CHALIMBANA UNIVERSITY

DIRECTORATE OF DISTANCE EDUCATION

PYS 3100: FOUNDATIONS OF RESEARCH METHODS IN PSYCHOLOGY

FIRST EDITION 2020

AUTHORS: MOONO MAURICE

CHEWE BWALYA

EDWARD MAKUMBA

Copyright

First Edition

CHALIMBANA UNIVERSITY

PRIVATE BAG E1

CHALIMBANA

Acknowledgement

The Chalimbana University wishes to thank Maurice Moono for the production of this module.

TABLE OF CONTENT

CONTENT **PAGE**

MODULE OVERVIEW

Introduction

This module will introduce you to research methods in psychology. You will learn about different approaches to research, research designs, sampling techniques, research instruments and how to analyze data. Generally, the course will introduce you to the research process.

Rationale

The course will equip you with research skills that will help you conduct any form of research.

Course Aim

The course aims to Introduce research methods in Psychology as well the application of basic research methods in Psychology.

Learning Outcomes

By the end of the course, students should be able to;

- discuss research approaches
- analyse research paradigms
- develop research instruments
- analyse both qualitative and quantitative data
- discuss various research designs
- analyse sampling techniques
- develop research proposal
- write research report
- describe how various research designs address different types of questions and hypotheses
- formulate testable research hypotheses, based on operational definitions of variables
- choose and apply appropriate statistical method to analyse data
- describe and apply code of ethics for human subjects

Study skills

As an adult learner, your approach to learning will be different to that of your school days you will choose when you want to study. You will have professional and/or personal motivation for doing so and you will most likely be fitting your activities around other professional or domestic responsibilities.

Essentially you will be taking control of your learning environment. As a consequence, you will need to consider performance issues related to time management, goals setting, stress management, etc. perhaps you will also need to reacquaint yourself in areas such as essay planning, coping with examinations and using the internet as a learning source.

Your most significant considerations will be time and space i.e. the time you dedicate to your learning and the environment in which you engage in that learning. It is recommended that you take time now before starting your self-study to familiarise yourself with these issues. There are a number of excellent resources on the web. A few suggested links are: http://www.how-to-study.com/ and http://www.ucc.vt.edu/stdysk/stdyhlp.html

Time frame

You are expected to spend at least three terms of your time to study this module. In addition, there shall be arranged contact sessions with lecturers from the University during residential possibly in April, August and December. You are requested to spend your time carefully so that you reap maximum benefits from the course. Listed below are the components of the course, what you have to do and suggestions as to how you should allocate your time to each unit in order that you may complete the course successfully and no time.

Required Materials

Text books and the module.

Need help

In case you have difficulties in studying this module don't hesitate to get in touch with your lecturers. You can contact them during week days from 08:00 t0 17:00 hours. Mr Moono Maurice mmoono.75@gmail.com Tutorial Room 3,. You are also free to utilise the services of the University Library which opens from 08:00 hours to 20:00 hours every working day.

Assessment

Continuous Assessment	**50%**
One Assignment	**25%**
One Test	**25%**
Final Examination	**50%**
Total	**100%**

REFERENCES

Prescribed readings

Creswell, J. W . (2010). Mapping the developing landscape of mixed methods research. In A.

Creswell, J. W . (2011). Controversies in mixed methods research. In N. Denzin & Y .

John, W. Best, and James, V. Kahn, (1989). Research in Education. New Jersey: Prentice Hall

Kombo, D.K. and Tromp, D.E.A. (2014). Proposal and Thesis Writing: An Introduction. Nairobi: Paulines Publications Africa

Thomas, K. Crowl, (199). Fundamentals of Educational Research. Australia: Brown and Benchmark

Recommended readings

Creswell, J. W . (2012). Educational research: Planning, conducting, and evaluating quantitative and qualitative research (4th ed.). Upper Saddle River, NJ: Merrill.

Creswell, J. W . (2013). Qualitative inquiry and research design: Choosing among five approaches (3rd ed.). Thousand Oaks, CA: Sage.

J. W ., & Miller, D. (2000). Determining validity in qualitative inquiry. Theory Into Practice, 39(3), 124–130.

Creswell, J. W ., & Plano Clark, V . L. (2011). Designing and conducting mixed methods research (2nd ed.). Thousand Oaks, CA: Sage.

Denzin, N. K., & Lincoln, Y . S. (Eds.). (2011). The SAGE handbook of qualitative research (4th ed.). Thousand Oaks, CA: Sage.

UNIT 1: RESEARCH APPROACHES

1.1 Introduction

Welcome to the first unit of this module. In this unit you are going to learn about types of research, the three approaches to research namely: qualitative, quantitative and mixed method approach.

1.2 Learning outcomes

By the end of this unit, you are expected to;

- discuss the difference between basic and applied research.
- compare and contrast between quantitative and qualitative research.
- discuss the justification for using mixed method approach in research.

1.3 Time frame

You need about four (4) hours per week interacting with this material.

1.4 Content

- Types of Research
- Three Approaches to Research

Research is a process to discover new knowledge. In the Code of Federal Regulations (45 CFR 46.102(d)) pertaining to the protection of human subjects research is defined as: "A systematic investigation (i.e., the gathering and analysis of information) designed to develop or contribute to generalizable knowledge." Kombo and Tomp (2006) define research as the process of arriving at dependable solutions to problems through the planned systematic collection, analysis and interpretation of data. Tuckman (1978) describe research as a systematic attempt to provide answers to problems. Research is different from other forms of discovering knowledge (like reading a book) because it uses a systematic process called the Scientific Method.

The Scientific Method consists of observing the world around you and creating a hypothesis about relationships in the world. A hypothesis is an informed and educated prediction or explanation about something. Part of the research process involves testing

the hypothesis, and then examining the results of these tests as they relate to both the hypothesis and the world around you. When a researcher forms a hypothesis, this acts like a map through the research study. It tells the researcher which factors are important to study and how they might be related to each other or caused by a manipulation that the researcher introduces (e.g. a programme, treatment or change in the environment). With this map, the researcher can interpret the information he/she collects and can make sound conclusions about the results.

Research can be done with human beings, animals, plants, other organisms and inorganic matter. When research is done with human beings and animals, it must follow specific rules about the treatment of humans and animals that have been set. This ensures that humans and animals are treated with dignity and respect, and that the research causes minimal harm.

No matter what topic is being studied, the value of the research depends on how well it is designed and done. Therefore, one of the most important considerations in doing good research is to follow the design or plan that is developed by an experienced researcher who is called the Principal Investigator (PI). The PI is in charge of all aspects of the research and creates what is called a protocol (the research plan) that all people doing the research must follow. By doing so, the PI and the public can be sure that the results of the research are real and useful to other scientists.

1.5 Types of Research

1.5.1 Basic research

This research is conducted largely for the enhancement of knowledge and is research which does not have immediate commercial potential. The research is done for human welfare, animal welfare, and plant kingdom welfare. It is called basic, pure, fundamental research. The main motivation here is to expand man's knowledge, not to create or invent something. According to Travers, “Basic Research is designed to add to an organized body of scientific knowledge and does not necessarily produce results of immediate practical value.” Such research is time and cost intensive (Example: An experimental research that may not be or will be helpful in human progress). It is used to solve a problem by adding to the field of application of discipline.

1.5.2 Applied Research

Applied research is desig ned to solve practical problems of the modern world, rather than to acquire knowledge for knowledge's sake. The goal of applied research is to improve the human condition. It focuses on analysis and solving social and real-life problems. This research is generally conducted on a large scale basis and is expensive. As such, it is often conducted with the support of some financing agency like the national government, public corporation, world bank, UNICEF, UGC, Etc. According to Hunt, “applied research is an investigation for ways of using scientific knowledge to solve practical problems” for example: - improve agriculture crop production, treat or cure a specific disease, improve the energy efficiency of homes, offices, how can communication among workers in large companies be improved. This type of research can also be called Action Research.

1.6 The Three Approaches To Research

In this unit, three research approaches are advanced, namelysumma: (a) qualitative, (b) quantitative, and (c) mixed methods. Unquestionably, the three approaches are not as discrete as they first appear. Qualitative and quantitative approaches should not be viewed as rigid, distinct categories, polar opposites, or dichotomies. Instead, they represent different ends on a continuum (Newman & Benz, 1998). A study tends to be more qualitative than quantitative or vice versa. Mixed methods research resides in the middle of this continuum because it incorporates elements of both qualitative and quantitative approaches. Often the distinction between qualitative research and quantitative research is framed in terms of using words (qualitative) rather than numbers (quantitative), or using closed-ended questions (quantitative hypotheses) rather than open-ended questions (qualitative interview questions). A more complete way to view the gradations of differences between them is in the basic philosophical assumptions researchers bring to the study, the types of research strategies used in the research (e.g., quantitative experiments or qualitative case studies), and the specific methods employed in conducting these strategies (e.g., collecting data quantitatively on instruments versus collecting qualitative data through observing a setting). Moreover, there is a historical evolution to both approaches—with the quantitative approaches dominating the forms of research in the social sciences from the late 19th century up until the mid-20th century. During the latter half of the 20th century, interest in qualitative research increased and along with it, the development of mixed methods research. With this background, it should prove helpful to view definitions of these three key terms as used in this unit:

Qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures, data typically collected in the participant's setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data. The final written report has a flexible structure. Those who engage in this form of inquiry support a way of looking at research that honors an inductive style, a focus on individual meaning, and the importance of rendering the complexity of a situation.

Quantitative research is an approach for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures. The final written report has a set structure consisting of introduction, literature and theory, methods, results, and discussion. Like qualitative researchers, those who engage in this form of inquiry have assumptions about testing theories deductively, building in protections against bias, controlling for alternative explanations, and being able to generalize and replicate the findings.

1.7 Summary of the differences between qualitative and quantitative research

1. **Theory / research ratio**

Qualitative research: Inductive setting that is articulated in the context of "discovery", the researcher rejects the formulation of theories. Theory and research work simultaneously.

Quanti: Sequential phases, based on a deductive approach that is articulated in the context of "justification". The theory precedes the research.

2. **Concepts**

Quali: They seek to find the character of uniqueness.

Quanti: Definitive and operative, they are the theory and are converted from the beginning into variables.

3. **Relationship with the studied environment**

Quali: (active subject) Naturalistic approach: space and actions are analyzed in the present time during the research.

Quanti: (passive subject) Experimental approach: the subject is not responsive but this is not a problem.

4. **Interaction researcher/respondent**

Quali: Essential, it is necessary that empathy arises between the two parts.

Quanti: Almost absent, the interviewer must be warm and human but must not interact outside the questionnaire.

5. **Search design**

Quali: Without a structure, open, in search of unexpected options, it gets modified in progress.

Quanti: Closed structure, planned in advance.

6. **Representativeness of the respondent**

Quali: Inexistent. Different information are taken on different levels of depth.

Quanti: It is necessary to use representative samples.

7. **Uniformity of the detection instrument**

Quali: Absent. Not necessarily always the same.

Quanti: It is necessary to use a standard.

8. **Nature of data**

Quali: Soft: Data collected in their integrity, subjective.

Quanti: Hard: objective and standardized data.

9. **Type of respondent**

Quali: Unique individual.

Quanti: Variable individual.

10. **Type of analysis**

Quali: Case based.

Quanti: Variable based, mathematical and statistical techniques.

11. Presentation of data

Quali: Quotes, narrative-style extracts, to allow reality as it has been experienced during the study.

Quanti: Tables and graphs, statistics, analysis and comparison with data obtained and data from past years and with estimates.

12. Generalization

Quali Absent. Identification of the Weberian ideal types, interpretation of reality.

Quanti: Necessary. Individual fragmentation, correlation between variables, conceptual unit in the random model.

13. Scope of results

Quali: Limited number of cases.

Quanti: Significant number, representativity.

14. Methodology

Quali: Observation of the respondent in the focus room, interviews with privileged witnesses.

Quanti: Structured questionnaire for CATI, CAWI or PAPI.

We have uncovered all the differences between quantitative and qualitative research. You must consider that there are qualitative shades in the quantitative instrument, but they should not be confused with qualitative, precisely for the reasons that have been specified so far. For example, in a CATI we could make an open end and ask, “If I say car, what are the first three brands that come to your mind,” the answer will have a qualitative shade but this has nothing to do with it, believe me. That data will then be transcribed and converted into numbers.

Mixed methods research is an approach to inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks. The core assumption of this form of inquiry is that the combination of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone. These definitions have considerable information in each one of them.

1.8 Terminology

1. Qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem.
2. Quantitative research: is the systematic emperical investigation of observable phenomena via statistical, mathametical or computational technique. Quantitative data is numerical in form.
3. Mixed methods research is an approach of collecting both qualitative and qualitative data.

1.9 Activity

1. What do you think could be the challengs of using mixed methods approach in research ?
2. Discuss the advantages of using mixed method approach in research.

1.10 Summary

In this unit, you have learnt about three main different approaches to research namely: Qualitative, Quantitative, and mixed method approach. You have also learnt about two types of research namely: basic and applied research. In the next unity you will learn about research paradigins.

UNIT 2: RESEARCH PARADIGMS

2.1 Introduction

In this unit, you will learn about research paradigms that are used in research. You will basically learn about the following research paradgms; post positivism world views, the constractivist world world view, the trasformation world view and the paragmatic world view.

2.2 Learning Outcomes

By the end of this unit, you are expected to;

- discuss research paradigm.
- explain one research approach and suggest the research paradigm you can use.

2.3 Time frame

You need about four (4) hours per week interacting with this material.

2.4 Content

- Post Positivism Worldview
- The Constructivist Worldview
- The Transformative Worldview
- The Pragmatic Worldview

Two important components in each definition are that the approach to research involves philosophical assumptions as well as distinct methods or procedures. The broad research approach is the plan or proposal to conduct research, involves the intersection of philosophy, research designs, and specific methods. To reiterate, in planning a study, researchers need to think through the philosophical worldview assumptions that they bring to the study, the research design that is related to this worldview, and the specific methods or procedures of research that translate the approach into practice.

Although philosophical ideas remain largely hidden in research (Slife & Williams, 1995), they still influence the practice of research and need to be identified. We suggest that individuals preparing a research proposal or plan make explicit the larger philosophical ideas they espouse. This information will help explain why they chose qualitative, quantitative, or mixed methods approaches for their research.

2.5 Research Paradigms/ World views

We have chosen to use the term worldview as meaning "a basic set of beliefs that guide action" (Guba, 1990, p. 17). Others have called them paradigms (Lincoln, Lynham, & Guba, 2011; Mertens, 2010); epistemologies and ontologies (Crotty, 1998), or broadly conceived research methodologies (Neuman, 2009). We see worldviews as a general philosophical orientation about the world and the nature of research that a researcher brings to a study. Worldviews arise based on discipline orientations, students' advisor's/mentors inclinations, and past research experiences. The types of beliefs held by individual researchers based on these factors will often lead to embracing a qualitative, quantitative, or mixed methods approach in their research. Although there is ongoing debate about what worldviews or beliefs researchers bring to inquiry, we will highlight four that are widely discussed in the literature these are: postpositivism, constructivism, transformative, and pragmatism.

2.5.1 Post positivism Worldview

The postpositivist assumptions have represented the traditional form of research, and these assumptions hold true more for quantitative research than qualitative research. This worldview is sometimes called the scientific method, or doing science research. It is also called positivist/postpositivist research, empirical science, and postpositivism. This last term is called post-positivism because it represents the thinking after positivism, challenging the traditional notion of the absolute truth of knowledge (Phillips & Burbules, 2000) and recognizing that we cannot be positive about our claims of knowledge when studying the behaviour and actions of humans. The postpositivist tradition comes from 19th-century writers, such as Comte, Mill, Durkheim, Newton, and Locke (Smith, 1983) and more recently from writers such as Phillips and Burbules (2000). Postpositivists hold a deterministic philosophy in which causes (probably) determine effects or outcomes. Thus, the problems studied by postpositivists reflect the need to identify and assess the causes that influence outcomes, such as found in experiments. It is also reductionistic in that the intent is to reduce the ideas into a small, discrete set to test, such as the variables that comprise hypotheses and research questions. The knowledge that develops through a postpositivist lens is based on careful observation and measurement of the objective reality that exists "out there" in the world. Thus, developing numeric measures of observations and studying the behaviour of individuals becomes paramount for a postpositivist.

Finally, there are laws or theories that govern the world, and these need to be tested or verified and refined so that we can understand the world. Thus, in the scientific method—the accepted approach to research by postpositivists—a researcher begins with a theory, collects data that either supports or refutes the theory, and then makes necessary revisions and conducts additional tests. In reading Phillips and Burbules (2000), you can gain a sense of the key assumptions of this position, such as the following:

1. Knowledge is conjectural (and antifoundational)—absolute truth can never be found. Thus, evidence established in research is always imperfect and fallible. It is for this reason that researchers state that they do not prove a hypothesis; instead, they indicate a failure to reject the hypothesis.

2. Research is the process of making claims and then refining or abandoning some of them for other claims more strongly warranted. Most quantitative research, for example, starts with the test of a theory.

