

MODULE 4

RESEARCH METHODOLOGY.

SAMUEL I. AKINSEINDE

INTRODUCTION

Research is a vital tool for development because the result of research can be used for improving the system. Basically, research is regarded as a diligent search or inquiry. It may involve scientific investigation and study in order to discover facts about basic processes in nature. Educational research is a systematic observation of events in education in order to establish new idea or knowledge that is directly useful in education practices. Research in education has shown positive results in some of the educational practices. These include (1) innovative curricula, (2) influence of home environment on reading mathematics and intelligence; (3) understanding of attitude of students and teachers and (4) influence of time on learning.

There are different ways of classifying research studies. One approach is to classify educational research in terms of the methods used to carry the research. In this case, educational research will be classified into (1) Historical, (2) Experimental and (3) Descriptive research. Despite the classification, research studies have common procedure such as (1) statement of the problem (2) data collection, (3) analysis of data and (4) drawing necessary conclusions based on the analysis of the data.

OBJECTIVES

This module describes historical, experimental and survey research. The methods of research design will be discussed further in module five. After reading this chapter, you should be able to:

- describe appropriate method of carrying out research studies;

- define and state the major characteristics of historical research,
- state major difference between correlational and developmental research and
- state the purpose of descriptive research.

HOW TO STUDY THE MODULE

- Read step-by-step the research methods as discussed.
- Formulate topics on each method.
- Read the module in conjunction with module five.

WORD STUDY.

Historical research: It involves studying, understanding and explaining what happened in the past. It predicts future.

Experimental research: It establishes cause-effect relationship. It investigates the effect of an independent variable on a dependent variable.

Descriptive Research: A research that is concerned with the collection of data in order to answer the question about the current status of the subject of the study.

HISTORICAL RESEARCH

This type of research is concerned with past events. It involves studying, understanding and explaining what happened in the past with a view to relate it to the present or use it as a basis for predicting the future,. There are typical research studies that can be better conducted using historical research method. Some educational problems that relate to policies, cultural practices and religious beliefs can be better understood based on past experiences. The procedure for conducting historical research is similar to other types of research which involve the definition of the problem, research questions, hypotheses, data collection and evaluation of data. The research method requires gathering data from primary and secondary sources. However, primary sources are more preferred and reliable for historical research studies. Elements of historical research include but not limited to the following:

- factors that lead to a particular situation;
- the trends on specific subject matter such as the development of an educational programme and
- effects of decision taken on a matter.

The researcher is to discover what happened in the past by considering aspects of the elements enumerated above and tests the accuracy and authenticity of the observations and reports made by the historians. Historical research in education differs from other types of educational research in that the researcher cannot manipulate or control any of the variables. Instead, necessary information can be obtained through written or printed materials or documents such as diaries, letters, manuscripts, reports, newspapers, legal records and compilation of numerical data. Historical researcher can obtain information by conducting interviews for those who witnessed an event of historical significance. Examples of historical research topics are as shown below:

- * Origin and Development of Vocational Education in Nigeria.
- * Home Economics: Trends and Development, 1952 - 2000.
- * Teacher Training in Agriculture in Nigeria.
- * Fifty years of Progress in Vocational and Technical Education in Nigeria.

The historical researcher should adequately investigate available data and write-up on the events of the past, and objectively evaluate all evidences before arriving at the conclusion that can be defended successfully.

EXPERIMENTAL RESEARCH

Experimental research involves group comparison. It attempts to establish cause-effect relationship. The "cause" (independent variable) is referred to as a treatment while the effect (or the dependent variable) is the difference that is to occur or not occur. The "cause" is manipulated.

Experimental research investigates the effect of an independent variable on a dependent variable. In an experimental study, the researcher manipulates an independent variable and observes the effect of the manipulation on the dependent variable. It is expected that the researcher will carefully manipulate the variable, observe, and measure the results.

A peculiar aspect of experimental research is the selection of the groups to be studied. The groups to be studied are randomly formed or selected before the experiment is conducted. The researcher is expected to define the population and draw a representative sample. The use of proper sampling technique makes it possible to generalise the result of

the findings to larger population. In order to have a reliable result, there must be precise measurement using appropriate tools. Besides, one must establish suitable research control to avoid personal biases and extraneous variables.

Educational problems can be studied using experimental method to establish the results which would be regarded as convincing enough. Experimental research topics in education may take the following forms.

- * The effect of varying the sequence of learning activities in beginning typewriting.
- * The effect of level of aspiration upon the learning of skills.
- * An experimental comparison of un-guided and guided discovery methods of teaching "Basic Technology" principles and skills.

In order to conduct these experiments under the classroom conditions, the methods of the study must be clearly stated showing the (1) control, (2) manipulation and (3) observation. A study that involves the effects of two methods of teaching "Basic Technology" will comprise of two groups of pupils. They should be similar with respect to class level, entry qualification, motivation, use of laboratory facilities and reading ability. A study on the relationship between teaching method (independent variable) and the learning of Technology Principles (dependent variable), will involve group A and group B. Group A will be taught Technology Principles using un-guided discovery method while group B will be taught the same content using guided discovery method. The achievement of the two groups in Basic Technology can be compared and results recorded for discussion.

DESCRIPTIVE RESEARCH

Descriptive research is concerned with collecting data in order to answer questions or to test hypothesis about the current status of the subject of the study. This may be a particular situation or phenomenon. It is a widely used research method for assessing attitudes or opinions toward programme, individuals, organisation or events.

