0 CONCLUSION**

In this unit, we have discussed how to write research report. Research report writing is a specialised skill, but one that can easily be learned. Although, academic disciplines may vary somewhat in the details required for the presentation of their subject, the basic elements are quite consistent for the full range of reports. The purpose of a research report dictates its structure and functions. The structure of research reports has become standardised into models that shape the presentation into a consistent and logical framework. The function is not only to relay findings but to link those findings directly to a theoretical model or to one or more empirically testable hypotheses. Finally, the report proceeds from the hypothesis test to findings and ultimately conclusion.

#### **5.0 SUMMARY**

As already discussed from the unit, research report has traditionally been regarded as the last stage of the research process. However, the practice of leaving it all until the end is neither encouraged nor accepted. Instead, you will be expected to write up as you proceed in parallel with the research process. Research reports are organised in fairly consistent formats in order to facilitate communication. Clegg, (1998:141) describes research report as the response to five questions: “who”, “what”, “where”, “when”, “how”, and “why”. That is, the purpose of a research report is to relay findings that are empirically and logically related to some conception of causation, to a theory. Furthermore, research report can also be conceptualised according to three general categories: description of an incident or a research technique; exploration of a new idea or unusual event; and explanations of causal

relationships. Finally, the purpose of research report is to expand the horizons of human knowledge, to enhance methodologies and to increase the incisiveness of analysis (Nachmias and Nachmias, 1996:556).

## **6.0 TUTOR-MARKED ASSIGNMENT**

1. What are the essential contents of a research report?
2. Describe the process of a research report?

## **7.0 REFERENCES/FURTHER READING**

Blumberg, B., Cooper, D.R. & Schindler, P.S. (2005). *Business Research Methods*. London: McGraw Hill Inc.

Clegg, F. (1988). *Simple Statistics: A Course Book for the Social Sciences*. Cambridge: Cambridge University Press.

Eneanya, A.N. (2012). *Research Method in Political Science and Public Administration*. Lagos: University of Lagos Press.

Nachmias, C.F & Nachmias, D. (1996). *Research Methods in the Social Sciences*. (5<sup>th</sup> ed.). London: St. Martin's Press Inc.

Pierce, R. (2008). *Research Methods in Politics: A Practical Guide*. London: SAGE Publications Inc.