3. Data, evidence, and rational considerations shape knowledge. In practice, the researcher collects information on instruments based on measures completed by the participants or by observations recorded by the researcher.

4. Research seeks to develop relevant, true statements, ones that can serve to explain the situation of concern or that describe the causal relationships of interest. In quantitative studies, researchers advance the relationship among variables and pose this in terms of questions or hypotheses.

5. Being objective is an essential aspect of competent inquiry; researchers must examine methods and conclusions for bias. For example, standard of validity and reliability are important in quantitative research.

2.5.2 The Constructivist Worldview

Others hold a different worldview. Constructivism or social constructivism (often combined with interpretivism) is such a perspective, and it is typically seen as an approach to qualitative research. The ideas came from Mannheim and from works such as Berger and Luekmann's (1967) The Social Construction of Reality and Lincoln and Guba's (1985) Naturalistic Inquiry. More recent writers who have summarized this position are Lincoln and colleagues (2011), Mertens (2010), and Crotty (1998), among others. Social constructivists believe that individuals seek understanding of the world in which they live and work. Individuals develop

subjective meanings of their experiences— meanings directed toward certain objects or things. These meanings are varied and multiple, leading the researcher to look for the complexity of views rather than narrowing meanings into a few categories or ideas. The goal of the research is to rely as much as possible on the participants' views of the situation being studied. The questions become broad and general so that the participants can construct the meaning of a situation, typically forged in discussions or interactions with other persons. The more open-ended the questioning, the better, as the researcher listens carefully to what people say or do in their life settings. Often these subjective meanings are negotiated socially and historically. They are not simply imprinted on individuals but are formed through interaction with others (hence social constructivism) and through historical and cultural norms that operate in individuals' lives. Thus, constructivist researchers often address the processes of interaction among individuals. They also focus on the specific contexts in which people live and work in order to understand the historical and cultural settings of the participants. Researchers recognize that their own backgrounds shape their interpretation, and they position themselves in the research to acknowledge how their interpretation flows from their personal, cultural, and historical experiences. The researcher's intent is to make sense of (or interpret) the meanings others have about the world. Rather than starting with a theory (as in postpositivism), inquirers generate or inductively develop a theory or pattern of meaning. For example, in discussing constructivism, Crotty (1998) identified several assumptions:

1. Human beings construct meanings as they engage with the world they are interpreting. Qualitative researchers tend to use open-ended questions so that the participants can share their views.

2. Humans engage with their world and make sense of it based on their historical and social perspectives—we are all born into a world of meaning bestowed upon us by our culture. Thus, qualitative researchers seek to understand the context or setting of the participants through visiting this context and gathering information personally. They also interpret what they find, an interpretation shaped by the researcher's own experiences and background.

3. The basic generation of meaning is always social, arising in and out of interaction with a human community. The process of qualitative research is largely inductive; the inquirer generates meaning from the data collected in the field.

2.5.3 The Transformative Worldview

Another group of researchers holds to the philosophical assumptions of the transformative approach. This position arose during the 1980s and 1990s from individuals who felt that the postpositivist assumptions imposed structural laws and theories that did not fit marginalized individuals in our society or issues of power and social justice, discrimination, and oppression that needed to be addressed. There is no uniform body of literature characterizing this worldview, but it includes groups of researchers that are critical theorists; participatory action researchers; Marxists; feminists; racial and ethnic minorities; persons with disabilities; indigenous and postcolonial peoples; and members of the lesbian, gay, bisexual, transsexual, and queer communities. Historically, the transformative writers have drawn on the works of Marx, Adorno, Marcuse, Habermas, and Freire (Neuman, 2009). Fay (1987), Heron and Reason (1997), Kemmis and Wilkinson (1998), Kemmis and McTaggart (2000), and Mertens (2009, 2010) are additional writers to read for this perspective. In the main, these inquirers felt that the constructivist stance did not go far enough in advocating for an action agenda to help marginalized peoples. A transformative worldview holds that research inquiry needs to be intertwined with politics and a political change agenda to confront social oppression at whatever levels it occurs (Mertens, 2010). Thus, the research contains an action agenda for reform that may change lives of the participants, the institutions in which individuals work or live, and the researcher's life. Moreover, specific issues need to be addressed that speak to important social issues of the day, issues such as empowerment, inequality, oppression, domination, suppression, and alienation. The researcher often begins with one of these issues as the focal point of the study. This research also assumes that the inquirer will proceed collaboratively so as to not further marginalize the participants as a result of the inquiry. In this sense, the participants may help design questions, collect data, analyze information, or reap the rewards of the research. Transformative research provides a voice for these participants, raising their consciousness or advancing an agenda for change to improve their lives. It becomes a united voice for reform and change. This philosophical worldview focuses on the needs of groups and individuals in our society that may be marginalized or disenfranchised. Therefore, theoretical perspectives may be integrated with the philosophical assumptions that construct a picture of the issues being examined, the people to be

studied, and the changes that are needed, such as feminist perspectives, racialized discourses, critical theory, queer theory, and disability theory. it is helpful to view the summary by Mertens (2010) of key features of the transformative worldview or paradigm:

- It places central importance on the study of lives and experiences of diverse groups that have traditionally been marginalized. Of special interest for these diverse groups is how their lives have been constrained by oppressors and the strategies that they use to resist, challenge, and subvert these constraints.
- In studying these diverse groups, the research focuses on inequities based on gender, race, ethnicity, disability, sexual orientation, and socioeconomic class that result in asymmetric power relationships.
- The research in the transformative worldview links political and social action to these inequities.
- Transformative research uses a programme theory of beliefs about how a programme works and why the problems of oppression, domination, and power relationships exist.

2.5.4 The Pragmatic Worldview

Another position about worldviews comes from the pragmatists. Pragmatism derives from the work of Peirce, James, Mead, and Dewey (Cherryholmes, 1992). Other writers include Murphy (1990), Patton (1990), and Rorty (1990). There are many forms of this philosophy, but for many, pragmatism as a worldview arises out of actions, situations, and consequences rather than antecedent conditions (as in postpositivism). There is a concern with applications—what works—and solutions to problems (Patton, 1990). Instead of focusing on methods, researchers emphasize the research problem and use all approaches available to understand the problem (see Rossman & Wilson, 1985). As a philosophical underpinning for mixed methods studies, Morgan (2007), Patton (1990), and Tashakkori and Teddlie (2010) convey its importance for focusing attention on the research problem in social science research and then using pluralistic approaches to derive knowledge about the problem. Using Cherryholmes (1992), Morgan (2007), and my own views, pragmatism provides a philosophical basis for research:

- Pragmatism is not committed to any one system of philosophy and reality. This applies to mixed methods research in that inquirers draw liberally from both quantitative and qualitative assumptions when they engage in their research.
- Individual researchers have a freedom of choice. In this way, researchers are free to choose the methods, techniques, and procedures of research that best meet their needs and purposes. • Pragmatists do not see the world as an absolute unity. In a similar way,

mixed methods researchers look to many approaches for collecting and analyzing data rather than subscribing to only one way (e.g., quantitative or qualitative).

- Truth is what works at the time. It is not based in a duality between reality independent of the mind or within the mind. Thus, in mixed methods research, investigators use both quantitative and qualitative data because they work to provide the best understanding of a research problem.
- The pragmatist researchers look to the what and how to research based on the intended consequences—where they want to go with it. Mixed methods researchers need to establish a purpose for their mixing, a rationale for the reasons why quantitative and qualitative data need to be mixed in the first place.
- Pragmatists agree that research always occurs in social, historical, political, and other contexts. In this way, mixed methods studies may include a postmodern turn, a theoretical lens that is reflective of social justice and political aims.
- Pragmatists have believed in an external world independent of the mind as well as that lodged in the mind. But they believe that we need to stop asking questions about reality and the laws of nature (Cherryholmes, 1992). "They would simply like to change the subject" (Rorty, 1983, p. xiv).
- Thus, for the mixed methods researcher, pragmatism opens the door to multiple methods, different worldviews, and different assumptions, as well as different forms of data collection and analysis.

Research Designs The researcher not only selects a qualitative, quantitative, or mixed methods study to conduct; the inquirer also decides on a type of study within these three choices. Research designs are types of inquiry within qualitative, quantitative, and mixed methods approaches that provide specific direction for procedures in a research design. Others have called them strategies of inquiry (Denzin & Lincoln, 2011). The designs available to the researcher have grown over the years as computer technology has advanced our data analysis and ability to analyze complex models and as individuals have articulated new procedures for conducting social science research.

2.6 Terminology

1. World view research paradigm: is a basic belief that guide action /they are also called philosophical orientation about the world and the nature of research tthat a researcher bring to the study.

2.7 Activity

1. Select any world view discussed in this unit and show the type of research where it can be used.

2.8 Reflection

What do you think are the advantages of using paragmatic approach in research?

2.9 Summary

In this unit, you have learnt about four basic phitosoplical views that researchers can use. You have also learnt the type of research where each paradigm can be used. By this time we hope you clearly understand the improtance of these world views in research. In the next unit, we will take you through the importance of validity and reliability in research..

UNIT 3 : VALIDITY AND RELIABILITY

3.1 Introduction

Although validation of findings occurs throughout the steps in the process of research, this discussion focuses on it to enable a researcher to write a passage into a proposal on the procedures for validating the findings that will be undertaken in a study. Proposal developers need to convey the steps they will take in their studies to check for the accuracy and credibility of their findings. Validity does not carry the same connotations in qualitative research as it does in quantitative research; nor is it a companion of reliability (examining stability) or generalizability (the external validity of applying results to new settings, people, or samples. Qualitative validity means that the researcher checks for the accuracy of the findings by employing certain procedures, while qualitative reliability indicates that the researcher's approach is consistent across different researchers and different projects (Gibbs, 2007).

3.2 Learning Outcomes

By the end of this unit, you are expected to;

- discuss validity of research.
- discuss reliability of research.
- develop strategies that the researcher can use to ensure that the research findings are reliable and validiy.

3.3 Time frame

You need about two (2) hours per week interacting with this material.

3.4 Content

- Validity
- Reliability

Validity is one of the strengths of qualitative research and is based on determining whether the findings are accurate from the standpoint of the researcher, the participant, or the readers of an account (Creswell & Miller, 2000). Terms abound in the qualitative literature that address validity, such as trustworthiness, authenticity, and credibility (Creswell & Miller, 2000), and it is a much discussed topic (Lincoln, Lynham, & Guba, 2011). A procedural perspective that we recommend for research proposals is to identify and discuss one or more

strategies available to check the accuracy of the findings. The researcher actively incorporates validity strategies into their proposal. We recommend the use of multiple approaches, and these should enhance the researcher's ability to assess the accuracy of findings as well as convince readers of that accuracy. There are eight primary strategies, organized from those most frequently used and easy to implement to those occasionally used and more difficult to implement:

- Triangulate different data sources of information by examining evidence from the sources and using it to build a coherent justification for themes. If themes are established based on converging several sources of data or perspectives from participants, then this process can be claimed as adding to the validity of the study.
- Use member checking to determine the accuracy of the qualitative findings through taking the final report or specific descriptions or themes back to participants and determining whether these participants feel that they are accurate. This does not mean taking back the raw transcripts to check for accuracy; instead, the researcher takes back parts of the polished or semi-polished product, such as the major findings, the themes, the case analysis, the grounded theory, the cultural description, and so forth. This procedure can involve conducting a follow-up interview with participants in the study and providing an opportunity for them to comment on the findings.
- Use a rich, thick description to convey the findings. This description may transport readers to the setting and give the discussion an element of shared experiences. When qualitative researchers provide detailed descriptions of the setting, for example, or offer many perspectives about a theme, the results become more realistic and richer. This procedure can add to the validity of the findings.
- Clarify the bias the researcher brings to the study. This self-reflection creates an open and honest narrative that will resonate well with readers. Reflectivity has already been mentioned as a core characteristic of qualitative research. Good qualitative research contains comments by the researchers about how their interpretation of the findings is shaped by their background, such astheir gender, culture, history, and socioeconomic origin.
- Also present negative or discrepant information that runs counter to the themes. Because real life is composed of different perspectives that do not always coalesce, discussing contrary information adds to the credibility of an account. A researcher can accomplish this by discussing evidence about a theme. Most evidence will build a

case for the theme; researchers can also present information that contradicts the general perspective of the theme. By presenting this contradictory evidence, the account becomes more realistic and more valid.

- Spend prolonged time in the field. In this way, the researcher develops an in-depth understanding of the phenomenon under study and can convey detail about the site and the people that lends credibility to the narrative account. The more experience that a researcher has with participants in their settings, the more accurate or valid will be the findings.
- Use peer debriefing to enhance the accuracy of the account. This process involves locating a person (a peer debriefer) who reviews and asks questions about the qualitative study so that the account will resonate with people other than the researcher. This strategy—involving an interpretation beyond the researcher and invested in another person—adds validity to an account.
- Use an external auditor to review the entire project. As distinct from a peer debriefer, this auditor is not familiar with the researcher or the project and can provide an objective assessment of the project throughout the process of research or at the conclusion of the study. The role is similar to that of a fiscal auditor, and specific questions exist that auditors might ask (Lincoln & Guba, 1985). The procedure of having an independent investigator look over many aspects of the project (e.g., accuracy of transcription, the relationship between the research questions and the data, the level of data analysis from the raw data through interpretation) enhances the overall validity of a qualitative study. How do qualitative researchers check to determine if their approaches are reliable (i.e., consistent or stable)? Yin (2009) suggested that qualitative researchers need to document the procedures of their case studies and to document as many of the steps of the procedures as possible. He also recommended setting up a detailed case study protocol and database, so that others can follow the procedures. Gibbs (2007) suggested several qualitative reliability procedures:
- Check transcripts to make sure that they do not contain obvious mistakes made during transcription.
- Make sure that there is not a drift in the definition of codes, a shift in the meaning of the codes during the process of coding. This can be accomplished by constantly

comparing data with the codes and by writing memos about the codes and their definitions (see the discussion on a qualitative codebook).

- For team research, coordinate the communication among the coders by regular documented meetings and by sharing the analysis.
- Cross-check codes developed by different researchers by comparing results that are independently derived. Proposal writers need to include several of these procedures as evidence that they will have consistent results in their proposed study.

We recommend that several procedures be mentioned in a proposal and that single researchers find another person who can cross-check their codes for what is called intercoder agreement (or cross-checking) (also see Guest et al., 2012). Such an agreement might be based on whether two or more coders agree on codes used for the same passages in the text. It is not that they code the same passage of text but whether another coder would code it with the same or a similar code. Reliability subprogrammes in qualitative computer software packages can then be used to determine the level of consistency of coding. Miles and Huberman (1994) recommended that the consistency of the coding be in agreement at least 80% of the time for good qualitative reliability. Qualitative generalization is a term that is used in a limited way in qualitative research, since the intent of this form of inquiry is not to generalize findings to individuals, sites, or places outside of those under study (see Gibbs, 2007, for his cautionary note about qualitative generalizability). In fact, the value of qualitative research lies in the particular description and themes developed in context of a specific site. Particularity rather than generalizability (Greene & Caracelli, 1997) is the hallmark of good qualitative research. However, there are a few discussions in the qualitative literature about generalizability, especially as applied to case study research in which the inquirer studies several cases. Yin (2009), for example, felt that qualitative case study results can be generalized to some broader theory. The generalization occurs when qualitative researchers study additional cases and generalize findings to the new cases. It is the same as the replication logic used in experimental research. However, to repeat a case study's findings in a new case setting requires good documentation of qualitative procedures, such as a protocol for documenting the problem in detail and the development of a thorough case study database.

3.5 Terminolgies

1. Quantitative validity: means that the researcher checks for the acuracy of findings by employing certain procedures.
2. Qualitative reliability indicates that the researcher' approach is consistent across different researchers and different project.

3.6 Activity

1. Explain how you can ensure validity and reliability of your research findings.

3.7 Reflection

Do you think there is something as reliable findings in research?

3.8 Summary

In this unit, you have learnt about validation of research findings. You have learnt that one of the strengths of qualitative research is based on determining whether the findings are acurate from the stand point of the researcher, the participants, or the readers. You have also learnt of various ways of ensuring validity of the findings in research.

UNIT 4: TOPIC SELECTION

4.1 Introduction

The Term 'topic' refers to subject issue or area under discussion. The 'topic' one selects to research on is essential in the success of research project. The ability to develop a good research topic is an important skill. If the researcher selects a topic in his field of specialisation, he is likely to enjoy the reading materials related to the subject and put in more effort and time. The researcher will develop a concern for that field and will be keen on collecting the required data, analysing it and finding out the results.

Research requires painstaking (thorough) thought, writing and reading before the proposal is finalised.

4.2 Learning Outcomes

By the end of this unit, you are expected to;

- formulate a topic for your research.
- discuss steps involved in topic selection.
- analyse qualities of an effective research topic.

4.3 Time frame

You need about four (4) hours per week interacting with this material.