Descriptive study requires the development of an instrument. Descriptive data can be collected through survey questionnaire, interview, observation or standardized attitude scale. The survey questionnaire, involves probing in order to describe a situation that exists at a particular time or period. The interview is an oral

investigation that can produce data which is not possible with a questionnaire. This is appropriate when the questions demand information that are personal in nature or cannot be properly structured into a scaled format. The observation technique enables the investigator to collect data by observing naturally occurring behaviour. Instrument for data collection are usually developed for specific studies. It may involve drawing a sample of students, teachers, school buildings, text-books for study. The sample's response is then converted to data for analysis.

The following steps can serve as a guide for starting a descriptive study.

- Define the problem and state its hypothesis.
- Identify the assumptions of the study.
- Examine the particular situation.
- Define the population.
- Select the sample from the population.
- Construct or adapt instrument for collecting data.
- Validate the instrument.
- Administer the questionnaire or conduct the interview.

The problem with this type of research is that some of the subjects who are expected to return the questionnaires may fail to return them. This is the cause of a low response rate. This makes it difficult if not impossible to draw valid conclusions. On the other hand, some subjects will not honour interview schedule. This makes it impossible to conduct the interview and collect information needed for the study. Several types of studies may be classified as descriptive research. These are: (1) surveys, (2) developmental studies, (3) correlation studies. These are discussed briefly below.

Surveys

Surveys usually seek information for solving educational problems. Most surveys are used for describing existing condition, evaluating programme effectiveness or comparing existing conditions with standard criteria. When a survey covers a portion of the population which represents all relevant sub-groups in the population, it is known as a sample survey. The researcher must consider the sample size to be studied in order to obtain representative of the population. This can be achieved

using appropriate sampling technique such as a simple-random or stratified random sample. When the survey covers the entire population, it is referred to as a Census. A census survey is appropriate when the population is relatively small and readily accessible.

Surveys may be conducted to measure achievement, opinion, sociological or psychological constructs. Generally, survey research focuses on people, their beliefs, opinions, attitudes, motivation and behaviour (Gay, 1981; Osuala, 1985).

Developmental Studies.

Developmental studies are concerned with how some characteristics or behaviour variables of a given population change over time. These characteristics may change at different levels of age, maturation or growth. There are two techniques for investigating developmental studies. These are: (1) Longitudinal method and (2) the Cross-sectional method.

Longitudinal studies investigate developmental changes in the same group of people or subjects over a period of time. In this case, the same group of children is studied within a period of time as they progress from one grade level to another with respect to those characteristics under observation in the study. This approach enables the researcher(s) to study the developmental patterns such as intelligence or skill development of a group of primary school pupils from one grade level to another. Thereafter, the data collected are analysed on relevant variables. An example of longitudinal study is that of Piaget's work on cognitive development. An advantage of longitudinal method is that it involves the same group at each level.

The Cross-sectional approach involves the study of different children at various stages of development at the same time. Specifically, children of varying ages can be sampled and studied at the same time. Effort must be made to ensure that sample selected represents children at their level so that the findings can be generalisable. The advantage of the cross-sectional approach over the longitudinal methods is that larger samples can be studied.

Correlational Studies

Correlation research is for establishing the extent of relationship or association between two or more variables. Such relationships can be used to make predictions on an existing condition and that the variables are related, dependent or correlated. The method is to collect two or

more sets of scores on a sample of subjects and compute the coefficient of correlation between the sets of scores. The degree of relationship is expressed as a correlation coefficient. If the variables are highly related, a correlation coefficient which is close to 1.00 will be obtained. If the variables are not related, the coefficient will be close to .00. Where there is positive correlation, an increase in one variable causes an increase in the other. However, a negative correlation (such as - 1.00) indicates an inverse relationship. This implies that a high score on one variable will cause a low score on the other variable.

In this type of study, the most commonly used correlation technique is the Pearson Product Moment (i.e. Pearson r). This type of correlation coefficient is appropriate when both variables to be correlated use interval or ratio scale. If both variables used ordinal scale or are expressed as ranks, the Spearman rank order correlation coefficient is appropriate. Other correlation techniques which are not often used are Point Biserial, Tetrachoric and Phi coefficient.

Genuine and artificial dichotomies are used for dividing the variables of these group into scale. The artificial dichotomy refers to test scores which are divided into **Pass** and **Fail** (using cut off point) while the genuine dichotomy use **male** and **female** (or **dead** and **alive**).

Assignment.

1. Examine the following research titles and state the type of research design that is appropriate for each title (e.g. Experimental, Survey, correlational, development or historical research).
 - (a) Personality and school factors that influence students attitude to the school counsellor in secondary schools.
 - (b) The relationship of size of Elementary schools to operational cost and programme quality.
 - (c) A comparative study of the effectiveness of science instruction in the Junior Secondary School using two different teaching methods.
 - (d) A study of the role perceptions of Secretaries in Local Education Authority and Headmasters in Delta State.
 - (e) A study of the interactions of attitudes and values of Secondary School Principals and their staff.
 - (f) Performance evaluation of the State Primary Education Board

- (SPEB) in the Administration of Primary Education in Delta State.
- (g) An evaluation of a Team Method of teaching Secondary School Physics to academically talented studies.
 - (h) Contributions of Sociology and Anthropology to Education.
 - (i) A study of the current content of Technical Education courses in Nigeria Colleges of Education - Technical.
 - (j) The development and validation of a Physics Achievement Test.
 - (k) A study of the Student Personnel Services at the Delta State University, Abraka.
 - (l) The relation of students' needs to their perception of a University environment.
2. Identify independent and dependent variables in each of the research titles listed above.