4.4 Content

- Steps to Follow in Topic Selection
- Defining a Topic
- Formulating the Topic
- Qualities of an effective topic

4.5 Steps to Follow in Topic Selection

An instructor may assign you a specific topic, but most often instructors require you to select your own topic of interest. When deciding on a topic, there are a few things that you will need to do:

- brainstorm for ideas
- choose a topic that will enable you to read and understand the literature
- ensure that the topic is manageable and that material is available
- make a list of key words
- be flexible
- define your topic as a focused research question

- research and read more about your topic
- formulate a thesis statement

Be aware that selecting a good topic may not be easy. It must be narrow and focused enough to be interesting. However, the following are among other things that you may follow:

- Identify what interests or puzzles you in an area of study. These social, economic, health, cultural issues. For example, why are illicit brews popular in shanty compounds of Zambia despite the dangers experienced by most people in these areas and the warnings from government?
- Identify key words for the topic. According to smith (2011) key words in the title will help the researcher make clear criteria relating to both the content and process. Therefore, the researcher should examine the precise wording of the topic in order to establish what the research is looking for in terms of evidence and achievement.

However, there three things that a researcher should consider when analysing the key words in the topic-

(a) The researcher should look for the word, discuss, plan, review, evaluate etc. These words will guide the researcher on how to deal with content of the research.

(b) Then the researcher should identify and underline content words for example; Social class, Leadership style, motivation, children's rights etc. This will guide the researcher what he/she must focus on in the research.

(c) The researcher should read and write out the whole title. This helps the researcher to establish what he/she intends to do, content area, what she/he should do with content and the type of structure, style and audience the research is intended for.

4.6 Defining a Topic

Defining the topic involves analysing selected words and out of the selected words a number of topics can be studied for example, on elicit brews, the researcher has to decide on what to concentrate on, whether it is causes and effects or the costs, or free primary education. The researcher may choose to concentrate on free primary and pupil retention, accessibility or learner performance.

A good topic will make a claim that is novel, nonobvious, useful, and sound, for both the writer and the potential readers. Further, a good research topic should be something that one is deeply

interested in, is scientifically original and significant, and is manageable within the graduate studies time frame. Defining a topic can be a multi-step process. You need to:

- Think about what drew you to the topic in the first place: what areas interest you the most?
- Do some basic research both for background information and to find out what's already been written on your topic
- Be sure you have a manageable amount to cover within the time and space requirements of your assignment

4.7 Formulating the Topic

This involves the researcher to look for articles and other materials relevant to the research topic. This information will help the researcher to develop clarity over the topic selected. The researcher should take notes paraphrase and summarize what she/he has read on relevant materials which will be included in the literature review. Other relevant materials related to the topic can be found in a library or internet.

4.8 Qualities of an Effective Research Topic

An effective research topic should among other things possess the following; -

a) It should be researchable.
b) It should captivate the interest of the researcher.
c) It should contribute to the new body of knowledge.
d) It should be provocative.
e) It should be clear and focused.
f) It should be focused.
g) It should address a specific question or problem in a meaningful way.
h) It should answer questions, such as who, what, when, where, why and how, about the subject.

4.9 Terminology

1. Topic refers to subject issue or area under discussion.

4.10 Activity

1. Discuss steps to follow when selecting a topic for research.
2. Analyse qualities of a good topic for research.

4.11 Reflection

Discuss characteristics of a good topic.

4.12 Summary

In this unit, you have learnt about the importance of selecting a good research topic. You have also learnt about the steps you need to take in order for you to come up with a good research topic. Qualities of a good research topic have also been explained. We hope that by this time you are able to come up with a good research topic for your proposal.

UNIT 5: FIVE VARIABLES

5.1 Introduction

The research variables, of any scientific experiment or research process, are factors that can be manipulated and measured. Variables are attributes or qualities of the cases measured or recorded for example gender, colour and country are all perfectly acceptable variables, because they are essentially changeable. If the cases are persons, the variables could be sex, age, height, weight, level of empowerment ability etc.

5.2 Learning Outcomes

By the end of this unit, you are expected to;

- differentiate between an independent and dependent variable.

5.3 Time frame

You need about two (2) hours per week interacting with this material.

5.4 Content

- Independent Variable
- Dependent Variable25

Most scientific experiments measure quantifiable factors, such as time or weight, but this is not essential for a component to be classed as a variable. As an example, most of us have filled in surveys where a researcher asks questions and asks you to rate answers. These responses generally have a numerical range, from '1 - Strongly Agree' through to '5 - Strongly Disagree'. This type of measurement allows opinions to be statistically analysed and evaluated.

There are two major forms of variables. These are Independent and Dependent variable. However, it should be noted that the key to designing any experiment is to look at what research variables could affect the outcome. There are many types of variables but the most important are the independent and dependent variables.

(a) Independent variables

Independent variables are also known as the predictor or the explanatory variables. The independent variables are the core of the experiment and are isolated and manipulated by the researcher. For example, if the study is on the impact of alcohol abuse among high school pupils', then alcohol abuse is the independent variable. This is because it can explain or affect the increase or decrease in alcohol abuse.

(b) Dependent variable

Dependent variable usually depends on the independent variable. Usually there is only one dependent variable which is known as the outcome. In other words, the dependent variable is the measurable outcome of the manipulation of the independent variable; the results of the experimental design. For many physical experiments, isolating the independent variable and measuring the dependent is generally easy.

To understand better the independent and dependent variables, let us look at the following title: The role of adult education in enhance parents' attitudes towards their children's' education. This title has two key variables (a) role of adult education (independent variable) and enhancing attitudes towards their children's education (dependent variable). In this study an attempt was to find out how the role of adult education (independent variable) influences the enhancement of parents' children's education (dependent variable). For instance, if you designed an experiment to determine how quickly a cup of coffee cools, the manipulated independent variable is time and the dependent measured variable is temperature.

5.5 Terminology

1. Variables: are factors that can be manipulated and measured.

5.6 Activity

1. What is the difference between independent and dependant variables?

5.7 Reflection

How can lack of understanding of the variables affect research findings?

5.8 Summary

In this unit, you have learnt about variables as they relate to research. You have learnt about independent and dependant variable and how they influence research findings.

UNIT 6: BACKGROUND OF THE STUDY AND THE STATEMENT OF THE PROBLEM

6.1 Introduction

In this unit, you are going to learn about background to the problem and statement of the problem. The background to the problem will be looking at in the following areas: qualities of an effective background to the problem, steps in writing an effective background of the study and challenges faces when writing an effective background to the problem. Key characteristics of the statement of the problem will also be discussed.

6.2 Learning Outcomes

By the end of this unit, you are expected to;

- write a good background of the problem.
- analyse characteristics of the background to the problem.
- develop a good statement of the problem.

6.3 Time frame

You need about four (4) hours per week interacting with this material.

6.4 Content

- Background to the problem
- Qualities of an effective Background to the study
- Steps in Writing an effective Background of the Study
- Background to the study
- Challenges faced in writing an effective Background to the study
- Statement of The Problem
- Key characteristics of a statement of the problem
- Delimitation of the study
- Limitation of the study
- Significance of the study

6.5 Background to the problem

The term “background” refer to the setting or position of the study. This is a brief overview of the problem the researcher aspires to tackle. This includes an explanation of the area of your research to set context for the problem at hand. It also includes a detailed literature review in

which you explain what previous studies state about the topic, discuss recent developments on the topic, and identify the gap in literature that has led to your study.

It identifies and describes the history and nature of a well-defined research problem with reference to the existing literature. The background information should indicate the root of the problem being studied, appropriate context of the problem in relation to theory, research, and/or practice, its scope, and the extent to which previous studies have successfully investigated the problem, noting, in particular, where gaps exist that your study attempts to address. Further, the background to the study helps clarify what has brought about the need for the study; It points out the challenges faced due to the identified issue; It indicates the opportunities for improvement; It demonstrates the researchers view of the research problem; It helps to convince the readers that the problem or opportunity exists and that it should be addressed. It also shows the reader that the researcher knows the study area as she/he is familiar with what has preceded.

6.6 Qualities of an Effective Background to the Study

An effective background to the study should possess among other things the following qualities. (a) It should be brief and specific though it gets a lot from literature review. It is actually a summary of information in the literature review. (b) It should excite the reader to be concerned about having the problem addressed and interested in the solution proposed by the research (c) It gives the reader a glimpse of the research problem (c) It gives the reader an idea of how the proposal is structured. (d) The language used should be simple and straight forward. (e) It should be formative and persuasive since it attempts to enlighten the reader about the research problem and the urgency of the problem.

6.7 Steps in Writing an Effective Background of the Study

Having an effective background requires essential steps to follow. The following are the steps to follow:

1. *Reflection*: Before writing the background to the study, the researcher should analyse the selected topic and the title and then identify the variables. This will assist in locating the relevant literature related to the research problem and literature will assist in background formulation.

2. *Brain Storming*: The researcher should think about the relevant literature related to the topic that will specifically bring out the need for the study. Challenges related to the selected topic should also be reflected in the selected literature.

3. *Material Compilation*: The researcher should read various books and articles from the library. These books and articles should be related to the topic.

4. *Formulation*: The materials found should be used in the literature review to write the background to the study. The researcher should cite previous studies that are similar to what is being proposed.

6.8 Challenges Faced in Writing an Effective Background

Challenges faced by researchers in writing in an effective background include the following;

- Failure to differentiate between the background to the study and literature review. While the literature review expounds on various studies related to the area of study, the background should be a short summary briefly expounding on factors that have brought about the need for the study and opportunities for improvement,
- Some researchers use the background content to justify the need for the study. Therefore, this section gives a brief overview of the research problem.
- Lack of clarity due to poor language use, such as the use of jargon such as slang, trendy words, abbreviations, colloquial expressions, redundant phrases and confusing language
- Quoting studies but not explaining how they fit in the background section.

6.9 Statement of The Problem

A problem statement is a brief description of the issues that need to be addressed by a researcher. It should help you clearly identify the purpose of the project you will propose. Often, the problem statement will also serve as the basis for the introductory section of your final proposal, directing your reader's attention quickly to the issues that your proposed project will address and providing the reader with a concise statement of the proposed project itself. It is the main idea of your report. In other words, it is a summary what you want to prove in your report for your reader. All of your subsequent topic sentences of body paragraphs should tie back into this thesis, so make sure that it is general enough to stand throughout your essay.

However, *a statement of the problem* is a claim of one or two sentences in length that outlines the problem addressed by a study. The fundamental goal of a problem statement is to convert a generalised problem (this may be something that bothers you or a perceived lack of) into a

targeted, well-defined problem is one that can be resolved through focused research and careful decision-making.

The statement of the problem should briefly address the question: What is the problem that the research will address? (Ellis and Levy, 2008). It need not be too long. One page is more than enough for a good statement of problem. Furthermore, it should be specific, manageable, and written to stimulate reader interest. If the purpose is publication in a peer-reviewed journal, the proposed research should contribute to the literature of the profession and perhaps beyond (Moffatt, 1980).

6.10 Some key characteristics of a problem statement

In research, a good statement of the problem should:

1. Address a gap
2. be significant enough to contribute to the existing body of research
3. be one that will lead to more research
4. render itself to be investigated via collection of data
5. be interesting to the researcher and suit his/her skills, time and resources
6. be ethical

6.11 Delimitation of the study

This describes the boundary that you have to set for your study. It refers to the geographical location or setting in which your study will take place.

6.12 Limitation of the study

These are challenges anticipated or faced by the researcher. It may include; time and financial limitation that influenced the scope of the study.

6.13 Significance of the study

This outlines the importance of the topic being investigated. It may state beneficiaries of the study and how they will benefit from the study.

6.14 Terminologies

1. Background to the problem: refers to the setting or position of the study.
2. Statement of the problem: is the brief description of the issues that needs to be addressed by the researcher.

6.15 Activity

1. Come up with a topic and then develop a background of the study and statement of the problem.

6.16 Reflection

Why do you think formation of the statement of the problem is critical in research?

6.17 Summary

In this unit, you have learnt about the background to the study and the statement of the problem. You learnt about the qualities of a good background of the study, steps involved in writing a good background of the study. You have also learnt about characteristics of a good statement of the problem.

UNIT 7: RESEARCH HYPOTHESES, CONCEPTUAL FRAMEWORK AND THEORETICAL FRAMEWORK

7.1 Introduction

In this unit, you will learn about different types of research hypothesis, such as simple hypothesis, complex hypothesis, empirical hypothesis, null and alternative hypothesis. You will also learn about strategies of designing an effective conceptual frame work and qualities of an effective theoretical framework.

7.2 Learning Outcome

By the end of this unit, you are expected to;

- analyze different types of hypothesis.
- design an effective conceptual framework.
- discuss qualities of an effective theoretical framework.

7.3 Time frame

You need about four (4) hours per week interacting with this material.

7.4 Content

- Research hypothesis
- Types of research hypothesis
- Guidelines of formulating the hypothesis
- Conceptual Framework
- Usefulness of the Conceptual Framework
- Strategies of designing effective Conceptual Framework
- Qualities of an effective Conceptual Framework
- Theoretical Framework
- Qualities of an effective Theoretical Framework

7.5 Research hypothesis

In our day-to-day activities we are often faced with problems for which we must gather information and seek answers. In-order to focus our information gathering, we try to identify possible solutions or explanations to our problems and then gather the information needed to see if a given explanation is correct. These "educated guesses" about possible differences, relationships, or causes are called *hypotheses*.

When we examine the definitions of hypotheses given by researchers such as Cone and Foster (1994) Research hypotheses are declarative sentences that conjecture a relationship between two or more variables. Others say it refers to an assertion, proposition or statement about relations or constraints whose truth value is as of unknown but in principle determinable by tests. In other words we can refer it to as a statement created by researchers when they speculate upon the outcome of a research or experiment.

Now let's take a look at the different types of research hypothesis.

7.5.1 Simple hypothesis

This is that one which there exists relationship between two variables. One is called independent variable or *cause* and the other is dependent variable or *effect*. For example:

a) smoking leads to cancer

b) the higher ratio of unemployment leads to crime

7.5.2 Complex hypothesis

Complex hypothesis is that one in which relationship among variables exists. The dependent as well as the independent variables are more than two. For example:

a) smoking and other drugs lead to cancer, chest infections, etc.

b) the higher ratio of unemployment, poverty, illiteracy, lead to crime like robbery, rape, prostitution, and killing.

7.3.5 Empirical hypothesis

This is that one which is applied to a field. During formulation, it is an assumption only but when it is put to a test it becomes an empirical or working hypothesis.

7.5.6 Null hypothesis

It is contrary to the positive statement of working hypothesis. According to nullhypothesis, there is nosignificant relationship between dependent variable and independentvariable. It allows for statistical testing. It is denoted by HO.

7.5.7 Alternative hypothesis

Firstly, many hypotheses are selected. Then among them select one which is more workable and more efficient. That hypothesis is introduced later on due to changes in the old formulated hypothesis. It is denoted by HI.

7.5.8 Logical hypothesis

It is that type in which hypothesis is verified logically. For example, agreement, disagreement, difference and residue.

7.5.9 Statistical hypothesis

This is one which can be verified statistically. The statement would be logical or illogical but

if statistics verifies it, it will be statistical hypothesis.

7.6 The importance of hypothesis in research

The hypothesis plays a very important role in research. This includes the following:

(i) It states the researcher's expectations concerning the relationship between the variables in the research problem.

(ii) The hypothesis refines the research problem.

(iii) By defining the variables in the study, the hypothesis enables the researcher to collect data that either supports the hypothesis or rejects it.

7.7 Qualities of an effective hypothesis

Hypotheses must be of maximum value to the researcher. As such an effective hypothesis has the following qualities

i) Must be conceptually clear - It must state clearly and concisely as possible the expected relationships or differences between two or more variables.

ii)Should have empirical references - This property is an essential feature of a scientific approach

to problems. It is fulfilled as soon as operational definitions have been found for all the concepts appearing in the statement of the hypothesis. Particular care should be taken to avoid moral judgments, values, attitudes, etc. Expressions like good, bad, ought to, should and the like indicate non-scientific attitudes by the researcher.

iii) Must be specific - This property reflects the fact that the range of the problem is narrow enough toallow precise well-definite investigation. If the problem is too wide the hypothesis will be too general and thus not testable.

iv) Must be testable with available techniques - It must be testable and verifiable. it is possible to support or not support the hypothesis by collecting and analyzing data. The only way to go about this is by studying carefully the operational definitions which should indicate clearly the methods of measurement.

v) It must be consistent with the existing body of knowledge.

vii) It must give logical arguments to justify the hypothesis.

viii) The wordings must be clear and precise - In stating hypotheses the simplest and most concise

statement of the relationship expected is generally the best. Brief, clear hypotheses are easier for the reader to understand and also easier to test.

7.8 Guidelines in formulating the hypothesis

We have already discussed that research problems are questions about relations among variables and hypotheses are tentative, concrete and testable answers to such problems. In other words hypothesis is a suggested answer to a problem, has to be tested empirically before it can be accepted and incorporated into a theory or rejected. In this sense the role of hypothesis is not only to suggest explanations for certain facts or problems but also to guide in the investigation.

According to Kombo and Tromp (2006) when formulating an effective hypothesis you should take the following into consideration.

i) Reflect on issues of concern

ii) Analyze the research problem, title, objectives and literature review. These sections will identify key variables that the researcher can use as a base to define the relationships.

iii) Generalize operational definitions for all variables.

iv) State the research hypothesis- The research hypothesis should clearly state the relationship that the researcher thinks exists between the independent and dependent variables.

v) Formulate- The researcher should then write down the relationship between the variables ensuring that they are measurable and if accomplished will answer the research question. The researcher should ensure they reflect expected relationships or differences.

vi) Evaluation - After formulating the hypothesis, the researcher should evaluate it to find out if it addresses all sections of the research problem.

7.9 Conceptual Framework

This is an analytical tool with several variations and contexts. It is used to make conceptual distinctions or organize ideas. Strong conceptual frameworks capture something real and do this in a way that is easy to remember and apply. Reichel and Ramey (1987) in Kombo and Tromp(2006) say that this is a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation.

On the other hand it is defined as a research tool intended to assist a researcher to develop awareness and understanding of the situation under scrutiny and to communicate this. When clearly articulated, a conceptual framework has potential usefulness as a tool to assist a researcher to make a meaning of subsequent findings. It forms part of the agenda for negotiation to be scrutinized and tested, reviewed and reformed as a result of investigation (Guba and Lincoln, 1989 in Kombo and Tromp 2006).

7.9.1 Usefulness of Conceptual framework

A conceptual framework increasingly strengthens and keeps the research on track by:

- Providing clear links from the literature to the research goals and questions.
- Contributing to the formulation of the research design.
- Providing reference points for discussion of literature, methodology and analysis of data.
- Contributing to the trustworthiness of the study
- Giving a broad scope to thinking about the research.
- Conceptualizing the problem and providing a means to link ideas and data so that deeper connections can be revealed.

7.9.2 Strategies of Designing Effective Conceptual Framework

To come up with an effective conceptual framework, one has to analyze a set of broad ideas and principles taken from relevant fields of inquiry, and study a variety of works showing experiences where several kinds of thought combine. Extensive bodies of knowledge could be used as cornerstones for organizing one's thinking.

The following strategies are useful when designing an effective conceptual framework.

i) Reflection - assessing situations from social, economic and philosophical perspectives. One has to be clear about what the research is about (title, objectives). Factors such as the independent and dependent variables and research questions should also be put into perspective.

ii) Defining the key issue (problem) to be addressed and defining its practical boundaries.

iii) Identifying key uncertainties (gaps in understanding/knowledge) about the situation or the social/economic systems, and so on. (The questions that need to be answered by the study).

iv) Identifying and assessing different possibilities for action.

A well constructed conceptual framework can guide the entire research writing process, keep you on track, save time and enable you to defend your arguments soundly and readily.

7.9.3 Qualities of effective Conceptual framework

An effective conceptual framework should have the following qualities:

- Should be clear and concise.
- Language used should be simple and straight forward
- It should be self explanatory. It should have supportive evidence of ideas used.

- It should be logical and address the title, research objectives and statement of the problem.
- It should be consistent with the literature review.
- It should also show a link between the literature review and the study problem.
- it should develop a set of guiding principles against which judgments and prediction might be made.
- It should act as a reference point from which to locate the research questions within contemporary theorizing.
- It should provide a structure within which to organize the content of research and to frame conclusions within the context.

7.10 Theoretical Framework

A theoretical framework is a collection of interrelated ideas based on theories. Theories are formulated to explain, predict and understand phenomena and in cases, to challenge and extend knowledge within the limits of critical bounding assumptions. It is a reasoned set of prepositions, which are derived from and supported by data or evidence. A theoretical framework accounts for or explains phenomena. It attempts to clarify why things are the way they are based on theories. A theoretical framework is a general set of assumptions about the nature of phenomena. It is a structure that can support a theory of a research study.

Theories represent tentative solutions to problems. A theory is a generalization about a phenomenon, an explanation of how and why something occurs. Indeed, any statements that explain what is measured or described in any general statements about cause or effect-are theory based, at least implicit.

7.10.1 Importance of theoretical framework

A theoretical framework plays an important role in research. They are as follows:

i) It introduces you to a new view of the research problem. This enables you to understand the total realm of the problem.

ii) It enables you to conceptualize the topic in its entirety as an outgrowth of the larger society. This helps you to acknowledge the problem from a wider perspective and not from a narrow personalized self-interest approach. This enhances your objectivity.

7.10.2 Qualities of an effective theoretical framework

An effective theoretical framework should:

i) Account for and explain phenomena.

ii) Be specific and well articulated.

iii) Reflect the research problem being addressed.

iv) Be measured in a practical situation.

v) Provide tentative answers to questions, issues and problems addressed in the research problem.

Should systematically address the various aspects of the problem, particularly the key factors that are assumed to influence or the problem.

7.11 Terminologies

1. Hypothesis: is a declarative sentence that conjecture a relationship between two or more variables.
2. Conceptual framework: is a set of broad ideas and principles taken from relevant fields of enquiry and used to structure a subsequent presentation.
3. Theoretical framework; is a collection of interrelated ideas based on theories.

7.12 Activity

1. Discuss qualities of an effective hypothesis.
2. Analyse strategies of designing an effective conceptual framework.
3. Explain qualities of an effective theoretical framework.
4. What is the difference between a theoretical framework and the conceptual framework?

7.13 Summary

In this unit, you have discussed types of hypothesis, strategies of designing a conceptual framework and qualities of the theoretical framework. The concepts discussed in this unit are very important for you to understand because they usually help hold the research. In case you have doubts, please go back and read again.

UNIT 8: RESEARCH AIM,OBJECTIVES

8.1 Introduction

In this unit, you will learn about the importance of research objectives in research. You will also learn about qualities of effective aims, steps in constructing effective aims, challenges faced in the formation of aims, qualities of effective objectives and guidelines of writing objectives and research questions.

8.2 Learning Outcomes

By the end of this unit, you are expected to;

- write effective research aims.
- construct effective research objectives.
- analyse qualities of effective objectives.

8.3 Time frame

You need about four (4) hours per week interacting with this material.

8.4 Content

- Research Aim
- Importance of aims in research
- Qualities of an effective aim and goal
- Steps in constructing effective aims
- Challenges faced in the formulation of aims
- Research objectives
- Importance of objectives
- Qualities of effective objectives
- Guidelines in writing objectives
- Research questions

8.5 Research Aim

Aims are intentions, goals or what the researcher strives to achieve. The aim reflects the aspirations and expectations of the researcher. They are usually stated in general terms that are not easily measurable.

8.5.1 Importance of aims in research

Aims reflect the outcome of the research. They portray the overall expectations of the study. By analysing the aims of the study one is able to assess the study and evaluate its progress.

They assist in formulation of the objectives as they pinpoint the purpose of the study. They help in identifying whether the research is urgently needed or not.

8.5.2 Qualities of effective aims and goals

Effective aims portray the following qualities:

- They are pragmatic. They state the purpose of the study, they do not refer to specific issues.
- They are reflective and clearly stated.
- They are broad and they lead to specific objectives.
- They state the accomplishment of a group rather than of individuals.
- They are always stated in general terms that provide direction for research development.

8.5.3 Steps in constructing effective aims

Before writing the purpose of the study, below are the steps to follow:

Reflection

The researcher should spend time to think of what he/she wants to accomplish by the end of the study. This can be achieved by analysing the title.

Formulation

The researcher should then write down what the purpose of the study will be.

Analysis

The researcher should analyse the selected aims to find out if they if they address the research problem and research questions.

8.5.4 Challenges faced in the formulation of aims

1. Lack of clarity

This is one problem faced by researchers in stating the aim of the study. The purpose of the study is not clearly articulated.

2. Lack of cohesion

In some research works, there is no clear link between the title, purpose of the study and the study objectives or problem statement.

3. Overambitious aims

Some researchers set out overambitious studies that may be achievable based on the resources and time available. For example, a student studying masters whose aim is to find out the effect of free primary education in a five year span may not achieve this. This is because most programmes at masters level run for a span of two years (Kombo and Tromp, 2014)

Examples of sample aims

- Kwamboka (2003): Factors affecting food selection, intake and nutritional status of the elderly in Mathare slums in Nairobi, Kenya.
  The aim of the study is to investigate factors that affect food selection, intake and nutritional status of the elderly in Mathare slums of Nairobi, Kenya.
- Kamonji (2003): An investigation of resources women farmers use to enhance household food security: A case study of Embu distrct, Kenya.
  The purpose of the study was to determine the resources women used for household food security in Embu district.

From the above samples, it is clear that all the aims formulated are linked to the title. The aims do not refer to specific issues, and state he accomplishment of a group rather than of individuals (kombo and Tromp: 2004).

8.6 **Research objectives**

Objectives are intentions or purposes stated in specific measurable terms. They provide opportunities for evaluating the end results. In research an objective is a specific statement relating to the defined aim of the study. Specific objectives specify what the researcher will do in the study.

8.6.1 Importance of objectives

- Objectives guide decisions in the selection of respondents, research instruments and the study area.
- Objectives influence all components of the research design including data analysis and report writing.

- A clear statement of objectives helps to limit the scope of the literature review. They help the researcher organise the study in clearly defined parts or phases.
- Objectives break up the aims into achievable and measurable components. They serve as a guide for evaluation.
- They serve to clarify the variables of the study. This helps in the evaluation of the study.
- Objectives provide a common consistent focus for the many activities in research.

8.6.2 Qualities of effective objectives

The following are qualities of effective objectives:

1. They are specific - This means that, selected objectives clearly state what the researcher will do in order to fulfil the purpose of the study
2. They are measurable - This means that they can be evaluated.
3. They are focused - The objectives should narrow the study to essentials. They should also cover the different aspects of the problem and its contributing factors in a coherent way and in a logical sequence. They should systematically address the various aspects of the problem, particularly the key factors that are assumed to influence or cause the problem.
4. They are operational – They should be clearly phrased in operational terms, specifying exactly what the researcher will do.
5. They are realistic – This means that they are achievable.

8.6.3 Guidelines in writing objectives

Effective guidelines to the researcher must be as follows:

- Reflection: This concerns analysing the aim of the study, the topic and title before formulating the specific objectives. Specific objectives should be related to all these aspects.
- Formulation: The researcher should write down the specific objectives ensuring that they are measurable and if accomplished will answer the research question.
- Evaluation: After the formulation of objectives the researcher should answer the following questions:
    1. Do the objectives address all parts of the research problem?
    2. Do the objectives measure what is being researched?

3. Are the objectives feasible?
4. If too ambitious, could the scope of the study be reduced?

Bare it in mind that answers to these questions will assist the researcher to formulate effective objectives.

8.7 Research questions

These are questions the research asks in order to get answers. They are supposed to be related to the research objectives. The research questions guide the research process by addressing the variables of the study.

8.8 Terminologies

- Research aims: are: intentions, goals or is what the researcher strives to achieve.
- Research objectives: are intentions or purposes stated in specific and measurable terms.

8.9 Activity

1. Discuss qualities of effective objectives.

8.10 Reflection

What do you think is the difference between the aim and an objective?

8.11 Summary

In this unit, you have learnt about the importance of research objectives, qualities of an effective aim, steps in constructing effective aims, challenges faced in the formulating of aims and guidance of writing aims and research questions

UNIT 9: REVIEW OF RELATED LITERATURE

9.1 Introduction

This part of the report provides a background for the development of the present study and brings the reader up to date. Since further research is based upon everything that is known about a problem, this section gives evidence of the investigator's knowledge of the field.

A brief summary, indicating areas of agreement or disagreement in findings, or gaps in existing knowledge, should be included.

9.2 Learning Outcomes

By the end of this unit, you are expected to;

- review literature on given topic.
- discuss qualities of an effective literature review.
- systematically organize the literature review.
- critically evaluate strength and weaknesses of sources reviewed.

9.3 Time frame

You need about four (4) hours per week interacting with this material.

9.4 Content

- Importance of literature review
- Qualities of an Effective Literature Review
- How to organise your literature review

According to Borg and Gall (1989) the review of the literature is an important part of scientific approach and is carried out in all areas of scientific research, whether in the physical, natural or social sciences. The review of literature in educational research provides you with the means of getting to the frontier in your particular field of knowledge. Until you have learned what others have done and what remains still to be done in your area, you cannot develop a research project that will contribute to furthering knowledge in your field. Thus the literature in any field forms the foundation upon which all future work must be built. If you fail to build this foundation of knowledge provided by the review of literature, your work is likely to be shallow and naive, and will often duplicate work that has already been done better by someone else.

Sometimes researchers are tempted to get a sketchy review of literature suffice so that they can get started sooner on their own research project. However, you should make every effort to

complete a thorough review before starting your research because the insights and knowledge gained by the review almost inevitably lead to a better-designed project and greatly improve the chances of obtaining important and significant results. Often the insights you gain through the review will save as much time in conducting the project as the review itself required.

9.5 Importance of literature review

Literature review is essential in research. This is due to the following:

a) It shapens and deepens the theoretical foundation of the research. Literature review enables the researcher to study different theories related to the identified topic. By studying these theories, a researcher gains clarity and better understanding of the theoretical foundations related to the current research.

b) It gives the researcher insight into what has already been done in the selected field, pinpointing its stregnths and weakeness. This information guides the researcher in the identified gaps.

c) It enables the researcher to know the kind of additional data needed in the study. This helps avoid duplication of work.

d) An understanding of previous works helps the researcher to develop a significant problem which provide further knowledge in the field of study. It also helps in delimiting the research problem. This is through portraying what has already been done and what would be useful to focus on in the current study.

e) Wide reading exposes the researcher to a variety of approaches of dealing with the researcher issue. This contributes to a well-designed methodology. The researcher can avoid methods indicated in the literature to have failed and adopt new approaches. This will result in a significant study.

f) It helps in developing an anlytic framework or a basic for analyzing and interpreting data.

9.6 Qualities of an Effective Literature Review

Cone and Foster (1994) say there are many ways of organizing literature. The strategies described here are just among some of them. Let us look at those outlined by Kombo and Tromp (2006).

(i) *Identify key issues to be addressed by the literature review* - You need to identify key words related to your topic, in order to look up for these key words in the index to locate sources of

information related to your topic. For example, let us say you wish to search *Education Index* for studies related to the following question: "What are student and teacher attitudes toward disabled children in inclusive schooling?" Your list of words might include the following: Attitudes, Inclusive Schooling, Hearing Impaired, Visually Impaired/Blind, Mentally Challenged, Physically Challenged.

The objectives of the study should also be identified. You should also be certain of the specific problem the literature review will help to address. You should also know what type of literature review you are conducting. Certain literature review deal with issues of theory, methodology, policy or social.

(ii) Formulate a preliminary statement of the problem -

You should formulate a preliminary statement. This will assist you to be focused in material selection. For example, *What are the causes and effects of negative attitudes towards the disabled in schools? What has been done and can be done to change teachers and student attitude?* After the preliminary statement you can now begin to identify sources of information relevant to the research topic.

(iii) Identify sources of information

You need to identify books, articles, professional papers and othe relevant publications that relate to the research title and the research problem. There is a variety of sources of information for your review. Some of it is found in libraries. some of it is in journals while other sources can be found on Internet.

You should also identify the scope of the literature review. Be clear on what types of publications will be used. Ensure that you also identify the discipline you are working in. This helps to quicken up your search for the materials.

(iv) Analyse critically the articles identified - Once the necessary articles you need been identified, you should now critically analyze each book or article selected by reflecting on:

- whether the author formulated a problem/issue. Clearly defined it and established its significance.
- whether the author evaluated the literature relevant to the problem.
- whether there is an objective basis to the reasoning or is the author merely proving what he/she already believes.
- how the author structures the argument, for example, does it establish cause-effect relationships?
- how the book or article relate to the specific objectives or questions you are attempting

to study.

(v) Classify and ccode the article - You should develop a system of coding that will permit you to indicate what type of material is contained on a given note card. The coding system adopted by the researcher will be different for each review of the literature. This includes taking notes and paraphrasing any relevant literature that you want to include in the literature review. You should mark these notes with some codes for easy retrieval. This involves putting the code on index card or on the photocopied article (if you photocopied it).

These codes are generally placed in the upper right-hand corner of the note card. Example suggested by Borg & Gall (1989):

An important study

S Studies dealing with social interaction

A Studies dealing with achievement of learners

G Studies describing grouping systems

B Studies relating to behaviour problems

P Studies relating grouping to personality adjustment

Using such a code is helpful in several ways. It makes you actively aware of the major areas of concentration in your topic. It makes it possible for you to check quickly your notes on a specific portion of the literature, and it makes the job of writing up your review of the literature much easier.

You should add on the coded article any thoughts that come to your mind about the article. Indicate any statements that are direct quotations, use quotation marks and write down the page number. You should keep personal reactions separated from direct quotations. The details of the source e.g. author, title, date of publication and the publisher should be indicated.

(vi) Create an outline for the review - To create an outline of the literature review, you should identify the main points in the order they should be presented. The article codes will assist in this. You should also differentiate each main heading into logical subheadings. Similar points should be grouped together.

(vii) Synthesize the information gathered - You should organize and synthesize material from all those articles, chapters and books you gathered before writing the literature. You should also have been thinking about this as you read the materials. You should evaluate your literature critically. Which studies are best, and why? Which studies are worst, and why? Consider methodological as well as conceptual strengths and weaknesses and analyzing each reference in terms of the research variables. You should also analyze all references identified for the

relationships or differences between them.

(viii) Write the review of related literature - You are now ready to start writing. But you should do the following:

- Select studies that relate mostly directly to the problem at hand.
- Tie together the results of the studies so that their relevance is clear.
- Indicate that the research area reviewed is incomplete or requires extension.
- Organized the review along major points relevant to the problem.
- Give the reader some indication of the relative importance of the results from the studies reviewed.
- Use a professional tone in criticizing others' work. You should not overstate your criticisms of others who think differently from you. Remember that all research has strengths as well as weaknesses.

9.7 How to organise your literature review

To begin organizing your literature review's argument and structure, you need to identify relationships between the sources you've read. Based on your reading and notes, you can look for:

Trends and patterns (in theory, method or results): do certain approaches become more or less popular over time?

Themes: what questions or concepts recur across the literature?

Debates, conflicts and contradictions: where do sources disagree?

Pivotal publications: are there any influential theories or studies that changed the direction of the field?

Gaps: what is missing from the literature? Are there weaknesses that need to be addressed?

This step will help you work out the structure of your literature review and (if applicable) show how your own research will contribute to existing knowledge.

Plan your literature review's structure

There are various approaches to organizing the body of a literature review. You should have a rough idea of your strategy before you start writing. Depending on the length of your literature review, you can combine several of these strategies—for example, your overall structure might be thematic, but each theme is discussed chronologically.

Chronological

The simplest approach is to trace the development of the topic over time. However, if you choose this strategy, be careful to avoid simply listing and summarizing sources in order. Try to analyze patterns, turning points and key debates that have shaped the direction of the field. Give your interpretation of how and why certain developments occurred.

Thematic

If you have found some recurring central themes, you can organize your literature review into subsections that address different aspects of the topic.

For example, if you are reviewing literature about inequalities in migrant health outcomes, key themes might include healthcare policy, language barriers, cultural attitudes, legal status, and economic access.

Methodological

If you draw your sources from different disciplines or fields that use a variety of research methods, you might want to compare the results and conclusions that emerge from different approaches. For example:

Look at what results have emerged in qualitative versus quantitative research

Discuss how the topic has been approached by empirical versus theoretical scholarship

Divide the literature into sociological, historical, and cultural sources

Theoretical

A literature review is often the foundation for a theoretical framework. You can use it to discuss various theories, models, and definitions of key concepts. You might argue for the relevance of a specific theoretical approach, or combine various theoretical concepts to create a framework for your research.

Like any other academic text, your literature review should have an introduction, a main body, and a conclusion. What you include in each depends on the objective of your literature review.

As you write, you can follow these tips:

Summarize and synthesize: give an overview of the main points of each source and combine them into a coherent whole

Analyze and interpret: don't just paraphrase other researchers—add your own interpretations where possible, discussing the significance of findings in relation to the literature as a whole

Critically evaluate: mention the strengths and weaknesses of your sources

Write in well-structured paragraphs: use transitions and topic sentences to draw connections, comparisons and contrasts

9.8 Terminology

1. Literature: means the work the researcher consulted in order to understand and investigate the research problem.

9.9 Activity

1. Discuss ways of presenting your literature review.
2. Discuss the importance of literature review in research.

9.10 Summary

This unit has helped you understand the importance of literature review in research. You have learnt about qualities of a good literature review and how to organize your literature in your research. You have also learnt that the literature review must be critically evaluated and the literature weaknesses and the strength must be clearly stated.

UNIT 10: RESEARCH DESIGN

10.1 Introduction

Research design is the plan to be followed to answer the questions raised by research problems. it is a formal, written set of specifications and procedures for conducting and controlling a research project (Leedy, 1985). A research design involves selecting the most appropriate methods and techniques to solve the problem under investigation. For Adegoke and Adedayo (2010) research design is a logical arrangement of the procedures and tools to be employed in a proposed research in order to minimise misinterpretations of social phenomenon being investigated. This constitutes the beginning of the empirical phase of the research process.

Bowling (2001) identified the following components of research:

- Strategy
- Framework
- Participants/target groups
- Process
- Results
- Decisions

Research design enables the researcher to continue with investigation even when she/he cannot access a set of respondents or even when the originator of the research is unavailable. So it becomes obvious that it is the vehicle for the operationalising a research question.

10.2 Learning Outcome

By the end of this unit, you are expected to;

- discuss the research design.
- analyse the types of research design; descriptive design, experimental design, correlational design, case study design, cross cultural research design and survey.
- discuss the steps to follow in selecting a research design.
- discuss the qualities of an effective research design.
- ascertain the guidelines in selecting a research design.

10.3 Time frame

You need about six (6) hours per week interacting with this material.

10.4 Content

- Types of research design
- Steps to follow in selecting a research design
- Guidelines in selecting research designs
- Mixed method research method

10.5 Types of Research Design

Research designs are of different types depending on the type of the research study and approach employed by a researcher or student. As long as the research can be categorised into two major research paradigms, that is, *Qualitative* and *Quantitative*, then research design can vary according to such paradigms.

a) **Quantitative;** it is theory driven that uses fixed approaches that involve the collection of statistical and numerical data. Quantitative research is generally approached using scientific methods and the process include.

- the generation of models, theories, and hypotheses
- the development instruments and methods for measurements
- the experimental control and manipulations of variables
- the collection of empirical data
- the modelling and analysis of data; and
- the evaluation of result.

Thus, the objective of the quantitative research is to develop and employ mathematical or representational of models designed to indicate systematic patterns of relations, time sequences or causal connection in data, and theories and testing of hypotheses pertaining to natural phenomenon (Blaikie, 2008).

b) **Qualitative***;* Qualitative research is based on qualitative data and tends to follow the exploratory mode of scientific method. Bolarinwa (2006) observes that qualitative research verbally describes or tells what is done or what has been done. It tells stories around events, occurrences and practices. Theory and conceptual insight derive from collection of data prior to it. Examples of qualitative research design, some include participant-observation, ethnography, interviews, case study, action research, photography and grounded theory.

10.5.1 Descriptive design

Descriptive designs are used for large samples using survey a method. Descriptive design can be cross-sectional or longitudinal where time series data tend to be collected.

10.5.2 Cross sectional design; it is also known as transverse design. It refers to a design in which a researcher carries out observations of all the population, or a representative subset, at one specific point in time. For example can decide to study how Grade twelve students in Isoka and Chililabombwe have performed in Biology national examination in 2016.

10.5 3 Longitudinal design*;* this design is used when one wants to study a sample or a unit or an individual over a long period of time.

10.5.4 Experimental design

In this, subjects are randomly assigned to an experimental group which receives the treatment or a control group which does not receive treatment. Assuming the two groups were initially equivalent, the researcher can compare their performance. In this design cause and effect can be easily determined. If you decide to use this design, you must be certain of independent and dependent variables and must guard against the influence of extraneous variables.

10.5.5 Correlational design

It indicates the degree of relationship or correlation or association between variables. Diagnostic studies employ this type of design. The design is employed when a researcher wants to discover a statistical relationship between variable exists, both in direction and magnitude. For example, if you compare the examination performance of a group of Chalimbana University students who prepare their own meals every day and those who eats at the cafeteria or restaurant, you will use correlation design. The use of this design will enable you to map out the relationship between two or more educational activities.

10.5.6 Case study design

This study is used for small samples to build insight by testing hypothesis. A researcher in this type of design can decide to use case study approach. A case study approach entails an investigation that seeks to describe in detail a unit in context and holistically. A case in this context is a unit or an individual or object that one intends to study or examine.. it can be a

person, an institution, concept, theory or a farm. The aim is to bring deeper insight and better understanding of the problem prevailing

10.5.7 Cross cultural research design

This is used to compare the behaviour patterns of different cultures. Using this design you can perceive how various cultures perceive certain educational and social outcomes. For example you can make tentative comparison in terms performance in literacy between rural and urban schools and find out to what extent cultural variations influence performance.

10.5.8 Survey

Survey research involves the collection of information from a sample of individuals through their responses questions. It is an efficient method for systemically collecting data from a broad spectrum of individuals and educational settings. As you probably have observed, a great many researchers chose this method of data collection. In fact surveys have become such a vital part of our social fabric that we cannot assess much of what we read in the newspaper or see on TV without having some understanding of survey research.

Surveys are efficient in that many variables can be measured without substantially increasing the time or cost. Survey data can be collected from many people at relatively low cost and, depending on the survey design, relatively quickly.

Survey methods lend themselves to probability sampling from large population. Thus, survey research is very appealing when sample generalisability is a central research goal. In fact, survey research is often the only means available for developing a representative picture of attitudes and characteristics of a large population.

A survey should be guided by a clear conception of the research problem under investigation and the population to be sampled. Throughout the process of questionnaires design, the research objective and evaluations often uses surveys to assess the extent to which programmes achieve their goals.

Generally, survey research is a method of collecting information by asking questions. Sometimes interviews are done face-to face with people at home, in school, or at work. Other times questions are sent in the mail for the people to answer and mail back.. Increasingly, are conducted by telephone.

10.6 Steps to follow in selecting a research design

The following are steps to follow in research design:

a) *The problem* – The first step involves the proper selection and then know about what he has to search, but should be kept in mind that the problems selected should not be unmanageable in nature and also should not be based on desires.
b) *Objective of the study* – the objective should be very clear in the mind of the researcher as this will lead to the clarity of the design and proper response from the respondents.
c) *Nature of the study*- the research design should be very much in relation with the nature of the study, which is to be carried out.
d) *Data sources* – the various sources of the data or the information should be very clearly stated by the researcher.
e) *Techniques of data collection*- for the collection of the required information, sometimes becomes very necessary to use some special techniques.
f) *Social cultural context* –research design based on the social cultural concept is prepared in order to avoid the various study variations.
g) *Geographical limit* – this step become a necessity at this point in time as with the help of this step, research linked to the hypothesis applies only to certain number of social groups.
h) *Basis of selection* – selecting a proper sample acts as a very important and critical step and this done with help of some mechanics like drawing a random stratified, deliberate, double cluster or quota sample etc.

Be aware that selecting a good topic may not be easy. It must be narrow and focused enough to be interesting, yet broad enough to find adequate information. Before selecting your topic, make sure you know what final project should look like. Each class or instructor will likely require a different format or style of research project. Moreover, it is very imperative to discuss with friends on the validity and reliability of your research.

10.7 Qualities of Effective Research Design

- They are systematic and logical. They effectively address the questions raised in the study. Based on this design the researcher can construct questions that will solicit the desired information.
- They contribute to accurate and fair interpretation of results.

- They clarify to the researcher the respondents and the means by which the study will be conducted.
- They contribute to deeper insights and better understanding of the research topic.

10.8 Guidelines in Selecting a Research Design

The following are essential points that a researcher should adhere to while selecting a research design:

Identify the research questions to be addressed by the study: the researcher should identify and reflect on the research questions raised in the study, reflection should include brainstorming on issues such as:

- Do the questions raised in the study require collecting information by interviewing, questionnaires? If the response is positive then the researcher will use a survey design.
- Do the questions raised in the study require systematic manipulation of independent and dependent variable? If the answer is yes, then the researcher will use experimental design.
- Does the study require a researcher to assess the degree of relationship between two or more variables? If the answer is yes,, then a correlation design will be used.
- Does the seek to describe a unit in detail if so then a case study will be used.
- Does the study seek to compare the behaviour patterns of different cultures? If the answer is positive then a cross- cultural research design will be applicable.

After identifying the research design to be used, read materials related to the design to understand the advantages and disadvantages. Indicate the research design pointing out its validity and reliability.

10.7 Mixed Methods Designs

10.8.1 Convergent parallel mixed methods

Convergent parallel mixed methods is a form of mixed methods design in which the researcher converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem. In this design, the investigator typically collects both forms of data at roughly the same time and then integrates the information in the interpretation of the overall results. Contradictions or incongruent findings are explained or further probed in this design.

10.8.2 Explanatory sequential mixed methods

Explanatory sequential mixed methods is one in which the researcher first conducts quantitative research, analyzes the results and then builds on the results to explain them in more detail with qualitative research. It is considered explanatory because the initial quantitative data results are explained further with the qualitative data. It is considesequential because the initial quantitative phase is followed by the qualitative phase. This type of design is popular in fields with a strong quantitative orientation (hence the project begins with quantitative research), but it presents challenges of identifying the quantitative results to further explore and the unequal sample sizes for each phase of the study.

10.8.3 Exploratory sequential mixed methods

Exploratory sequential mixed method is the reverse sequence from the explanatory sequential design. In the exploratory sequential approach, the researcher first begins with a qualitative research phase and explores the views of participants. The data are then analyzed, and the information used to build into a second, quantitative phase. The qualitative phase may be used to build an instrument that best fits the sample under study, to identify appropriate instruments to use in the follow-up quantitative phase, or to specify variables that need to go into a follow-up quantitative study. Particular challenges to this design reside in focusing in on the appropriate qualitative findings to use and the sample selection for both phases of research. These basic models can then be used in more advanced mixed methods strategies.

10.8.4 Transformative mixed methods

Transformative mixed method is a design that uses a theoretical lens drawn from social justice or power as an overarching perspective within a design that contains both quantitative and qualitative data. The data in this form of study could be converged or it could be ordered sequentially with one building on the other. An embedded mixed methods design involves as well either the convergent or sequential use of data, but the core idea is that either quantitative or qualitative data is embedded within a larger design (e.g., an experiment) and the data sources play a supporting role in the overall design. A multiphase mixed methods design is common in the fields of evaluation and program interventions. In this advanced design, concurrent or sequential strategies are used in tandem over time to best understand a long-term program goal.

10.8.5 Convergent Parallel Mixed Method

The convergent mixed methods approach is probably the most familiar of the basic and advanced mixed methods strategies. Researchers new to mixed methods typically first think of this approach because they feel that mixed methods only consists of combining the quantitative and qualitative data. In this approach, a researcher collects both quantitative and qualitative data, analyzes them separately, and then compares the results to see if the findings confirm or disconfirm each other. The key assumption of this approach is that both qualitative and quantitative data provide different types of information—often detailed views of participants qualitatively and scores on instruments quantitatively—and together they yield results that should be the same. It builds off the historic concept of the multimethod, multitrait idea from Campbell and Fiske (1959), who felt that a psychological trait could best be understood by gathering different forms of data. Although the Campbell and Fiske conceptualization included only quantitative data, the mixed methods researchers extended the idea to include the collection of both quantitative and qualitative data.

10.9 Notation Used in Mixed Methods Research

Factors Important in Choosing a Mixed Methods Design The choice of a particular mixed methods design is based on several factors that relate to the intent of the procedures as well as practical considerations. I will begin with the procedural reasons for choosing a particular mixed methods strategy. It should be recognized that many variations exist in mixed methods designs, and the particular approach an investigator has in mind may not conform exactly to the approaches specified here. However, these designs represent the common underlying features of many designs, and, with modification, researchers can find their own strategy. Consider the amount of time you have to collect data. Concurrent approaches are less time consuming because both qualitative and quantitative data are collected at the same time in the same visit to the field.

10.10 Terminologies

1. Cross sectional design: refers to the design in which a researcher carries out observation of all the population, or a representative subset, at one specific point in time.
2. Research design: it is a formal written set of specifications and procedures for conducting and controlling the research project.

3. Convergent parallel mixed method: is a form of mixed methods disgn in which the research conveges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem.
4. Explainatory sequential mixed method: is a method in which the research first conducts quantitative research analyses the results and the builds on the results to explain them in more detail will qualitative research.

10.11 Activity

1. Discuss the following research designs:
   a) Correlational design
   b) Case study
   C) Cross culture research design
2. What is explaratory sequential mixed methods?
3. Discuss research designs that can be used when you are doing a qualitative research.

10.12 Reflections

What do you think are the advantages of the experimental design?

10.13 Summary

In this unit you have learnt the following research designs: experimental design, case study, correlational design, cross culture research, descriptive design, survey and mixed methods designs, you have learnt about steps to follow when selecting a research design.

UNIT 11: SAMPLING TECHNIQUES

11.1 Introduction

I am sure by this time, you should be wondering how you can select people to participate in your research. This unit will give you information on the sampling techniques. Each sampling technique will be critically examined in terms of their advantages and disadvantages.

11.2 Learning Outcomes

By the end of this unit you are expected to;

- define the term population as used in research.
- differentiate between probability and non-probability sampling techniques.
- explain challenges faced in population sampling.

11.3 Time frame

You need about six (6) hours per week interacting with this material.

11.4 Content

- Sampling techniques
- Sampling designs
- Probability sampling
- Non-Probability Sampling
- Bias and error in sampling
- Challenges faced in population sampling
- Qualities of effective respondent's selection

11.5 Population

A population is a group of individuals, objects or items from which samples are taken for measurements (for example a population of students). Population refers to an entire group of persons or elements that have at least one thing in common, for instance, students at Chalimbana University. Population also refers to a larger group from which the sample is taken. It is important for the researcher to find out as much as possible about the study population. This includes some of the overall demographics such as age, gender and class of the population. The greater the diversity and differences that exists in the population, the larger the researcher's sample size should be. Capturing the variability in population allows for more reliability of the study.

The following are qualities of an effective population of the study.

a) *Diversity*: an effective population sample attempts to be as diverse as possible. The greater the diversity and differences that exists in the population sample the higher the applicability of the research findings to the whole population.
b) *Representative*: It is important for the researcher to identify and select respondents that fulfil the questions the research is addressing. For example, if a study is on the effect of the slum environment of basic education, it is important that the majority of the population of the respondents is from the slum environment.
c) *Accessibility*: An effective population sample is one that is accessible to the researcher.
d) *Knowledge*: An effective population sample should have some idea of the topic being investigated.

In population sampling, the researcher should carry out the following:

a) Reflect on the research title particularly the independent and dependent variables and the study objectives. This enables the researcher to identify the type of population that will be most suitable for the study
b) Identify the largest population which can relevantly be used as respondents in addressing the research question and meeting the specific objectives.
c) Consider the heterogeneity of a potential study population and choose areas or communities which represents the range of variations with the most important characteristics.
d) Evaluate the effectiveness of the selected population in meeting the objectives of the study. Issues of accessibility to the respondents should also be considered during evaluation.

11.6 Sample

The sample is a group of people, objects, or items that are taken from a larger population for measured or to be studied. In other words, they are peple selected to take part in the study. The sample must be representative of the population to ensure that the findings are generalised**.**

11.5 Sampling techniques

Sampling is the procedure a researcher uses to gather people, places or things to study. It is a process of selecting a number of individuals or objects from a population such that the selected group contains elements representative of the characteristics found in the entire group (Orodho and Kombo, 2002). A sample is a finite part of a statistical population whose properties are

studied to gain information about the whole (Webster, 1985). When dealing with people, it can be defined as a set of respondents (people) selected from a larger population for the purpose of survey. Research conclusion and generalizations are only as good as the sample they are based on. Samples are always subsets or small part of the total number that could be studied. Sampling is the act, process or technique of selecting a suitable sample, or representative part of population for the purpose of determining parameters or characteristics of the whole population. The way in which a researcher selects subjects for a study will determine how one is able to generalize the results of the study.

11.8 Sampling design

The term "sampling design" refers to that part of the research plan that indicates how cases are to be selected for observation. Sampling designs are divided into two broad areas:

- Probability designs
- Non-probability designs

11.9 Probability Sampling

The key component behind all probability sampling approaches is randomization, or random selection. In probability sampling, people, places or things are randomly selected. Each unit in the population has an equal chance of being selected. This sampling gives every member of the population equal chance of being included in the study. Probability sampling enables the researcher to generalise to the larger population and make inferences. If the purpose of your research is to draw conclusions or make predictions affecting the population as a whole, then probability sampling is appropriate. Various methods have been established to accomplish probability sampling. These include the following:

11.9.1 Simple random sampling

This method is referred to as simple random sampling as no complexities are involved. All you need is a relatively small, clearly defined population to use this method. For example in a town of 10,000 residents, the researcher may simply obtain a list of all residents, and then using a sequence of numbers from a random number table (or draws of a hat, flips of coin), selects say 10% or 20% or some portion of names on that list, making sure that he / she is not drawing from any letter of the alphabet more heavily than others. Advantages of simple random sampling are that the samples yield research data that can be generalized to a larger population. This method also permits the researcher to apply inferential statistics to the data and provides

equal opportunities of selection for each elements of the population. It is a procedure in which all the individuals in the defined population have an equal and independent chance of being selected as a member of the sample.

Disadvantages

However this method also has disadvantages. These include the following:

- It is not the most statistically efficient method of sampling. The researcher may, just because of luck of draw, not get good representation of subgroups in a population.
- Bias in selection is common.
- Some samples may be over or under represented.
- Non response error is high. Some of the members selected may have moved to other areas.

11.9.2 Stratified random sampling

Stratified random sampling involves dividing your population into homogeneous subgroups and then taking simple random sample in each subgroup. The sample is selected in such a way as to ensure that certain subgroups in the population are represented in the sample in proportion to their number in the population. This method is appropriate when the researcher is interested in issues related to gender, race or age disparities in the population.

For example, if one is planning to study Factors Influencing female enrolment in architecture and knows that gender is going to be an important factor because female students rarely take this course or quite before completing the course, the researcher therefore needs to stratify the sample by the gender strata, making sure that the female students are over sampled (draw more or random number of female students) as opposed to male students (which the researcher would under sample). For example, the department has 1,000 students consisting of 900 male and 100 female students, and the researcher's intent on sampling 10% of the total, and the researcher proceeds as usual, drawing 90 marks at random and 10 female at random. If he/she had used the students list of names, regardless of gender, chances are that the researcher may not obtain 10 female students at random because they are fewer in total number. The advantages of this method are that you will be able to represent not only the overall population, but also key subgroups of the population, especially small minority groups. Stratified random selection will generally have more statistical precision than simple random selection.

Disadvantages

If not carefully stratified, bias can occur resulting in some groups of the population being unrepresented.

11.9.3 Systematic random sampling.

Suppose a researcher had a large list of people, places or things to select from, such as 100,000 people or more. The appropriate method to use is to select every 10^{th}, 20^{th}, or 30^{th} person to such a list. This decision to use every 10^{th}, 20^{th}, or 30^{th} person is called the sampling interval, and as it is done systematically and the entire list is used, the researcher is said to be systematically random sampling.

Advantages.

- Large population can be analysed.
- Every member of the population has an equal chance of inclusion
- Bias is minimised

Disadvantages

- The response may be low since the respondents' availability is unpredictable.
- The selection of the first sample member may result in bias in the entire sample
- The list used may not be in a systematic order.

11.9.4 Cluster random sampling.

In the event that a population is dispersed across a wide geographic region, one may have to use cluster random sampling. This method allows for the division of the study population into clusters (usually countries, regions, provinces or other boundaries) and random sampling of everyone in those clusters. The units within the sampled clusters should be measured.

For instance, a survey of all secondary schools in Kenya will require the researcher to visit all the provinces. If one uses the simple random sampling method, he/she will have to cover the entire country geographically. Instead, one could simply do a cluster sampling of two districts per province, which would then be visited for the survey. The advantage of this method is that it needs a detailed sampling frame for selected clusters only rather than for the entire target area. There are savings in travel costs and time as well. However, there is a risk of missing important sub groups and not having a complete representation of the target population.

Probability sampling is any method of sampling that utilizes some form of random selection. In order to have a random selection method, a researcher must set up some process or procedure that assures that the different units in the selected population have equal probabilities of being chosen. Some forms of random selection include picking a name out of a hat. These days, you can use a computer and generate random numbers as the basis of random selection. Random sampling is still regarded as one of the best statistical methods as it is free from bias.

Disadvantages.

- There is a risk of missing on important sub-groups
- Lack of complete representation of the target population.

11.10 Non-Probability Sampling

In this method, the researcher is interested in the representativeness of the concept in their varying forms. This method of sampling aims to be theoretically representative of the study population by maximising the scope or range of variation of the study. This method is mainly applied to find out how a small group, or representative group, is doing for purposes of illustrating or explanation. Various methods have been established to accomplish non-probabilistic sampling.

11.10.1 Quota sampling

This sampling technique begins by dividing the population into relevant strata such as age, gender or geographical region. The total sample is allocated among the strata in direct proportion to their estimated or actual size in the population. Once the researcher identifies the people to be studied, they have to resort to haphazard or accidental sampling because no effort is usually made to contact people who are difficult to reach in a quota. The problem with this method is that bias intrudes on the sampling frame. This is because researchers allowed to self-select respondents are subject to bias such as interviewing their friends in excessive proportion or concentrating in areas where there are large numbers of potential respondents.

11.10.2 Convenience sampling

This method is based on using people who are captive audiences, people the researcher meets haphazardly or accidentally. Respondents are people who just happen to be walking by, or show a special interest in your research. The use of volunteer is an example of convenience sampling.

11.10.3 Purposive sampling

In this sample method, the researcher purposely targets a group of people believed to be reliable for the study. For example, to study the effects of abortion on learning, the researcher may make efforts to contact students who previously had terminated their pregnancies. The researcher never knows if the sample is representative of the population. The power of purposive sampling lies in selecting information rich cases for in-depth analysis related to the central issues being studied.

Purposive sampling can be used with both quantitative and qualitative studies. Purposive sampling can be carried out in addition to probability sampling. For example, after completing your baseline study based on a random sample, you may recognise that certain section of the project area are quite different from other areas due to variations in landscape, geography, culture etc. you may then positively select those areas to get representative information about how the variation have influenced the behaviour of the people. Purposive sampling is particularly relevant when you are concerned with exploring the universe and understanding the audience. This means, using your common sense and the best judgement in choosing the right habitation and meeting the right of the correct people for the purpose of your study. Types of purposive sampling include the following:

- *Extreme Case Sampling*: it focuses on cases that are rich in information because they are unusual or special in some ways, for instance, the only community in a region that prohibits wife inheritance.
- *Maximum Variation Sampling*: Aims at capturing the central themes that cut across participant variationism, for instance, persons of different age, gender, religion and marital status in an area protesting against child marriage.
- *Homogeneous Sampling*: Picks up a small sample with similar characteristics to describe some particular subgroup in depth, for example, charcoal burners, touts, bar maids and so on.
- *Typical case Sampling*: Uses one or more typical cases (individuals, families/households) to provide a local profile. The typical cases are carefully selected with the co-operation of the local people/extension workers.
- *Critical Case Sampling*: Looks for critical cases that can make a point quite dramatically , for instance, farmers who have set up an unusually high yield record of a crop in arid land

- *Snowball or Chain Sampling*: Begins with asking people, "who knows a lot about__." By asking a number of people, you can identify specific kinds of cases, for example critical, typical, and extreme and so on. Snowball sampling begins with a few people or cases and then gradually increases the sample size as new contacts are mentioned by the people you started out with.

  Purposive sampling is adequate under the following situations:

  - When studying past invents and only a fraction of relevant materials is available or accessible.
  - While studying sensitive issues such as abortion, prostitution or crime, certain individuals or groups of individuals may refuse to cooperate. The researcher may use a non-probability method.
  - If the population contains few relevant cases.
  - If the population is unknown or not readily identifiable.

11.11 Target population (Selection of respondents)

The people a researcher selects as respondents in the study are vital in achieving the set objectives. Selection of respondents will largely depend on the following.

- Information needed
- Data techniques to be used
- The available funding may pre-specify the sample size.

For reliable conclusion to be drawn from the research, samples for quantitative research must be representative of the target group. Other things being equal, a larger sample of respondents is better than a smaller one. In general, the larger the sample, the more representative is likely to be, and the more generalizable the result of the study are likely to be. Minimum acceptable sizes depend on the type of research.

Generally, a researcher would need 30 subjects in each group for co-relational and descriptive research may be able to get by with 15 subjects per group in experimental or quasi experimental design. In general, selection of respondents will depend on the nature of the analysis to be performed, the desired precision of the estimates one wishes to archive, the kind of number of comparisons that will be made. The number of variables that have to be examined simultaneously and how a heterogeneously universe is sampled. Population is a set of all the

elements of interest in a study. Efforts should be made by a researcher to ensure that the informants, particularly key informants, possess special knowledge related to the study. Efforts should be made to ensure that participants are active participants in the culture or organization under study, that they are involved in the events under study and have adequate time. They should be willing to talk to the researcher.

11.12 Bias and error in sampling

There are various challenges faced by researchers during sampling. Some of these challenges include the following:

Sampling error – sampling error comprises of the differences between the sample and the population that are due solely in the particular units that happen to have been selected. For example, suppose that a sample of 100 university students is measured and all are found to be taller than six feet. It is very clear even without any statistical proof that this would be a highly unrepresentative sample leading to invalid conclusions. This is a very unlikely occurrence because naturally such rare cases are widely distributed among the population. But it can occur. Luckily, this is a very obvious error and can be detected very easily. The more dangerous error is the less obvious sampling error against which nature offers very little protection. An example would be a sample in which the average height is overstated by only one inch or two rather than one foot which is more obvious. It is the unobvious error that is of much concern.

There are two basic causes for sampling error; chances and sampling bias.

a) *Chance* – This is the error that occurs due to bad luck. This may result in untypical choices. Unusual units in a population do exists and there is always a possibility that an abnormally large number of them will be chosen. The main protection against this kind of errors is to use a large enough sample.

b) *Sampling Bias* – Sampling bias is a tendency to favour the selection of units that have particular characteristics. Sampling bias is usually the result of a poor sampling plan. The most notable is the bias of non-response when for some reason some units have no chance of appearing in the sample. Take a hypothetical case where a survey is conducted to find out the level of stress that graduate students are going through. A mail questionnaire is sent to 100 randomly selected graduate students. Only 52 students respond. The results show that students are not under stress, yet the actual case is that stress levels may be high except among those

who are answering the questionnaire. Bias can be very costly and has to be guarded against as much as possible. A means of selecting the units of analysing must be designed to avoid the more obvious forms of bias.

Non-sampling error (measurement error) – The other main cause of unrepresentative samples is non-sampling error. Non-sampling error may either be produced by participants in the statistical study or may be an innocent by-product of the sampling plans and procedures. A non-sampling error is an error that results solely from the manner in which the observations are made. The simplest example of non-sampling error is inaccurate measurements due to malfunctioning instruments or poor procedures. For example, consider the observation of human weights. If persons are asked to state their own weights themselves, no two answers will be of equal reliability. The people will have weighed themselves on different scales. An individual's weight fluctuates, so that the time of weighing will affect the answer. The scale reading will also vary with the person's state of undress. Responses therefore will not be of comparable validity unless all persons are weighed under the same circumstances. Biased observation due to inaccurate measurements can be innocent but very devastating.

In surveys of personal characteristics, unintended errors may result from the manner in which the response is elicited, the social desirability of the persons surveyed, the purpose of the study and the personal biases of the interviewer or survey writer. In all the sampling procedures major weaknesses include failure to identify the accessible and target population and using a sample that is too small to permit statistical analysis.

11.13 Challenges faced in population sampling

In population identification, researchers are sometimes faced with various challenges. These include the following:

- Scope: Avery wide scope for example a study of a whole country may hinder effective sampling of the population. A narrow scope for example a study on one of the population. A narrow scope for example a study on one school affects the validity and reliability of the findings.
- Lack of representation.
- Bias in sampling: some researchers select a population that is convenient for them in terms of accessibility.
- Poor accessibility to the population: some population samples are difficulty to access.

Respondents

In research, the term "respondents" refers to those who will reply to, or respond to the research instruments. The selection of respondents is crucial to the overall usefulness of the information produced. This is because respondents help in the clarification of issues under the study. This contributes to the achievements of the set objectives. The selection of the respondents will largely depend on the information needed and the date techniques to be used. The researcher should ensure that informants, particularly key informants, possess special knowledge related to the study.

11.14 Qualities of effective respondent's selection

The following should be adhered to by researchers in the selection of respondents.

- Respondents should be individuals who possess some knowledge about the topic being studied.
- They should be willing to share the information they have in relation to the topic with the researcher.
- They should be active participants in the culture or organization under study.
- They must be willing to give their time to the study.
- A large sample of respondents is better than a small one. In general, the larger the sample, the more representative it is likely to be, and the more generalizable the result of the study is likely to be.

11.15 Challenges faced in respondent selection

The selection of the reliable informants has various challenges. These include the following:

- Unwillingness of respondents to share all they know on the issue with the researcher.
- Language barrier: the interviewer or questionnaire may have been written in Kiswahili yet the respondent can effectively express him/herself in English or say Dholuo.
- Hostility towards the researcher: Some respondents may personalise the questions asked particularly during interviews and become hostile towards the researcher.
- Time limitations.

In general, selection of respondents will depend on the nature of the analysis to be performed, the desired precision of the estimates one wishes to achieve, the kind and number of

comparisons that will be made, the number of variables that have to be examined simultaneously and how heterogeneously a universe is sampled.

11.16 Terminologies

1. Stratified random sampling: is the type of sampling which involves dividing your population into homogeneous sub groups and taking simple random sampes in each sub groups.
2. Critical case sampling: uses one of the typical cases (individuals, families) households to provide a local profile.

11.17 Activity

1. Discus Qualities of an effective population sample.
2. Explain the advantages and disadvantages of the following sampling techniques.
    a. Simple random sampling
    b. Stratified random sampling
    c. Convenience sampling
3. Discus different types of purposive sampling.

11.18 Reflection

What challenges do researches face during sampling?

11.19 Summary

In this unit, you have studied sampling techniques. You have learnt about probability and non probaiblity designs. The probability sampling techniques you learnt about are: simple random sampling, stratified random sampling, systematic random and sampling. You have also looked at non sampling techniques such as Quata sampling, convinience sampling, and purposeful sampling.

UNIT 12: RESEARCH INSTRUMENTS

12.1 Introduction

In this unit you will focus on research instruments. Research instruments refers to the tools that the researcher uses in collecting the necessary data. The most common research instruments used. Include the following : questionnaire, interview, observation, checklist and focus group.

12.2 Learning Outcomes

By the end of this unit, you are expected to;

- design a questionnaire.
- design interview guide schedules.
- design observation shedule.
- conduct focus group discussion.

12.3 Time frame

You need about six (6) hours per week interacting with this material.

12.4 Content

- Types of Questionnaires
- Interviews
- Focus Groups Discussion
- Observation
- Systematic Observation and Observation Schedules
- Standardized Tests

12.5 Types of Questionnaires

Denscombe (2010) maintains that there are many types of questionnaires. They can vary enomously in terms of their purpose, size and appearnce. To qualify as a resaerch questionnaire, however, they should do the following:

- be designed to collect information which can be used subsequently as data for analysis.and whose purpose is to discover things
- consists of a written list of questions, that each person who answers the particular questionnaire reads an identical set of questions. This allows for consistency and

precision in terms of the wording of the questions and makes the processing of the answers easier.

- Gather information by asking people directly about the points concerned with the research.

Questionnaires work on the premise that if you want to find out something about people and their attitudes you simply go and ask them what it is you want to know and get the information “straight from the horse’s mouth”

When to use a questionnaire

Kasonde (2014) maintains that different methods are better suited to different circumstances and questionnaires are no exception. Although they can used, perhaps ingeniuosly across a wide spectrum of research situations (both postal and internet) are at their most productive:

- when used with large number of respondents in many locations;
- when what is required tends to be fairly straight forward information-relatively brief and uncontroversial ;
- when their is need for standardized data from identical questions-without requiring personal face to face interaction;
- when the respondents can be expected to be able to read and understand the questions-the implication of age, intellect, language and eyesight need to be considered;
- when the social climate is open enough to allow full and honest answers.

Kinds of Data Collected by Questionnaires

As you may be aware,Questionnaires rely on written information supplied directly by people in response to questions asked by the researcher. In this respect, the kind of data is distinct from that which could be obtained from interviews, observation or documents. The information from questionnaires tend to fall into two broad categories- “facts” and “opinions”-and it is vital that at all stages of using questionnaires the researcher is clear whether the information being sought is to do with facts or to do with opinions.

Factual informationdoes not require much in the way of judgement or pesonal attitudes on the part of respondents. It just requires respondents to reveal straightfowrd information (such as their address, age, sex, marital status or number of children). An example of a “fact “ question might be”which TV programmes did you watch last night?

Opinoins, attitudes, views, beliefs, preferences etc can be investigated using questionnaires. In this case, though respondents are required to reveal information about feelings, to express values and to weigh up alternatives in a way that calls for a judgement about things rather than the mere reporting of facts. An example of an opinion question might be “which is your favourite TV programme?

As you may be aware, it is worth stressing that in practice questionnaires are very likely to include questions about both facts and opinoins. Political opinion polls for reinstance, might include factual questionsabout how people actually voted at the last election as well as questions about feelings of support for particular political parties’ policies, and market researchers might want to know factual information about the age , social class, sex, etc of the people whose opinions, attidues and preferences they are investigating.

Planning the Use of Questionnaire

You may be aware that Questionnaires tend to be ‘once-offs’. In general, researchers do not have the time or resources to repeat pieces of research which involve the use of questionnaires; nor do they have the opportunity to make amendments and corrections to the questionnaires once it has been printed and distributed. And the vast majority of respondents are likely to be less than sympathetic to a plea from the researcher to fill in the questionnaire a second time in order to overcome a mistake in the first version. There is, theirfore, a lot of pressure to get it right first time. This involves planning. The cost, the timing and other factors linked to the distribution of the questionnaire need to be carefully considered because each has a direct bearing on the researcher’s prospects of getting it right first time.

As a research tool a questionnaire has various advantages including the following: information can be collected from a large sample and diverseregions, confidentiality is upheld and itsaves time . howeve it has also some disadvantages, these include : response rate can be quite slow as participants complete or answer the questionnaire at their own pace, especially when it involves mailing. The other disadvantage is that there is no direct contact with the participants so the researcher cannot deal with any possible misunderstanding. Finally, no clear reason can be given for incomplete responses.

12.6 Interviews

Interviews are an attractive propositions for project researchers. At first glance, they do not seem to involve much technical issues and they draw on a skill that the researcher already have- the ability to conduct conduct a conversation. Although their are a lot of supperficial similarities between a conversation an interview, interviews are actually something more than just a conversation. Interviews involve a set of assumptions and understandings about the situation which are not nomarly associated with a casual conversation Denscomb,1983'Silverman 1995). When someone agrees to take part in a research interview:

- There is concent to take part. From the researcher'spoint of view this is particulary important in relation to research ethics. The interview is not done by secret recording of discussion or the use of casual converstion as data. It is openly a meeting intended to produce material that will be used for research purposes-and the interviewee understands this and agrees to it.
- Interviewees' needs can be treated as "on the record" and for the record. It ia of course, possible for interviewees to stipulate that their words are not to be attributed to them, or not to be made publicly available. The point is, though, that unless interviewees specify to the contrary, the interview talk is "on record" and for the record".
- The agenda for the discusion is set by the researcher. Although the degree of control excised by the researcher will vary according to the style of interviewing , there is a tacit agreement built into the notion of being interviewed that the proceeding and the agenda for the discussion will be controlled by the researcher.

When to Use Interviews

Although interviews can be used to for the collection of straightforward factual information, their potential as a data collection method is better exploited wthen they are applied to the explaration of more complex and uncontroversial facts, then questionnaires might prove to be a more cost-effective method. But when the researcher needs to gain insights into things such as people's feelings, emotions and experiences, then interiews will almost certainly provide a more suitable method-a method that is attuned to the intricacy of the subject matter. To specific, interiews-in particular indepeth interviews-lead themselves to the collection of data based on:

- Opininos, feelings, emotions, and experiences. The nature of these means that they need to be exploited in depth and in detail rather than simply reported in a word of two
- Sensitive issues. When the research covers issues that might be considered sensitive or rather personal there is a case to be made for using interviews. Using a careful and considerable approach , participants can be encouraged to discuss personal and sensitive issues in open and honest manner.
- Previlaged information. Here the justification for interviews is based on the values of contract with key players in the field who can give privilaged information. The depth of information provided by interviews can produce best "value for money" if the informants are wiling and able to give information that others could not.

The decission to use interviews for a research project, as you may be aware needs to take account of their feasibility as a data collection method. Before embarking on a programme of interviews the researcher needs to feel assured of that:

- It is possible to gain direct acess to the prospective interviewees.

There is obviously no point in pursuing the idea of conducting interviews unless there are good grounds for believing that the necessary people can be accessesd,and that some agreement can be obtained from all the parties involved in the research.

- The interviews are viable in terms of the costs in time and travel involved.

With limited resources, the researcher needs to ensure that the people are not distributed too widely across a large geographical area and that condicting the interviews will not incur prohibitive costs.

12.7 Types of Research Interviews

12.7.1 Structured interviews

You may be aware that structured interviews involve tight control over the format of the research questions and answers. In essence, the structured interview is like questionnaire which is administered face to face with a respondent. The researcher has a predetermined list of questions, to which the respondent is invited to offer limited option responses. The tight control over the wording of the questions, the order in which the questions occur and the range of answers that are on offer have the advantage of "standardization". Each respondent is

faced with identical questions. And range of pre-coded answers on offer to respondents ensures that analysis is relatively easy. The structured interview in this respect, leads itself to collection of quantitative data.

Structured interviews are often associated with social surveys where researchers are trying to collect large volume of data from a wide rang of respondents. Here we are witnessing the replacement of interviews armed with clipboards and paper questionnaires with those using laptop computers to input information direct into a suitable software program. Such computer assissted personal interview (CAPI) has the advantage of using software with built in checks to eliminate errors in the collection of data, and it allows quick analysis of the data. However, its relatively large initial costs,caused by the purchase of the laptop computers, the development of suitable software and the training involved mean that CAPI is better suited to large-budget, large-number surveys than to small-scale research.

12.7.2 Semi-structured interviews

With semi-structured interviews, the interviewer still has a clear list of issues to be addressed and questions to be answered. However, with the semi-structured interview the interviewer is prepared to be flexible in terms of the order in which the topics are considered and perhaps more significantly, to let the interviewee develop ideas and speak more widely on the issues raised by the researcher. The answers are open-ended, and there is more emphasis on the interviewee elaborating points of interest.

12.7.3 Unstructered interviews

Unstructured interviews go further in the extent to which emphasis is placed on the interviewee's thoughts. The researcher's role is to be as unintrusive as possible –to start the ball rolling by introducing a theme or topic and then letting the the interviewee develop their ideas and pursue their train of thought.

Semi-structured and unstructured interviews are realy on a continuum and in practice,it is likely that any interview will slide back and forth along the scale. What they have in common, and what separates them from structured interview is their willingness to allow the interviewee to use their own words and develop their own thoughts. Allowing interviewees to "speak their minds is a better way of discovering things about complex issues and generally semi-structured and unstructured interviews have as their aim "discovery" rather than "checking".

12.7.4 One-to-one interviews

You may be aware that the most common form of interview is the one-to-one variety which involves a meeting between one researcher and one informant. One reason for its popularity is that it is relatively easy to arrange. Only two people's diaries need to concide. Another adavntage is that the opinions and views expressed throughout the interview stem from one source: the interviewee. This makes it fairly straightforward for the researcher to locate specific ideas with specific people. A third advantage is that the one-to-one interview is relatively easy to control. The researcher only has one person's idea to grasp and a fourth adavantage of conducting one-to-one interviews becomes evident when the researcher embarks on transcribing the interview tape. It is far easier to transcribe a recorded interview when the talk involves just one interviewee. There is only one voice to recognise and only one person talkingat a time.

12.7.5 Group interviews

According to Mwansa (2005) a disavantage of the one-to-one interview is that it limits the number of views and opinions available to the researcher. Listening to one person at a time effectively restricts the number of voices that can be heard and the range of views that can be included within a research project. Group interviews however, provide a practical solution to this. By interviwing more than one person at a time the researcher is able to dramatically increase the number and range of participants involved in the research.

Group interview can be undertaken very much like a one-to-one interview in the sense that the interviewer remains the focal point of the interaction that takes place. The questions and answers are channelled through the interviewer. The difference is that instead of each question prompting a response from just one interviewee the researcher can get perhaps four responses from four people during the interview.

Increasing the numbers involved can have benefits in terms of the representativeness of the data. The inclusion of more participants is likely to mean that a broader spectrum of people are covered by the research and that there might be a greater variety of experiences and opinions emerging from the investigation. Indeed, undercertain circumstances researchers can deliberately select participants who are very different in order to gather widely different views and experiences on the topic of the interview.

An alternative version of the group interview is one that streese the “group” characteristics of the interaction during an interview. It sees the group interaction as distinctive in the way that it can get the participants to respond as part of a group, rather than as individuals. The researcher’s incentive for using a group interview, in this case, is not a quantitative one concerned with increased numbers and improved representativeness. It is, instead, a qualitative one concerned with the way that group discussions can be more illuminating. The group discussion allows participants to listen to alternative points of view, it allows members to express support for certain views and to challange views with which they disagree. The group interview, in this case trades on group dynamics. It uses the social and psychological aspects of groupbehaviour to foster the ability of participants to get involved, speak their minds and reflect on the views of others.

12.8 Focus Groups Discussion

You may be aware that a Focus group consists of small groups of people who are brought together by a “moderator”(the researcher) to explore attitudes and perceptions, feelings and ideas about a specific topic. Denscomb(2010) maintains that focus group discussions typically last for 1 hour 30 minutes or 2 hrs and are useful for gauging the extent to which there are shared views among a group fo people in relation to a specific topic. According to Mwansa (2005) focus group interviews have six to nine people in them. This is a large enough number to allow a range of views and opinions to be present among the group but not too large as to be unmanageable in terms of the discussion. In small-scale research projects the numbers are often smaller. The reason for this is that focus groups can be costly and time-consuming to arrange. It is not easy to organise a venue for the meetingand get six or more people to fund travel and pay the the room.

According to Kasonde (2014) focus groups make particular use of dynamics and have three distinct features:

- There is a focus to the session,with the group discussion being based on an item or experience about which all participants have similar knowledge,
- Particular emphasis is placed on the interactionwith in the group as as a means of eliciting information,
- The moderator’s role is to facilitate the group interaction rather lead the discussion

12.9 Observation

You may be aware that observation offers the social researcher a distinct way of collecting data. It does not relay on what people say they do, or what they think. It is more direct than that. Instead it draws on the premise that , for certain purposes, it is best to observe what actually happens.

Mwansa (2005) maintains that there are essentially two kinds of observation research used in the social sciences. The first of these is:

systematic.or non-participantobservation, has its origins in social psychology-in particular, the study of interaction in settings such as school classrooms. It is normally linked with the production of quantitative data and the use of statistical analysis. The second is

participant observation. This is mainly associated with sociology and anthropology, and is used by researchers to infiltrate situations, sometimes as an undercover operation, to understand the culture and processes of the group being investigated. It is normally associated qualitative data.Denscomb (2010) maintains that these are two methods of research might seem poles apart interms of their origins and their use in current social research, but they share some vital characteristics:

- Direct observation. The obvious connection is that they both rely on direct observation. In this respect, they stand together, in to methods such as questionnaires and interviews, which base their data on what informants tell the researcher, and in contrast to documents where the researcher tends to be one step removed from the action
- Field work. The second common facfor is their dedication to collecting data in real-life situations-out there in the field. In their distinct ways, they both involve field work. The dedicationto field work immediatelly identifies observation as an empirical method for data collection. As a method, it requires the researcher to go in search of information,at first hand, rather than relying on secondary sources.
- Natural settings. Fieldwork observation-distinct from laboratory observations-occurs in situations which would have occured whether or not the research had taken place. The whole point is to observe things as they normally happen, rather than as they happen under artificially created conditions such as laboratory experiments. There is a major concern to avoid disrupting the natural ness of the setting when understanding the research. In this approach to social research,it becomes very important to minimize

the extent to which the presence of the researcher might alter the situation being reseached.

- The issue of perception. Systematic obervationand participant observation both recognise that the process of observing is far from straightforward. Both are acutely sensitive to the possibility that research's perceptions of situations might be influenced by personal factors and that the data collected could thus be unreliable. They tend to offervery differentways of overcoming this, but both see it as a problem that needs to be addressed.

12.10 Systematic Observation and Observation Schedules

Mwansa (2005) maintains that the psychology of memory and perception explains why the facts recorded by one researcher are very likely to differ from those recorded by another, and why different observers can produce different impressions of the situation. However, all this is rather worrying when it comes to the use of observation as a method of collecting data. It suggests that the data are reliable to be inconsistent be tween researchers-too dependent upon the individual and the personal circumstances of each researcher. It implies that different observers will produce different data.

It is precisely this problem which is addressed by systematic observation and its use of an observation schedule. The whole purpose of the schedule is to minimize, possibly to eliminate, the variations that will arise from data based on individual perceptions of events and situations. Its aim is to provide a frame work for observation which all observers will use, and will eliminate them to do the following:

- Be alert to the same activities and be looking out for the same things
- Record data systematically and thoroughly
- Produce data which are consistent between observers, which two or more researchers who witness the same event recording the same data.

To achieve these three aims, observation schedules contain a list of items that operate something like a checklist. The researcher who uses an observation schedule will monitor the items contained in the checlist and make a reord of them as they occur. All observers will have their attention directed to the same things. The process of systemic observation then becomes a matter of measuring and recording how many times an event occurs, or how long some event continues. In this way, there will be a permanent record of the events which should be consistent between any researcher who use the schedule, because what is being

oberved is directed by the items contained in the schedule. When researchers are properly trained and experienced, there should be what is called high “inter-observer” reliability.

The value of findings from the use of an observation schedule will depend however, on how appropriate the items contained in the schedule are for the situation. Precise measurements of something that is irrelevant will not advance the research at all. It is imperative, for this reason, that the items on the schedule are carefully selected. The findings will only be worth something if the items can be shown to be appropriate for the issues being inverstigated.

12.11 **Standardized Tests**

You may be aware that standardization is when a test is given to a large number of subjects who will be the representative of the people whose test is designed for. All those subjects should take the same version of the test and should be put under the same conditions. The scores of this group would help to find the norm or standards.

12.12 **Verifying the Data**

The credibility of research is something that needs to be demonstrated as part and parcel of the research process itself. It should not be taken for granted. For the research to achieve credibility it needs to demonstrate in some way or anotherthat the findings are based on practices that are acknowledged to be the bases of good research. And Silverman(2006-2010) has tressed, this applies as much to qualitative research as it does to to quantitative research. Conventionary, the bases for judging the credibility of research have been:

- Validity. This refers to the accuracy and precision of the data. It also concerns appropriate ness of the data in terms of the research question being investigated. The basic question is “are the data the right kind for investigating the topic and have they been measured correctly?
- Reliability. This refers to whether a research instrument is neutral in its effect and consistent across multiple occasions of its use. This is frequently translated as the question “would the research instrument produce the same results on different ocassions (all other things being equal)?
- Generalizability (external validity). This refers to the prospect of applying the findings from research to other examples of the phenomenon. It concerns the ability of research findingsnto explain or occur in, similar phenomenon at a general or universal level rather than being something that is unique to a particular case (s) used for the reseach

- Objectivity. This refers to the absence of bias in the reseach. It denotes research that is impartial and neural in terms of the research's influence on its outcome, and it denotes processes of data collection and anlysis that are fair and even –handed.

12.13 Data Collection

Kasonde (2014) maintains that Data Collection refers to the gathering of information to answer research questions. In research, the term "dta collection" refers to gathering specific information aimed at providing or refuting some facts. In data collection you, as researcher, must have a clear understanding of what you hope to obtain and how to obtain it ie whether you are going to conduct an experiment, a survey, field research or to focus on the re-analysis of statistics already created by others(documentary analysis). Using our example of research instruments above the data collection procedure(s) would be:

Qualitaive researchers may use different approaches in collecting data, such as the grounded theory practice, and classical ethnography. The type of data collected in qualitative methods can include invterviewsand group discussions, observation and field notes, pictures, and other materials. Qualitative reserchers typically rely on the following methods for gathering information: participant observation, non-participant observation, field notes, journals, structured interviews, semi-structured interviews unstructured interviews and analysis of documents.

According to Kasonde (2014) in education research the most frequently used qualitative research methodologies include the following:

- Ethnographic Research, used for investingating cultures by collecting and describing data that is intended to help in the development of a theory. An example applied ethnographic research is the study of a particular culture and understanding of the role of a particulae behaviour in the cultural framework.
- Critical Social Research, used a researcher to understand how people communicate and develop symbolic meanings
- Ethical Inquiry, an intellectual analysis of ethical problems which includes the study of ethics as related to responsibility, rights, duty, right and wrong choices, etc.
- Grounded Theory is an inductive type of research, based or "grounded" in the observations or data from which it was developed; it uses a variety of data sources, including quantitative data, review of records, interviews, observations and surveys.

- Phenomenological Research, describes the “subjective reality” of an event as perceived by the study population; it is the study of a phenomenon.
- Philosophical Research, is conducted by field exparts within the boundaries of a specific field of study or profession.

Denscomb (2010) maintains that their is not a particular method of data collection that claims to be unique. He has indicated,“very divers materials (interviews; transcripts of meetings; court proceedings; field observations;other documents, like diaries and letters; questionnaire answers; sensus statistics;etc) provide indispensable data for social research.

12.14 Terminology

1. Research instruments: these are tools used to collect data from respondents.

12.13 Activity

1. Discuss the disadvantages and advantages of using the following research instruments:
   a) Questionnaire
   b) Interview
   c) Focus group discussion

12.15 Reflection

From all the research instruments you have learnt about in this unit, which one do you think is easier to use?

12.16 Summary

In this unit, you have learnt the following research instruments: a questionnaire, focus group discussion, interview and observation. It is hoped that by this time you are aware of advantages and their disadvantages.

UNIT 13: DATA ANALYSIS AND PRESENTATION

13.1 Introduction

For data to be useful, our observations need to be organised so that we can get some patterns and come to logical conclusions. Data refers to the information that was gathered to prove some facts concerning the problem that the researcher is conducting the research on. Data collection is vital in our daily living. In view of this, the unit identifies data analysis, data analysis in qualitative research and data analysis in quantitative research.

13.2 Learning Outcomes

By the end of this unit, you are expected to;

- analyse Quantitative data.
- analyse Qualitative datat.
- present the analysed data in various formats.

13.3 Time frame

You need about six (6) hours per week interacting with this material.

13.4 Content

- Data analysis
- Qualitative data analyses
- Quantitative data analysis
- Data presentation

13.5 Data analysis

In research data analysis to examining what has been collected in a survey or experiment and making deductions and inferences. It involves extracting important variables, deducting any anomalies and testing any underlying assumptions. It involves scrutinizing the required information and making inferences. Statistical data analysis divides the methods for analysing data into two categories, exploratory methods and confirmatory methods. Exploratory methods are used to discover what the data seems to be saying by using simple arithmetic and easy to draw pictures to summarise data. It is used mainly in qualitative research.

Confirmatory methods use ideas from probability theory in the attempt to answer specific questions. These methods are mainly applicable in quantitative research. The methods used in

data analysis are influenced by whether the research is qualitative or quantitative (Kombo and Tromp: 2014).

13.6 Qualitative Data Analysis

Qualitative data refers to non-numeric information such as interview transcripts, notes, video and audio recordings, images and text documents. Qualitative data analysis can be divided into the following five categories:

1. Content analysis. This refers to the process of categorizing verbal or behavioural data to classify, summarize and tabulate the data.

2. Narrative analysis. This method involves the reformulation of stories presented by respondents taking into account context of each case and different experiences of each respondent. In other words, narrative analysis is the revision of primary qualitative data by researcher.

3. Discourse analysis. A method of analysis of naturally occurring talk and all types of written text.

4. Framework analysis. This is more advanced method that consists of several stages such as familiarization, identifying a thematic framework, coding, charting, mapping and interpretation.

5. Grounded theory. This method of qualitative data analysis starts with an analysis of a single case to formulate a theory. Then, additional cases are examined to see if they contribute to the theory.

Qualitative data analysis can be conducted through the following three steps:

Step 1: Developing and Applying Codes. Coding can be explained as categorization of data. A 'code' can be a word or a short phrase that represents a theme or an idea. All codes need to be assigned meaningful titles. A wide range of non-quantifiable elements such as events, behaviours, activities, meanings etc. can be coded.

There are three types of coding:

1. *Open coding*. The initial organization of raw data to try to make sense of it.
2. *Axial coding*. Interconnecting and linking the categories of codes.
3. *Selective coding*. Formulating the story through connecting the categories.

Coding can be done manually or using qualitative data analysis software such as

NVivo, Atlas ti 6.0, HyperRESEARCH 2.8, Max QDA and others.

When using manual coding you can use folders, filing cabinets, wallets etc. to gather together materials that are examples of similar themes or analytic ideas. Manual method of coding in qualitative data analysis is rightly considered as labour-intensive, time-consuming and outdated.

In computer-based coding, on the other hand, physical files and cabinets are replaced with computer based directories and files. When choosing software for qualitative data analysis you need to consider a wide range of factors such as the type and amount of data you need to analyse, time required to master the software and cost considerations.

Moreover, it is important to get confirmation from your dissertation supervisor prior to application of any specific qualitative data analysis software.

The following table contains examples of research titles, elements to be coded and identification of relevant codes:

Table 1: elements of coding. (Source, Cooper 2008 data analysis)

Research title	***Elements to be coded***	***Codes***
Born or bred: revising The Great Man theory of leadership in the 21st century	Leadership practice	Born leaders Made leaders Leadership effectiveness
A study into advantages and disadvantages of various entry strategies to Chinese market	Market entry strategies	Wholly-owned subsidiaries Joint-ventures Franchising Exporting Licensing

Impacts of CSR programs and initiative on brand image: a case study of Coca-Cola Company UK.	Activities, phenomenon	Philanthropy Supporting charitable courses Ethical behaviour Brand awareness Brand value
An investigation into the ways of customer relationship management in mobile marketing environment	Tactics	Viral messages Customer retention Popularity of social networking sites

Qualitative data coding

Step 2: Identifying themes, patterns and relationships. Unlike quantitative methods, in qualitative data analysis there are no universally applicable techniques that can be applied to generate findings. Analytical and critical thinking skills of researcher plays significant role in data analysis in qualitative studies. Therefore, no qualitative study can be repeated to generate the same results.

Nevertheless, there is a set of techniques that you can use to identify common themes, patterns and relationships within responses of sample group members in relation to codes that have been specified in the previous stage.

Specifically, the most popular and effective methods of qualitative data interpretation include the following:

- ***Word and phrase repetitions*** – scanning primary data for words and phrases most commonly used by respondents, as well as, words and phrases used with unusual emotions;
- ***Primary and secondary data comparisons*** – comparing the findings of interview/focus group/observation/any other qualitative data collection method with the findings of literature review and discussing differences between them;

- ***Search for missing information*** – discussions about which aspects of the issue was not mentioned by respondents, although you expected them to be mentioned;
- ***Metaphors and analogues*** – comparing primary research findings to phenomena from a different area and discussing similarities and differences.

Step 3: Summarizing the data. At this last stage you need to link research findings to hypotheses or research aim and objectives. When writing data analysis chapter, you can use noteworthy quotations from the transcript in order to highlight major themes within findings and possible contradictions.

It is important to note that the process of qualitative data analysis described above is general and different types of qualitative studies may require slightly different methods of data analysis.

13.7 Quantitative Data Analysis

In quantitative data analysis you are expected to turn raw numbers into meaningful data through the application of rational and critical thinking. Quantitative data analysis may include the calculation of frequencies of variables and differences between variables. A quantitative approach is usually associated with finding evidence to either support or reject hypotheses you have formulated at the earlier stages of your research process.

The same figure within data set can be interpreted in many different ways; therefore, it is important to apply fair and careful judgement.

For example, questionnaire findings of a research titled "A study into the impacts of informal management-employee communication on the levels of employee motivation: a case study of Agro Bravo Enterprise" may indicate that the majority 52% of respondents assess communication skills of their immediate supervisors as inadequate.

This specific piece of primary data findings needs to be critically analyzed and objectively interpreted through comparing it to other findings within the framework of the same research. For example, organizational culture of Agro Bravo Enterprise, leadership style, the levels of frequency of management-employee communications need to be taken into account during the data analysis.

Moreover, literature review findings conducted at the earlier stages of the research process need to be referred to in order to reflect the viewpoints of other authors regarding the causes of

employee dissatisfaction with management communication. Also, secondary data needs to be integrated in data analysis in a logical and unbiased manner.

Let's take another example. You are writing a dissertation exploring the impacts of foreign direct investment (FDI) on the levels of economic growth in Vietnam using correlation quantitative data analysis method.

You have specified FDI and GDP as variables for your research and correlation tests produced correlation coefficient of 0.9.

In this case simply stating that there is a strong positive correlation between FDI and GDP would not suffice; you have to provide explanation about the manners in which the growth on the levels of FDI may contribute to the growth of GDP by referring to the findings of the literature review and applying your own critical and rational reasoning skills.

A set of analytical software can be used to assist with analysis of quantitative data. The following table illustrates the advantages and disadvantages of three popular quantitative data analysis software: Microsoft Excel, Microsoft Access and SPSS.

Table 2: Advantages and disadvantages data analysis software. (Source, Cooper 2008 data analysis).

	Advantages	**Disadvantages**
Excel Spreadsheet	Cost effective or Free of Charge Can be sent as e-mail attachments & viewed by most smartphones All in one program Excel files can be secured by a password	Big Excel files may run slowly Numbers of rows and columns are limited Advanced analysis functions are time consuming to be learned by beginners Virus vulnerability through macros
Microsoft Access	One of the cheapest amongst premium programs	Difficult in dealing with large database Low level of interactivity

	Flexible information retrieval Ease of use	Remote use requires installation of the same version of Microsoft Access
SPSS	Broad coverage of formulas and statistical routines Data files can be imported through other programs Annually updated to increase sophistication	Expensive cost Limited license duration Confusion among the different versions due to regular update

Advantages and disadvantages of popular quantitative analytical software

Quantitative data analysis with the application of statistical software consists of the following stage:

1. Preparing and checking the data. Input of data into computer.
2. Selecting the most appropriate tables and diagrams to use according to your research objectives.
3. Selecting the most appropriate statistics to describe your data.
4. Selecting the most appropriate statistics to examine relationships and trends in your data.

It is important to note that while the application of various statistical software and programs are invaluable to avoid drawing charts by hand or undertake calculations manually, it is easy to use them incorrectly. In other words, quantitative data analysis is "a field where it is not at all difficult to carry out an analysis which is simply wrong, or inappropriate for your data or purposes. And the negative side of readily available specialist statistical software is that it becomes that much easier to generate elegantly presented incorrect information.

Therefore, it is important for you to seek advice from your dissertation supervisor regarding statistical analyses in general and the choice and application of statistical software in particular.

13.8 Data presentation

There are three ways that researchers can present data after analysis. These are:

1. Using statistical techniques
2. Using graphical techniques
3. Using a combination of both 1 and 2.

13.9 Statistical techniques

Statistical techniques are a set of mathematical methods used to extract and clarify information from observed data. Statistics generate simple numbers to describe distributions, either grouped or ungrouped. Statistics is a basic tool of measurement, evaluation and research. Statistics have two major functions in data presentation. They can add to our understanding of the data that make up the distribution and they can substitute for the distribution. A sample statistic is any numerical value describing a characteristic of a sample.

The following are some of the statistical techniques used to present analysed data:

13.9.1 Frequency distribution

The values in a set of ungrouped data constitute a distribution. The values that we have in a set of ordinal data and the values we generate by converting ungrouped data into grouped form, constitute a frequency distribution.

13.9.2 Measure of central tendency

Measure of central tendency are numbers that define the location of a distribution's centre. For example, if we regard all measurements as being attempts to give us the 'true' value of a particular phenomenon, we can regard the centre of the distribution of a set of measurements an estimate of that 'true' value.

Mean: is the average. It is the arithmetic average of a set of scores. It is found by the sum total dived by the number.

Median: It is a set of ungrouped data. If the data is arranged in ascending or descending order, in general, the median is the value that has half of the data less than it, and half greater than it. If the sample size (n) is an old number, the median is the middle value of the entire distribution. If (n) is an even number, the median is the mean of the two 'middle' values.

Mode: This is the value that occurs most often. It is possible to have no mode, this is no value occurs more than once. Most frequently occurring score in a set of scores. It is possible to have more than one mode. A distribution may be bimodal, trimodal or multi-modal.

13.9.2 Measures of dispersion

This type of statistic describes how much the distribution varies around the central point. We can describe this spread as measures of dispersion. These measures quantify the variability of the distribution.

Range: This is the lowest and highest scores in a set of scores. The simplest measure of dispersion of data. The difference between the highest and the lowest values in the data (maximum/minimum).

Variance: It is the standard deviation squared. It is the measure that indicates the distribution of data. The idea is that each observation differs from the mean by some amount which is referred to as the difference from the mean.

Standard deviation: This is the square root of the variance. It is the approximate average amount by which each score in a set of scores differs from the mean.

Coefficient of variability: this is calculated by expressing the standard deviation as a percentage of the mean.

13.9.3 Graphical techniques

This is where grouped data is presented in form of a table, the information can also be represented diagrammatically. Data can be graphically presented by a histogram or polygon.

Histogram- this can be shown as a series of vertical or horizontal bars, their length indicating the frequency of the particular class.

Polygon- Data can also presented as polygons. The polygon is closed by connecting the midpoint of the end class to the mid-points of ‘imaginary’ classes of each side, which have a notional frequency of zero.

Bars- The cumulative frequency distribution can also be plotted as a series of bars or lines joining the midpoints of the classes.

Pie chart- A pie chart can also be used for presenting results.

13.10 Terminologies

1. Data analysis is a process of examining what has been collected so inferences can be made.

Statistical techniquie: are a set of mathematic method used to extract and clarify information from observed data.

13.11 Activity

1. Define mean, mode and range.
2. Distinguish between qualitative and quantitative data analysis research.
3. Briefly explain what is involved in causal-comparative research and experimental research.

13.12 Reflection

What do you think is the best way of analysing data from correlation studies?

13.13 Summary

In this study you have learnt about various ways of analysing data. You have also learnt about how to present data after analysis. Statistical techniques used in data analysis have also been discussed. We believe by this time your are able to analyse you own data.

REFERENCES

Prescribed readings

John, W. Best, and James, V. Kahn, (1989). *Research in Education*. New Jersey: Prentice Hall.

Kombo, D.K. and Tromp, D.E.A. (2014). *Proposal and Thesis Writing: An Introduction*. Nairobi: Paulines Publications Africa.

Thomas, K. Crowl, (199). *Fundamentals of Educational Research*. Australia: Brown and Benchmark.

RECOMMENDED READINGS

Creswell, J. W . (2011*). Controversies in mixed methods research*. In N. Denzin & Y . Lincoln (Eds.), *The SAGE handbook on qualitative research* (4th ed., pp. 269–284). Thousand Oaks, CA: Sage.

Creswell, J. W . (2012*). Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Upper Saddle River, NJ: Merrill.

Creswell, J. W . (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Thousand Oaks, CA: Sage.

J. W ., & Miller, D. (2000). *Determining validity in qualitative inquiry*. Theory Into Practice, 39(3), 124–130.

Creswell, J. W ., & Plano Clark, V . L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.

Denzin, N. K., & Lincoln, Y . S. (Eds.). (2011). *The SAGE handbook of qualitative research* (4th ed.). Thousand Oaks, CA: Sage.